M

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45˚/66°/70°/75° Lead Angle

Lead Angle	Applications / Shape	Facing	Chamfering
45°	**MB45** M14~M17	• Delivers the low cutting force benefits of positive inserts and the fracture resistance benefits of negative inserts • Provides excellent surface finish • Available for steel, stainless steel, cast iron, aluminum alloys, and heat-resistant alloys	
45°	**MFPN45** M22~M27	• 10-edge pentagonal inserts (double-sided) • Low cutting force with helical cutting-edge design • Dual cutting edge design (High toughness) • Weldon and cylindrical shanks available	

Lead Angle	Applications / Shape	Facing	Chamfering
45°	**MFSE45** With Wiper Insert M40	• 10-edge pentagonal inserts (double-sided) • Low cutting force with helical cutting-edge design • Dual cutting edge design (High toughness) • End mills have ø32mm cylindrical shank	
45°	**MFLN45** M46	• For heavy milling • Tough 4-edge vertical inserts • For large depths of cut and high feed rates • Max. D.O.C. 12 mm	

Lead Angle	Applications / Shape	Facing
66°	**MFPN66** M33~M35	• Double-sided 10-edge insert • Cutting edge angle 66˚ • Reduces chattering with low cutting force design • End mills have ø32mm, ø40mm cylindrical shank
75°	**MSRS15** M63~M64	• For heavy milling • Max. D.O.C. 12 mm • High chip evacuation rate per unit

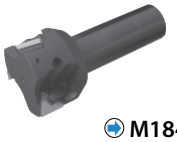
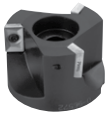
Lead Angle	Applications / Shape	Facing
70°	**MFLN70** M47	• For heavy milling • Tough 4-edge vertical inserts • For large depths of cut and high feed rates • Max. D.O.C. 17 mm
70°	**MFK** M52~M54	• High efficiency multi-edge cutter for cast iron • 10-edge pentagonal inserts (double-sided) • Low cutting force with helical cutting-edge design Improved surface finish, minimizing chattering and prevented burr formation • Dual cutting edge design (High toughness)
70°	**MFK-SF** M56	• For cast iron • Adjustable cutting edge height • High speed and high precision machining of cast iron by combining ceramic insert and CBN wiper insert

88˚/90˚ Lead Angle (Double-sided insert)

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
90°	**MA90** M72~M75	• Economical double-sided 4-edge insert • Obtuse edge increases cutting edge toughness • Smooth surface wall with low cutting force and reduced chattering		
	MA90 Modular Head M76			
	MEW M84~M89	• Economical double-sided 4-edge insert • Obtuse edge increases cutting edge toughness • Smooth surface wall with low cutting force and reduced chattering		
	MEW Modular Head M90			

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
90°	**MFWN** M144~M148	• Economical double-sided 6-edge insert • Superior fracture resistance with thick edge design • "Large slant edge" design reduces shock when cutting edge enters the workpiece • Low cutting force and reduce chattering • End mills have weldon or cylindrical shanks		
90°	**MFWN Mini** M153~M154	• Can be used up to 5 mm D.O.C. • Good cost performance • Economical double-sided 6-edge insert • Superior fracture resistance with thick edge design • "Large slant edge" design reduces shock when cutting edge enters the workpiece • Low cutting force and reduce chattering		
88°	**MFSN88** M159~M161	• Economical double-sided 8-edge insert • Reduces chattering with low cutting force design • Contribute to cost-cutting for Shoulder Roughing • End mills have ø32mm, ø40mm cylindrical shank		

90° Lead

Lead Angle	Applications / Shape	Facing	Shouldering	Slotting
90°	**MEC** M96~M102	• Good squareness • Low cutting force • The silver coating prevents chip wear on the tool body • With coolant hole (Over shank size ø16) • The twisted cutting edge improves cutting performance • Smooth surface of shoulder wall		
	MEC Modular Head M103			
	MECX M112~M113	• Good squareness • Small size insert with multi-edge specification • Recommended for small machines: low cutting force and high strength design • The silver coating prevents chip wear on the tool body • With coolant hole		
	MTP90  M184	• Medium to roughing of steel / cast iron • For small machines and M/C		
	EM M190	• Extended length end mills		
	EM-LE M191	• Long edge end mill		
	FM-90  M192	• Fixed pocket face mills		

Lead Angle	Applications / Shape	Facing	Shouldering	Slotting
90°	**MEV** M120~M122	• Newly developed vertical triangle inserts • Economical 3-edge insert • The MEV can perform a wide variety of machining processes		
	MEV Modular Head M122			
	DMC-H M187	• High Rake • For small milling machine and M/C		
	DMC-SX M186	• For small milling machine and M/C		

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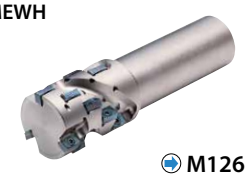
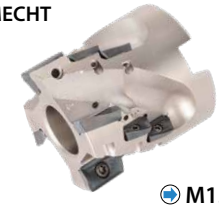
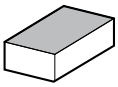
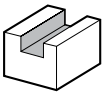
90˚ Lead (Heavy Milling)

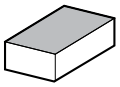
Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
90°(Long cutting edge)	**MEWH**  M126	• Low cutting force and sharp cutting performance • Excellent surface finish quality • Economical double-sided 4-edge insert • High quality and stable machining with heavy milling		
	MEWH Shell Mill M127	• MEWH shell mill		
	MSRS90 M172~M173	• High efficiency, low cutting force and stable machining without chatter • Various expansive possibilities with combining neutral insert and custom-ordered cutter		
	MSR M178~M179	• Low cutting force and restrain chattering with notched insert • Chipbreaker design with specialized notches improves chip evacuation • Chipbreaker achieves stabilized machining for heavy milling		
	MFLN90 M166	• For heavy milling • Tough 4-edge vertical inserts • For large depths of cut and high feed rates • Max. ap 20 mm • Chamfered corner type available • Prevents chattering and insert fracturing		

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
90°(Long cutting edge)	**MECH** M130	• Notched insert improves higher productivity		
	MECH Shell Mill M131	• MECH shell mill		
	MECHT  M139	• Excellent chattering resistance and good chip control with special design for titanium alloys • End mills have ø32mm, cylindrical shank		

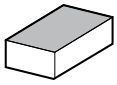
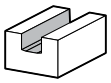
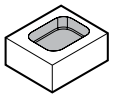
90° Lead (for Aluminum Alloys)

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
				
	MFAH M196~M197	• High efficiency super-fine pitch milling cutter for finishing aluminum alloys • Light-weight aluminum body with internal coolant available or choose a Steel body • Adjustable cutting edge height • 3 different cutting edge design		
90°	**MFAH** M202~M204	• High efficiency milling cutter for finishing aluminum alloys • Light-weight hybrid body with internal coolant available/Steel body • Adjustable cutting edge height • 3 different cutting edge design		
	MEAS M212	• High efficiency milling cutter for finishing aluminum alloys • Excellent scatter prevention to ensure stable		
	FM-AL M216	• Aluminum cutting face mills • Fixed pocket		
	EM-AL M216	• Aluminum cutting end mills • Fixed pocket		

For Finishing Operations

Shape \ Applications	Facing
	
MFF M221	• High-Quality surface finish • Molded wiper insert • Cutter body design provides excellent reliability • Easy-to-adjust cutting edge

High Feed Cutters

Shape \ Applications	Facing	Shouldering	Slotting	Pocketing	Cutting Diameter DCX
					Ø0.375" Ø0.625" Ø0.5" Ø1" Ø1.5" Ø2" Ø2.5" Ø3" Ø4" Ø5" Ø6"

MFH-RAPTOR (Face Mill)
M225~M227

- Various applications with 4 types of inserts

GM Type
(General purpose)

GH Type
(Tough edge)

LD Type
(Large D.O.C.) MAX. D.O.C. = 5mm

FL Type
(With wiper edge)
Roughing and finishing

Ø2" Ø6"
Ø50mm Ø160mm

MFH-RAPTOR (End Mill)
M229~M231

Ø1" Ø1.5"
Ø25mm Ø80mm

MFH-RAPTOR (Modular Head)
M232

- 3D convex cutting edge reduces shock of biting workpiece
- Multi-functional cutter for ramping, helical milling vertical milling (plunging) etc. (GM/GH type)

Ø25mm Ø40mm
Ø0.375" Ø0.625" Ø0.5" Ø1" Ø1.5" Ø2" Ø2.5" Ø3" Ø4" Ø5" Ø6"

MFH-MAX (Face Mill)
M242

- Economical double-sided 4-edge insert
- High feed milling with large depth of cut capabilities

GM Type
(General Purpose)

Ø1" Ø1.25"
Ø25mm Ø40mm

MFH-MAX (End Mill)
M241

- Achieves high efficiency machining in various shouldering, slotting, helical milling, and ramping applications

Ø1.5" Ø3"
Ø40mm Ø80mm

MFH-MAX (Modular Head)
M243

Ø1" Ø1.25"
Ø22mm Ø42mm

MFH-Mini (Face Mill)
M249

- Economical double-sided 4-edge insert

GM type
(General purpose)

GH type
(Tough edge)

Ø0.625" Ø1.25"
Ø16mm Ø32mm

MFH-Mini (End Mill)
M248

- High efficiency and high feed machining at small dia. machining and small machining center

Ø1.5" Ø2"
Ø40mm Ø50mm

MFH-Mini (Modular Head)
M250

Ø0.625" Ø1.25"
Ø16mm Ø32mm

MFH-Micro (End Mill)
M255

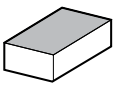
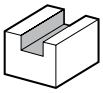
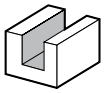
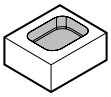
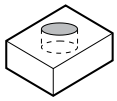
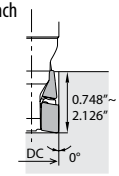
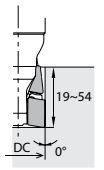
- Micro diameter cutter for high feed machining
- High efficiency machining with low cutting force and reduced chattering

Ø0.375" Ø0.625"
Ø8mm Ø16mm

MFH-Micro (Modular Head)
M256

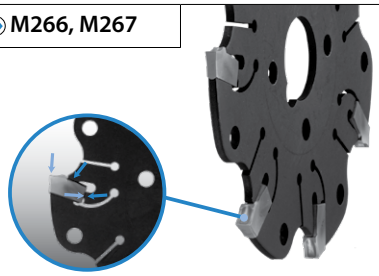
Ø0.500" Ø0.625"
Ø8mm Ø16mm

Multi-Functional End Mills

Applications / Shape	Facing	Shouldering	Slotting	Deep slotting	Pocketing	Drilling	Lead Angle and Max. D.O.C.	Cutting Diameter DC
								ø0.5 ø1 ø2
MEY **M260~M261**	• Multi-function machining (Drilling/Ramping/ Shouldering/Grooving) • High efficiency mold machining • Low cutting force, Good chip evacuation		• Full 2-insert structure and high stability • Good chip control when Ramping		• Cutting diameters that are larger than the shank diameters enables wall shouldering • The silver coating prevents chip wear on the tool body		Inch 	Inch ø0.630" ø1.984" ø16 ø25 ø50
							mm 	mm ø16mm ø50mm

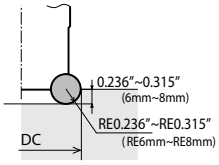
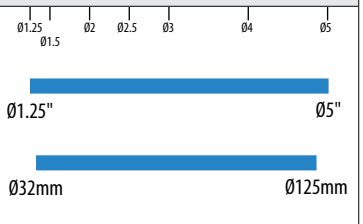
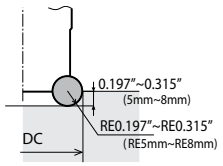
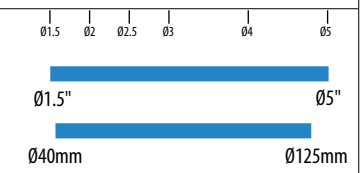
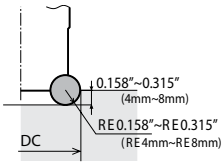
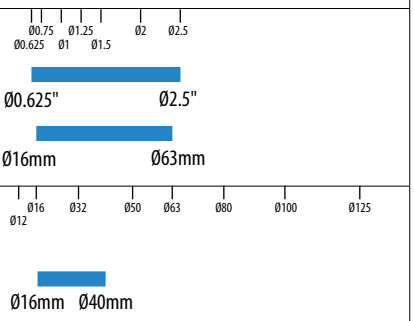
Slot Mill MSTA

M266, M267

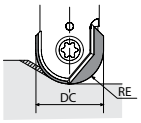
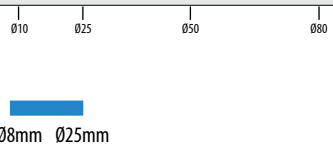
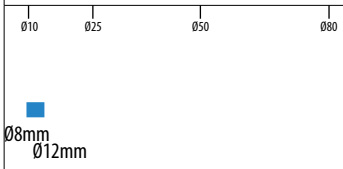


- Self-clamping type
- Remove insert with appropriate wrench

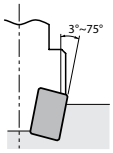
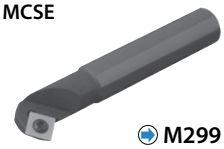
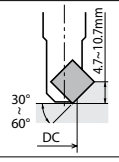
Radius

Applications / Shape	Facing	Shouldering	Pocketing	Lead Angle and Max. D.O.C.	Cutting Diameter DC
MRW Face Mill/End Mill M276~M280	• High efficiency radius cutter with double-sided insert • Combine sharpness and cutting edge strength (A.R. Max. +12˚) • Prevent insert rotation during machining with flat lock structure • Wide application range from steel to heat-resistant alloys				
MRX Face Mill M285~M286	• Low cutting force and high performance radius cutter • Low cutting force with helical cutting-edge design (A.R. Max. +10˚) • Prevent insert rotation during machining with flat lock structure • Wide application from facing, grooving, pocketing to plunging • Wide application range from steel to heat-resistant alloys				
MRX End Mill M288~M297					
MRX head (Modular Head) M290					

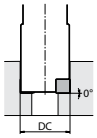
Ball-nose end mill

Applications / Shape	Contouring/Profiling	Pocketing	Lead Angle and Max. D.O.C.	Cutting Diameter DC
MRF M270	• For high quality mold finishing • High R-accuracy (Insert's R-accuracy: ±0.01mm or under) • The bushing ensures insert installation accuracy			
MRFW M271	• Carbide shank • For high quality mold finishing • High R-accuracy (Insert's R-accuracy: ±0.01mm or under) • The bushing ensures insert installation accuracy • Superior to anti vibration, and stable machining is possible with long overhang length without chattering			

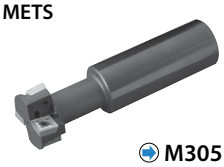
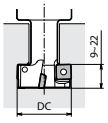
Chamfering

Shape \ Applications	Chamfering	Back Chamfering	V Shape Slotting	Countersinking	Lead Angle and Max. D.O.C.
CM / CM-AL M298	• Chamfering angles 3°-75° • CM-AL for aluminum cutting				
MCSE  M299	• For 30˚, 45˚, 60˚ chamfering • Economical 4-edge insert • Available back chamfering				

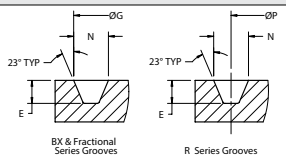
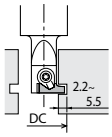
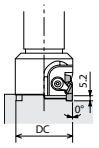
Bolt Countersinking

Shape \ Applications	Bolt Countersinking	Facing	Shouldering	Lead Angle and Max. D.O.C.
MEF M302	• Countersink for hexagon socket bolt (M6 ~ M30) • Economical 4-edge insert			

T-Slotting

Shape \ Applications	T-Slotting	Back Side Milling	Lead Angle and Max. D.O.C.
METS  M305	• T-Slotting • Recommended for high feed machining with 2 flute design • Economical 4-edge insert		

Grooving

Shape \ Applications	Internal Grooving	Ring Grooving	API Ring Grooving	Lead Angle and Max. D.O.C.
API M312			• The most economical and reliable tool to produce API ring grooves for the oil, gas, and petrochemical industries	
MGI M308	• Edge Width 1.0 ~ 4.0mm • Grooving for M/C			
MVG M310		• Cutting dia. ø30 ~ ø75mm • Edge width 4.0 ~ 4.9mm • O-Ring grooving (G Series)		

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Milling Insert Identification System

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

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

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

Relief Angle

Symbol (Class)	Tolerance					
	Corner Height		Thickness		I.C. Size	
	ANSI (±inch)	ISO (±mm)	ANSI (±inch)	ISO (±mm)	ANSI (±inch)	ISO (±mm)
A	0.0002	0.005	0.0010	0.025	0.0010	0.025
F					0.0005	0.013
C	0.0005	0.013			0.0010	0.025
H					0.0005	0.013
E	0.0010	0.025	0.0010	0.025	0.0010	0.025
G			0.0050	0.130		
J	0.0002	0.005	0.0010	0.025	0.002~0.006	0.05~0.15
K*	0.0005	0.013				
L*	0.0010	0.025				
M*	0.003~0.007	0.080~0.180	0.0050	0.130		
N*			0.0010	0.025		
U*	0.005~0.015	0.130~0.380	0.0050	0.130	0.003~0.009	0.08~0.25
R	Blank with grind stock on all surfaces					
S	Blank with grind stock on top and bottom surface only					

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

Tolerance

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

I.C. Size (ANSI)

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

Cutting Point

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

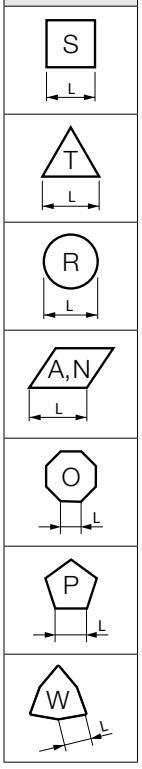
Edge Preparation

ANSI (inch): S E K N 4 2 A F T N

ISO (metric): S E K N 12 03 A F T N

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

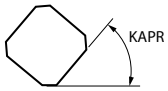
Edge Length Symbol (ISO)



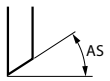
Thickness			
ISO		ANSI	
Thickness (mm)	Symbol	Thickness (inch)	Symbol
1.59	01	1/16	1
1.98	T1	5/64	1.2
2.38	02	3/32	1.5
2.78	T2	-	-
3.18	03	1/8	2
3.97	T3	5/32	2.5
4.76	04	3/16	3
5.56	05	7/32	3.5
6.35	06	1/4	4
7.94	07	5/16	5
9.525	09	3/8	6

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

Cutting Edge Angle	
Symbol	Cutting Edge Angle
A	45°
D	60°
E	75°
F	85°
H	87°
P	90°
X	65°



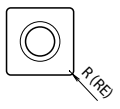
Relief Angle	
Symbol	Relief Angle
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
R	10°
S	14°
T	22°
U	23°



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

Manufacturer's Option
Chipbreaker, etc.

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



45° General Purpose Milling Series

MB45

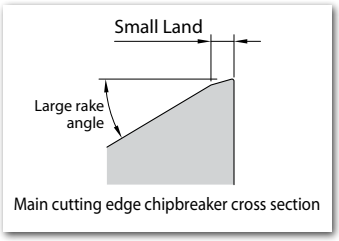
Delivers the low cutting force benefits of positive inserts and the fracture resistance benefits of negative inserts, and provides excellent surface finish

1 Large insert lineup for a wide variety of machining applications

Five insert designs for various machining applications
Economical inserts with 8 cutting edges
General purpose GM insert with E-Class and M-Class options based on required machining accuracy

SM
(E Class) - Low Cutting Force

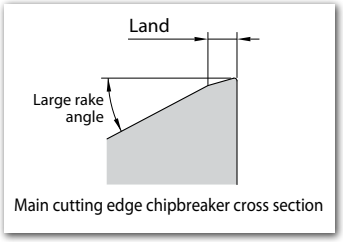
Sharpness oriented with a low cutting force design
-10% cutting resistance compared to general purpose GM insert
Recommended for small machines (BT30)



Main cutting edge chipbreaker cross section

GM
(E/M Class) - General Purpose

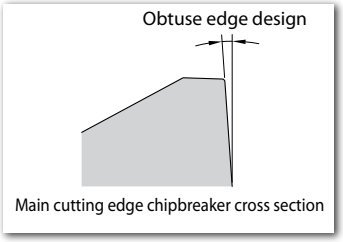
1st recommendation for steel machining
Low cutting force and fracture resistance
E-Class or M-Class options



Main cutting edge chipbreaker cross section

GH
(M Class) - Tough Edge

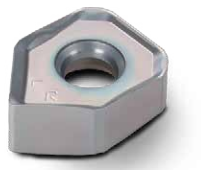
Tough cutting edge and excellent fracture resistance
Obtuse edge design is resistant to chipping
Recommended for intermittent machining



Main cutting edge chipbreaker cross section

W
(E-Class) Wiper Insert

Ultra-long wiper edge (Wiper edge length approx. 8 mm)


* Double-sided 2-edge insert

When to use GM (Class E/M)

Selection by Machining Application

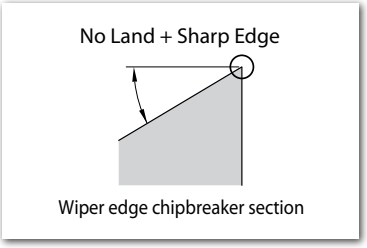
Surface roughness oriented: **GM** (E-Class)
Cost-effective and surface finish oriented: **GM** (M-Class)
Efficiency and surface roughness oriented: **W** (E-Class)

Criteria	GM (E-Class)	GM (M-Class)	W (E-Class) * Wiper
Tolerance	Inscribed Circle Tolerance ±0.0005"	Inscribed Circle Tolerance ±0.0020"	Inscribed Circle Tolerance ±0.0005"
Surface Finish	○ Approx. 1.6μmRa	△ Approx. 3.2μmRa	◎ Approx. 0.8μmRa or less
(Gloss)	(○)	(◎)	(◎)
Machining Efficiency	○	○	◎
Economy	○	◎	△

*Surface finish is based on internal assessment and varies depending on the machining environment

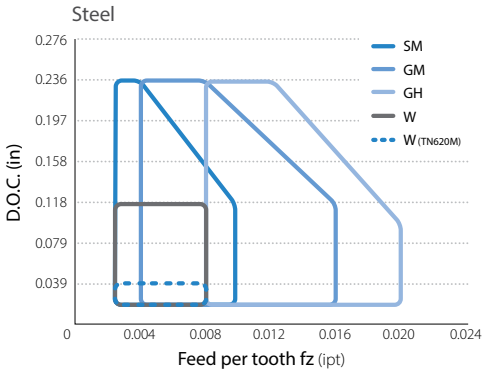
AM
for Aluminum Alloys

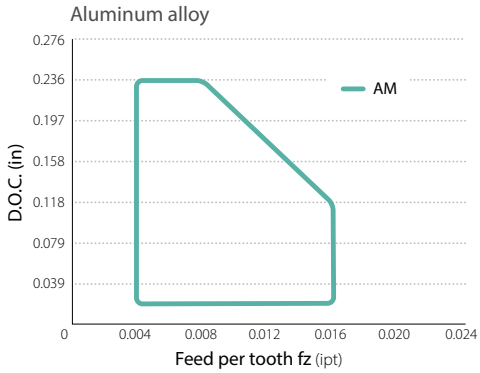
No Land + Sharp Edge Specifications
Excellent sharpness



Wiper edge chipbreaker section

Applicable Insert Range





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2 7 insert grades available for steel, stainless steel, cast iron, heat-resistant alloys, and aluminum

For steel, stainless steel and cast iron

PR1825/PR1835/PR1810 New development MEGACOAT NANO EX

For hardened material

PR015S MEGACOAT HARD PVD coating

For steel Surface finish oriented

TN620M Cermet

For stainless steel and heat-resistant alloys

CA6535 CVD coating

For aluminum machining

PDL025 DLC coating

GW25 Non-coated Carbide

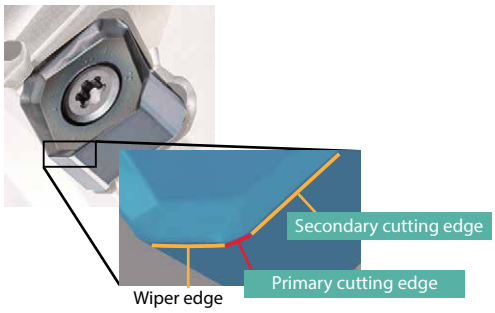
3 Low cutting force design with excellent fracture resistance and superior surface finish

Low cutting force and excellent fracture resistance

A unique helical cutting edge

A.R. Ensures a maximum of 13° and suppresses chatter with low cutting force.

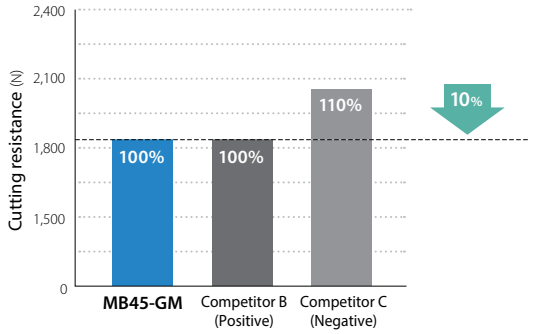
Double edge structure



Primary cutting edge generates thin chips
Reduces impact load and greatly reduces vibration when exiting the part

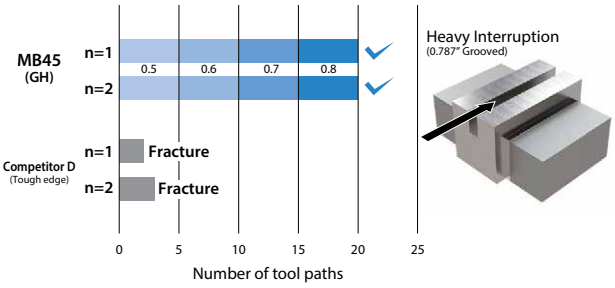
Unique helical cutting edge and double-edge structure

Cutting resistance comparison (Internal evaluation)



Cutting Conditions: Vc = 590 sfm, D.O.C. = 0.118", ae/DC = 80 % Center Cut, fz = 0.012 ipt, Workpiece: 1049

Fracture resistance comparison (Internal evaluation) fz = 0.020 ipt~0.032 ipt



Cutting Conditions: Vc = 330 sfm, D.O.C. × ae = 0.079" × 3.937" mm Center Cut, BT50
Workpiece: 4140HT ø5.000" (10 flute)

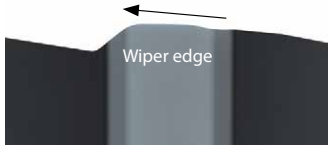
High Quality

Long arc wiper edge utilizing unique technology

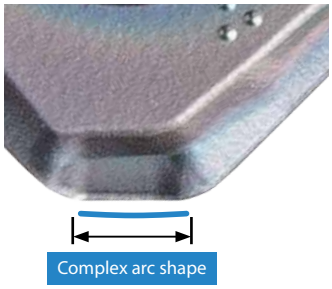
Unique long arc wiper edge

Reduces variation in mounting accuracy and provides superior finished surface quality

Side view of insert



Convex curved shape with wiper edge protruding upward
*GM/SM/AM (E-Class)



MB45 (Face Mill)

Fig.1

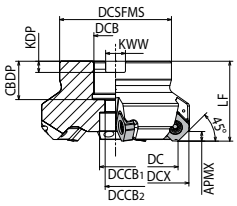
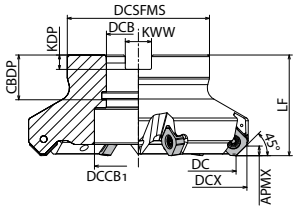


Fig.2



Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX	A.R. max.(°)	R.R. (°)	Coolant Hole	Max RPM	Fig.	Applicable Inserts M18
Inch	Inch Bore Dia.	Coarse Pitch	MB45- 2000R-14T3C	●	3	2.000	2.492	1.750	0.750	0.669	0.433	1.575	0.750	0.187	0.313					11,300		
			2500R-14T4C	●	4	2.500	2.992													10,100	1	
			3000R-14T5C	●	5	3.000	3.492	2.250	1.000	0.866	0.551	1.969	1.063	0.236	0.382	0.236	+13	-12	Yes	9,200		SN□U1406...
			4000R-14T5C	●	5	4.000	4.492	3.750	1.500	2.047	-	1.969	1.417	0.394	0.626					8,000	2	
			5000R-14T6C	●	6	5.000	5.492					2.480								7,100		
		Fine Pitch	MB45- 2000R-14T4C	●	4	2.000	2.492	1.750	0.750	0.669	0.433	1.575	0.750	0.187	0.313					11,300		
			2500R-14T5C	●	5	2.500	2.992													10,100	1	
			3000R-14T6C	●	6	3.000	3.492	2.250	1.000	0.866	0.551	1.969	1.063	0.236	0.382	0.236	+13	-12	Yes	9,200		SN□U1406...
			4000R-14T8C	●	8	4.000	4.492	3.750	1.500	2.047	-	1.969	1.417	0.394	0.626					8,000	2	
			5000R-14T10C	●	10	5.000	5.492					2.480	1.417	0.394	0.626					7,100		
		Extra Fine Pitch	MB45- 2000R-14T5C	●	5	2.000	2.492	1.750	0.750	0.669	0.433	1.575	0.750	0.187	0.313					11,300		
			2500R-14T6C	●	6	2.500	2.992													10,100	1	
			3000R-14T8C	●	8	3.000	3.492	2.250	1.000	0.866	0.551	1.969	1.063	0.236	0.382	0.236	+13	-12	Yes	9,200		SN□U1406...
			4000R-14T10C	●	10	4.000	4.492	3.750	1.500	2.047	-	1.969	1.417	0.394	0.626					8,000	2	
			5000R-14T13C	●	13	5.000	5.492					2.480	1.417	0.394	0.626					7,100		

Maximum number of revolutions
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page **M19**.
Do not use the face mill or end mill at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.

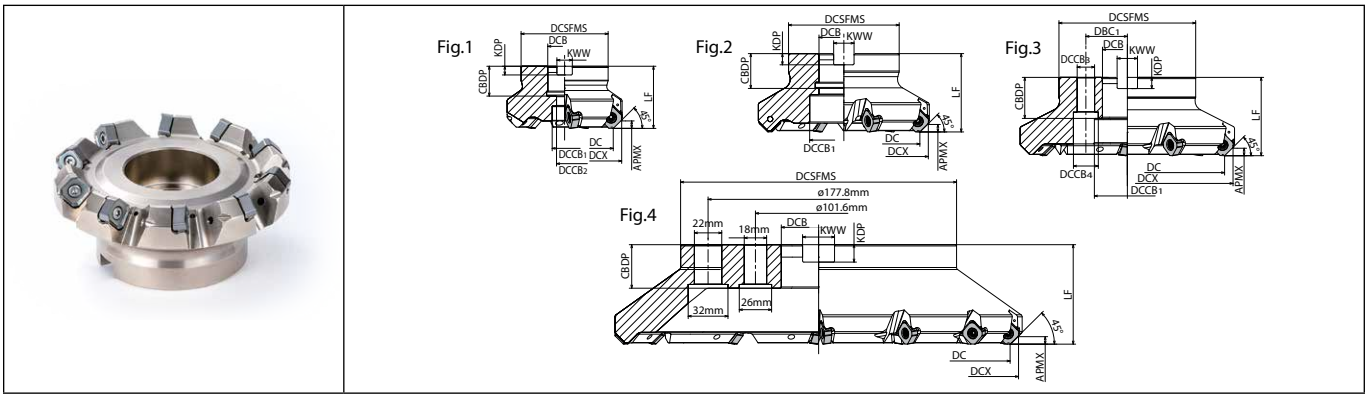
Inch Size Face Mill and End Mill Spare Parts

	Part Number	Insert Screw	Wrench	Anti-Seize Compound	Arbor Bolt
Face Mills	MB45- 2000R-14T...	SB-50110TRP	TTP-20	P-37	HH3/8-1.25(H)
	2500R-14T...				HH3/8-1.25(H)
	3000R-14T...				HH1/2-1.25(H)
	4000R-14T... ~ 5000R-14T...				-
		Recommended Torque for Insert Screw 4.5 Nm			
End Mills	MB45- 1500S125-14T2C	SB-50110TRP	TTP-20	P-37	-
	1500S125-14T3C				
	2000S125-14T3C				
	2500S125-14T4C				
		Recommended Torque for Insert Screw 4.5 Nm			

Coat Anti-seize Compound (P-37) thinly on portion of taper and thread prior to installation.
(H) Optional coolant-through bolt available

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MB45 (Face Mill)



Toolholder Dimensions

Unit	Part Number			Std. Item	No. of Inserts	Dimensions														A.R. max.(°)	R.R. (°)	Coolant Hole	Weight (kg)	Max RPM	Fig.	Applicable Inserts ➡ M18
						DC	DCX	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	$DCCB_3$	$DCCB_4$	DBC_1	LF	CBDP	KDP	KWW	APMX							
mm	Inch Bore Dia.	Coarse Pitch	MB45- 080R-14T5C	●	5	80	93	70	1.000"	20	13				50	1.063"	0.236"	0.375"					1.4	9,000	1	SN□U1406...
			100R-14T5C	●	5	100	113	78	1.250"	45		-	-	-		1.339"	0.315"	0.500"				Yes	2.0	8,000		
			125R-14T6C	●	6	125	138	89	1.500"	55					63	1.496"	0.394"	0.625"					3.3	7,200	2	
			160R-14T7	●	7	160	173	110	2.000"	70	-						0.433"	0.750"	6	+13	-12		5.1	6,300		
			200R-14T8	●	8	200	213	140	1.875"	110		18	26	4.000"			0.551"	1.000"				No	7.6	5,700	3	
			250R-14T10	●	10	250	263																10.8	5,100		
			315R-14T14	●	14	315	328	222		-		-	-	-	80								20.4	4,500	4	
		Fine Pitch	MB45- 080R-14T6C	●	6	80	93	70	1.000"	20	13				50	1.063"	0.236"	0.375"					1.4	9,000	1	SN□U1406...
			100R-14T8C	●	8	100	113	78	1.250"	45		-	-	-		1.339"	0.315"	0.500"				Yes	1.8	8,000		
			125R-14T10C	●	10	125	138	89	1.500"	55					63	1.496"	0.394"	0.625"					3.1	7,200	2	
			160R-14T12	●	12	160	173	110	2.000"	70	-						0.433"	0.750"	6	+13	-12		4.9	6,300		
			200R-14T14	●	14	200	213	140	1.875"	110		18	26	4.000"			0.551"	1.000"				No	7.4	5,700	3	
			250R-14T16	●	16	250	263																10.5	5,100		
			315R-14T18	●	18	315	328	222		-		-	-	-	80								20.2	4,500	4	
		Extra Fine Pitch	MB45- 080R-14T8C	●	8	80	93	70	1.000"	20	13				50	1.063"	0.236"	0.375"					1.3	9,000	1	SN□U1406...
			100R-14T10C	●	10	100	113	78	1.250"	45		-	-	-		1.339"	0.315"	0.500"			-12	Yes	1.8	8,000		
			125R-14T13C	●	13	125	138	89	1.500"	55					63	1.496"	0.394"	0.625"	6	+13			3.0	7,200	2	
			160R-14T16	●	16	160	173	110	2.000"	70	-						0.433"	0.750"			-13		4.8	6,300		
			200R-14T18	●	18	200	213	140	1.875"	110		18	26	4.000"			0.551"	1.000"				No	7.2	5,700	3	
			250R-14T20	●	20	250	263														-12		10.4	5,100		

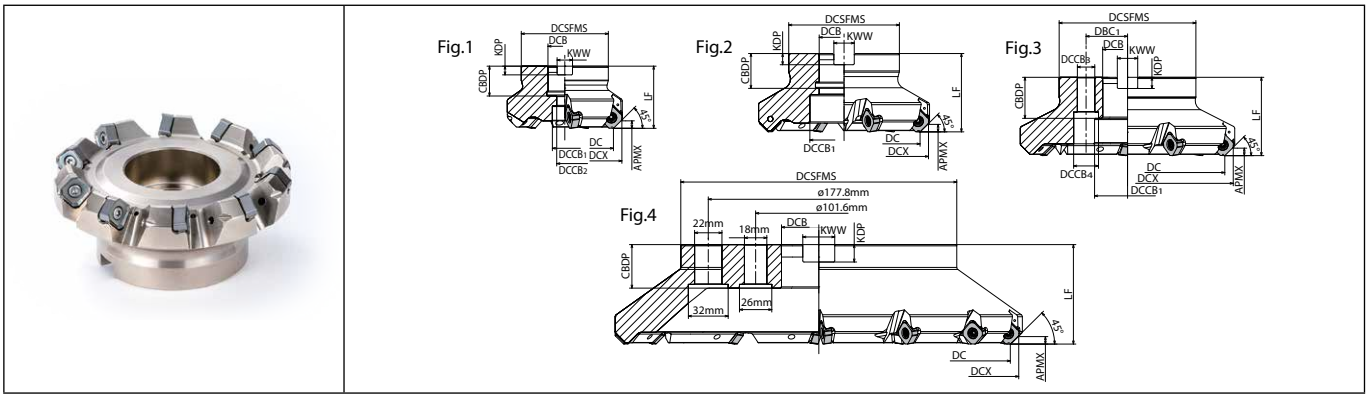
Maximum number of revolutions
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page **M19**.
Do not use the face mill or end mill at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.

Metric Size Face Mill and End Mill Spare Parts

		Part Number	Insert Screw	Wrench	Anti-Seize Compound	Arbor Bolt	Differential Screw
Face Mills	Inch Bore Dia.	MB45- 080R-14T...	SB-50110TRP	TTP-20	P-37	HH1/2-1.25(H)	-
		100R-14T... ~ 315R-14T...				-	-
	Metric Bore Dia.	MB45- 040R/050R-14T...-M				HH8X25(H)	-
		040R/050R-14T...-22M				-	W10X31*
		063R-14T...-M	Recommended Torque for Insert Screw 4.5 Nm			HH10X30(H)	-
		080R-14T...-M				HH12X35(H)	-
		100R-14T...-M ~ 315R-14T...-M				-	-
End Mills		MB45- 40S32-14T2C ~ 80S32-14T5C	SB-50110TRP	TTP-20	P-37	-	-
			Recommended Torque for Insert Screw 4.5 Nm				

Coat Anti-seize Compound (P-37) thinly on portion of taper and thread prior to installation.
(H) Optional coolant-through bolt available
*How to install differential screw on page **M16**
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MB45 (Face Mill)



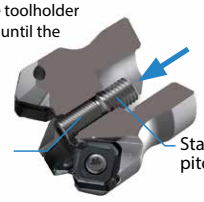
Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions DC	DCX	DCSFMS	DCB	DCB1	DCB2	DCB3	DCB4	DBC1	LF	CBDP	KDP	KWW	APMX	A.R. max.(°)	R.R. (°)	Coolant Hole	Weight (kg)	Max RPM	Fig.	Applicable Inserts ➡ M18
mm	Metric Bore Dia. Coarse Pitch	●	2	40	54	38	16	13.5	9				40	19	6.3	10.4	6	+13	-12	Yes	0.4	12,700	1	SN□U1406...
	MB45-040R-14T2C-M																							
	050R-14T3C-M	●	3	50	63	48	22	18	11	-	-	-		21							0.5	11,400		
	063R-14T4C-M	●	4	63	76	50															0.7	10,100		
	080R-14T5C-M	●	5	80	93	70	27	20	13				50	24	7	12.4					1.4	9,000		
	100R-14T5C-M	●	5	100	113	78	32	45						30	8	14.4					1.9	8,000	2	
	125R-14T6C-M	●	6	125	138	89	40	55					63	33	9	16.4					3.2	7,200		
	160R-14T7-M	●	7	160	173	110			-	14	20	66.7								No	5.1	6,300	3	
	200R-14T8-M	●	8	200	213	142	60	110		18	26	101.6		35	14	25.7					7.3	5,700		
	250R-14T10-M	●	10	250	263																10.5	5,100		
	315R-14T14-M	●	14	315	328	222		-		-	-	-	80								19.4	4,500	4	
	Fine Pitch MB45-040R-14T3C-M	●	3	40	54	38	16	13.5	9				40	19	5.6	8.4	6	+13	-12	Yes	0.3	12,700	1	SN□U1406...
	040R-14T3C-22M*	●				47	22	12	-					21	6.3	10.4					0.5	12,700		
	050R-14T4C-M	●	4	50	63	48		18	11	-	-	-									0.4	11,400		
	063R-14T5C-M	●	5	63	76	50															0.6	10,100		
	080R-14T6C-M	●	6	80	93	70	27	20	13				50	24	7	12.4					1.4	9,000		
	100R-14T8C-M	●	8	100	113	78	32	45						30	8	14.4					1.8	8,000	2	
	125R-14T10C-M	●	10	125	138	89	40	55					63	33	9	16.4					3.0	7,200		
	160R-14T12-M	●	12	160	173	110			-	14	20	66.7								No	4.9	6,300	3	
	200R-14T14-M	●	14	200	213	142	60	110		18	26	101.6		35	14	25.7					7.0	5,700		
	250R-14T16-M	●	16	250	263																10.2	5,100		
	315R-14T18-M	●	18	315	328	222		-		-	-	-	80								19.2	4,500	4	
	Extra Fine Pitch MB45-040R-14T4C-M	●	4	40	54	38	16	13.5	9				40	19	5.6	8.4	6	+13	-12	Yes	0.3	12,700	1	SN□U1406...
	040R-14T4C-22M*	●				47	22	12	-					21	6.3	10.4					0.4	11400		
	050R-14T5C-M	●	5	50	63	48		18	11	-	-	-									0.4	11,400		
	063R-14T6C-M	●	6	63	76	50															0.6	10,100		
	080R-14T8C-M	●	8	80	93	70	27	20	13				50	24	7	12.4					1.3	9,000		
	100R-14T10C-M	●	10	100	113	78	32	45						30	8	14.4					1.7	8,000	2	
	125R-14T13C-M	●	13	125	138	89	40	55					63	33	9	16.4					2.9	7,200		
	160R-14T16-M	●	16	160	173	110			-	14	20	66.7							-13	No	4.8	6,300	3	
	200R-14T18-M	●	18	200	213	142	60	110		18	26	101.6		35	14	25.7					6.9	5,700		
	250R-14T20-M	●	20	250	263														-12		10.1	5,100		

Maximum number of revolutions
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page **M19**.
Do not use the face mill or end mill at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.

How to Install Differential Screw (MB45-040R-14T3C-22M, MB45-040R-14T4C-22M)

1. Insert the fine pitch side of the double screw into the toolholder and carefully rotate it until the screw stops.

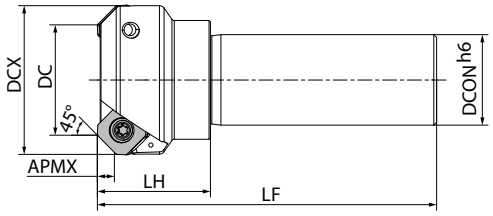


2. To ensure that the holder and arbor are securely connected, provide a clearance of approx. 4mm between the holder and arbor before tightening the screws.

3. Rotate the screw until there is no clearance, and check the holder is attached to the arbor.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MB45 (End Mill)



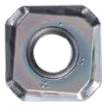
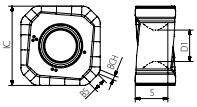
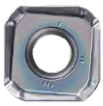
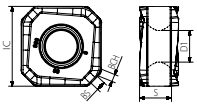
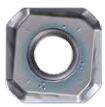
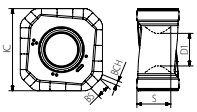
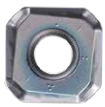
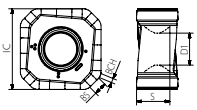
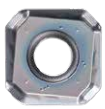
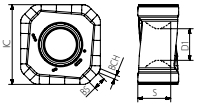
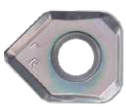
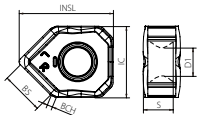
Toolholder Dimensions

Unit	Part Number		Std. Item R	No. of Inserts	Dimensions DC	DCX	DCON	LH	LF	APMX	A.R. max.(°)	R.R. (°)	Coolant Hole	Max RPM	Spare Parts: Anti-Seize Compound	Spare Parts: Screw	Spare Parts: Wrench	Applicable Inserts ➡ M18
Inch	Cylindrical Shank	MB45- 1500S125-14T2C	●	2	1.500	1.992	1.250	1.575	4.724	0.236	+13	-12	Yes	12,700	P-37	SB-50110TRP Tightening torque 4.5N·m	TTP-20	SN□U1406...
		1500S125-14T3C	●	3	1.500	1.992								11,400				
		2000S125-14T3C	●	3	2.000	2.492								10,100				
		2500S125-14T4C	●	4	2.500	2.992								9,000				
mm		MB45- 40S32-14T2C	●	2	40	53	32	40	120	6	+13	-12	Yes	12,700	P-37	SB-50110TRP Tightening torque 4.5N·m	TTP-20	SN□U1406...
		50S32-14T3C	●	3	50	63								11,400				
		63S32-14T4C	●	4	63	76								10,100				
		80S32-14T5C	●	5	80	93								9,000				

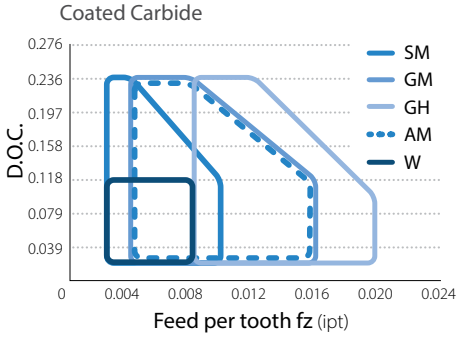
Maximum number of revolutions
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page **M19**.
Do not use the face mill or end mill at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.

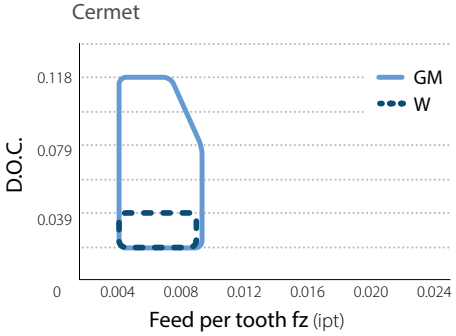
SNMU/SNEU

Usage Classification										
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)										
Carbon steel / Alloy steel					★	☆		■		P
Mold and die steel					★	☆		■		P
Austenitic stainless steel					☆	★				M
Martensitic stainless steel	★					☆				M
Precipitation hardened stainless steel						★				M
Gray cast iron				★						K
Nodular cast iron				★						K
Non-ferrous metals		★					☆			N
Heat-resistant alloy	★					☆				S
Titanium alloy						★				S
Hard materials (≤ 60 HRC)			★							H

Insert		Part Number	No. of Edges	IC	Dimensions (mm) S	D1	INSL	BCH	BS	Carbide CVD CA6535	DLC PDL025	PVD PR015S	PR1810	PR1825	PR1835	- GW25	Cermet - TN620M	Applicable Toolholder ⇒ M14~M17
	 General Purpose (M-Class)	SNMU 1406ANER-GM	8	14.7	6.07	5.8	-	0.8	2.3	●			●	●	●		●	MB45-...
	 Tough Edge (M-Class)	SNMU 1406ANER-GH	8	14.7	5.89	5.8	-	1.4	1.7	●		●	●	●	●			MB45-...
	 General Purpose (E-Class)	SNEU 1406ANER-GM	8	14.7	6.07	5.8	-	0.8	2.3	●			●	●	●		●	MB45-...
	 Low Cutting Force (E-Class)	SNEU 1406ANER-SM	8	14.7	6.07	5.8	-	0.8	2.3	●				●	●			MB45-...
	 Aluminum / Non-Ferrous Metals (E-Class)	SNEU 1406ANFR-AM	8	14.7	6.07	5.8	-	0.8	2.3		●					●		MB45-...
	 Wiper Insert (E-Class / 2-edge)	SNEU 1406ANEN-W	2	14.7	6.15	5.8	19.4	1.1	8.8	●			●	●	●		●	MB45-...

Applicable Chipbreaker Range





SNMU and SNEU inserts are sold in 10 piece boxes

SNEU1406ANEN-W inserts are sold in 5 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

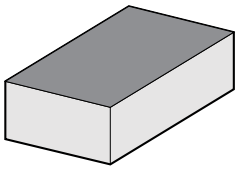
Recommended Cutting Conditions

Chipbreaker	Workpiece Material	Feed fz (ipt)	Recommended Insert Grade (Vc: sfm)							
			MEGACOAT NANO EX (PVD coating)			MEGACOAT HARD (PVD coating)	CVD coating	Cermet	DLC coating	Carbide
			PR1835	PR1825	PR1810	PR015S	CA6535	TN620M	PDL025	GW25
General GM	Carbon Steel	0.004 - **0.008** - 0.016 (0.002 - **0.005** - 0.008)	☆ 390 - **590** - 820	★ 390 - **590** - 820	-	-	-	★ 660 - **820** - 980	-	-
	Alloy Steel	0.004 - **0.008** - 0.016 (0.002 - **0.005** - 0.008)	☆ 330 - **520** - 720	★ 330 - **520** - 720	-	-	-	★ 590 - **720** - 820	-	-
	Mold steel	0.004 - **0.008** - 0.016 (0.002 - **0.003** - 0.006)	☆ 260 - **460** - 590	★ 260 - **460** - 590	-	-	-	★ 490 - **590** - 720	-	-
	Austenitic stainless steel	0.004 - **0.008** - 0.016	☆ 330 - **520** - 660	☆ 330 - **520** - 660	-	-	-	-	-	-
	Martensitic stainless steel	0.004 - **0.008** - 0.016	☆ 490 - **660** - 820	-	-	-	☆ 590 - **790** - 980	-	-	-
	Precipitation hardened stainless steel	0.004 - **0.008** - 0.012	★ 300 - **390** - 490	-	-	-	-	-	-	-
	Gray cast iron	0.004 - **0.008** - 0.016	-	-	★ 390 - **590** - 820	-	-	-	-	-
	Ductile cast iron	0.004 - **0.008** - 0.014	-	-	★ 330 - **490** - 660	-	-	-	-	-
	Ni-based heat resistant alloys	0.004 - **0.005** - 0.008	☆ 70 - **100** - 160	-	-	-	★ 70 - **100** - 160	-	-	-
Low Cutting Force SM	Carbon Steel	0.002 - **0.005** - 0.010	☆ 390 - **590** - 820	☆ 390 – **590** – 820	-	-	-	-	-	-
	Alloy Steel	0.002 - **0.005** - 0.010	☆ 330 - **520** - 720	☆ 330 – **520** – 720	-	-	-	-	-	-
	Mold steel	0.002 - 0.004 - 0.008	☆ 260 - **460** - 590	☆ 260 – **460** – 590	-	-	-	-	-	-
	Austenitic stainless steel	0.002 - **0.005** - 0.010	★ 330 - **520** - 660	☆ 330 – **520** – 660	-	-	-	-	-	-
	Martensitic stainless steel	0.002 - **0.005** - 0.010	☆ 490 - **660** - 820	-	-	-	★ 590 - **790** - 980	-	-	-
	Precipitation hardened stainless steel	0.002 - **0.005** - 0.010	☆ 300 - **390** - 490	-	-	-	-	-	-	-
	Gray cast iron	0.002 - **0.005** - 0.010	-	-	☆ 390 - **590** - 820	-	-	-	-	-
	Ductile cast iron	0.002 - **0.004** - 0.008	-	-	☆ 330 - **490** - 660	-	-	-	-	-
	Ni-based heat resistant alloys	0.002 - **0.004** - 0.006	☆ 70 - **100** - 160	-	-	-	☆ 70 - **100** - 160	-	-	-
	Titanium alloy	0.002 - **0.003** - 0.006	★ 130 - **200** - 260	-	-	-	-	-	-	-
Tough Edge GH	Carbon Steel	0.008 - **0.012** - 0.020	☆ 390 - **590** - 820	☆ 390 – **590** – 820	-	-	-	-	-	-
	Alloy Steel	0.008 - **0.012** - 0.020	☆ 330 - **520** - 720	☆ 390 – **520** – 720	-	-	-	-	-	-
	Mold steel	0.008 - **0.012** - 0.018	☆ 260 - **460** - 590	☆ 260 – **460** – 590	-	-	-	-	-	-
	Austenitic stainless steel	0.008 - **0.012** - 0.016	☆ 330 - **520** - 660	☆ 330 – **520** – 660	-	-	-	-	-	-
	Martensitic stainless steel	0.008 - **0.012** - 0.016	☆ 490 - **660** - 820	-	-	-	☆ 590 - **790** - 980	-	-	-
	Precipitation hardened stainless steel	0.008 - **0.012** - 0.016	☆ 300 - **390** - 490	-	-	-	-	-	-	-
	Gray cast iron	0.008 - **0.012** - 0.020	-	-	☆ 390 - **590** - 820	-	-	-	-	-
	Ductile cast iron	0.008 - **0.012** - 0.018	-	-	☆ 330 - **490** - 660	-	-	-	-	-
	Ni-based heat resistant alloys	0.004 - **0.008** - 0.012	☆ 70 - **100** - 160	-	-	-	☆ 70 - **100** - 160	-	-	-
	Hardened material ≤ 60 HRC	0.002 - **0.004** - 0.008	-	-	-	★ 160 - **260** - 330	-	-	-	-
AM	Aluminum alloy	0.004 - **0.008** - 0.016	-	-	-	-	-	-	★ 660 - **1970** - 2950	☆ 660 - **1640** - 2620

The numbers in bold font are recommended starting conditions. 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-based heat resistant alloy and titanium alloy. When choosing wet machining for other workpieces, reduce the cutting speed to 70% or less.
When machining aluminum, be sure to use within recommended conditions. Do not rotate more than the maximum speed listed on the main unit.
Dry machining is recommended for cermet.

Precautions

Applications



Facing

How to mount inserts

1. Completely eliminate chips and dust from the insert mounting side.
2. Coat anti-seize compound thinly on portion of taper and thread of clamp screw prior to installation.
3. After mounting a clamp screw on the top edge of wrench, tighten the screw while keeping the insert pushed against the shim seat surface and holder surface (Fig.1).
4. Tighten the wrench in a direction parallel to the clamp screw.
   Recommended tightening torque · · · 4.5 N·m
5. After tightening, check that there is no gap between the contact surface of the insert and the surface of the shim, or between the side surface of insert and the holder surface.

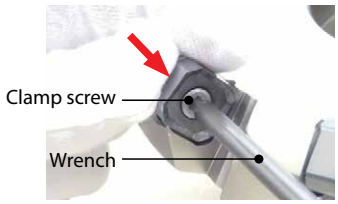


Fig.1

Defining the machining diameter (DC)

With respect to the machining diameter (DC) specified in ISO*, the numerical value of the machining diameter (Fig. 2) where the plane surface is finished depends on the insert. Please be careful.

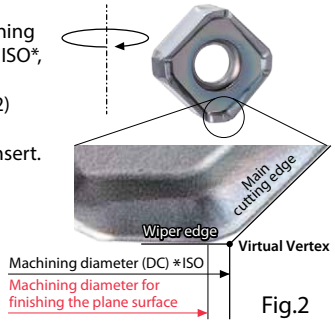


Fig.2

Machining diameter at which the plane surface is finished (for ø125mm)

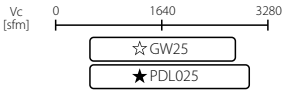
	GM	GH	SM	AM
Difference to machining diameter (DC)	-1.1	-2.0	-1.1	-1.1
Machining diameter (mm) at which the plane surface is finished *Dimensional tolerance $^{0}_{-0.2}$mm	123.9	123.0	123.9	123.9

*GH has a larger double-edge size, so the machining diameter at which the plane surface is finished is smaller than other inserts.

Precautions when machining

Precautions when machining aluminum

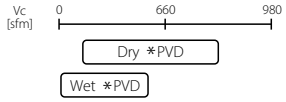
- Be sure to use within recommended conditions.
- Do not rotate more than the maximum speed listed on the main unit.
  *The number of revolutions listed on the holder is the maximum number of revolutions without load.



	Recommended cutting speed [sfm]
PDL025	660 ~ 1970 ~ 2950
GW25	660 ~ 1640 ~ 2620

Precautions for wet machining of steel

For wet machining, select PR1835 and use a cutting speed of 70% or less of the recommended condition as a guide.



MB45-125R-14T10C
SCREW:SB-50110TRP WRENCH:
MAX 7,200 RPM
Rotating at maximum speed is prohibited.

How to use a wiper insert

1. Use when the feed amount per revolution [ipr] becomes large. The table below shows the standard feed amount per revolution and the number of wipers installed.

Feed per rotation	Number of wiper inserts	Pocket for wiper insert
0.079 < f [ipr] ≤ 0.157	1 pc	Pocket with "Single dot" (Fig. 3)
0.157 < f [ipr]	2 pcs	"Single dot" and "Double dots" pockets (Figs. 3, 4) * Only holders with 12 or more inserts have "Double dots"

2. Chipbreaker recommended for use with wiper insert

	GM chipbreaker	GH chipbreaker	SM chipbreaker	AM chipbreaker
Wiper Insert	✓	Not recommended	✓	Not recommended

3. Install the wiper insert correctly as shown in Fig. 5.
   * Fig. 6 shows the insert incorrectly attached to the holder.

"Double dots" are placed in the diagonal pocket of "Single dot"
* For only holders with 12 or more inserts

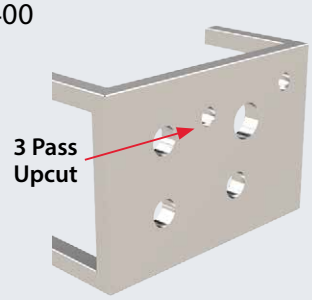
Fig. 5

Fig. 6

800.823.7284
www.kyocera precisiontools.com

Case studies
Excellent performance even under unstable machining conditions

Cradle SS400



Vc = 520 sfm
D.O.C. x ae= 0.003"x5.12", Wet

Machining efficiency

MB45 ø160mm 12 flute
GM(PR1825)
Vf = 760 sfm
fz = 0.008 ipt

Competitor G ø160mm 8 flute
Vf = 620 sfm
fz = 0.010 ipt

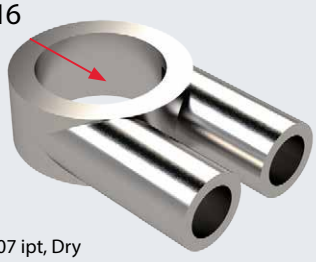
Machining efficiency 1.2x

MB45 shows stable machining in an environment prone to deflection and chatter.
Increasing the number of inserts improves efficiency.
Improved joints between machining passes.

(User evaluation)

Case studies
Achieves 1.6x longer tool life under the same machining conditions

Housing 316



Vc = 300 sfm
D.O.C. = 0.079", fz = 0.007 ipt, Dry

Number of parts

MB45 ø63mm 5 flute
GM(PR1825)
30 pcs per corner

Competitor H ø63mm 5 flute
18 pcs per corner

Tool life 1.6x

MB45 shows stable machining without chattering.
Wear on the cutting edge proceeds normally and shows 1.6x tool life than competitor.

(User evaluation)

MFPN45 (Face Mill)

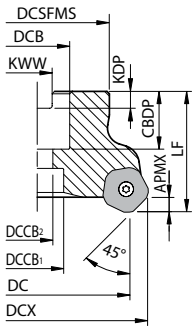


Fig. 1

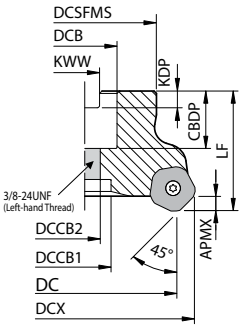


Fig. 2

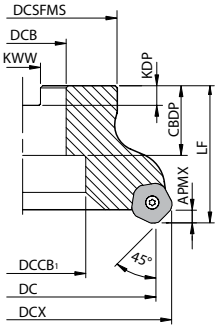


Fig. 3

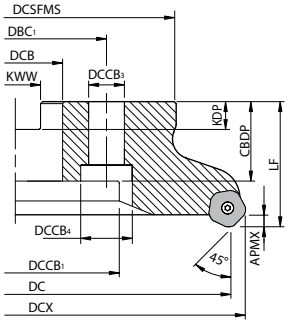


Fig. 4

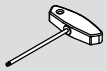
Toolholder Dimensions

Unit			Part Number	Std. Item R	No. of Inserts	Dimensions DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	DCCB3	DCCB4	DBC1	LF	CBDP	KDP	KWW	APMX	A.R. max.(°)	R.R.(°)	Coolant Hole	Weight (kg)	Fig.	Applicable Inserts ⇒ M28
Inch	Inch Bore Dia.	Coarse Pitch	MFPN 452500R-4T	●	4	2.500	2.815	1.890	0.750	0.669	0.433				1.575	0.750	0.187	0.313			-10		0.5	1	
			453000R-5T	●	5	3.000	3.315	2.283	1.000	0.866	0.551				1.969	1.063	0.236	0.375					1.1	1	
			454000R-6T	●	6	4.000	4.315	2.756	1.500	2.047		-	-	-	1.969	1.142	0.394	0.625					1.4	3	
			455000R-7T	●	7	5.000	5.315	3.425		2.283					2.480	1.417	0.394	0.625	0.236* (6mm)	+10		No	2.6	3	PN□U1205...R-..
			456000R-8T	●	8	6.000	6.315	4.016	2.000	2.835	-				2.480	1.496	0.433	0.750			-6		3.8	3	
			458000R-10T	●	10	8.000	8.315	5.591	2.500	3.937		0.709	1.024	4.000	2.480	1.575	0.551	1.000					6.6	4	
			4510000R-12T	●	12	10.000	10.315	5.591		3.937		0.709	1.024	4.000	2.480	1.575	0.551	1.000					9.3	4	
		Fine Pitch	MFPN 452000R-4T	●	4	2.000	2.315	1.750	0.750	-	3/8-24UNF				1.969	0.830	0.187	0.313			-10		0.3	2	
			452500R-5T	●	5	2.500	2.815	1.890		0.669	0.433				1.575	0.750	0.187	0.313					0.5	1	
			453000R-6T	●	6	3.000	3.315	2.283	1.000	0.866	0.551				1.969	1.063	0.236	0.375					1.1	1	
			454000R-8T	●	8	4.000	4.315	2.756	1.500	2.047		-	-	-	1.969	1.142	0.394	0.625					1.3	3	
			455000R-10T	●	10	5.000	5.315	3.425		2.283					2.480	1.417	0.394	0.625	0.236* (6mm)	+10		No	2.6	3	PN□U1205...R-..
			456000R-12T	●	12	6.000	6.315	4.016	2.000	2.835	-				2.480	1.496	0.433	0.750			-6		3.9	3	
			458000R-14T	●	14	8.000	8.315	5.591	2.500	3.937		0.709	1.024	4.000	2.480	1.575	0.551	1.000					6.6	4	
			4510000R-16T	●	16	10.000	10.315	5.591		3.937		0.709	1.024	4.000	2.480	1.575	0.551	1.000					9.3	4	
		Extra Fine Pitch	MFPN 452500R-6T	●	6	2.500	2.815	1.890	0.750	0.669	0.433				1.575	0.750	0.187	0.313			-10		0.5	1	
			453000R-8T	●	8	3.000	3.315	2.283	1.000	0.866	0.551				1.969	1.063	0.236	0.375					1.1	1	
			454000R-10T	●	10	4.000	4.315	2.756	1.500	2.047		-	-	-	1.969	1.142	0.394	0.625	0.236* (6mm)	+10		No	1.3	3	PN□U1205...R-..
			455000R-13T	●	13	5.000	5.315	3.425		2.283	-				2.480	1.417	0.394	0.625			-6		2.6	3	
			456000R-16T	●	16	6.000	6.315	4.016	2.000	2.835					2.480	1.496	0.433	0.750					3.9	3	

APMX : 0.236"/6mm (GM, SM, GH Chipbreakers), 0.197"/5mm (GL Chipbreaker), 0.118/3mm (W Chipbreaker)

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Inch Size Face Mill Spare Parts

Part Number			Insert Screw	Wrench		Shim	Shim Screw	Wrench	Anti-Seize Compound	Arbor Bolt	Mounting Screw
				TTW*1	DTM						
											
Coarse Pitch	MFPN	452500R-4T	SB-50140TR	TTW-15	-	MFPN-45	SPW-7050	LW-5	P-37	HH3/8-1.25	-
		453000R-5T								HH1/2-1.25	
		454000R-6T ~ 4510000R-12T	Recommended Torque for Insert Screw 4.2 Nm			Recommended Torque for Shim Screw 6.0 Nm				-	
Fine Pitch	MFPN	452000R-4T	SB-50140TR	TTW-15	-	-	-	-	P-37	-	XNS610*2
		452500R-5T								HH3/8-1.25	-
		453000R-6T	Recommended Torque for Insert Screw 4.2 Nm							HH1/2-1.25	
		454000R-8T ~ 4510000R-16T								-	
Extra-Fine Pitch	MFPN	452500R-6T	SB-40140TRN	-	DTM-15	-	-	-	P-37	HH3/8-1.25	-
		453000R-8T								HH1/2-1.25	
		454000R-10T ~ 456000R-16T	Recommended Torque for Insert Screw 3.5 Nm							-	

Coat Anti-seize Compound (P-37) thinly on portion of taper and thread prior to installation.

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

MFPN45 (Face Mill)

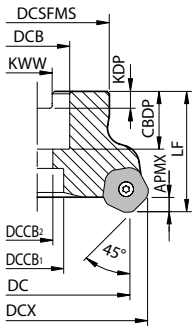


Fig. 1

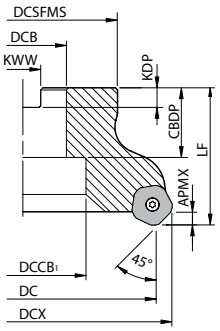


Fig. 2

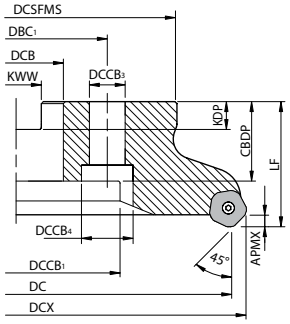


Fig. 3

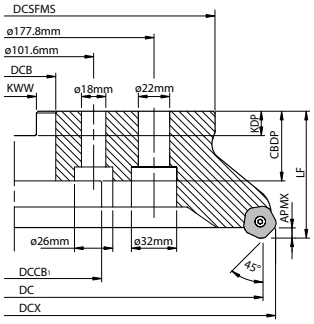


Fig. 4

Toolholder Dimensions

Unit			Part Number	Std. Item R	Std. Item L	No. of Inserts	Dimensions DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	DCCB3	DCCB4	DBC1	LF	CBDP	KDP	KWW	APMX	A.R. max.(°)	R.R.(°)	Coolant Hole	Weight (kg)	Fig.	Applicable Inserts ⇒ M28
mm	Inch Bore Dia.	Coarse Pitch	MFPN 45080R/L-5T	●	●	5	80	93	60	1.000"	22	13				50	1.063"	0.236"	0.375"	6*	+10	-8	No	1.1	1	PN□U1205...R/L-..
			45100R/L-6T	●	●	6	100	113	70	1.250"	48		-	-	-		1.260"	0.315"	0.500"			-6		1.4	2	
			45125R/L-7T	●	●	7	125	138	87	1.500"	58					63	1.417"	0.394"	0.625"					2.6	2	
			45160R/L-8T	●	●	8	160	173	102	2.000"	72	-					1.496"	0.433"	0.750"					4	2	
			45200R-10T	●		10	200	213	142	1.875"	110		18	26	4.000"		1.575"	0.551"	1.000"					6.7	3	
			45250R-12T	●		12	250	263																9.4	3	
		Fine Pitch	MFPN 45080R-6T	●		6	80	93	60	1.000"	22	13				50	1.063"	0.236"	0.375"	6*	+10	-8	No	1.1	1	PN□U1205...R-..
			45100R-8T	●		8	100	113	70	1.250"	48		-	-	-		1.260"	0.315"	0.500"			-6		1.4	2	
			45125R-10T	●		10	125	138	87	1.500"	58					63	1.417"	0.394"	0.625"					2.7	2	
			45160R-12T	●		12	160	173	102	2.000"	72	-					1.496"	0.433"	0.750"					4	2	
			45200R-14T	●		14	200	213	142	1.875"	110		18	26	4.000"		1.575"	0.551"	1.000"					6.9	3	
			45250R-16T	●		16	250	263																9.6	3	
		Extra Fine Pitch	MFPN 45080R-8T	●		8	80	93	60	1.000"	22	13				50	1.063"	0.236"	0.375"	6*	+10	-8	No	1.1	1	PN□U1205...R-..
			45100R-10T	●		10	100	113	70	1.250"	48		-	-	-		1.260"	0.315"	0.500"			-6		1.3	2	
			45125R-13T	●		13	125	138	87	1.500"	58					63	1.417"	0.394"	0.625"					2.7	2	
			45160R-16T	●		16	160	173	102	2.000"	72	-					1.496"	0.433"	0.750"					4	2	
			45200R-18T	●		18	200	213	142	1.875"	110		18	26	4.000"		1.575"	0.551"	1.000"					6.9	3	
			45250R-20T	●		20	250	263																9.6	3	

APMX : 0.236"/6mm (GM, SM, GH Chipbreakers), 0.197"/5mm (GL Chipbreaker), 0.118/3mm (W Chipbreaker)

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Toolholder Dimensions

Unit			Part Number	Std. Item R	Std. Item L	No. of Inserts	DC	DCX	DCSFMS	DCB	DCB_1	DCB_2	DCB_3	DCB_4	DBC_1	LF	CBDP	KDP	KWW	APMX	A.R. max.(°)	R.R. (°)	Coolant Hole	Weight (kg)	Fig.	Applicable Inserts ➔ M28
mm	Metric Bore Dia.	Coarse Pitch	MFPN 45063R-4T-M	●		4	63	76	47	22	19	11	-	-	-	40	21	6.3	10.4	6*	+10	-10	No	0.5	1	PN□U1205...R-..
			45080R-5T-M	●		5	80	93	60	27	22	13				50	24	7	12.4			-8		1.1	1	
			45100R-6T-M	●		6	100	113	70	32	48	-					30	8	14.4			-6		1.4	2	
			45125R-7T-M	●		7	125	138	87	40	58					63	32	9	16.4					2.6	2	
			45160R-8T-M	●		8	160	173	102		68		14	20	66.7									3.8	3	
			45200R-10T-M	●		10	200	213	142	60	110		18	26	101.6		40	14	25.7					6.4	3	
			45250R-12T-M	●		12	250	263																9.1	3	
			45315R-14T-M	□		14	315	328	220				-	-	-	80								21.3	4	
		Fine Pitch	MFPN 45063R-5T-M	●		5	63	76	47	22	19	11	-	-	-	40	21	6.3	10.4	6*	+10	-10	No	0.5	1	PN□U1205...R-..
			45080R-6T-M	●		6	80	93	60	27	22	13				50	24	7	12.4			-8		1	1	
			45100R-8T-M	●		8	100	113	70	32	48	-					30	8	14.4			-6		1.4	2	
			45125R-10T-M	●		10	125	138	87	40	58					63	32	9	16.4					2.5	2	
			45160R-12T-M	●		12	160	173	102		68		14	20	66.7									3.8	3	
			45200R-14T-M	●		14	200	213	142	60	110		18	26	101.6		40	14	25.7					6.5	3	
			45250R-16T-M	●		16	250	263																9.1	3	
		Extra Fine Pitch	MFPN 45063R-6T-M	●		6	63	76	47	22	19	11	-	-	-	40	21	6.3	10.4	6*	+10	-10	No	0.5	1	PN□U1205...R-..
			45080R-8T-M	●		8	80	93	60	27	22	13				50	24	7	12.4			-8		1.1	1	
			45100R-10T-M	●		10	100	113	70	32	48	-					30	8	14.4			-6		1.3	2	
			45125R-13T-M	●		13	125	138	87	40	58					63	32	9	16.4					2.6	2	

APMX : 0.236"/6mm (GM, SM, GH Chipbreakers), 0.197"/5mm (GL Chipbreaker), 0.118/3mm (W Chipbreaker)

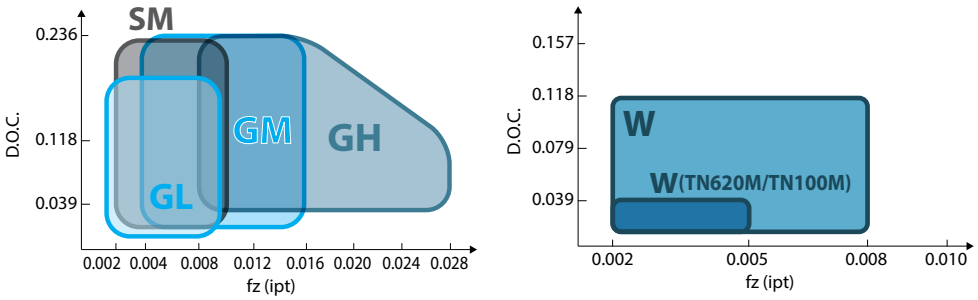
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Metric Size Face Mill Spare Parts

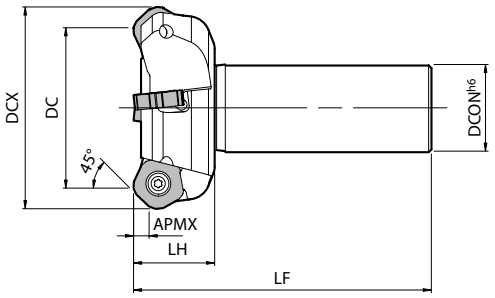
Part Number		Insert Screw	Wrench TTW	Wrench DTM	Shim	Shim Screw	Wrench	Anti-Seize Compound	Arbor Bolt
Coarse Pitch	MFPN 45063R-4T-M	SB-50140TR	TTW-15	-	MFPN-45	SPW-7050	LW-5	P-37	HH10×30
	45080R-5T-(M)	Recommended Torque for Insert Screw 4.2 Nm			Recommended Torque for Shim Screw 6.0 Nm				HH12×35
	45100R-6T-(M) ~ 45315R-14T-(M)								-
Fine Pitch	MFPN 45063R-5T-M	SB-50140TR	TTW-15	-	-	-	-	P-37	HH10×30
	45080R-6T-(M)	Recommended Torque for Insert Screw 4.2 Nm							HH12×35
	45100R-8T-(M) ~ 45315R-18T-(M)								-
Extra-Fine Pitch	MFPN 45063R-6T-M	SB-40140TRN	-	DTM-15	-	-	-	P-37	HH10×30
	45080R-8T-(M)	Recommended Torque for Insert Screw 3.5 Nm							HH12×35
	45100R-10T-(M) ~ 45125R-13T-(M)								-

Coat Anti-seize Compound (P-37) thinly on portion of taper and thread prior to installation.

Applicable Chipbreaker Range



MFPN45 (End Mill)



Toolholder Dimensions

Unit		Part Number	Std. Item R	No. of Inserts	Dimensions DC	DCX	DCON	LF	LH	APMX	A.R. max.(°)	R.R. (°)	Coolant Hole	Spare Parts: Anti-Seize Compound	Spare Parts: Screw	Spare Parts: Wrench	Applicable Inserts
Inch	Weldon	MFPN 452000R-W125-3T	●	3	2.00	2.31	1.25	3.60	1.18	0.236* (6mm)	+10	-12	No	P-37	SB-50140TR Tightening torque 4.2N·m	TTW-15	PN□U1205...R-..
		452500R-W125-4T	●	4	2.50	2.81						-10					
		453000R-W125-5T	●	5	3.00	3.31						-8					
mm	Cylindrical	MFPN 45050R-S32-3T	●	3	50	63	32	110	30	0.236* (6mm)	+10	-12	No	P-37	SB-50140TR Tightening torque 4.2N·m	TTW-15	PN□U1205...R-..
		45063R-S32-4T	●	4	63	76						-10					
		45080R-S32-5T	●	5	80	93						-8					

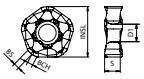
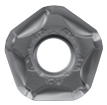
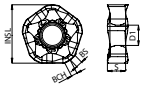
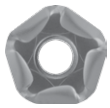
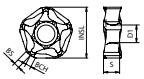
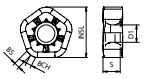
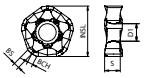
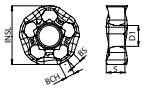
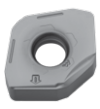
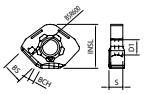
APMX : 0.236"/6mm (GM, SM, GH Chipbreakers), 0.197"/5mm (GL Chipbreaker), 0.118/3mm (W Chipbreaker)
Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.

PNMU/PNEU

Usage Classification

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

Carbon steel / Alloy steel				☆			★	☆		■	P
Mold and die steel				☆			★	☆		■	P
Austenitic stainless steel					☆		☆	★			M
Martensitic stainless steel	★							☆			M
Precipitation hardened stainless steel					☆			★			M
Gray cast iron			☆			★					K
Nodular cast iron			☆			★					K
Non-ferrous metals											N
Heat-resistant alloy	★							☆			S
Titanium alloy					☆			★			S
Hard materials (≤ 60 HRC)		★									H

Insert		Part Number	No. of Edges	Dimensions (mm) S	D1	INSL	BCH	BS	Carbide CVD CA6535	Carbide PVD PR0155	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	Cermet - TN100M	TN620M	Applicable Toolholder → M22~M27
	 General Purpose	PNMU 1205ANER-GM	10	5.56	6.2	17.88	2	2	●		△	●	●	●	●	●		●	MFPN45...R-..
	 General Purpose	PNMU 1205ANEL-GM	10	5.56	6.2	17.88	2	2	●		△	●	●	●	●	●		●	MFPN45...L-..
	 Low Cutting Force	PNMU 1205ANER-SM	10	5.56	6.2	17.88	2	2	●		△	●	●	●	●	●			MFPN45...R-..
	 Tough Edge	PNMU 1205ANER-GH	10	6.17	6.2	17.98	2	2	●	●	△	●	●	●	●	●			MFPN45...R-..
	 Surface Finish Oriented	PNEU 1205ANER-GL	10	5.56	6.2	17.51	2.7	2.7	●		△	●	●	●	●	●		●	MFPN45...R-..
	 Surface Finish Oriented	PNEU 1205ANEL-GL	10	5.56	6.2	17.51	2.7	2.7	●		△	●	●	●	●	●		●	MFPN45...L-..
	 2-edge / with Wiper Edge	PNEU 1205ANER-W	2	5.56	6.2	17.85	2.3	8.1	●		△	●	●	●	●	●	●	●	MFPN45...R-..

Recommended Cutting Conditions → M29

PNMU and PNEU inserts are sold in 10 piece boxes

PNEU1205ANER-W inserts are sold in 5 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Chipbreaker	Workpiece Material	Feed fz (ipt) ( ) : TN620M	Recommended Insert Grade (Vc: sfm)					
			Cermet	MEGACOAT NANO EX (MEGACOAT NANO)			MEGACOAT HARD	CVD
			TN620M	PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	PR015S	CA6535
GM	Carbon Steel	0.004 - **0.008** - 0.016 (0.002 - **0.005** - 0.008)	★ 660 - **820** - 980	☆ 390 - **590** - 820	★ 390 - **590** - 820	-	-	-
	Alloy Steel	0.004 - **0.008** - 0.016 (0.002 - **0.005** - 0.008)	★ 590 - **720** - 820	☆ 330 - **520** - 720	★ 330 - **520** - 720	-	-	-
	Mold Steel	0.004 - **0.008** - 0.014 (0.002 - **0.003** - 0.006)	★ 490 - **590** - 720	☆ 260 - **460** - 590	★ 260 - **460** - 590	-	-	-
	Austenitic Stainless Steel	0.004 - **0.008** - 0.016	-	☆ 330 - **520** - 660	☆ 330 - **520** - 660	-	-	-
	Martensitic Stainless Steel	0.004 - **0.008** - 0.016	-	☆ 490 - **660** - 820	-	-	-	☆ 590 - **790** - 980
	Precipitation Hardened Stainless Steel	0.004 - **0.008** - 0.012	-	★ 300 - **390** - 490	-	-	-	-
	Gray Cast Iron	0.004 - **0.008** - 0.016	-	-	-	★ 390 - **590** - 820	-	-
	Nodular Cast Iron	0.004 - **0.008** - 0.014	-	-	-	★ 330 - **490** - 660	-	-
	Ni-base Heat-Resistant Alloy	0.004 - **0.005** - 0.008	-	☆ 70 - **100** - 160	-	-	-	★ 70 - **100** - 160
SM *(GL)	Carbon Steel	0.002 - **0.005** - 0.010 (0.002 - **0.004** - 0.006)	★ 660 - **820** - 980	☆ 390 - **590** - 820	☆ 390 - **590** - 820	-	-	-
	Alloy Steel	0.002 - **0.005** - 0.010 (0.002 - **0.004** - 0.006)	★ 590 - **720** - 820	☆ 330 - **520** - 720	☆ 330 - **520** - 720	-	-	-
	Mold Steel	0.002 - **0.004** - 0.008 (0.002 - **0.003** - 0.005)	★ 490 - **590** - 720	☆ 260 - **460** - 590	☆ 260 - **460** - 590	-	-	-
	Austenitic Stainless Steel	0.002 - **0.005** - 0.010	-	★ 330 - **520** - 660	☆ 330 - **520** - 660	-	-	-
	Martensitic Stainless Steel	0.002 - **0.005** - 0.010	-	☆ 490 - **660** - 820	-	-	-	★ 590 - **790** - 980
	Precipitation Hardened Stainless Steel	0.002 - **0.005** - 0.010	-	☆ 300 - **390** - 490	-	-	-	-
	Gray Cast Iron	0.002 - **0.005** - 0.010	-	-	-	☆ 390 - **590** - 820	-	-
	Nodular Cast Iron	0.002 - **0.004** - 0.008	-	-	-	☆ 330 - **490** - 660	-	-
	Ni-base Heat-Resistant Alloy	0.002 - **0.004** - 0.006	-	☆ 70 - **100** - 160	-	-	-	☆ 70 - **100** - 160
	Titanium Alloy	0.002 - **0.003** - 0.006	-	★ 130 - **200** - 260	-	-	-	-
GH	Carbon Steel	0.008 - **0.016** - 0.028	-	☆ 390 - **590** - 820	☆ 390 - **590** - 820	-	-	-
	Alloy Steel	0.008 - **0.016** - 0.024	-	☆ 330 - **520** - 720	☆ 330 - **520** - 720	-	-	-
	Mold Steel	0.008 - **0.014** - 0.020	-	☆ 260 - **460** - 590	☆ 260 - **460** - 590	-	-	-
	Austenitic Stainless Steel	0.008 - **0.012** - 0.016	-	☆ 330 - **520** - 660	☆ 330 - **520** - 660	-	-	-
	Martensitic Stainless Steel	0.008 - **0.012** - 0.016	-	☆ 490 - **660** - 820	-	-	-	☆ 590 - **790** - 980
	Precipitation Hardened Stainless Steel	0.008 - **0.012** - 0.016	-	☆ 300 - **390** - 490	-	-	-	-
	Gray Cast Iron	0.008 - **0.016** - 0.028	-	-	-	☆ 390 - **590** - 820	-	-
	Nodular Cast Iron	0.008 - **0.014** - 0.020	-	-	-	☆ 330 - **490** - 660	-	-
	Ni-base Heat-Resistant Alloy	0.008 - **0.012** - 0.016	-	☆ 70 - **100** - 160	-	-	-	☆ 70 - **100** - 160
	Hardened Materials (≤ 60 HRC)	0.002 - **0.004** - 0.008	-	-	-	-	★ 160 - **260** - 330	-

★: 1st Recommendation ☆: 2nd Recommendation

The numbers in bold font represent the center value of the recommended cutting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

*1. GL chipbreaker: Recommended when finish is a priority

*2. GH chipbreaker: For Fine Pitch cutter, recommended feed is fz ≦ 0.016 ipt
GH chipbreaker is not recommended for extra fine pitch cutters

Cutter Type and Chipbreaker Selection

Milling Purpose	Cutter Type			Chipbreaker				
	Coarse Pitch	Fine Pitch	Extra Fine Pitch	GM	SM	GH	GL	W
General milling for steel and alloy steel		●		●				
Steel and alloy steel (to prevent chattering due to low rigidity machine or poor clamping power)	●				●			
Productivity oriented (high metal removal rate) (D.O.C. 1 0.1575", fz 1 0.0138 ipt)	●					●		
Focusing on finishing quality	●	●					●	
General milling of stainless steel		●			●			
Stainless steel (to prevent chattering due to low rigidity machine or poor clamping power)	●				●			
Cast iron (for high feed rates and high efficiency)			●	●				
Cast iron (D.O.C. 1 0.1575", fz 1 0.0138 ipt)	●					●		
Improved surface finish in high-efficiency milling		●	●					●

How to Use Wiper Insert

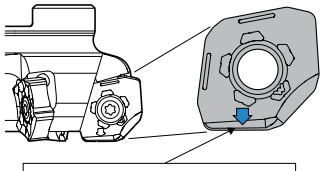
1) Please use one wiper insert per cutter.
(If you use more than 2 inserts on one cutter, the workpiece surface may have galling.)

2) Combination of Wiper Insert with other Chipbreakers

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

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

How to Attach Wiper Inserts on MFPN Cutter



The down arrow symbol (↓) indicates wiper cutting edge.
When attaching inserts, make sure that the arrow symbol points downward.

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

Applicable Chipbreaker

Cutter Type	Chipbreaker		
	GM	SM (GL)	GH
Coarse Pitch (with shim)	✓	✓	✓
Fine Pitch (without shim)	✓	✓	✓ (Feed rate is recommended under fz = 0.0157 ipt)
Extra Fine Pitch (without shim)	✓	✓	Not recommended

800.823.7284
www.kyoceraprecisiontools.com

Usage Precautions (How to mount an insert)

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

Fig.1

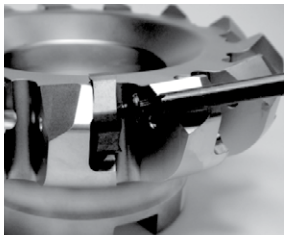


Fig.2

Fig.3

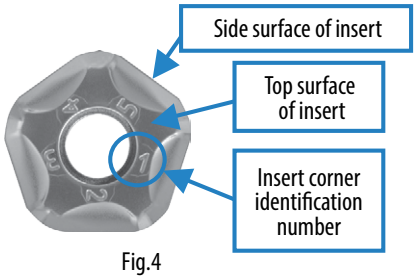


Fig.4

How to Replace the Shim (Coarse Pitch)

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

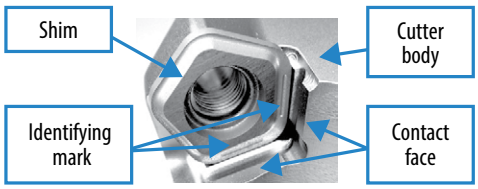


Fig.5

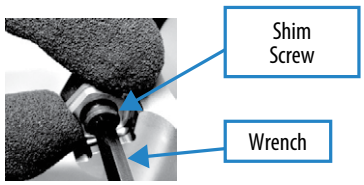


Fig.6

66° High Efficiency Milling

MFPN66

Economical Inserts with 10 Cutting Edges
Reduces Chattering with Low Cutting Force Design
Reduces Cutting Costs when Machining Auto Parts and Other General Purpose Machining Applications

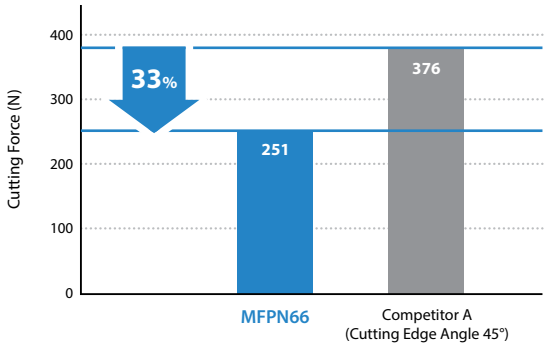
1 Economical inserts with 10 cutting edges
Applicable to various machining applications with wide size range from ø32mm

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

2 Reduces Chattering with Low Cutting Force Design
Available for Small to Medium ap Applications

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

Low Cutting Force Comparison (Internal Evaluation)



Thrust Force is Cutting Resistance

Cutting Conditions : Vc = 660 sfm, f = 0.006 ipt, D.O.C. = 0.118"
Cutter Diameter Ø63mm, Workpiece : 1049 Steel

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

Excellent Surface Finish with Low Workpiece Clamping Rigidity

Cutting Conditions : Vc = 660 sfm, f = 0.008 ipt, D.O.C. = 0.020"
Cutter Diameter Ø63mm, Workpiece : 1049 Steel

3 Long Tool Life with MEGACOAT NANO Coating Technology
Insert Lineup Also Contains Cermet Grade for Better Surface Finish

1st Recommendation
(General Purpose)
GM Chipbreaker

Tough Edge
GH Chipbreaker

For Stainless Steel Machining
SM Chipbreaker

Cermet for Milling TN620M

Excellent Wear Resistance and Adhesion Resistance
High Quality Surface Finish

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MFPN66 (Face Mill)

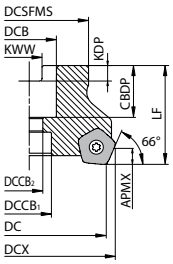

Fig. 1

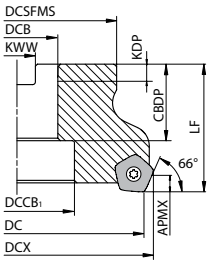

Fig. 2

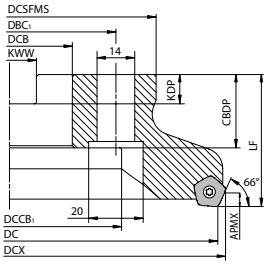

Fig. 3

Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions											A.R. max.(°)	R.R. (°)	Coolant Hole	Weight (kg)	Fig.	Applicable Inserts ⇨ M36
				R		DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	DBC1	LF	CBDP	KDP	KWW						
mm	Inch Bore Dia.	Fine Pitch	MFPN 66080R-6T-G	●	6	80	88	70	1.000"	20	13	-	50	1.063"	0.236"	0.375"	+12	-7	No	1.2	1	PNMU0905...
			66100R-7T-G	●	7	100	107	78	1.250"	45				1.339"	0.315"	0.500"				1.7		
			66125R-9T-G	●	9	125	132	89	1.500"	55	-		63	1.496"	0.394"	0.625"		-6		2.9	2	
			66160R-11T-G	●	11	160	167	110	2.000"	72					0.433"	0.750"				4.5		
		Extra Fine Pitch	MFPN 66080R-9T-G	●	9	80	88	70	1.000"	20	13	-	50	1.063"	0.236"	0.375"	+12	-7	No	1.2	1	PNMU0905...
			66100R-11T-G	●	11	100	107	78	1.250"	45				1.339"	0.315"	0.500"				1.7		
			66125R-13T-G	●	13	125	132	89	1.500"	55	-		63	1.496"	0.394"	0.625"		-6		3	2	
			66160R-15T-G	●	15	160	167	110	2.000"	72					0.433"	0.750"				4.8		
	Metric Bore Dia.	Fine Pitch	MFPN 66050R-4T-M-G	●	4	50	58	48	22	18	11	-	40	21	6.3	10.4	+12	-9	No	0.3	1	PNMU0905...
			66063R-5T-M-G	●	5	63	71											-8		0.5		
			66080R-6T-M-G	●	6	80	88	70	27	20	13		50	24	7	12.4		-7		1.2		
			66100R-7T-M-G	●	7	100	107	78	32	45	-			30	8	14.4		-6		1.6	2	
			66125R-9T-M-G	●	9	125	132	89	40	55			63	33	9	16.4				2.8		
			66160R-11T-M-G	●	11	160	167					66.7								3.8	3	
		Extra Fine Pitch	MFPN 66050R-5T-M-G	●	5	50	58	48	22	18	11	-	40	21	6.3	10.4	+12	-9	No	0.4	1	PNMU0905...
			66063R-7T-M-G	●	7	63	71											-8		0.5		
			66080R-9T-M-G	●	9	80	88	70	27	20	13		50	24	7	12.4		-7		1.2		
			66100R-11T-M-G	●	11	100	107	78	32	45	-			30	8	14.4		-6		1.6	2	
			66125R-13T-M-G	●	13	125	132	89	40	55			63	33	9	16.4				3		
			66160R-15T-M-G	●	15	160	167					66.7								4	3	

APMX : 5mm (GM, SM, GH Chipbreakers, Coated cabide), 3mm (GM Chipbreaker, Cermet)

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Spare Parts (Both Metric and Inch Size Bore Dia.)

Part Number			Spare Parts			
			Insert Screw	Wrench	Anti-seize Compound	Arbor 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	Recommended Torque for Insert Screw 3.5 Nm			-
		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	Recommended Torque for Insert Screw 3.5 Nm			-
		66125R-13T(-M)-G				
		66160R-15T(-M)-G				

Coat Anti-seize Compound (P-37) thinly on portion of taper and thread prior to installation.

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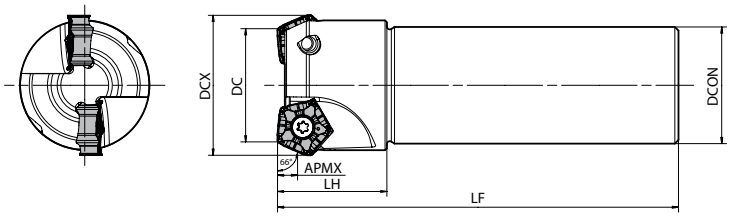
MFPN66 (End Mill)



Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions					A.R. max.(°)	R.R. (°)	Coolant Hole	Spare Parts			Applicable Inserts ➡ M36
		R		DC	DCX	DCON	LF	LH				Anti-Seize Compound	Screw	Wrench	
mm	MFPN 66032R-S32-2T-G	●	2	32	39.5	32	110	30	+12	-14	No	P-37	SB-4090TRP	DTPM-15	PNMU0905...
	66040R-S32-3T-G	●	3	40	47.5					-12					

APMX : 5 mm (GM, SM, GH Chipbreakers, Coated cabide), 3 mm (GM Chipbreaker, Cermet)
Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.
Recommended tightening torque for insert clamp : 3.5N·m

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
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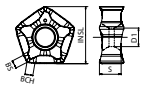
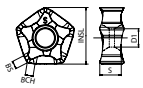
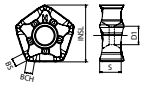
PNMU

Usage Classification										
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel			☆			★	☆	■	P
	Mold and die steel			☆			★	☆	■	
	Austenitic stainless steel				☆		☆	★		M
	Martensitic stainless steel							☆		
	Precipitation hardened stainless steel				☆			★		
	Gray cast iron		☆			★				K
	Nodular cast iron		☆			★				
	Non-ferrous metals									N
	Heat-resistant alloy							☆		S
	Titanium alloy				☆			★		
	Hard materials (≤ 60 HRC)	★								H

Insert		Part Number	No. of Edges	Dimensions (mm)					Carbide						Cermet	Applicable Toolholder ➡ M33 M35
				S	D1	INSL	BCH	BS	PVD						-	
									PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	TN620M	
	 General purpose	PNMU 0905XNER-GM	10	5.56	4.7	14.6	2	2		△	●	●	●	●	●	●	MFPN66...
	 Low cutting force	PNMU 0905XNER-SM	10	5.56	4.7	14.6	2	2		△	●	●	●	●	●		MFPN66...
	 Tough edge	PNMU 0905XNER-GH	10	5.56	4.7	14.6	2	2	●	△	●	●	●	●	●		MFPN66...

Recommended Cutting Conditions ➡ M37

PNMU inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Coated Carbide

Chipbreaker	Workpiece Material	Feed (fz: ipt)	Recommended Insert Grade (Cutting Conditions Vc: sfm)			
			MEGACOAT NANO EX (MEGACOAT NANO)			MEGACOAT HARD
			PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	PR015S
GM	Carbon Steel	0.004~**0.008**~0.012	☆ 390~**590**~820	★ 390~**590**~820	-	-
	Alloy Steel	0.004~**0.008**~0.012	☆ 330~**520**~720	★ 330~**520**~720	-	-
	Mold Steel	0.004~**0.007**~0.010	★ 260~**460**~590	★ 260~**460**~590	-	-
	Austenitic Stainless Steel	0.004~**0.007**~0.010	☆ 330~**490**~660	☆ 330~**490**~660	-	-
	Martensitic Stainless Steel	0.004~**0.007**~0.010	☆ 330~**490**~660	-	-	-
	Precipitation Hardened Stainless Steel	0.004~**0.007**~0.010	★ 300~**390**~490	-	-	-
	Gray Cast Iron	0.004~**0.008**~0.012	-	-	★ 390~**590**~820	-
	Nodular Cast Iron	0.004~**0.007**~0.010	-	-	★ 330~**490**~660	-
	Ni-base Heat-Resistant Alloy	0.004~**0.005**~0.008	☆ 70~**100**~160	-	-	-
SM	Carbon Steel	0.002~**0.005**~0.008	-	☆ 390~**590**~820	-	-
	Alloy Steel	0.002~**0.005**~0.008	-	☆ 330~**520**~720	-	-
	Mold Steel	0.002~**0.004**~0.006	-	☆ 260~**460**~590	-	-
	Austenitic Stainless Steel	0.002~**0.005**~0.008	★ 330~**490**~660	☆ 330~**490**~660	-	-
	Martensitic Stainless Steel	0.002~**0.005**~0.008	★ 330~**490**~660	-	-	-
	Precipitation Hardened Stainless Steel	0.002~**0.005**~0.008	☆ 300~**390**~490	-	-	-
	Gray Cast Iron	0.002~**0.005**~0.008	-	-	☆ 390~**590**~820	-
	Nodular Cast Iron	0.002~**0.004**~0.006	-	-	☆ 330~**490**~660	-
	Ni-base Heat-Resistant Alloy	0.002~**0.003**~0.006	★ 70~**100**~160	-	-	-
	Titanium Alloy	0.002~**0.003**~0.006	★ 130~**200**~260	-	-	-
GH*	Carbon Steel	0.006~**0.010**~0.014	-	☆ 390~**590**~820	-	-
	Alloy Steel	0.006~**0.010**~0.014	-	☆ 330~**520**~720	-	-
	Mold Steel	0.004~**0.008**~0.012	-	☆ 260~**460**~590	-	-
	Gray Cast Iron	0.006~**0.010**~0.014	-	-	☆ 390~**590**~820	-
	Nodular Cast Iron	0.004~**0.008**~0.012	-	-	☆ 330~**490**~660	-
	Hardened Materials (≤ 60HRC)	0.002~**0.003**~0.006	-	-	-	★ 160~**260**~330

*When using GH chipbreaker for fine pitch cutters, recommended feed is fz 0.008 ipt

★: 1st Recommendation ☆: 2nd Recommendation

Cermet

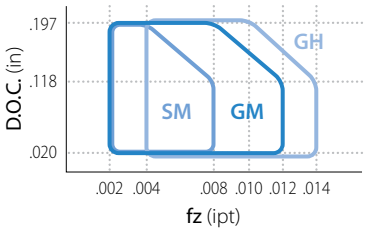
Chipbreaker	Workpiece Material	Feed (fz: ipt)	Recommended Insert Grade (Cutting Conditions Vc: sfm)
			Cermet
			TN620M
GM	Carbon Steel	0.002~0.005~0.006	★ 660~**820**~980
	Alloy Steel	0.002~0.005~0.006	★ 590~**720**~820
	Mold Steel	0.002~0.004~0.005	★ 490~**590**~720

★: 1st Recommendation

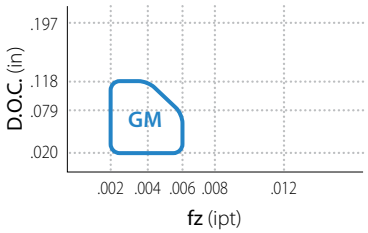
The number in bold font is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation

Cutting with coolant is recommended for Ni-base Heat Resistant Alloy and Titanium Alloy

Coated Carbide



Cermet



Applicable Chipbreaker Range

Cutter	Insert		
	GM	SM	GH
Fine Pitch	✓	✓	✓
Extra Fine Pitch	✓	✓	fz = 0.008 ipt is Recommended

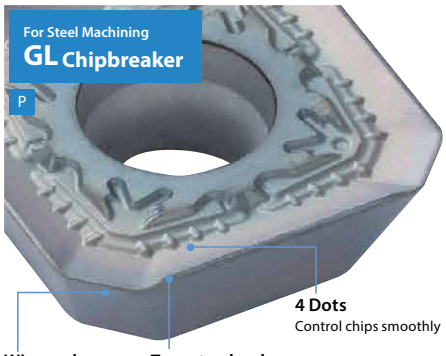
High Precision High Rake Milling

MFSE45

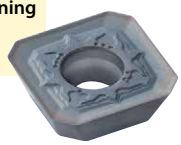
Rough and Finish in a Single Pass with Excellent Surface Finish
Roughing Condition (fz = 0.010ipt) Provides Excellent Surface Finish (0.8 µmRa or Less)

1 The MFSE45 Milling Solution

Delivers high-quality surfaces by roughing and finishing simultaneously

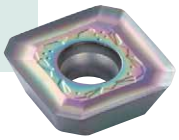


For Stainless Steel Machining
SL Chipbreaker



M
Micro-honing

For Aluminum Machining
AL Chipbreaker

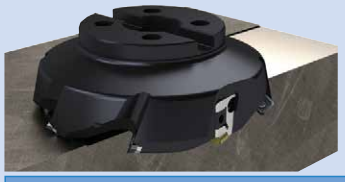


N
Sharp Edge

Machining Comparison Simulation (Example)

MFSE45 1 Pass and cutting time was cut by 1/3, with a good surface finish (0.8 µmRa or less)

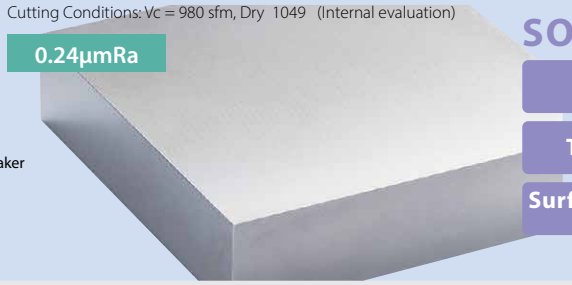
fz = 0.010 ipt (D.O.C. = 0.039")



Ø160mm -8T GL Chipbreaker
(With Wiper Insert)

Cutting Time **Roughing + Finishing**

Cutting Conditions: Vc = 980 sfm, Dry 1049 (Internal evaluation)



SOLUTION
- 1 Pass
- Time = 1/3
- Surface Finish ✓

Conventional Machining

Two separate passes for roughing and finishing
Cutting time is longer due to low feed rates during finishing

fz = 0.006 ipt (D.O.C. = 0.032")

Ø160mm-8T

fz = 0.005 ipt (D.O.C. = 0.008")

Ø160mm-8T

Cutting Time **Roughing** → **Finishing**

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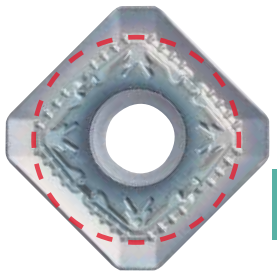
2 Excellent Surface Finish and Long Tool Life

Tight IC tolerance of insert

Improved surface finish quality and longer tool life with reducing front edge runout



Inscribed Circle Tolerance
± 0.0008" or Less

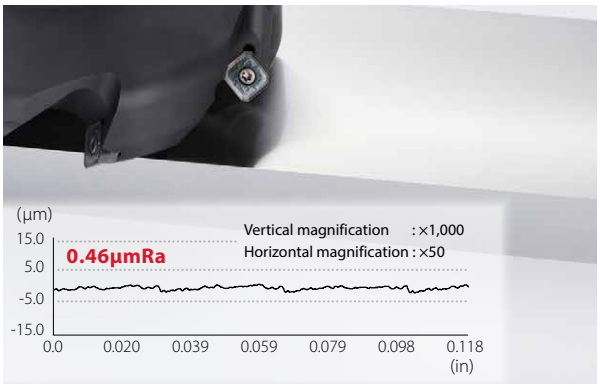
(Class E Standard ± 0.0012" or less)

Excellent Front Edge Runout Accuracy

Advantage ❶ Theoretical reduction of roughness on finished surface, excellent surface finish

Front Edge Runout: Small ⇒ Surface Roughness: Good

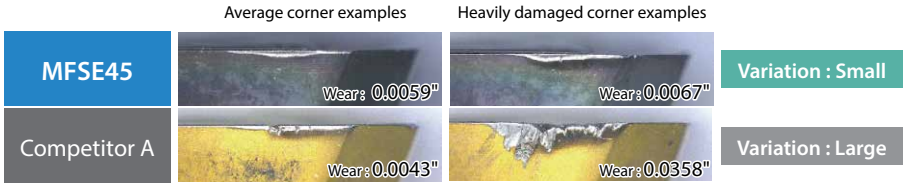
Surface roughness in stainless steel machining (Internal evaluation)



Cutting Conditions : Vc = 820 sfm, D.O.C. x ae = 0.039" x 3.937", fz = 0.006 ipt, Wet 304 Ø125mm (Standard 6 flutes) SL Chipbreaker

Advantage ❷ Insert wear progresses evenly and tool life can be improved

Effect on wear (User Evaluation)



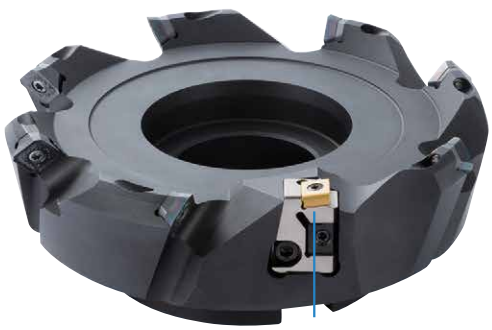
Cutting Conditions : Vc = 890 sfm, D.O.C. = ~ 0.059", fz = 0.008 ipt, Wet SS 400 Ø250mm (15 flutes) SL Chipbreaker (PR1535)

Due to the high wear rate of the insert, all inserts need to be replaced, which may result in shorter tool life.

3 Various Holders Available for Multiple Applications

In addition to styles with a wiper insert, the standard type with only the standard inserts are also available

Type	With Wiper Insert	Standard
Surface roughness	Approx. 0.8μmRa	Approx. 1.6μmRa
Recommended feed	fz = 0.010 ipt	fz = 0.005 ipt (Finish machining time)
Application	High efficiency finishing	General purpose (Uses 1 insert style)



Using wiper insert for MFF

(Cutting edge adjustment mechanism)

Note) See page 7 for details on how to adjust the cutting edge.

MFSE45 (Face Mill)

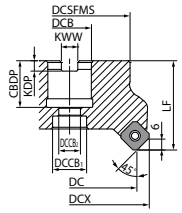


Fig. 1

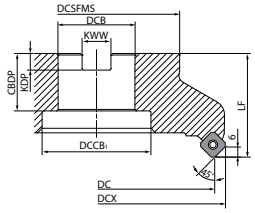


Fig. 2

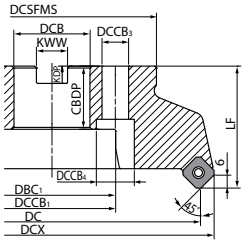
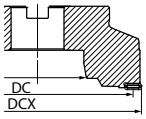


Fig. 3



Wiper Insert Pocket

Toolholder Dimensions

Unit			Part Number	Std. Item R	Std. Item L	No. of Inserts	Dimensions DC	DCX	DCB	DCSFMS	DCCB1	DCCB2	DCCB3	DCCB4	DBC1	LF	CBDP	KDP	KWW	Coolant Hole	Max RPM	Weight (kg)	Fig.	Applicable Inserts M42
mm	Standard	Inch Bore Dia.	MFSE 45080R-5T	●		5	80	88.7	1.000"	70	20	13	-	-	-	50	1.063"	0.236"	0.375"	No	12,800	1.4	1	SEET13T3...
			45100R-5T	●			100	108.7	1.250"	78	48						1.260"	0.315"	0.500"		11,500	1.9	2	
			45125R-6T	●		6	125	133.7	1.500"	89	55					63	1.496"	0.394"	0.625"		10,200	3.3	2	
			45160PL-7T	●	●	7	160	168.7	2.000"	110	72	-					1.496"	0.433"	0.750"		9,000	5.3	2	
			45200PL-8T	●	●	8	200	208.7	1.875"	142	100		18	26	101.6		1.575"	0.551"	1.000"		8,100	7.3	3	
			45250PL-10T	●	●	10	250	258.7		222	110						1.575"	0.551"	1.000"		7,200	15.8	3	
		Metric Bore Dia.	MFSE 45063R-5T-M	●		5	63	71.7	22	48	-	5	-	-	-	50	21	6.3	10.4	No	14,400	0.6	1	SEET13T3...
			45080R-5T-M	●			80	88.7	27	70							24	7	12.4		12,800	1.4	1	
			45100R-5T-M	●			100	108.7	32	78							30	8	14.4		11,500	1.8	2	
			45125R-6T-M	●		6	125	133.7	40	89		6				63	33	9	16.4		10,200	3.2	2	
			45160R-7T-M	●		7	160	168.7		110		7	14	20	66.7		32				9,000	5.4	3	
			45200R-8T-M	●		8	200	208.7	60	142		8	18	26	101.6		40	14	25.7		8,100	7	3	
			45250R-10T-M	●		10	250	258.7		222		10									7,200	15.5	3	
	Wiper Insert	Inch Bore Dia.	MFSE 45160R-8T-W	●		8	160	168.7	2.000"	102	72	-	-	-	-	63	1.496"	0.433"	0.750"	No	1,000	5.5	3	SEET13T3... LNGX1209...
			45200R-9T-W	●		9	200	208.7	1.875"	142	133		18	26	101.6		1.575"	0.551"	1.000"		800	7.6	3	
			45250R-11T-W	●		11	250	258.7		222							1.496"	0.551"	1.000"			12.3	3	
		Metric Bore Dia.	MFSE 45160R-8T-W-M	●		8	160	168.7	40	110	1	8	-	-	-	63	33	9	16.4	No	1,000	5.5	2	SEET13T3... LNGX1209...
			45200R-9T-W-M	●		9	200	212.8	60	142		9	18	26	101.6		40	14	25.7		800	7.3	3	
			45250-11T-W-M	□		11	250	262.7		222		11					38					12	3	

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Spare Parts

Common for Standard and Wiper Insert Styles

Clamp Screw	Wrench	Shim	Shim screw	Wrench	Anti-Seize Compound
SB-35120TRP	DTPM-15	MFSE-105	SPW-5035	LW-3.5	P-37
Recommended tightening torque for insert clamp 4N·m		Recommended tightening torque for shim clamp 5N·m			

For Wiper Insert

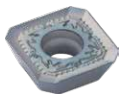
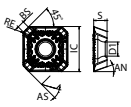
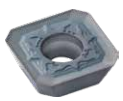
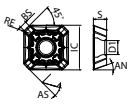
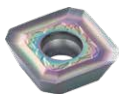
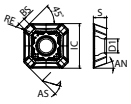
Clamp screw	Wrench	Wedge	Cartridge	Cartridge clamp screw	Wrench	Adjustment Screw
SB-3592TR	DTM-10	AD-MFF	CR-MFF	HH5X15L	TTW-15	W6X18N
Recommended tightening torque for wiper insert clamp 1.2N·m						

SEET

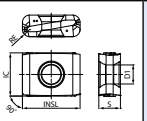
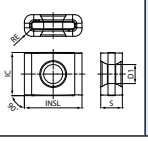
Usage Classification

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

Carbon steel / Alloy steel	☆			☆	☆	★	P
Mold and die steel	☆		☆		★	☆	P
Austenitic stainless steel	☆			☆	☆	★	M
Martensitic stainless steel	★				☆	☆	M
Precipitation hardened stainless steel							M
Gray cast iron	★				☆	☆	K
Nodular cast iron	★				☆	☆	K
Non-ferrous metals		★					N
Heat-resistant alloy	★					☆	S
Titanium alloy				☆		★	S
Hard materials							H

Insert		Part Number	No. of Edges	Dimensions (mm)					Angle (°)		Carbide						Applicable Toolholder ⇨ M40
				IC	S	D1	RE	BS	AN	AS	CVD	DLC	PVD				
											CA6535	PDL025	PR1525	PR1535	PR1825	PR1835	
	 General Purpose	SEET 13T3AGSN-GL	4	13.4	3.97	4.2	1.5	2.1	20	29	●		●	●	●	●	MFSE45...
	 Stainless Steel	SEET 13T3AGSN-SL	4	13.4	3.97	4.2	1.5	2.1	20	29	●		●	●	●	●	MFSE45...
	 Non-Ferrous Metals	SEET 13T3AGFN-AL	4	13.4	3.97	4.2	1.5	2.1	20	29		●					MFSE45...

LNGX

Insert		Part Number	No. of Edges	Dimensions (mm)					Carbide		Cermet	Applicable Toolholder ⇨ M40 M221
				IC	S	D1	RE	INSL	PVD		PVD	
									PR1525	PR1825	PV60M	
	 Low Cutting Force	LNGX 120916R-TT	4	9.525	4.76	4.2	1.6	12.7	●	●	●	MFSE45...-W MFSE45...-W-M MFF...-SF
		LNGX 120916	4	9.525	4.76	4.2	1.6	12.7	●	●	●	MFSE45...-W MFSE45...-W-M MFF...-SF

Recommended Cutting Conditions ⇨ M43

SEET and LNGX inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Chipbreaker	Workpiece Material	fz (ipt)	Recommended Insert Grade (Cutting Speed Vc: sfm)			
			MEGACOAT NANO EX (MEGACOAT NANO)		CVD Coated Carbide	DLC (Coated Carbide)
			PR1835 (PR1535)	PR1825 (PR1525)	CA6535	PDL025
GL	Carbon Steel	0.004 ~ **0.006** ~ 0.012	★ 490 ~ **660** ~ 980	☆ 490 ~ **660** ~ 980	☆ 490 ~ **660** ~ 980	–
	Alloy Steel	0.004 ~ **0.006** ~ 0.012	★ 490 ~ **660** ~ 980	☆ 490 ~ **660** ~ 980	☆ 490 ~ **660** ~ 980	–
	Mold Steel	0.004 ~ **0.006** ~ 0.010	☆ 330 ~ **490** ~ 820	★ 330 ~ **490** ~ 820	☆ 330 ~ **490** ~ 820	–
	Austenitic Stainless Steel*	0.004 ~ **0.006** ~ 0.010	★ 330 ~ **660** ~ 820	☆ 330 ~ **660** ~ 820	☆ 330 ~ **660** ~ 820	–
	Martensitic Stainless Steel*	0.004 ~ **0.006** ~ 0.010	★ 330 ~ **660** ~ 820	☆ 330 ~ **660** ~ 820	☆ 330 ~ **660** ~ 820	–
	Gray Cast Iron	0.004 ~ **0.006** ~ 0.010	☆ 330 ~ **660** ~ 820	☆ 330 ~ **660** ~ 820	☆ 330 ~ **660** ~ 820	–
	Nodular Cast Iron	0.004 ~ **0.006** ~ 0.010	☆ 330 ~ **660** ~ 820	☆ 330 ~ **660** ~ 820	★ 330 ~ **660** ~ 820	–
SL	Carbon Steel	0.004 ~ **0.005** ~ 0.006	☆ 490 ~ **660** ~ 980	☆ 490 ~ **660** ~ 980	☆ 490 ~ **660** ~ 980	–
	Alloy Steel	0.004 ~ **0.005** ~ 0.006	☆ 490 ~ **660** ~ 980	☆ 490 ~ **660** ~ 980	☆ 490 ~ **660** ~ 980	–
	Mold Steel	–	–	–	–	–
	Austenitic Stainless Steel*	0.004 ~ **0.006** ~ 0.008	★ 330 ~ **660** ~ 820	☆ 330 ~ **660** ~ 820	☆ 330 ~ **660** ~ 820	–
	Martensitic Stainless Steel*	0.004 ~ **0.006** ~ 0.008	★ 330 ~ **660** ~ 820	☆ 330 ~ **660** ~ 820	☆ 330 ~ **660** ~ 820	–
AL	Aluminum Alloy (Si 13% or less)	0.004 ~ **0.006** ~ 0.012	–	–	–	★ 660 ~ **1,310** ~ 1,640

*Machining with coolant is recommended for stainless steel.
Bold text in the table indicates recommended values. Adjust the cutting speed and feed within the above conditions according to the actual machining situation.

★: 1st Recommendation ☆: 2nd Recommendation

Face Mills for Heavy Milling

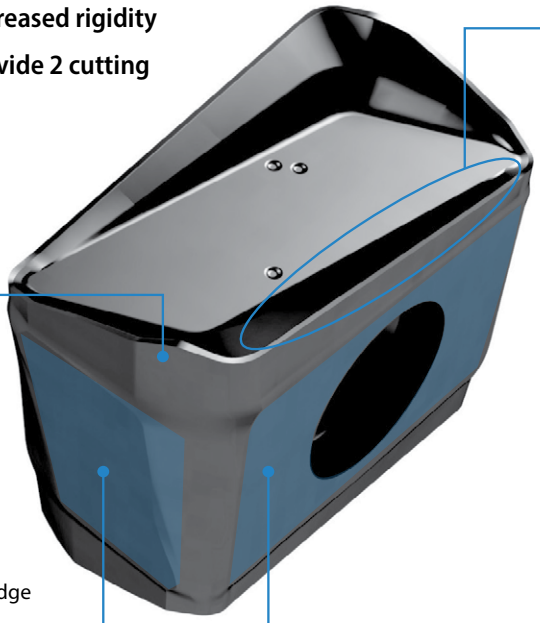
MFLN

Tough 4-edge tangential inserts for reliable heavy milling at large D.O.C. and high feed rates
Three lead angle options for optimized machining in various applications

1 Tough and Reliable Inserts for Stable Heavy Milling

Inserts up to 20mm long offer increased rigidity

Tangentially mounted inserts provide 2 cutting edges on each side

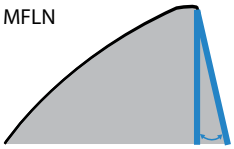


Obtuse Edge Design

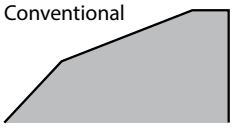
Increases the cutting edge angle only at the tip to maintain both strength and sharpness

Cross-section view of cutting edge

MFLN



Conventional



Corner Chamfer

(only available on MFLN90)

Both general corner-R type and chamfered corner type available

Prevents chattering and insert fracturing

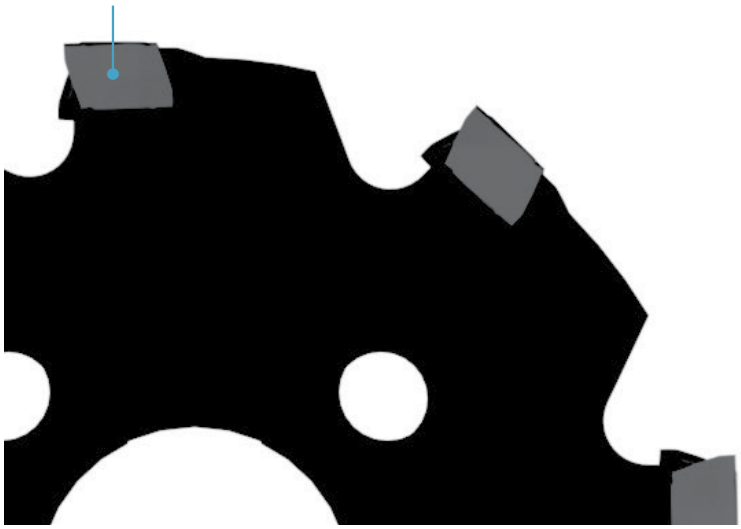
Convex cutting edge ridge

Reduced impact forces when entering the workpiece

Wide Flat Mounting Surface

Holds insert firmly in heavy milling applications

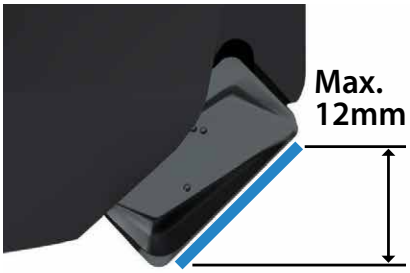
Tangentially mounted inserts increase rigidity



800.823.7284
www.kyoceraprecisiontools.com

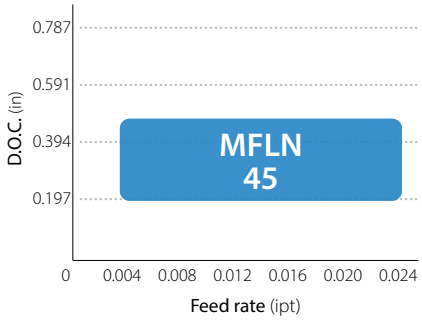
2 Large D.O.C. and High Feed Rates

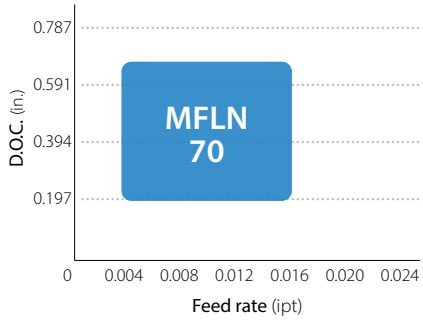
MFLN45
(Cutting edge angle **45°**)



MFLN70
(Cutting edge angle **70°**)

Applicable Range

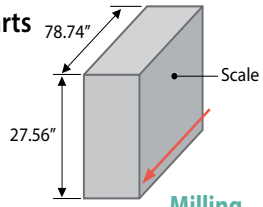




Case Study

Forging Die for Automotive Parts

Vc = 295 sfm
D.O.C. × ae = ~0.039" × ~3.15"
fz = 0.014 ipt Dry
MFLN45080R-4T-M (ø80mm-4 Inserts)
LOGU221616ER-GM PR1535



Chip Removal Volume

Milling Efficiency

MFLN45 (ø80mm-4 Inserts) **Q=416cc/min** x1.2

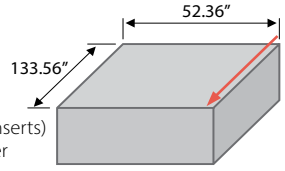
Competitor H (ø100mm-5 Inserts) **Q=336cc/min**

MFLN achieved 1.2 times machining efficiency.
Quieter machining and good chip shapes

(User evaluation)

Machining base FCD600

Vc = 395 sfm
D.O.C. = 0.433" × 6.49"
fz = 0.025 ipt Dry
XMFLN70250R-13T-OH-M (ø250mm-13 Inserts)
Fine pitch, internal coolant, custom holder
LOGU221616ER-GM PR1525



Chip Removal Volume

Milling Efficiency

	Roughing	Finishing
MFLN70	**Q=2,340cc/min**	**Q=2,340cc/min** x1.1
Competitor	Roughing (Competitor F) **Q=2,100cc/min**	Finishing (Competitor G) **Q=1,970cc/min**

MFLN improved machining efficiency with lower cutting force.
It can be used for both roughing and finishing applictions

(User evaluation)

MFLN45 (Face Mill)

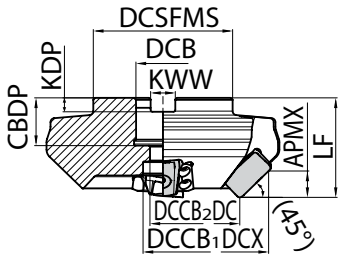


Fig. 1

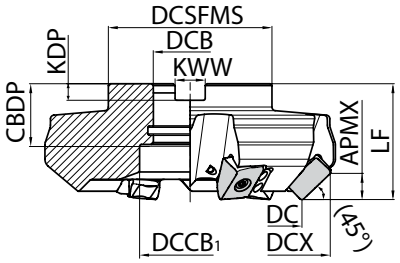


Fig. 2

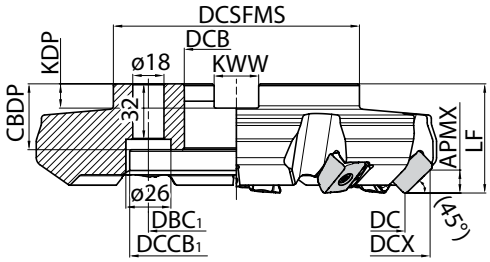


Fig. 3

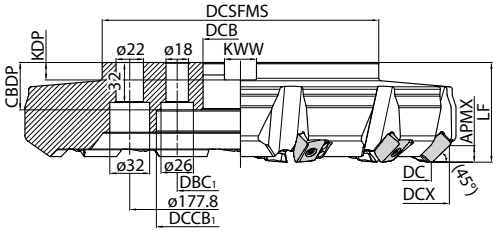


Fig. 4

Toolholder Dimensions

Unit		Part Number	Std. Item	No. of Inserts	Dimensions (mm)													A.R. max.(°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Applicable Inserts M48
			R		DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	DBC1	LF	CBDP	KDP	KWW	APMX								
mm	Inch Bore Dia.	MFLN 45080R-4T	●	4	80	104	70	1.000"	20	13	-	50	1.063"	0.236"	0.375"	12	+2	-15.5		5,970	2	1	LOGU221616ER-GM
		45100R-4T	●		100	124	78	1.250"	45				1.339"	0.315"	0.500"			-14.5	Yes	4,780	2.7	2	
		45125R-6T	●	6	125	149	89	1.500"	55			63	1.496"	0.394"	0.625"			-13.5		3,820	4.6	2	
		45160R-7T	●	7	160	184	110	2.000"	90	-				0.433"	0.750"				No	2,990	6.8	2	
		45200R-8T	●	8	200	224	142	1.875"	124		4.000"			0.551"	1.000"					2,390	10	3	
		45250R-10T	●	10	250	274	222		160											1,910	17.1	3	
		45315R-12T	□	12	315	339			215			80								1,520	25.3	4	
	Metric Bore Dia.	45080R-4T-M	●	4	80	104	70	27	20	13	-	50	24	7	12.4	12	+2	-15.5		5,970	2	1	LOGU221616ER-GM
		45100R-4T-M	●		100	124	78	32	45				30	8	14.4			-14.5	Yes	4,780	2.7	2	
		45125R-6T-M	●	6	125	149	89	40	55			63	33	9	16.4			-13.5		3,820	4.6	2	
		45160R-7T-M	●	7	160	184	110		90	-	66.7								No	2,990	6.7	3	
		45200R-8T-M	●	8	200	224	142	60	124				38	14	25.7					2,390	9.7	3	
		45250R-10T-M	●	10	250	274	222		160		101.6									1,910	16.9	3	
		45315R-12T-M	□	12	315	339			215			80								1,520	25.1	4	

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MFLN70 (Face Mill)

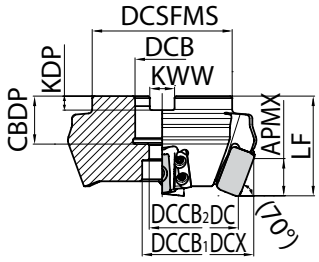


Fig. 1

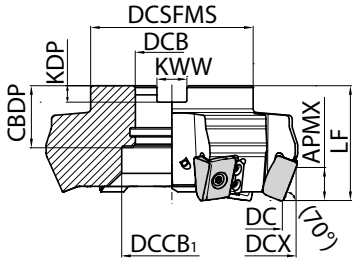


Fig. 2

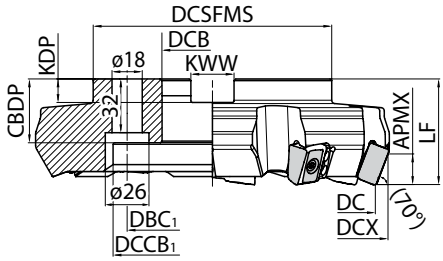


Fig. 3

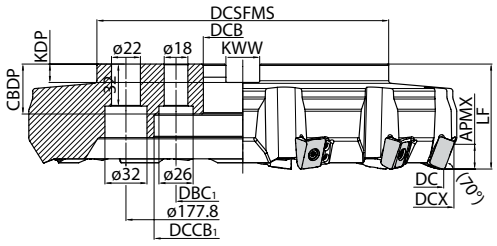
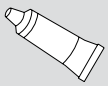


Fig. 4

Toolholder Dimensions

Unit		Part Number	Std. Item	No. of Inserts	Dimensions (mm)												A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Applicable Inserts ➡ M48
			R		DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	DBC1	LF	CBDP	KDP	KWW	APMX							
mm	Inch Bore Dia.	MFLN 70080R-4T	●	4	80	93	70	1.000"	20	13	-	50	1.063"	0.239"	0.375"	17	+1	-16.5		5,970	1.4	1	LOGU221616ER-GM
		70100R-4T	●		100	113	78	1.250"	45				1.339"	0.315"	0.500"			-14.5	Yes	4,780	2	2	
		70125R-6T	●	6	125	138	89	1.500"	55			63	1.496"	0.394"	0.625"			-13.5		3,820	3.5	2	
		70160R-7T	●	7	160	173	110	2.000"	70	-				0.433"	0.750"				No	2,990	5.8	2	
		70200R-8T	●	8	200	213	142	1.875"	120		4.000"			0.551"	1.000"					2,390	8.5	3	
		70250R-10T	●	10	250	263	222		160											1,910	15.1	3	
		70315R-12T	□	12	315	328			215			80								1,520	22.2	4	
	Metric Bore Dia.	MFLN 70080R-4T-M	●	4	80	93	70	27	20	13	-	50	24	7	12.4	17	+1	-16.5		5,970	1.4	1	LOGU221616ER-GM
		70100R-4T-M	●		100	113	78	32	45				30	8	14.4			-14.5	Yes	4,780	1.9	2	
		70125R-6T-M	●	6	125	138	89	40	55			63	33	9	16.4			-13.5		3,820	3.4	2	
		70160R-7T-M	●	7	160	173	110		90	-	66.7								No	2,990	5.3	3	
		70200R-8T-M	●	8	200	213	142	60	120				38	14	25.7					2,390	8.2	3	
		70250R-10T-M	●	10	250	263	222		160		101.6									1,910	14.8	3	
		70315R-12T-M	□	12	315	328			215			80								1,520	21.9	4	

Spare Parts

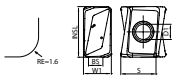
Part Number	Parts						
	Insert Screw	Wrench	Shim	Clamp screw	Wrench	Anti-Seize Compound	Arbor bolt
							
MFLN ○○080R-4T(-M)	SB-60200TRP	TTP-20	MAP-2216	SB-40140TR	DTM-15	P-37	HH12X35
MFLN ○○100R-4T(-M) ~ ○○315R-12T(-M)							–
	Tightening torque for clamping insert 6.0 N·m		Tightening torque for clamping shim 3.5 N·m				

Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

LOGU

Usage Classification						
★: Roughing / 1st Choice ☆: Roughing / 2nd Choice ■: Finishing / 1st Choice □: Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel	☆		★	☆	P
	Mold and die steel	☆		★	☆	P
	Austenitic stainless steel					M
	Martensitic stainless steel					M
	Precipitation hardened stainless steel					M
	Gray cast iron	☆		★	☆	K
	Nodular cast iron	☆		★	☆	K
	Non-ferrous metals					N
	Heat-resistant alloy					S
	Titanium alloy					S
	Hard materials					H

Insert		Part Number	No. of Edges	Dimensions (mm)						Carbide				Applicable Toolholder ➡ M46 M47 M166
				S	D1	RE	W1	INSL	BS	PVD				
										PR1525	PR1535	PR1825	PR1835	
	 Corner-R	LOGU 221616ER-GM	4	16.6	6.8	1.6	12.5	22.8	6.3	●	●	●	●	MFLN45... MFLN70... MFLN90...

Recommended Cutting Conditions ➡ M49

Applicable Insert Selection

	LOGU221616ER-GM (Corner-R)	LOGU2216PWER-GM (Corner Chamfer)
MFLN 45	✓	Not applicable
MFLN 70	✓	Not applicable

LOGU inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions (MFLN45 / MFLN70)

	Workpiece Material	D.O.C. (in.)		Feed (fz : ipt)	Recommended Insert Grades (Cutting Speed Vc : sfm)	
		Width of Cut ≦0.5×DC	Width of Cut >0.5×DC		MEGACOAT NANO EX (MEGACOAT NANO)	
					PR1825 (PR1825)	PR1835 (PR1835)
MFLN 45	Carbon Steel	~0.394	~0.315	0.004~**0.012**~0.024	★ 330~**490**~590	☆ 260~**390**~490
	Alloy Steel				★ 330~**490**~590	☆ 260~**390**~490
	Die Steel				★ 260~**390**~490	☆ 230~**330**~390
	Gray Cast Iron	~0.474	~0.394	0.004~**0.012**~0.024	★ 330~**490**~590	☆ 260~**390**~490
	Nodular Cast Iron				★ 330~**490**~590	☆ 260~**390**~490
MFLN 70	Carbon Steel	~0.591	~0.472	0.004~**0.008**~0.016	★ 330~**490**~590	☆ 260~**390**~490
	Alloy Steel				★ 330~**490**~590	☆ 260~**390**~490
	Die Steel				★ 260~**390**~490	☆ 230~**330**~390
	Gray Cast Iron	~0.669	~0.591	0.004~**0.008**~0.016	★ 330~**490**~590	☆ 260~**390**~490
	Nodular Cast Iron				★ 330~**490**~590	☆ 260~**390**~490

The number in **bold** font is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
Dry machining is recommended.

★: 1st Recommendation ☆: 2nd Recommendation

How to Mount Inserts

1. Completely eliminate chips and dust from the insert mounting side.
2. After mounting a clamp screw on the top edge of wrench, tighten the screw while keeping the insert pushed against the shim seat surface and holder surface (Fig.1,2)
3. Make sure that the identification on the top of the insert is the same in each pocket. (Fig.3)
4. Tighten the wrench (20IP) in while holding parallel to the clamp screw.
5. Tighten the insert clamp screw at an appropriate torque. (Recommended torque: 6.0 Nm)
6. After tightening, check that there is no gap between the insert and the surface of the shim, or between the side surface of insert and the holder surface. If there is a gap, remount the insert using the directions above.

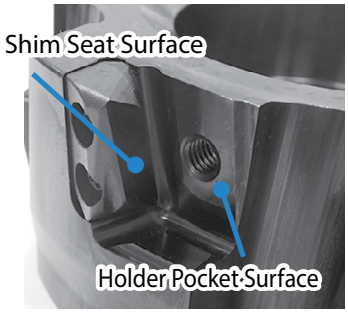


Fig.1

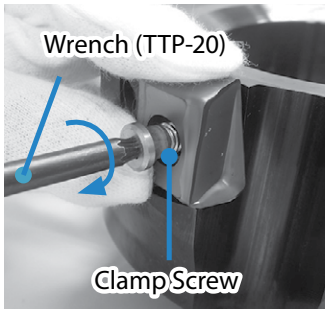


Fig.2

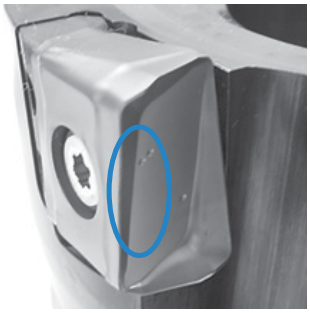


Fig.3

How to Replace the Insert Shim Seat

1. Completely eliminate chips and dust from the shim mounting side.
2. Coat medium strength screw locking adhesive on the screws.
3. Tighten the screw keeping the shim pushed against the pocket surface of toolholder.
4. After tightening both screws temporarily, tighten them with appropriate torque. (Recommended torque:3.5 N·m)
5. Please check that there is no gap between the shim and the pocket surfaces of toolholder.

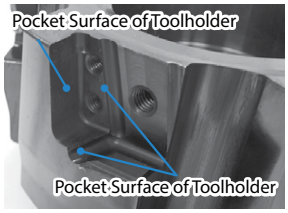


Fig.1

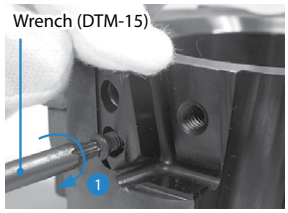


Fig.2

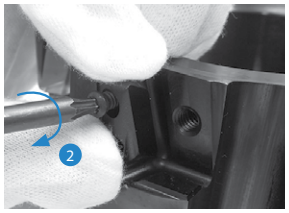


Fig.3

Fig.4

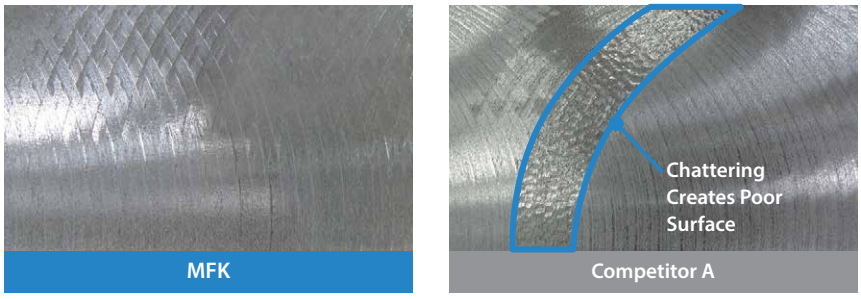
High Efficiency Cast Iron Machining

MFK

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

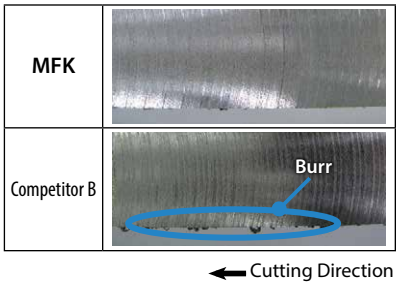
MFK Reduces cutting forces with a well balanced design
Excellent surface finish is achieved by minimizing chattering

Surface Finish Comparison (Internal Evaluation)



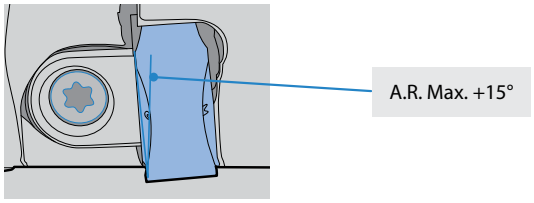
Cutting Conditions: Vc = 590 sfm, fz = 0.012 ipt, ap × ae = 0.118" × 3.071", Dry Workpiece: Nodular Cast Iron (80-60-03)

Burr Comparison (Internal Evaluation)

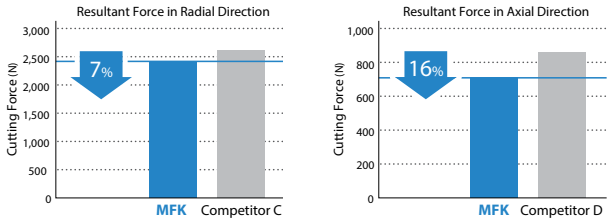


Sharp Cutting Prevents Burr Formation

1 Low Cutting Forces with Helical Cutting Edge Design

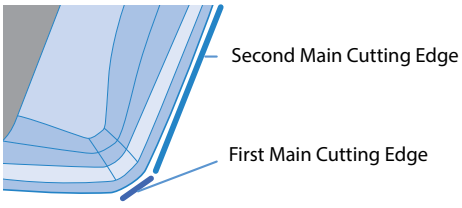


Cutting Force Comparison (Internal Evaluation)

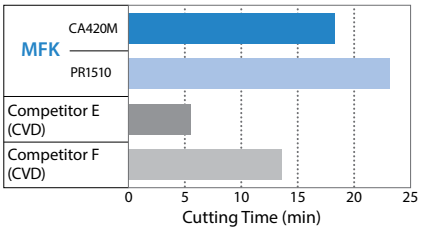


Cutting Conditions: Vc = 590 sfm, fz = 0.012 ipt, D.O.C. × ae = 0.118" × 2.441", Dry Workpiece: Nodular Cast Iron (80-60-03), Ø5.000"

2 Tough and Reliable Dual Angle Edge Design



Fracture Resistance Comparison (Internal Evaluation)



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

Reduces impact load when entering the workpiece

800.823.7284
www.kyocera precisiontools.com

Large Cutter Lineup for Various Applications

Fine and Extra Fine Pitch Types Available.

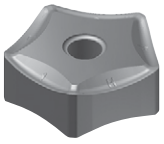
Fine Pitch
(Example: 5000R-11-12T = 12 Inserts)

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

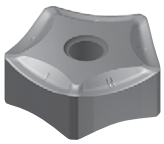
Extra Fine Pitch
(Example: 5000R-11-18T = 18 Inserts)

- Recommended for Rigid Setups
- Finer Pitch for Higher Efficiency

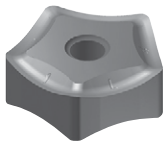
Wide Range of Chipbreakers for Various Machining Applications



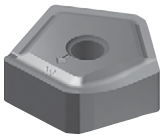
General Purpose:
GM Chipbreaker



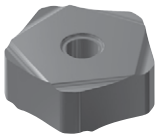
Heavy Duty:
GH Chipbreaker



Finishing:
GL Ground Chipbreaker

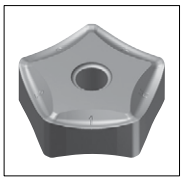


Wiper Edge:
W Ground Wiper Edge

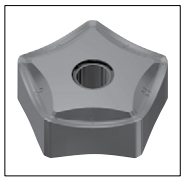


High Speed Machining:
Ceramic with Chipbreaker

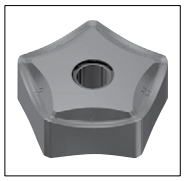
Insert Grade Lineup



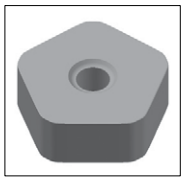
CA420M
Long Tool Life
(CVD)
(1st Recommendation)



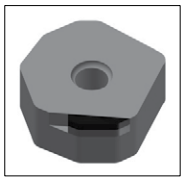
PR1510
Stable Machining
(PVD)



PR1525
Fracture Resistance
(PVD)



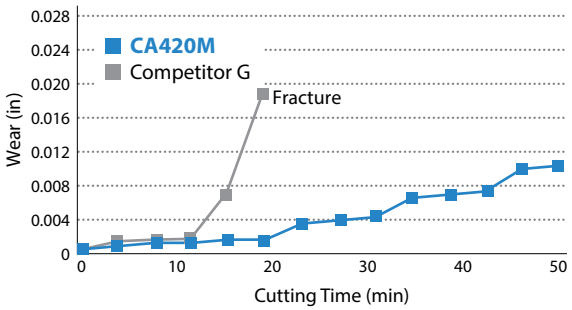
KS6050 / CS7050
High Speed Machining
(Ceramic)



KBN475
High Speed § Precision Machining
(CBN Wiper Insert)

Use CBN wiper inserts together with ceramic KS6050/CS7050 inserts

Wear Resistance Comparison (Internal Evaluation)



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

MFK (Face Mill)

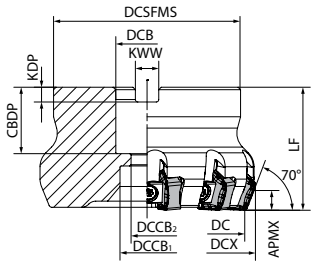


Fig. 1

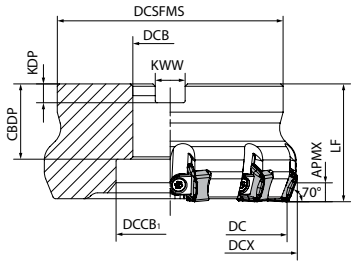


Fig. 2

Toolholder Dimensions

Unit			Part Number	Std. Item R	No. of Inserts	Dimensions DC	DCX	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.
Inch	Inch Bore Dia.	Fine Pitch	MFK 3000R-11-8T	●	8	3.000	3.340	2.750	1.000	0.866	0.551	2.480	1.063	0.240	0.375	0.236	+15	-7	No	8,000	1.61	1
			4000R-11-10T	●	10	4.000	4.340	3.750	1.500	1.299	0.866		1.181	0.390	0.625			-6		7,000	2.86	1
			5000R-11-12T	●	12	5.000	5.340			2.047	-		1.496					-5		6,100	3.67	2
			6000R-11-16T	●	16	6.000	6.340	4.880	2.000	2.835				0.430	0.750					5,300	4.94	2
		Extra Fine Pitch	MFK 3000R-11-10T	●	10	3.000	3.340	2.750	1.000	0.866	0.551	2.480	1.063	0.240	0.375	0.236	+15	-7	No	8,000	1.55	1
			4000R-11-14T	●	14	4.000	4.340	3.750	1.500	1.299	0.866		1.181	0.390	0.625			-6		7,000	2.74	1
			5000R-11-18T	●	18	5.000	5.340			2.047	-		1.496					-5		6,100	3.48	2
			6000R-11-22T	●	22	6.000	6.340	4.880	2.000	2.835				0.430	0.750					5,300	4.76	2

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

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Spare Parts and Applicable Inserts (Inch MFK)

Part Number	Spare Parts				Applicable Inserts M58
	Wedge	Wedge screw	Wrench	Mounting bolt	
MFK 3000R-11-8T	C09N	W6X18N	TT-15	HH1/2-1.25	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W
4000R-11-10T				HH3/4-2.3H	
5000R-11-12T				-	
6000R-11-16T					
MFK 3000R-11-10T	C09N	W6X18N	TT-15	HH1/2-1.25	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W
4000R-11-14T				HH3/4-2.3H	
5000R-11-18T				-	
6000R-11-22T					

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MFK (Face Mill)

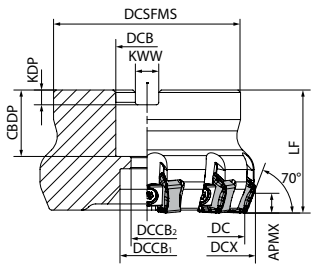


Fig. 1

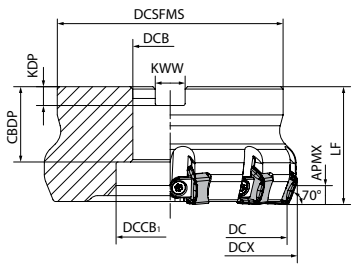


Fig. 2

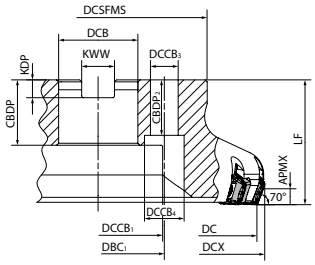


Fig. 3

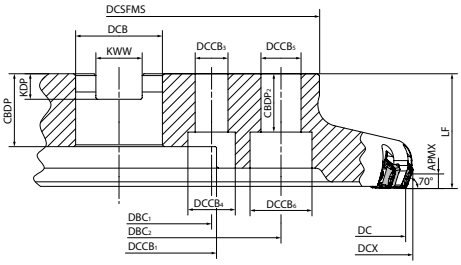


Fig. 4

Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions																		A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.
				R		DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	DCCB3	DCCB4	DCCB5	DCCB6	DBC1	DBC2	LF	CBDP	KDP	KWW	APMX	CBDP2						
mm	Inch Bore Dia.	Fine Pitch	MFK 080R-11-8T	●	8	80	89	76	1.250"	26	17	-	-	-	-	-	-	63	1.260"	0.315"	0.500"	6	-	+15	-7	No	8,000	1.76	1
			100R-11-10T	●	10	100	109	96																	-6		7,000	2.98	1
			125R-11-12T	●	12	125	134	100	1.500"	55	-								1.496"	0.394"	0.625"				-5		6,100	3.65	2
			160R-11-16T	●	16	160	169		2.000"	70									1.496"	0.433"	0.750"						5,300	4.62	2
			200R-11-20T	●	20	200	209	142	1.875"	110		18	26			4.000"			1.575"	0.551"	1.000"		32				4,700	7.65	3
			250R-11-24T	●	24	250	259																				4,200	10.73	3
			315R-11-28T	□	28	315	324	220						22	32		7.000"										3,700	19.71	4
		Extra Fine Pitch	MFK 080R-11-10T	●	10	80	89	76	1.250"	26	17	-	-	-	-	-	-	63	1.260"	0.315"	0.500"	6	-	+15	-7	No	8,000	1.7	1
			100R-11-14T	●	14	100	109	96																	-6		7,000	2.85	1
			125R-11-18T	●	18	125	134	100	1.500"	55	-								1.496"	0.394"	0.625"				-5		6,100	3.44	2
			160R-11-22T	●	22	160	169		2.000"	70									1.496"	0.433"	0.750"						5,300	4.44	2
			200R-11-28T	●	28	200	209	142	1.875"	110		18	26			4.000"			1.575"	0.551"	1.000"		32				4,700	7.4	3
			250R-11-36T	●	36	250	259																				4,200	10.36	3
			315R-11-44T	□	44	315	324	220						22	32		7.000"										3,700	19.21	4
	Metric Bore Dia.	Fine Pitch	MFK 080R-11-8T-M	●	8	80	89	76	27	20	13	-	-	-	-	-	-	63	24	7	12.4	6	-	+15	-7	No	8,000	1.87	1
			100R-11-10T-M	●	10	100	109	96	32	26	17								28	8	14.4				-6		7,000	2.99	1
			125R-11-12T-M	●	12	125	134	100	40	55	-								33	9	16.4				-5		6,100	3.56	2
			160R-11-16T-M	●	16	160	169			70		14	20			66.7							28				5,300	4.51	3
			200R-11-20T-M	●	20	200	209	142	60	110		18	26			101.6			40	14	25.7		32				4,700	7.35	3
			250R-11-24T-M	●	24	250	259																				4,200	10.43	3
			315R-11-28T-M	□	28	315	324	220						22	32		177.8										3,700	19.41	4
		Extra Fine Pitch	MFK 080R-11-10T-M	●	10	80	89	76	27	20	13	-	-	-	-	-	-	63	24	7	12.4	6	-	+15	-7	No	8,000	1.81	1
			100R-11-14T-M	●	14	100	109	96	32	26	17								28	8	14.4				-6		7,000	2.86	1
			125R-11-18T-M	●	18	125	134	100	40	55	-								33	9	16.4				-5		6,100	3.38	2
			160R-11-22T-M	●	22	160	169			70		14	20			66.7							28				5,300	4.32	3
			200R-11-28T-M	●	28	200	209	142	60	110		18	26			101.6			40	14	25.7		32				4,700	7.1	3
			250R-11-36T-M	●	36	250	259																				4,200	10.07	3
			315R-11-44T-M	□	44	315	324	220						22	32		177.8										3,700	18.92	4

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

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Spare Parts and Applicable Inserts (Metric MFK)

Part Number	Spare Parts (Inch Bore Dia.)				Applicable Inserts
	Wedge	Wedge screw	Wrench	Mounting bolt	
					➡ M58
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					
125R-11-12T				-	
160R-11-16T					
200R-11-20T					
250R-11-24T					
315R-11-28T					
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					
125R-11-18T				-	
160R-11-22T					
200R-11-28T					
250R-11-36T					
315R-11-44T					

Part Number	Spare Parts (Metric Bore Dia.)				Applicable Inserts
	Wedge	Wedge screw	Wrench	Mounting bolt	
					➡ M58
MFK 080R-11-8T-M	C09N	W6X18N	TT-15	HH12X35	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W
100R-11-10T-M				HH16X40	
125R-11-12T-M				-	
160R-11-16T-M					
200R-11-20T-M					
250R-11-24T-M					
315R-11-28T-M					
MFK 080R-11-10T-M	C09N	W6X18N	TT-15	HH12X35	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W
100R-11-14T-M				HH16X40	
125R-11-18T-M				-	
160R-11-22T-M					
200R-11-28T-M					
250R-11-36T-M					
315R-11-44T-M					

MFK-SF (Face Mill)

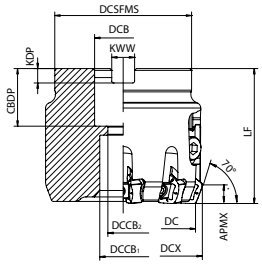


Fig. 1

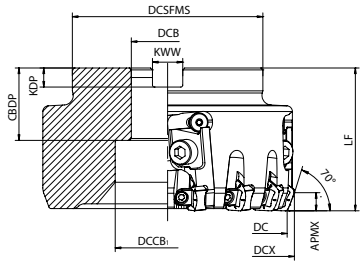


Fig. 2

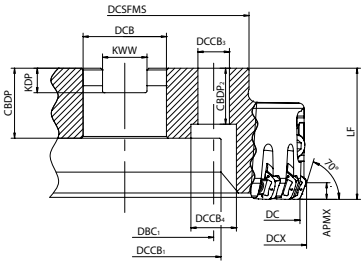


Fig. 3

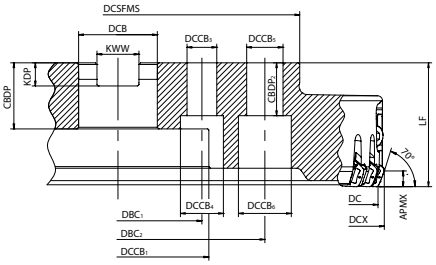


Fig. 4

Toolholder Dimensions

Unit	Part Number		Std. Item	No. of Inserts	Dimensions																	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.
			R		DC	DCX	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	$DCCB_3$	$DCCB_4$	$DCCB_5$	$DCCB_6$	DBC_1	DBC_2	LF	CBDP	KDP	KWW	APMX	$CBDP_2$						
mm	Inch Bore Dia.	MFK 080R-11-9T-SF	●	9 (3)	80	89	76	1.250"	26	17	-	-	-	-	-	-	75	1.260"	0.315"	0.500"	6	-	+15	-7	No	8,000	2.08	1
		100R-11-12T-SF	●	12 (4)	100	109	96																	-6		7,000	3.49	1
		125R-11-15T-SF	●	15 (5)	125	134	100	1.500"	55	-								1.496"	0.394"	0.625"						6,100	4.54	2
		160R-11-18T-SF	●	18 (6)	160	169		2.000"	70										0.433"	0.750"				-5		5,300	6.82	2
		200R-11-24T-SF	●	24 (8)	200	209	142	1.875"	110	-	18	26	22	32	4.000"	7.000"		1.575"	0.551"	1.000"		32				4,700	10.39	3
		250R-11-30T-SF	□	30 (10)	250	259																				4,200	16.85	3
		315R-11-39T-SF	□	39 (13)	315	324	220																			3,700	28.65	4
	Metric Bore Dia.	MFK 080R-11-9T-M-SF	●	9 (3)	80	89	76	27	20	13	-	-	-	-	-	-	75	24	7	12.4	6	-	+15	-7	No	8,000	2.21	1
		100R-11-12T-M-SF	●	12 (4)	100	109	96	32	26	17								28	8	14.4				-6		7,000	3.49	1
		125R-11-15T-M-SF	●	15 (5)	125	134	100	40	55	-								33	9	16.4				-5		6,100	4.47	2
		160R-11-18T-M-SF	●	18 (6)	160	169					14	20			66.7							28				5,300	6.99	3
		200R-11-24T-M-SF	●	24 (8)	200	209	142	60	110	-	18	26	22	32	101.6	177.8		35	14	25.7		32				4,700	9.89	3
		250R-11-30T-M-SF	□	30 (10)	250	259																				4,200	16.35	3
		315R-11-39T-M-SF	□	39 (13)	315	324	220																			3,700	28.14	4

Max. revolution : When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
Numbers in parentheses ( ) are the number of adjustable cutting edge pockets.
Please install wiper inserts in the adjustable cutting edge pockets.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Spare Parts and Applicable Inserts (MFK-SF)

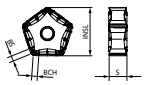
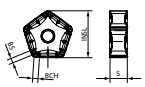
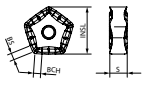
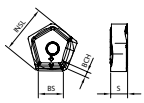
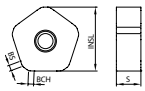
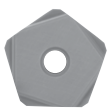
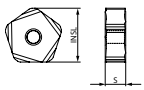
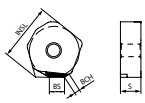
Part Number	Spare Parts								Applicable Inserts M58
	Wedge	Wedge screw	Wrench	Cartridge	Cartridge clamp screw	Wrench	Adjustment screw	Mounting bolt	
MFK 080R-11-9T-SF	C09N	W6X18N	TT-15	CR-MFK70R	HH8X25	LW-6	AJ-519TR	HH16X40	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 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									
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									

PNMG/PNEG/PNEA

Usage Classification

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

Carbon steel / Alloy steel									P
Mold and die steel									
Austenitic stainless steel									M
Martensitic stainless steel									
Precipitation hardened stainless steel									
Gray cast iron	★			☆		☆	★		K
Nodular cast iron	★			☆		★	☆		
Non-ferrous metals									N
Heat-resistant alloy									S
Titanium alloy									
Hard materials									H

Insert	Part Number	No. of Edges	Dimensions (mm) S	INSL	BCH	BS	Carbide CVD CA420M	Carbide PVD PR1510	PR1525	PR1810	PR1825	Ceramic CVD CS7050	Ceramic - KS6050	CBN - KBN475	Applicable Toolholder ➔ M52~M56
 General Purpose	PNMG 1106XNEN-GM	10	6.35	17.23	2	2	●	△	●	●	●				MFK... MFK...-M MFK...-SF
 Tough Edge	PNMG 1106XNEN-GH	10	6.35	17.23	2	2	●	△	●	●	●				MFK... MFK...-M MFK...-SF
 Surface Finish Oriented	PNEG 1106XNEN-GL	10	6.35	17.18	2.6	2.6	●	△	●	●	●				MFK... MFK...-M MFK...-SF
 2-edge / with Wiper Edge	PNEG 1106XNER-W	2	6.35	18.02	2	10	●	△	●	●	●				MFK... MFK...-M MFK...-SF
 High Speed Machining	PNEA 1106XNTN-T01020	10	6.5	16.94	1.5	1.5						●	●		MFK... MFK...-M MFK...-SF
  High Speed Machining (With Chipbreaker)	PNEG 1106XNTR-T00515	10	6.35	17.07	-	-						●	●		MFK... MFK...-M MFK...-SF
 2-edge / Wiper Insert	PNEG 1106XNTR-T01015W	2	6.5	18.06	1.7	4.8								●	MFK... MFK...-M MFK...-SF

Right-hand Insert Shown

Recommended Cutting Conditions ➔ M59, M60

Standard PNEG inserts sold in 10 piece boxes

PNEG1106XNER-W inserts are sold in 5 piece boxes

PNEG1106XNTR-T01015W inserts are sold in 1 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions (Ceramic/CBN)

Without Chipbreaker

Workpiece Material	Insert Grades	Cutting Speed Vc (sfm)	Edge Prep.	Feed Rate fz (ipt) 0.0020 0.0039 0.0079 0.0118 0.0157
Cast Iron	★ KS6050	1,970~**2,950**~3,940	0.004 × 20°	● 0.0039
	☆ CS7050			
Nodular Cast Iron	☆ KS6050	1,310~**1,970**~2,950		
	★ CS7050			

With Chipbreaker

Workpiece Material	Insert Grades	Cutting Speed Vc (sfm)	Edge Prep.	Feed Rate fz (ipt) 0.0020 0.0039 0.0079 0.0118 0.0157
Cast Iron	★ KS6050	1,970~**2,950**~3,940	0.002 × 15°	● 0.0039
	☆ CS7050			
Nodular Cast Iron	☆ KS6050	1,310~**1,970**~2,950		
	★ CS7050			

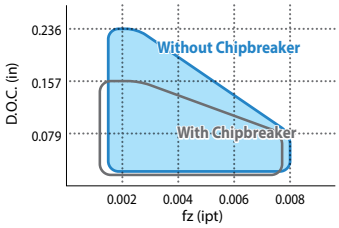
CBN Wiper Insert

Workpiece Material	Insert Grades	Cutting Speed Vc (sfm)	Edge Prep.	Feed Rate fz (ipt) 0.0020 0.0039 0.0079 0.0118 0.0157
Cast Iron	KBN475	1,970~**2,950**~3,940	0.004 × 15°	● 0.0039
Nodular Cast Iron		1,310~**1,970**~2,950		

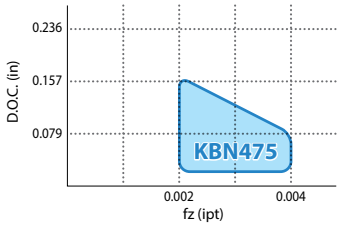
★: 1st Recommendation ☆: 2nd Recommendation

Recommended Application Range (Ceramic/CBN)

Gray/Nodular Cast Iron
(Ceramic)



Gray/Nodular Cast Iron
(CBN)



When using CBN wiper inserts
1. Please use CBN wiper inserts together with ceramic inserts.
Feed rate should be fz=0.004ipt 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.

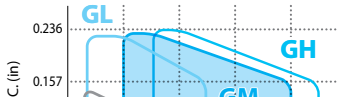
Recommended Cutting Conditions (Coated Carbide)

Workpiece Material	Insert Grades	Cutting Speed Vc (sfm)	Chipbreaker	Feed Rate fz (ipt) 0.0024 0.0039 0.0079 0.0118 0.0157
Cast Iron	**CA420M**	560~**750**~980	GM ★	0.0098
	PR1810	390~**590**~820	GH ☆	0.0118
	PR1825		GL	0.0047
	PR1510	390~**590**~820	GH	0.0118
	PR1525		GL	0.0047
Nodular Cast Iron	**CA420M**	490~**660**~820	GM	0.0079
	PR1810	330~**490**~660	GH ☆	0.0098
	PR1825		GL	0.0039
	PR1510	330~**490**~660	GH	0.0098
	PR1525		GL	0.0039

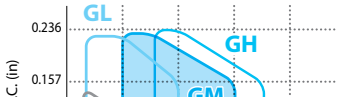
★: 1st Recommendation ☆: 2nd Recommendation

Recommended Application Range

Gray Cast Iron



Nodular Cast Iron



Notes:
1. When using W, please use together with GM or GH.
2. If machining fz=0.008 ipt 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.

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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 temporarily.
   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 : 6Nm)

7. Tighten the cartridge clamp screw firmly.
   (Recommended tightening torque : 10Nm)

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.

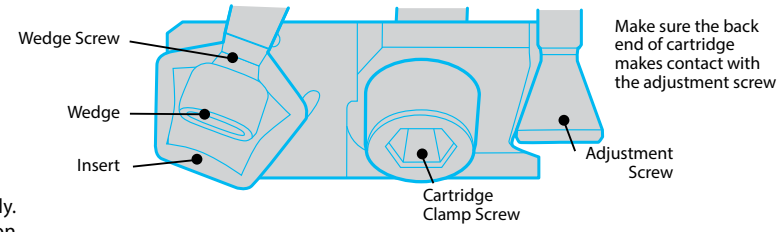


Fig.1

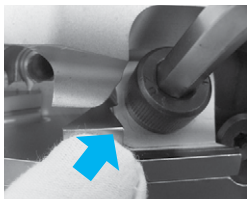


Fig.2

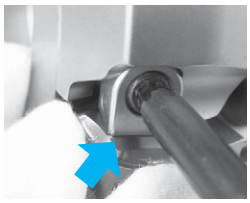


Fig.3

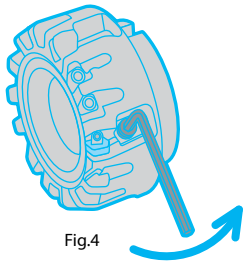


Fig.4

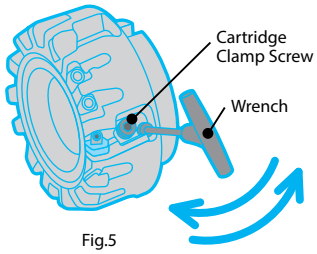


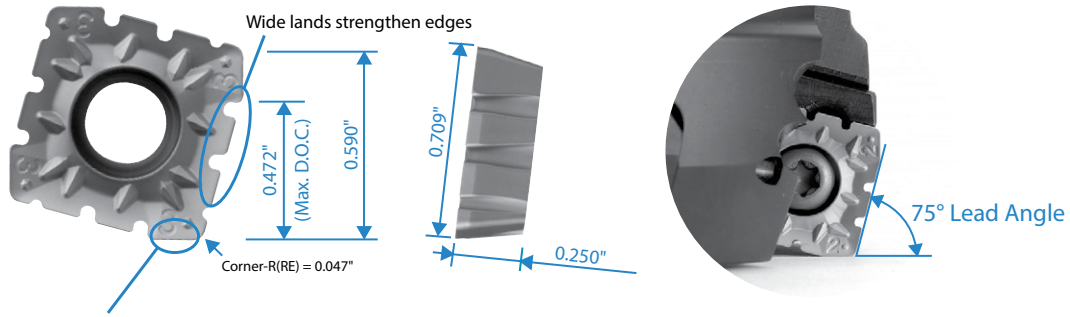
Fig.5

Face Mill for Heavy Machining

MSRS15

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

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

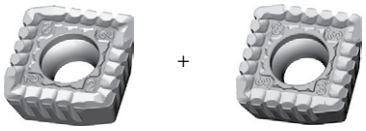
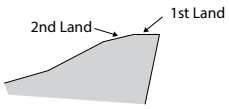
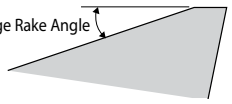
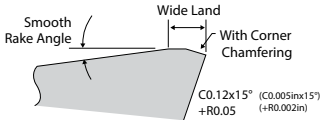


A.R. +9°
R.R. −9° (Ø80mm)
−5° (> Ø100mm)

Large wiper edges enable increased feed rates.

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

Chipbreaker Selection

	Low Cutting Force Oriented	General Purpose	Edge Strength Oriented
Insert Type	 NB2P (4-Notched) + NB3P (5-Notched)	NB2 (2-Notched) + NB3 (3-Notched)	NB2T (2-Notched) + NB3T (3-Notched)
Applications	Ideal when using extended arbors or for cutting thin plate workpieces	General purpose with good balance of strength and low cutting resistance	Ideal for interrupted cutting Ideal when feed rate is increased or workpiece material is Cast Iron
Edge Preparation	As many as four (or five) Notches help to alleviate the shock when biting into the workpiece 	Strength, cutting resistance, and chip control are all well balanced 	Strength is increased by the edge shape and moderate rake angle of the chamfer edge 

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

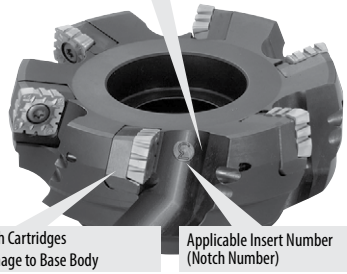
Insert Number - NB2P (4-Notched) and NB3P (5-Notched)

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

Features of Toolholder

Coarse Pitch

Designed with Large Chip Pockets
Good Chip Evacuation



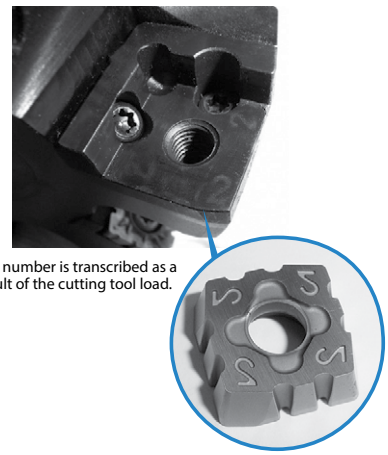
Designed with Cartridges
Prevents Damage to Base Body

Applicable Insert Number
(Notch Number)

Fine Pitch

Higher Productivity Due to Close Pitch Design

Insert Replacement Identification



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

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

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MSRS15 (Face Mill)

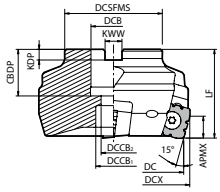


Fig. 1

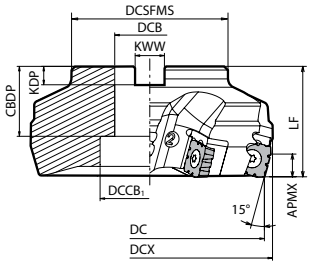


Fig. 2

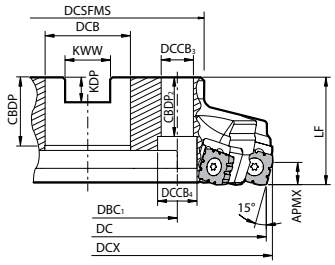


Fig. 3

Toolholder Dimensions

Unit	Part Number			Std. Item	No. of Inserts	Dimensions															A.R. (°)	R.R. (°)	Coolant Hole	Weight (kg)	Fig.	Applicable Inserts ⇒ M66
				R		DC	DCX	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	$DCCB_3$	$DCCB_4$	DBC_1	LF	CBDP	KDP	KWW	APMX	$CBDP_2$						
Inch	Inch Bore Dia.	Coarse Pitch	MSRS 155000R-6T	●	6	5.00	5.27	3.75	1.500	2.13	-	-	-	-	2.48	1.00	0.40	0.625	0.47	-	+9	-5		3.6	2	SPMT1806EDER... SPMT1806EDSR...
			158000R-10T	●	10	8.00	8.27	5.12	2.500	-		0.675	1.045	4		1.25	0.53	1.000		1.25		-5		7.7	3	
		Fine Pitch	MSRS 153000R-6T	●	6	3.00	3.27	2.25	1.000	0.87	0.551	-	-	-	1.97	0.75	0.31	0.375	0.47	-	+9	-9		1.3	1	SPMT1806EDER... SPMT1806EDSR...
			154000R-6T	●	6	4.00	4.27	3.75	1.250	1.38	-					1	0.40	0.500				-5		1.9	2	

Mounting bolt (HH1/2-1.25) is included for MSRS153000R-6T.
Cartridge is included in the coarse pitch type, but no cartridge in the fine pitch type.

Spare Parts (Inch)

Part Number			Spare Parts						
			Insert Screw	Wrench	Cartridge	Clamp Screw	Wrench	Anti-seize Compound	Mounting Bolt
Coarse Pitch	MSRS	155000R-6T	SB-60120TR	TT-25L	MAP-1806	SB-40140TR	DT-15	P-37	-
		158000R-10T	Recommended Torque for Insert Screw 7.5N · m		Recommended Torque for Cartridge Clamp 3.5N · m				
Fine Pitch	MSRS	153000R-6T	SB-60120TR	TT-25L	-	-	-	P-37	HH1/2-1.25
		154000R-6T	Recommended Torque for Insert Screw 7.5N · m						HH3/4-2.3H

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

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MSRS15 (Face Mill)

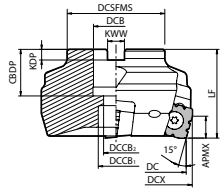


Fig. 1

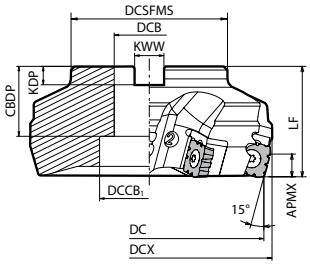


Fig. 2

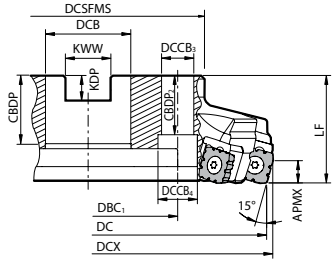


Fig. 3

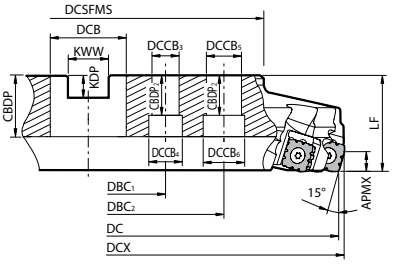


Fig. 4

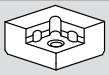
Toolholder Dimensions

Unit			Part Number	Std. Item R	Inserts	Dimensions DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	DCCB3	DCCB4	DCCB5	DCCB6	DBC1	DBC2	LF	CBDP	KDP	KWW	APMX	CBDP2	A.R. (°)	R.R. (°)	Coolant Hole	Weight (kg)	Fig.	Applicable Inserts ➔ M66
mm	Inch Bore Dia.	Coarse Pitch	MSRS 15080R-4T	●	4	80	87	55	1.000"	20	13	-	-	-	-	-	-	50	1.024"	0.236"	0.375"	12	-	+9	-9	No	1.3	1	SPMT1806EDER... SPMT1806EDSR...
			15100R-4T	●		100	107	70	1.250"	42									1.260"	0.315"	0.500"				-5		2	2	
			15125R-6T	●	6	125	132	85	1.500"	54				-	-	-	-	60	1.496"	0.394"	0.625"						3.6	2	
			15160R-8T	●	8	160	167	100	2.000"	68	-									0.433"	0.750"						5	2	
			15200R-10T	●	10	200	207	130	1.875"	-		18	26			4.00"				0.551"	1.000"		32				7.7	3	
			15250R-12T	●	12	250	257																				12	3	
			15315R-14T	●	14	315	322	220						22	32		7.00"						25				17	4	
		Fine Pitch	MSRS 15080R-6T	●	6	80	87	55	1.000"	20	13	-	-	-	-	-	-	50	1.024"	0.236"	0.375"	12	-	+9	-9	No	1.3	1	SPMT1806EDER... SPMT1806EDSR...
			15100R-6T	●		100	107	70	1.250"	42									1.260"	0.315"	0.500"				-5		1.9	2	
			15125R-8T	●	8	125	132	85	1.500"	54				-	-	-	-	60	1.496"	0.394"	0.625"						3.5	2	
			15160R-10T	●	10	160	167	100	2.000"	68	-									0.433"	0.750"						4.9	2	
			15200R-12T	●	12	200	207	130	1.875"	-		18	26			4.00"				0.551"	1.000"		32				7.6	3	
			15250R-14T	●	14	250	257																				11.9	3	
			15315R-16T	□	16	315	322	220						22	32		7.00"						25				17	4	
	Metric Bore Dia.	Coarse Pitch	MSRS 15080R-4T-M	●	4	80	87	70	27	20	13	-	-	-	-	-	-	50	24	7	12.4	12	-	+9	-9	No	1.3	1	SPMT1806EDER... SPMT1806EDSR...
			15100R-4T-M	●		100	107	85	32	45									29	8	14.4				-5		2	2	
			15125R-6T-M	●	6	125	132		40	55				-	-	-	-	60	33	9	16.4						3.6	2	
			15160R-8T-M	●	8	160	167	110		68	-	14	20			66.7							28				5	3	
			15200R-10T-M	●	10	200	207	140	60	-		18	26			101.6			38	15	25.7		32				7.7	3	
			15250R-12T-M	●	12	250	257																				12	3	
			15315R-14T-M	●	14	315	322	230						22	32		177.8										17	4	
		Fine Pitch	MSRS 15080R-6T-M	●	6	80	87	70	27	20	13	-	-	-	-	-	-	50	24	7	12.4	12	-	+9	-9	No	1.3	1	SPMT1806EDER... SPMT1806EDSR...
			15100R-6T-M	●		100	107	85	32	45									29	8	14.4				-5		1.9	2	
			15125R-8T-M	●	8	125	132		40	55				-	-	-	-	60	33	9	16.4						3.5	2	
			15160R-10T-M	●	10	160	167	110		68	-	14	20			66.7							28				4.9	3	
			15200R-12T-M	●	12	200	207	140	60	-		18	26			101.6			38	15	25.7		32				7.6	3	
			15250R-14T-M	●	14	250	257																				11.9	3	
			15315R-16T-M	□	16	315	322	230						22	32		177.8										17	4	

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

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Spare Parts (Metric)

Part Number		Spare Parts						
		Insert Screw	Wrench	Cartridge	Shim Screw	Wrench	Anti-seize Compound	Mounting Bolt
								
Coarse Pitch	MSRS 15080R-4T(-M)	SB-60120TR	TT-25L	MAP-1806	SB-40140TR	DT-15	P-37	HH12X35
	MSRS 15100R-4T(-M) ~ 15315R-14T(-M)	Recommended Torque for Insert Screw 7.5N · m		Recommended Torque for Cartridge Clamp 3.5N · m				-
Fine Pitch	MSRS 15080R-6T(-M)	SB-60120TR	TT-25L	-	-	-	P-37	HH12X35
	MSRS 15100R-6T(-M) ~ 15315R-16T(-M)	Recommended Torque for Insert Screw 7.5N · m						-

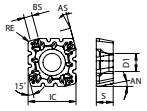
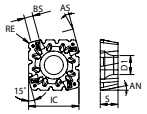
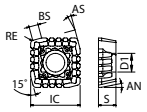
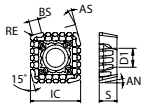
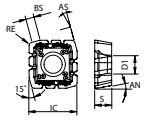
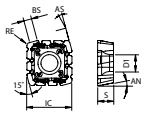
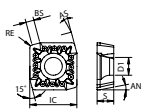
Coat Anti-seize Compound (P-37) thinly on portion of taper and thread when insert is fixed

SPMT

Usage Classification

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

Carbon steel / Alloy steel		★	☆	P
Mold and die steel		★	☆	P
Austenitic stainless steel				M
Martensitic stainless steel				M
Precipitation hardened stainless steel				M
Gray cast iron	★			K
Nodular cast iron	★			K
Non-ferrous metals				N
Heat-resistant alloy			★	S
Titanium alloy			★	S
Hard materials				H

Insert	Part Number	No. of Edges	Dimensions (mm) IC	S	D1	RE	BS	Angle (°) AN	AS	Carbide PVD PR1810	PR1825	PR1835	Applicable Toolholder ⇨ M63~M64
 2-notch	SPMT 1806EDER-NB2	4	18	6.35	6.8	1.2	3.1	11	15	●	●	●	MSRS15...
 3-notch	SPMT 1806EDER-NB3	4	18	6.35	6.8	1.2	3.1	11	15	●	●	●	MSRS15...
 4-notch / Low cutting force	SPMT 1806EDER-NB2P	4	18	6.35	6.8	1.2	3.1	11	15	●	●	●	MSRS15...
 5-notch / Low cutting force	SPMT 1806EDER-NB3P	4	18	6.35	6.8	1.2	3.1	11	15	●	●	●	MSRS15...
 2-notch / Tough edge	SPMT 1806EDSR-NB2T	4	18	6.35	6.8	1.2	3.1	11	15	●		●	MSRS15...
 3-notch / Tough edge	SPMT 1806EDSR-NB3T	4	18	6.35	6.8	1.2	3.1	11	15	●		●	MSRS15...
 Without notch	SPMT 1806EDER-V	4	18	6.35	6.8	1.2	3.1	11	15	●	●	●	MSRS15...

Right-hand Insert Shown

Recommended Cutting Conditions ⇨ M67

SPMT inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)			Recommended Insert Grades (Cutting Speed Vc: sfm)		
	NB2P + NB3P	NB2 + NB3	NB2T + NB3T	MEGACOAT NANO EX		
				PR1810	PR1825	PR1835
Carbon Steel	0.006	0.008	0.012	-	★ 390 ~ 590 ~ 820	☆ 390 ~ 590 ~ 720
Alloy Steel	0.006	0.008	0.012	-	★ 390 ~ 590 ~ 820	☆ 390 ~ 590 ~ 720
Mold Steel	0.004	0.006	0.008	-	★ 330 ~ 520 ~ 720	☆ 330 ~ 520 ~ 660
Gray Cast Iron	0.008	0.010	0.014	★ 390 ~ 590 ~ 820	-	-
Nodular Cast Iron	0.006	0.008	0.012	★ 390 ~ 520 ~ 720	-	-
Stainless Steel	Not Recommended					
Aluminum / Copper	Not Recommended					

★ : 1st Recommendation ☆ : 2nd Recommendation

Tangential 90° Milling with 4-Edge Inserts

MA90

Original tangential 90° end mill with economical 4-edge inserts

New grade PR18 Series and unique insert cutting edge design creates high-quality machining with longer tool life

1 The MA90 tangential end mills provide a large variety of machining operations

Large web thickness
High rigidity

Peripheral grinding
Excellent wall accuracy

Special wiper edge
Large relief angle suppresses wear
High-quality surface finish

Multi-functional (G-class insert)
Supports three-dimensional machining

Unique cutting edge design
Excellent fracture resistance and low cutting force design

Newly developed insert grade
MEGACOAT NANO EX
PR18 Series delivers longer tool life

2 New insert grades PR18 Series provides significantly longer tool life

Next-generation insert grade
PR18 Series
Longer Tool Life with Next-generation Coating for Milling

Extensive lineup of insert grades

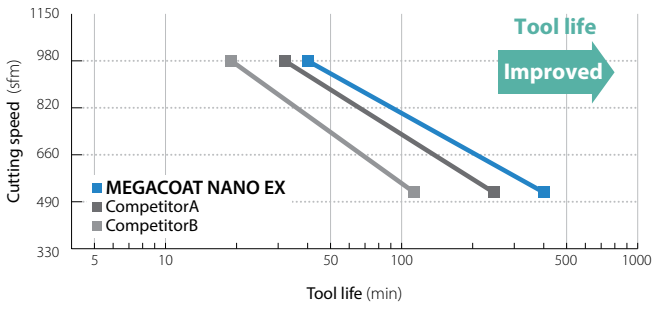
Workpiece material	P Steel					M Stainless steel					K Cast iron				
ISO	01	10	20	30	40	01	10	20	30	40	01	10	20	30	40
Lineup		1st recommendation PR1825					1st recommendation PR1835					1st recommendation PR1810			
		Wet PR1835					High-speed machining CA6535								

H Hardened material	PR015S (GH)	S Heat-resistant alloy	CA6535 (PR1835)	Titanium alloy	PR1835

PR1825 Wear resistance comparison (Internal evaluation)
V-T graph

Life criteria:
Flank face wear = 0.004"

Cutting conditions:
Vc = 520 / 980 sfm
D.O.C. = 0.079" × 4.331", fz = 0.005 ipt
4140 Dry
PNMU1205ANER-GM (MFPN)



800.823.7284
www.kyocera precisiontools.com

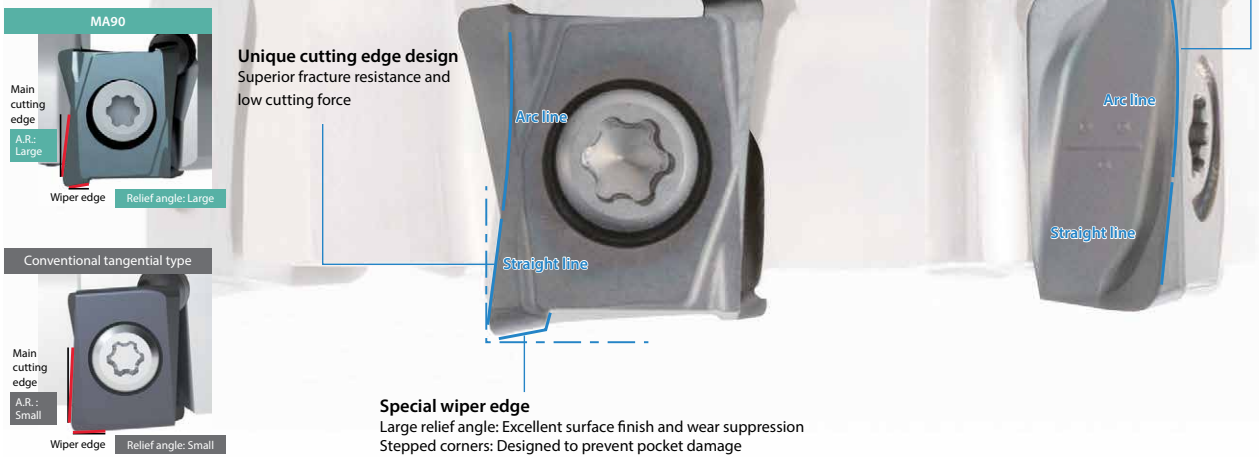
3 Achieve reliable results with an insert designed for high quality machining and long tool life

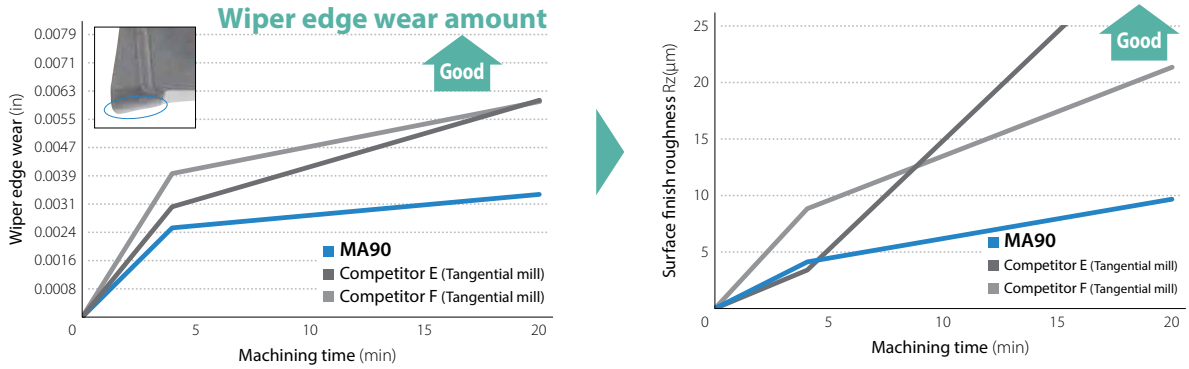
Unique cutting edge design delivers high fracture resistance and low cutting forces
Special wiper edge and peripheral grinding specs provide high quality finish and long tool life

Peripheral grinding specifications
Unique, sloped, edge shape
Grounded peripheral provides higher precision

Advantage

The large A.R. and relief angle of wiper edge create lower resistance and excellent surface finish.





Cutting conditions: Vc = 660 sfm, D.O.C. x a.e. = 0.039" x 37.50", fz = 0.004/0.005 ipt, Dry 1049 Φ50mm (6/7 flute) BT50

Long tool life and high-speed efficiency

Test 1 Even if the main cutting edge is in good condition, the tool reached the end of life due to deterioration of the finished surface. — MA90 ✓

Test 2 Machined with reduced cutting speed because the surface finish deteriorated early. — MA90 ✓

Edge condition and finished surface

		MA90	Competitor E Tangential	Competitor F Tangential
Wiper Edge	After 3.8 min	Abrasion progress: Small	Wear progress: Large / Spark generation	Wear progress: Large / Spark generation
	After 6.5 min			
Main Cutting Edge	After 13.1 min	Good	Good	Good
Finished Surface		Good 8.0µmRz (1.3µmRa)	Cloudy finish 20.6µmRz (2.2µmRa)	Surface finish deteriorating 14.9µmRz (3.0µmRa)
Results		Main cutting edge: Good Wiper edge wear: Small wear Good finished surface and further machining is possible	Main cutting edge: Good Wiper edge wear: Progressive Worse finished surface	Main cutting edge: Good Wiper edge wear: Progressive Worse finished surface

MA90 (End Mill)

Weldon Shank

Cylindrical Shank

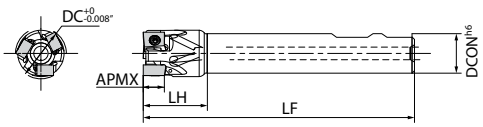


Fig. 1

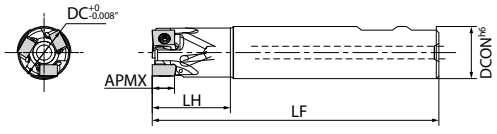


Fig. 2

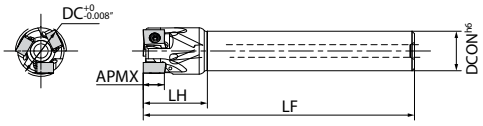


Fig. 3

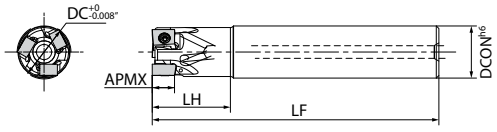


Fig. 4

Toolholder Dimensions (LOGU09... Inserts)

Unit			Part Number	Std. Item	No. of Inserts	Dimensions DC	DCON	LF	LH	APMX	Coolant Hole	Max RPM	Fig.	Spare Parts: Anti-Seize Compound	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts M78
Inch	Weldon	Standard Shank	MA90- 0625W625-09T2C	●	2	0.625	0.625	3.000	1.024	0.315	Yes	29,700	2	P-37	SB-44865UTRP	DTPM-8	LOGU0904...
			0750W750-09T3C	●	3	0.750	0.750	3.250	1.160			27,300	2				
			1000W100-09T4C	●	4	1.000	1.000	3.750	1.400			27,300	2		SB-44880UTRP		
			1250W100-09T4C	●	4	1.250		4.000	1.700			21,300	1				
			1250W100-09T5C	●	5				1.700			21,300	1				
			1250W125-09T5C	●	5		1.250		1.650			21,300	2				
			1500W125-09T5C	●	5	1.500		4.350	2.050			19,400	1				
			1500W125-09T6C	●	6							19,400	1				
	Cylindrical	Standard Shank	MA90- 0625S625-09T2C	●	2	0.625	0.625	3.000	1.024	0.315	Yes	29,700	4	P-37	SB-44865UTRP	DTPM-8	LOGU0904...
			0750S750-09T3C	●	3	0.750	0.750	3.250	1.160			27,300	4				
			1000S100-09T4C	●	4	1.000	1.000	3.750	1.400			27,300	4		SB-44880UTRP		
			1250S100-09T5C	●	5	1.250		4.000	1.700			21,300	3				
			1500S125-09T5C	●	5	1.500	1.250	4.350	2.050			19,400	3				
		Long Shank	MA90- 0750S750-09T3CL	●	3	0.750	0.750	7.000	1.590	0.315	Yes	27,300	4	P-37	SB-44865UTRP	DTPM-8	LOGU0904...
			1000S100-09T3CL	●	3	1.000	1.000		2.100			27,300	4		SB-44880UTRP		
			1500S125-09T3CL	●	3	1.500	1.250	9.500	2.661			19,400	3				

Maximum number of revolutions:
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on Page **M79**.
Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.
LOGU0904... Insert screw tightening torque = 1.2 Nm

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Toolholder Dimensions (LOGU12... Inserts)

Unit			Part Number	Std. Item	No. of Inserts	Dimensions DC	DCON	LF	LH	APMX	Coolant Hole	Max RPM	Fig.	Spare Parts: Anti-Seize Compound	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts ➡ M78
Inch	Weldon	Standard Shank	MA90- 1000W100-12T2C	●	2	1.000	1.000	3.750	1.400	0.472	Yes	29,700	2	P-37	SB-40104TRP	DTPM-15	LOGU1206...
			1250W100-12T2C	●	2	1.250		4.000	1.700			27,300	2				
			1250W100-12T3C	●	3							27,300	2				
			1250W125-12T3C	●	3		1.250		1.650			21,300	1				
			1500W125-12T3C	●	3	1.500		4.350	2.050			19,400	1				
			1500W125-12T4C	●	4							19,400	1				
	Cylindrical	Standard Shank	MA90- 1000S100-12T2C	●	2	1.000	1.000	3.750	1.400	0.472	Yes	29,700	4	P-37	SB-40104TRP	DTPM-15	LOGU1206...
			1250S100-12T3C	●	3	1.250		4.000	1.700			27,300	4				
			1500S125-12T4C	●	4	1.500	1.250	4.350	2.050			19,400	3				
		Long Shank	MA90- 1000S100-12T2CL	●	2	1.000	1.000	7.000	2.100	0.472	Yes	27,300	4	P-37	SB-40104TRP	DTPM-15	LOGU1206...
			1500S125-12T3CL	●	3	1.500	1.250	9.500	2.661			19,400	3				

Maximum number of revolutions:
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on Page **M79**.
Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.
LOGU1206... Insert screw tightening torque = 3.5 Nm

MA90 (End Mill)

Cylindrical Shank

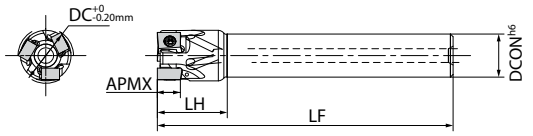


Fig. 1

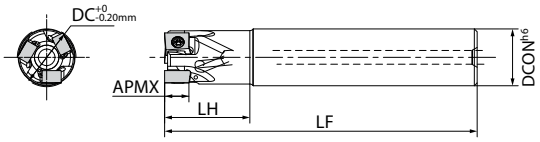


Fig. 2

Toolholder Dimensions (LOGU09... Inserts)

Unit			Part Number	Std. Item	No. of Inserts	Dimensions DC	DCON	LF	LH	APMX	Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts: Anti-Seize Compound	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts M78
mm	Cylindrical	Standard Shank	MA90- 16S12-09T2C	●	2	16	12	100	23	8	Yes	29,500	0.1	1	P-37	SB-44865UTRP	DTPM-8	LOGU0904...
			16S16-09T2C	●			16		26					2				
			18S16-09T2C	●		18			23			27,900		1				
			20S16-09T2C	●		20		110	26			26,600	0.2	1		SB-44880UTRP		
			20S16-09T3C	●	3									1				
			20S20-09T2C	●	2		20		30					2				
			20S20-09T3C	●	3									2				
			22S20-09T3C	●		22			26			25,400		1				
			25S20-09T3C	●		25		120	29			23,900	0.3	1				
			25S20-09T4C	●	4									1				
			25S25-09T3C	●	3		25		32				0.4	2				
			25S25-09T4C	●	4									2				
			28S25-09T3C	●	3	28	25		29			22,600	0.3	1				
			30S25-09T4C	●	4	30		130	32			21,900	0.5	1				
			32S25-09T4C	●		32						21,200		1				
			32S25-09T5C	●	5									1				
			32S32-09T4C	●	4		32		40				0.7	2				
			32S32-09T5C	●	5									2				
			35S32-09T4C	●	4	35		150	50			20,300	0.9	1				
			35S32-09T5C	●	5							20,300		1				
			40S32-09T4C	●	4	40						19,000	1.0	1				
			40S32-09T6C	●	6									1				
			50S32-09T5C	●	5	50		120	40			17,000	0.9	1				
			50S32-09T7C	●	7									1				
		Long Shank	MA90- 20S18-09T2CL	●	2	20	18	150	30	8	Yes	26,600	0.3	1	P-37	SB-44880UTRP	DTPM-8	LOGU0904...
			20S20-09T2CL	●			20		40					2				
			25S25-09T2CL	●		25	25	170	50			23,900	0.6	2				
			32S32-09T2CL	●		32	32	200	65			21,200	1.1	2				

Maximum number of revolutions:
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on Page **M79**.
Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.
LOGU0904... Insert screw tightening torque = 1.2 Nm

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

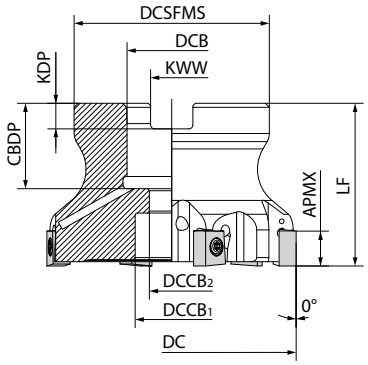
Toolholder Dimensions (LOGU12... Inserts)

Unit			Part Number	Std. Item	No. of Inserts	Dimensions DC	DCON	LF	LH	APMX	Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts: Anti-Seize Compound	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts ➡ M78
mm	Cylindrical	Standard Shank	MA90- 25S20-12T2C	●	2	25	20	120	29	12	Yes	18,300	0.3	1	P-37	SB-40104TRP	DTPM-15	LOGT1206... LOGU1206...
			25S25-12T2C	●			25		32				0.4	2				
			28S25-12T2C	●		28			29			17,300	0.4	1				
			30S25-12T2C	●		30		130	32			16,800	0.5	1				
			30S25-12T3C	●	3								0.5	1				
			32S25-12T2C	●	2	32	25	130	32			16,300	0.5	1				
			32S25-12T3C	●	3								0.5	1				
			32S32-12T2C	●	2		32	130	40			16,300	0.7	2				
			32S32-12T3C	●	3								0.7	2				
			35S32-12T3C	●		35						15,600	0.9	1				
			40S32-12T3C	●		40	32	150	50			14,600	0.9	1				
			40S32-12T4C	●	4								0.9	1				
			50S32-12T4C	●		50	32	120	40			13,100	0.9	1				
			50S32-12T6C	●	6								0.8	1				
		Long Shank	MA90- 25S25-12T2CL	●	2	25	25	170	50	12	Yes	18,300	0.6	2	P-37	SB-40104TRP	DTPM-15	LOGT1206... LOGU1206...
			32S32-12T2CL	●		32	32	200	65			16,300	1.1	2				

Maximum number of revolutions:
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on Page **M79**.
Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.
LOGU1206... Insert screw tightening torque = 3.5 Nm

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MA90 (Face Mill)



Toolholder Dimensions (LOGU09/12... Inserts)

Unit	Bore Dia.	Part Number	Std. Item	No. of Inserts	Dimensions										Coolant Hole	Max RPM	Spare Parts				Applicable Inserts M78
			R		DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX			Anti-Seize Compound	Insert Screw	Wrench	Arbor Bolt	
Inch	Inch Bore Dia.	MA90- 1500R-09T5C	●	5	1.500	1.400	0.750	0.669	0.433	1.575	0.750	0.187	0.313	0.315	Yes	19,400	P-37	SB-44880UTRP	DTPM-8	HH1/4-0.75(H)	LOGU0904...
		1500R-09T6C	●	6																	
		2000R-09T6C	●	6	2.000	1.750										16,800				HH3/8-1.25(H)	
		2000R-09T7C	●	7														Insert Tightening Torque 1.2 Nm			
		2500R-09T7C	●	7	2.500											15,100					
		2500R-09T9C	●	9																	
	Inch Bore Dia.	MA90- 1500R-12T3C	●	3	1.500	1.400	0.500	0.433	0.276	1.575	0.709	0.156	0.250	0.472	Yes	15,000	P-37	SB-40104TRP	DTPM-15	HH1/4-0.75(H)	LOGT1206... LOGU1206...
		1500R-12T4C	●	4																	
		2000R-12T4C	●	4	2.000	1.750	0.750	0.669	0.433		0.750	0.187	0.313			13,000				HH3/8-1.25(H)	
		2000R-12T6C	●	6														Insert Tightening Torque 3.5 Nm			
		2500R-12T6C	●	6	2.500											11,600					
		2500R-12T8C	●	8																	
		3000R-12T8C	●	8	3.000	2.250	1.000	0.866	0.551	1.969	1.063	0.236	0.382			10,600				HH1/2-1.25(H)	
		3000R-12T10C	●	10																	

Maximum number of revolutions:
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on Page **M79**.
Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.
(H) Optional coolant-thru bolt available.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MA90 (Face Mill)

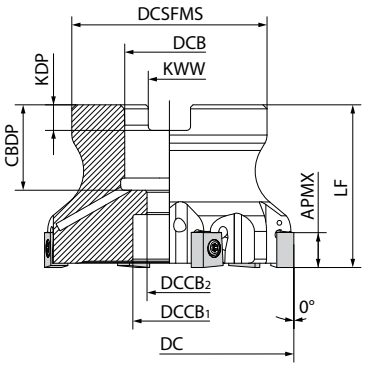


Fig. 1

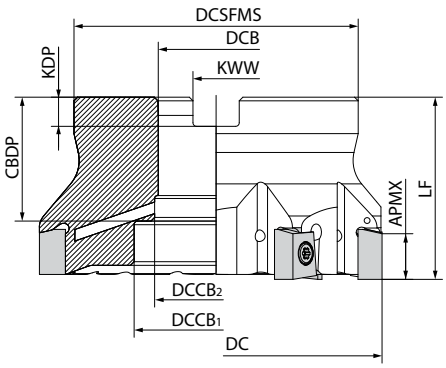


Fig. 2

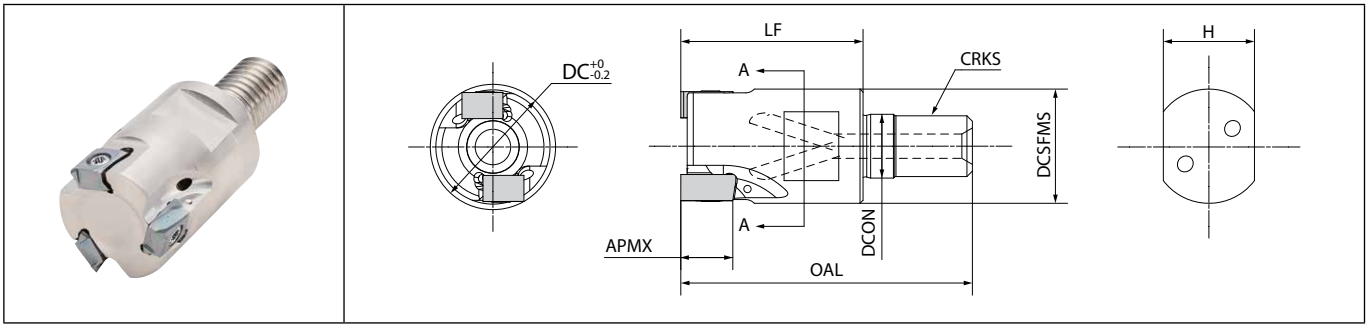
Toolholder Dimensions (LOGU09/12... Inserts)

Unit	Bore Dia.	Part Number	Std. Item R	No. of Inserts	Dimensions DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts: Anti-Seize Compound	Spare Parts: Insert Screw	Spare Parts: Wrench	Spare Parts: Arbor Bolt	Applicable Inserts M78
mm	Metric Bore Dia.	MA90- 040R-09T4C-M	●	4	40	38	16	15	9	40	19	5.6	8.4	8	Yes	26,600	0.2	1	P-37	SB-44880UTRP	DTPM-8	HH8×25(H)	LOGU0904...
		040R-09T6C-M	●	6																Insert Tightening Torque 1.2 Nm			
		050R-09T5C-M	●	5	50	48	22	18	11		21	6.3	10.4			23,900	0.4					HH10×30(H)	
		050R-09T7C-M	●	7																			
		063R-09T6C-M	●	6	63											21,200	0.5						
		063R-09T9C-M	●	9													0.4						
	Inch Bore Dia.	MA90- 080R-12T7C	●	7	80	70	1.00"	20	13	50	1.063"	0.236"	0.375"	12	Yes	10,400	1.2	1	P-37	SB-40104TRP	DTPM-15	HH1/2-1.25(H)	LOGT1206... LOGU1206...
		080R-12T10C	●	10																Insert Tightening Torque 3.5 Nm			
		100R-12T9C	●	9	100	78	1.25"	45	-		1.339"	0.315"	0.500"			9,300	1.5	2				-	
		100R-12T13C	●	13																			
		125R-12T12C	●	12	125	89	1.50"	55		63	1.496"	0.394"	0.625"			8,300	2.6						
		125R-12T16C	●	16																			
	Metric Bore Dia.	MA90- 040R-12T3C-M	●	3	40	38	16	14	9	40	19	5.6	8.4	12	Yes	14,600	0.2	1	P-37	SB-40104TRP	DTPM-15	HH8×25(H)	LOGT1206... LOGU1206...
		040R-12T4C-M	●	4																Insert Tightening Torque 3.5 Nm			
		050R-12T4C-M	●	4	50	48	22	18	11		21	6.3	10.4			13,100	0.3					HH10×30(H)	
		050R-12T6C-M	●	6																			
		063R-12T6C-M	●	6	63											11,700	0.4						
		063R-12T8C-M	●	8																			
		080R-12T7C-M	●	7	80	70	27	20	13	50	24	7	12.4			10,400	1.2					HH12×35(H)	
		080R-12T10C-M	●	10																			
		100R-12T9C-M	●	9	100	78	32	45	-		30	8	14.4			9,300	1.5	2				-	
		100R-12T13C-M	●	13																			
		125R-12T12C-M	●	12	125	89	40	55		63	33	9	16.4			8,300	2.5						
		125R-12T16C-M	●	16																			

Maximum number of revolutions:
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on Page **M79**.
Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.
(H) Optional coolant-thru bolt available.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MA90 (Modular Type)



Toolholder Dimensions (LOGU09/12... Inserts)

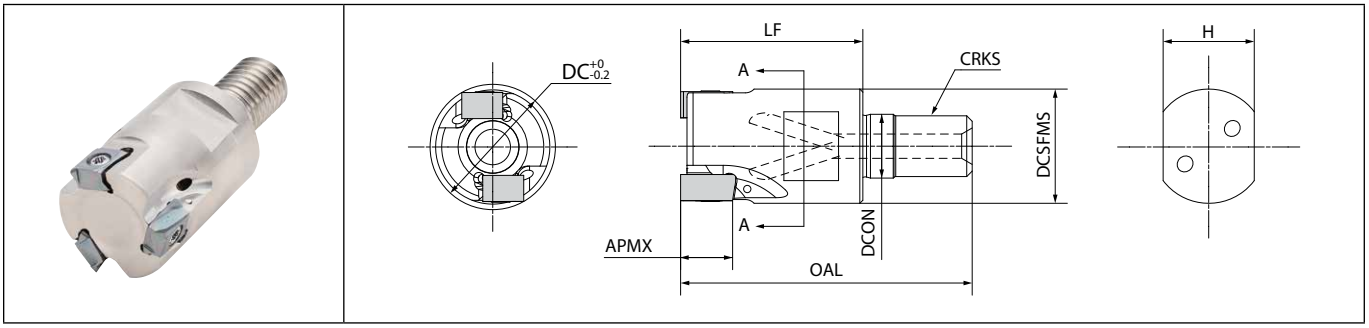
Unit	Part Number	Std. Item	No. of Inserts	Dimensions								Coolant Hole	Max RPM	Spare Parts			Applicable Inserts ➡ M78
				DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX			Anti-Seize Compound	Insert Screw	Wrench	
Inch	MA90- 0750M10-09T3C	●	3	0.750	0.711	0.413	1.890	1.181	M10xP1.50	0.591	0.315	Yes	27,300	P-37	SB-44865UTRP	DTPM-8	LOGU0904...
	1000M12-09T4C	●	4	1.000	0.906	0.492	2.205	1.378	M12xP1.75	0.748			18,300		SB-44880UTRP		
	1250M16-09T5C	●	5	1.250	1.181	0.669	2.441	1.575	M16xP2.00	0.945			16,300				
	MA90- 1000M12-12T2C	●	2	1.000	0.906	0.492	2.205	1.378	M12xP1.75	0.748	0.472	Yes	18,300	P-37	SB-40104TRP	DTPM-15	LOGT1206...
	1250M16-12T3C	●	3	1.250	1.181	0.669	2.441	1.575	M16xP2.00	0.945			16,300				LOGU1206...

Maximum number of revolutions:
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on Page **M79**.
Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.
LOGU0904... Insert screw tightening torque = 1.2 Nm
LOGU1206... Insert screw tightening torque = 3.5 Nm

See page **M324** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MA90 (Modular Type)



Toolholder Dimensions (LOGU09/12... Inserts)

Unit	Part Number	Std. Item	No. of Inserts	Dimensions								Coolant Hole	Max RPM	Spare Parts			Applicable Inserts ➡ M78
				DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX			Anti-Seize Compound	Insert Screw	Wrench	
mm	MA90- 20M10-09T2C	●	2	20	18.8	10.5	48	30	M10×P1.5	15	8	Yes	19,000	P-37	SB-44880UTRP	DTPM-8	LOGU0904...
	20M10-09T3C	●	3														
	25M12-09T3C	●	3	25	23	12.5	56	35	M12×P1.75	19			17,000				
	25M12-09T4C	●	4														
	32M16-09T4C	●	4	32	30	17	62	40	M16×P2.0	24			15,100				
	32M16-09T5C	●	5														
	MA90- 25M12-12T2C	●	2	25	23	12.5	56	35	M12×P1.75	19	12	Yes	18,300	P-37	SB-40104TRP	DTPM-15	LOGT1206... LOGU1206...
	32M16-12T2C	●	2	32	30	17	62	40	M16×P2.0	24			16,300				
	32M16-12T3C	●	3														

Maximum number of revolutions:
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on Page **M79**.
Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.
LOGU0904... Insert screw tightening torque = 1.2 Nm
LOGU1206... Insert screw tightening torque = 3.5 Nm

See page **M324** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

LOGU

Usage Classification

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

Carbon steel / Alloy steel				★	☆	P
Mold and die steel				★	☆	P
Austenitic stainless steel				☆	★	M
Martensitic stainless steel	★				☆	M
Precipitation hardened stainless steel					★	M
Gray cast iron			★			K
Nodular cast iron			★			K
Non-ferrous metals						N
Heat-resistant alloy	★				☆	S
Titanium alloy					★	S
Hard materials (≤ 60 HRC)		★				H

Insert	Part Number	No. of Edges	Dimensions (mm) W1	S	D1	INSL	BS	RE	Carbide CVD CA6535	PVD PR015S	PVD PR1810	PVD PR1825	PVD PR1835	Applicable Toolholder ⇒ M70~M76
General Purpose (G-Class)	LOGU 090404ER-GM	4	4.3	6.77	3.33	8.89	1.29	0.4	●		●	●	●	MA90-...-09-...
	090408ER-GM			6.71			0.90	0.8	●		●	●	●	
	090412ER-GM			6.65			0.49	1.2	●		●	●	●	
	090416ER-GM			6.59			0.10	1.6	●		●	●	●	
Low Cutting Force (G-Class)	LOGU 090404ER-SM	4	4.3	6.77	3.33	8.89	1.29	0.4	●			●	●	
	090408ER-SM			6.71			0.89	0.8	●			●	●	
	090412ER-SM			6.65			0.49	1.2	●			●	●	
	090416ER-SM			6.59			0.10	1.6	●			●	●	
Tough Edge (G-Class)	LOGU 090408ER-GH	4	4.3	6.71	3.33	8.89	0.90	0.8		●	●	●	●	
General Purpose (G-Class)	LOGU 120604ER-GM	4	6.6	10.10	4.55	13.28	2.50	0.4	●		●	●	●	
	120608ER-GM			10.04			2.14	0.8	●		●	●	●	
	120612ER-GM			9.97			1.79	1.2	●		●	●	●	
	120616ER-GM			9.92			1.44	1.6	●		●	●	●	
	120620ER-GM			9.85			1.08	2.0	●		●	●	●	
	120624ER-GM			9.79			0.72	2.4	●		●	●	●	
	120630ER-GM			9.69			0.20	3.0	●		●	●	●	
Single-Sided General Purpose (G-Class)	LOGT 120640ER-GM	2	6.6	9.56	4.55	13.28	1.69	4.0	●		●	●	●	
	120650ER-GM			9.40			0.63	5.0	●		●	●	●	
	120660ER-GM			9.24			0.37	6.0	●		●	●	●	
Low Cutting Force (G-Class)	LOGU 120604ER-SM	4	6.6	10.10	4.55	13.28	2.50	0.4	●			●	●	
	120608ER-SM			10.04			2.14	0.8	●			●	●	
	120612ER-SM			9.97			1.79	1.2	●			●	●	
	120616ER-SM			9.92			1.44	1.6	●			●	●	
	120620ER-SM			9.85			1.08	2.0	●			●	●	
	120624ER-SM			9.79			0.72	2.4	●			●	●	
	120630ER-SM			9.69			0.20	3.0	●			●	●	
Tough Edge (G-Class)	LOGU 120608ER-GH	4	6.6	10.16	4.55	13.25	2.26	0.8		●	●	●	●	

Unmarked : GM
△ : SM
□ : GH

M MILLING

45°-70° Lead Angle
75° Lead Angle
88°-90° Lead Angle
Finish Milling
High Feed Milling
Multi-Functional
Slot Mills
Ball-Nose Radius
Other Applications

Recommended Cutting Conditions ⇒ M79

LOGU and LOGT inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Chipbreaker	Workpiece Material	Cutter Diameter and Feed Rate (fz: ipt)				Recommended Insert Grade (Cutting Speed Vc: sfm)				
		09 Size Insert (LOGU09...)		12 Size Insert (LOGU12...)		CVD Coating	MEGACOAT HARD	MEGACOAT NANO EX		
		ø0.625" ø16mm ~ ø18mm	ø0.750" ~ ø2.500" ø20mm ~ ø63mm	ø1.000" ø25mm ~ ø30mm	ø1.250" ~ ø3.000" ø32mm ~ ø125mm	CA6535	PR015S	PR1810	PR1825	PR1835
General GM	Carbon Steel	0.002~**0.004**~0.006	0.002~**0.004**~0.006	0.002~**0.004**~0.007	0.002~**0.006**~0.009	-	-	-	★ 390~**590**~820	☆ 390~**590**~820
	Alloy Steel	0.002~**0.003**~0.005	0.002~**0.004**~0.006	0.002~**0.004**~0.006	0.002~**0.005**~0.008	-	-	-	★ 330~**520**~720	☆ 330~**520**~720
	Mold Steel	0.002~**0.003**~0.004	0.002~**0.004**~0.005	0.002~**0.004**~0.006	0.002~**0.005**~0.007	-	-	-	★ 260~**460**~590	☆ 260~**460**~590
	Austenitic Stainless Steel	0.002~**0.003**~0.004	0.002~**0.004**~0.005	0.002~**0.004**~0.006	0.002~**0.005**~0.007	-	-	-	☆ 330~**520**~660	★ 330~**520**~660
	Martensitic Stainless Steel	0.002~**0.003**~0.004	0.002~**0.004**~0.005	0.002~**0.004**~0.006	0.002~**0.005**~0.007	★ 590~**790**~980	-	-	-	☆ 490~**660**~820
	Precipitation Hardened Stainless Steel	0.002~**0.003**~0.004	0.002~**0.004**~0.005	0.002~**0.004**~0.006	0.002~**0.005**~0.007	-	-	-	-	★ 300~**390**~490
	Gray Cast Iron	0.002~**0.004**~0.006	0.002~**0.004**~0.006	0.002~**0.004**~0.007	0.002~**0.006**~0.009	-	-	☆ 390~**590**~820	-	-
	Nodular Cast Iron	0.002~**0.003**~0.004	0.002~**0.004**~0.005	0.002~**0.004**~0.006	0.002~**0.005**~0.007	-	-	☆ 330~**490**~660	-	-
	Ni-based Heat-Resistant Alloy	0.002~**0.002**~0.003	0.002~**0.003**~0.004	0.002~**0.003**~0.005	0.002~**0.004**~0.006	★ 70~**100**~160	-	-	-	☆ 70~**100**~160
	Titanium Alloy	0.002~**0.003**~0.004	0.002~**0.004**~0.005	0.002~**0.004**~0.005	0.002~**0.004**~0.006	-	-	-	-	☆ 100~**160**~230
Low Cutting Force SM	Carbon Steel	0.002~**0.003**~0.004	0.002~**0.004**~0.006	0.002~**0.004**~0.006	0.002~**0.004**~0.007	-	-	-	★ 390~**590**~820	☆ 390~**590**~820
	Alloy Steel	0.002~**0.003**~0.004	0.002~**0.003**~0.005	0.002~**0.003**~0.005	0.002~**0.004**~0.006	-	-	-	★ 330~**520**~720	☆ 330~**520**~720
	Mold Steel	0.002~**0.003**~0.004	0.002~**0.003**~0.004	0.002~**0.003**~0.005	0.002~**0.004**~0.006	-	-	-	★ 260~**460**~590	☆ 260~**460**~590
	Austenitic Stainless Steel	0.002~**0.003**~0.004	0.002~**0.003**~0.005	0.002~**0.003**~0.005	0.002~**0.004**~0.006	-	-	-	☆ 330~**520**~660	★ 330~**520**~660
	Martensitic Stainless Steel	0.002~**0.003**~0.004	0.002~**0.003**~0.005	0.002~**0.003**~0.005	0.002~**0.004**~0.006	★ 590~**790**~980	-	-	-	☆ 490~**660**~820
	Precipitation Hardened Stainless Steel	0.002~**0.003**~0.004	0.002~**0.003**~0.005	0.002~**0.003**~0.005	0.002~**0.004**~0.006	-	-	-	-	★ 300~**390**~490
	Ni-based Heat-Resistant Alloy	0.002~**0.002**~0.003	0.002~**0.003**~0.004	0.002~**0.003**~0.005	0.002~**0.003**~0.005	★ 70~**100**~160	-	-	-	☆ 70~**100**~160
	Titanium Alloy	0.002~**0.003**~0.004	0.002~**0.003**~0.005	0.002~**0.003**~0.005	0.002~**0.004**~0.005	-	-	-	-	★ 100~**160**~230
Tough Edge GH	Carbon Steel	0.002~**0.004**~0.006	0.002~**0.004**~0.006	0.002~**0.004**~0.007	0.002~**0.006**~0.009	-	-	-	★ 390~**590**~820	☆ 390~**590**~820
	Alloy Steel	0.002~**0.003**~0.005	0.002~**0.004**~0.006	0.002~**0.004**~0.006	0.002~**0.005**~0.008	-	-	-	★ 330~**520**~720	☆ 330~**520**~720
	Mold Steel	0.002~**0.003**~0.004	0.002~**0.004**~0.005	0.002~**0.004**~0.006	0.002~**0.005**~0.007	-	-	-	★ 260~**460**~590	☆ 260~**460**~590
	Austenitic Stainless Steel	0.002~**0.003**~0.004	0.002~**0.004**~0.005	0.002~**0.004**~0.006	0.002~**0.005**~0.007	-	-	-	☆ 330~**520**~660	☆ 330~**520**~660
	Martensitic Stainless Steel	0.002~**0.003**~0.004	0.002~**0.004**~0.005	0.002~**0.004**~0.006	0.002~**0.005**~0.007	-	-	-	-	☆ 490~**660**~820
	Precipitation Hardened Stainless Steel	0.002~**0.003**~0.004	0.002~**0.004**~0.005	0.002~**0.004**~0.006	0.002~**0.005**~0.007	-	-	-	-	☆ 300~**390**~490
	Gray Cast Iron	0.002~**0.004**~0.006	0.002~**0.004**~0.006	0.002~**0.004**~0.007	0.002~**0.006**~0.009	-	-	★ 390~**590**~820	-	-
	Nodular Cast Iron	0.002~**0.003**~0.004	0.002~**0.004**~0.005	0.002~**0.004**~0.006	0.002~**0.005**~0.007	-	-	★ 330~**490**~660	-	-
	Ni-based Heat-Resistant Alloy	0.002~**0.002**~0.003	0.002~**0.003**~0.004	0.002~**0.003**~0.005	0.002~**0.004**~0.006	-	-	-	-	☆ 70~**100**~160
	Titanium Alloy	0.002~**0.003**~0.004	0.002~**0.004**~0.005	0.002~**0.004**~0.005	0.002~**0.004**~0.006	-	-	-	-	☆ 100~**160**~230
	Hardened Materials (≤ 60 HRC)	0.002~**0.003**~0.004	0.002~**0.004**~0.005	0.002~**0.004**~0.006	0.002~**0.005**~0.007	-	★ 200~**260**~330	-	-	-

The values in **bold** are the recommended starting 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. When choosing wet machining for other workpieces, reduce the cutting speed to 70% or less.

Face milling are not recommended for slotting or pocketing. Recommended ae is 75% of the cutting diameter or less. We recommend coarse pitch cutters when ae is 30% of the cutting diameter or more.

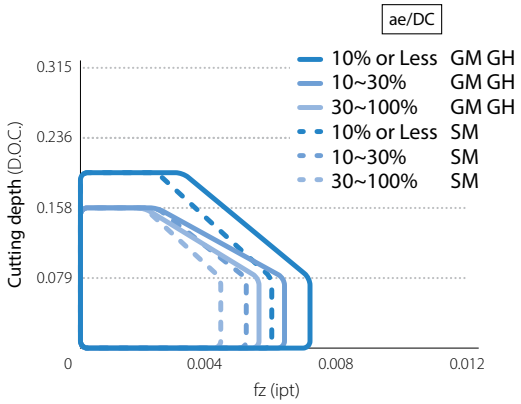
Working above recommended conditions or long-term use can damage the screws. It is recommended to replace the screws regularly.

Ramping and Helical milling are not recommended for large corner radius inserts R4.0mm / R5.0mm / R6.0mm.

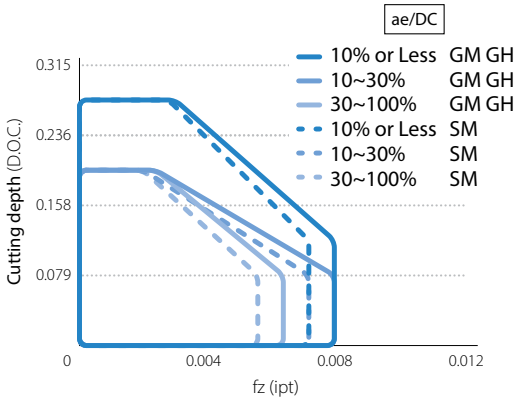
Cutting Performance

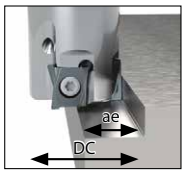
09 Size (LOGU09...) Machining for Steel (Dry)

Cutting Dia. DC : ø0.625", ø16mm ~ ø18mm



Cutting Dia. DC : ø0.750" ~ ø2.500", ø20mm ~ ø63mm

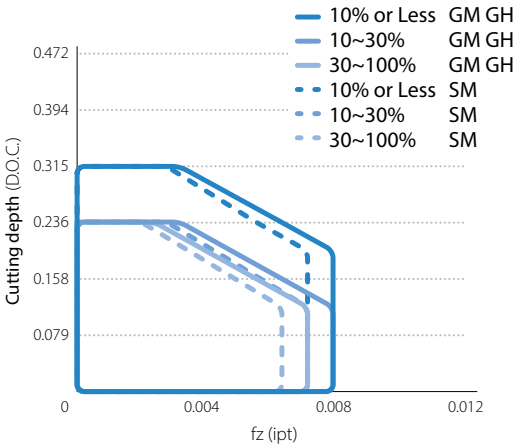




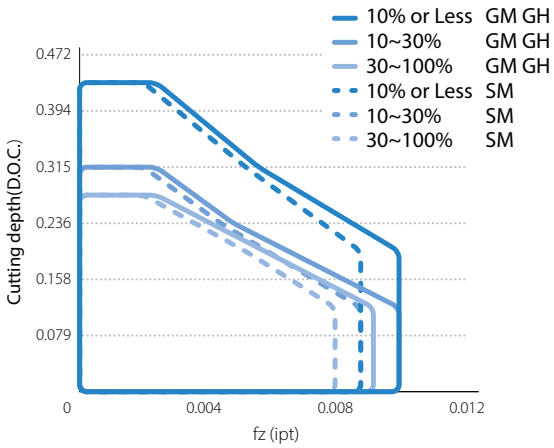
For other workpiece material, set D.O.C. and fz appropriately for each ae.

12 Size (LOGU12...) Machining for Steel (Dry)

Cutting Dia. DC : ø1.000", ø25mm ~ ø30mm



Cutting Dia. DC : ø1.250" ~ ø3.000", ø32mm ~ ø125mm

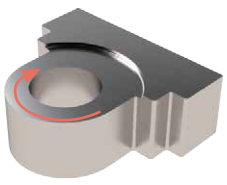


For other workpiece material, set D.O.C. and fz appropriately for each ae.

Case Studies

Brake parts 70-50-05

Vc = 440 sfm
n = 535 RPM
D.O.C. x ae = 0.134" x 0.984"
fz = 0.006 ipt
Vf = 22.04 ipm
Wet
MA90-080R-12T7C-M
LOGU120616ER-GM (PR1810)



Number of Workpieces

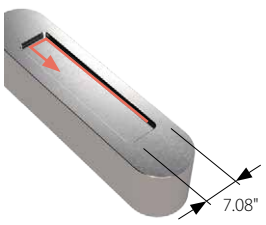
MA90 (7 flute)	1,000 pcs	Tool life x1.6
Competitor G (7 flute)	600 pcs	

MA90 showed good cutting edge condition and stable machining.
Achieved 1.6 times longer tool life.

(User evaluation)

Mold parts Stainless steel

Vc = 410 sfm
n = 1,600 RPM
D.O.C x ae = 0.039" x 0.984"
fz = 0.005 ipt
Vf = 22.44 ipm
Dry
MA90-25S20-09T3C
LOGU090408ER-GM (PR1835)



Machining efficiency

MA90 (3 flute)	Q = 14.5 cc/min	x1.5 Machining efficiency
Competitor H (3 flute)	Q = 9.5 cc/min	

MA90 showed 1.5 times higher machining efficiency than its competitors.
Improved tool life (3 to 4 pcs)

(User evaluation)

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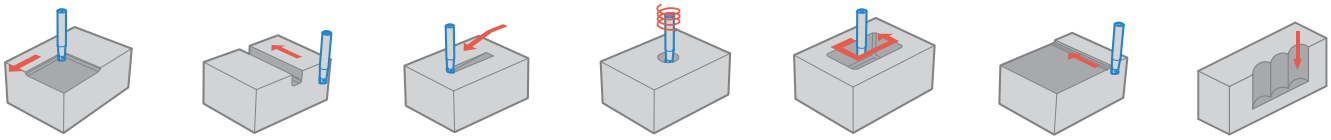
Notes

Applications



Face Milling & Shouldering | Slotting | Ramping | Helical Milling | Pocketing | Contouring | Plunging

Ramping Reference Table

Description	Cutter Diameter DC	0.625" / 16mm	0.750" / 20mm	1.000" / 25mm	1.250" / 32mm	1.500" / 40mm	2.000" / 50mm
MA... - 09 - ...	Max. Ramping Angle RMPX	1.16°	0.97°	0.64°	0.4°	0.23°	0.11°
	tan RMPX	0.020	0.017	0.011	0.007	0.004	0.002
Description	Cutter Diameter DC	1.000" / 25mm	28	30	1.250" / 32mm	35	40
MA... - 12 - ...	Max. Ramping Angle RMPX	2°	1.7°	1.6°	1.5°	1.2°	1°
	tan RMPX	0.034	0.030	0.027	0.026	0.021	0.017

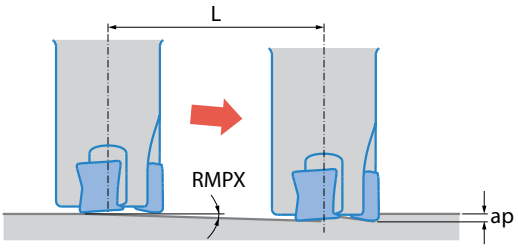
Ramping is not recommended for large corner radius inserts R4.0mm / R5.0mm / R6.0mm
Decrease ramping angle if chips become excessively long

Ramping Tips

Ramping angle should be under RMPX.
Reduce recommended feed rate by 70%

Formula for Min. Cutting Length (L) at Max. Ramping Angle

$$L = \frac{D.O.C.}{\tan RMPX}$$



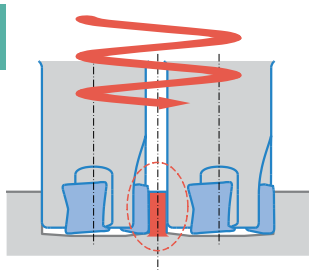
Ramping is not recommended for large corner radius inserts R4.0mm / R5.0mm / R6.0mm.

Helical Milling Tips

For Helical milling, use between min. cutting dia. and max. cutting dia.

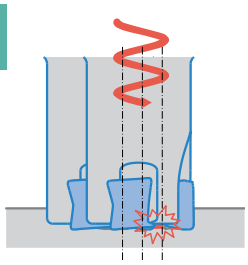
Exceeding max. cutting dia.

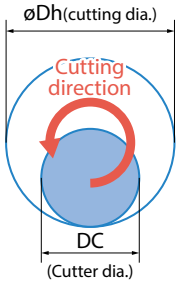
Center core remains after machining



Less than min. cutting dia.

Center core hits holder body





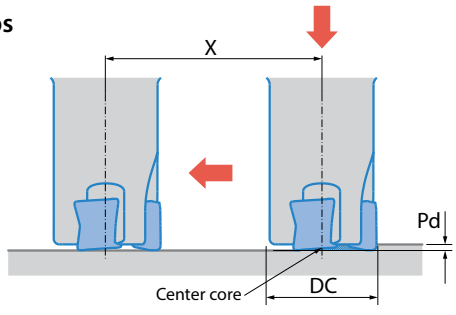
Units: inch

Description	Minimum cutting diameter øDh1	Maximum cutting diameter øDh2
MA... - 09 - ...	2XDC-0.157"	2XDC-0.079"
MA... - 12 - ...	2XDC-0.236"	2XDC-0.079"

Helical milling is not recommended for large corner radius inserts R4.0mm / R5.0mm / R6.0mm.

For helical milling, use between min. cutting dia. and max. cutting dia..
The cutter direction should be counterclockwise (down cut) (see above).
Please machine in a safe environment as long chips may be produced.

Drilling Tips

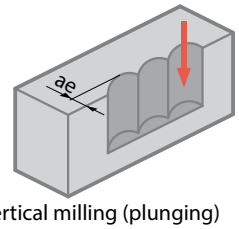


Units: inch

Description	Maximum drilling depth (Pd)	Min. cutting length (X) for flat bottom surface
MA... - 09 - ...	0.010"	DC-0.118"
MA... - 12 - ...	0.020"	DC-0.197"

It is recommended to reduce feed by 25% of recommendation until the center core is removed when traversing after drilling.
Axial feed rate recommendation per revolution is f = 0.004 ipt or less when drilling.

Plunging Tips



Available for vertical milling (plunging)
Feed should be set within fz = 0.004 (ipt) when plunging.

Units: inch

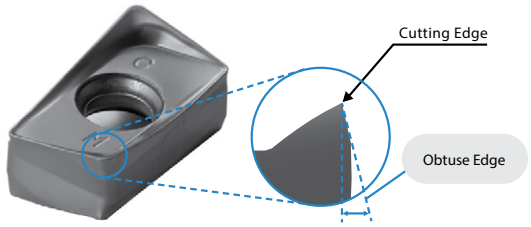
Description	Maximum width of cut (ae)
09 Size (LOGU09...)	0.079
12 Size (LOGU12...)	0.118

Double-Sided 4-Edge Insert

M-FOUR (MEW)

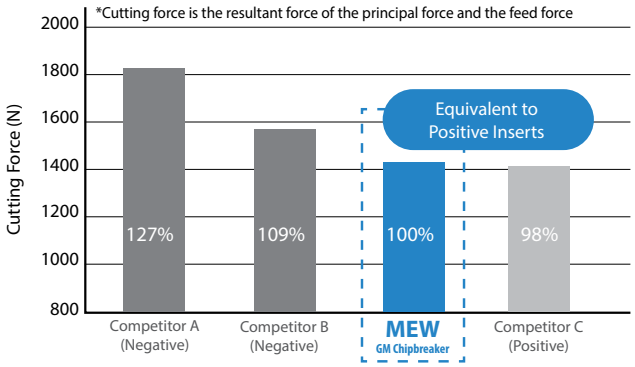
Unique mold technology reduces cutting forces equivalent to positive inserts

Obtuse Edge for Increased Cutting Edge Toughness



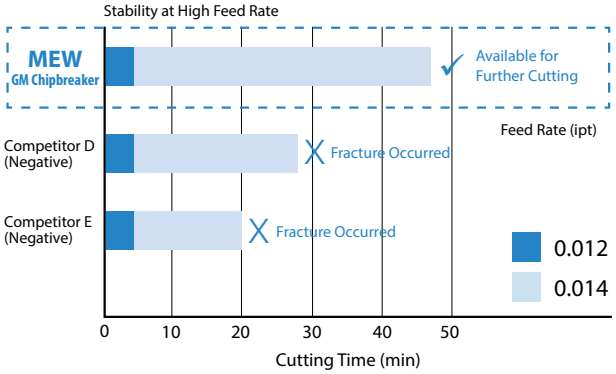
Low Cutting Forces Equivalent to Positive Inserts

Cutting Force Comparison



Cutting Conditions:
1049 Ø20mm Cutter
Vc = 500 sfm D.O.C. × ae = 0.118" × 0.591" fz = 0.006 ipt

Fracture Resistance Comparison (Internal Evaluation)



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

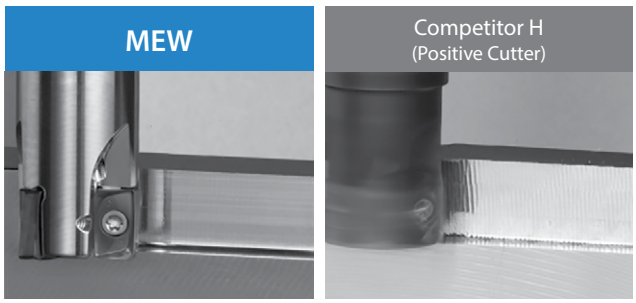
Improved surface finish, minimizing chatter

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

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

Large Rake Angle Reduces Cutting Forces

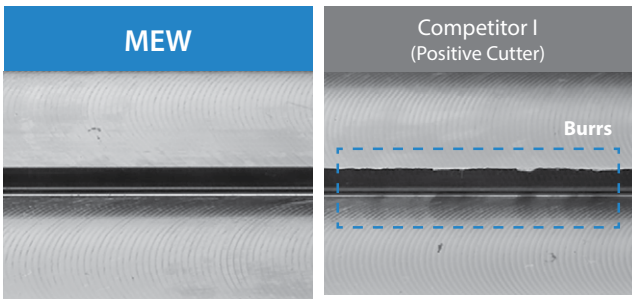
Surface of Shoulder Wall (Internal Evaluation)



Smooth surface of MEW without chattering

Cutting Conditions : Vc = 790 sfm, fz = 0.005 ipt, D.O.C. × ae = 0.158" × 0.197"
Cutter Dia. Ø0.750", Dry Workpiece : A65

Burr Comparison with Positive Cutters (Internal Evaluation)



Fewer burrs than positive cutters due to sharp cutting

Cutting Conditions : Vc = 820 sfm, fz = 0.004 ipt, D.O.C. × ae = 0.158" × 0.197"
Cutter Dia. Ø0.750, Dry Workpiece : 1049

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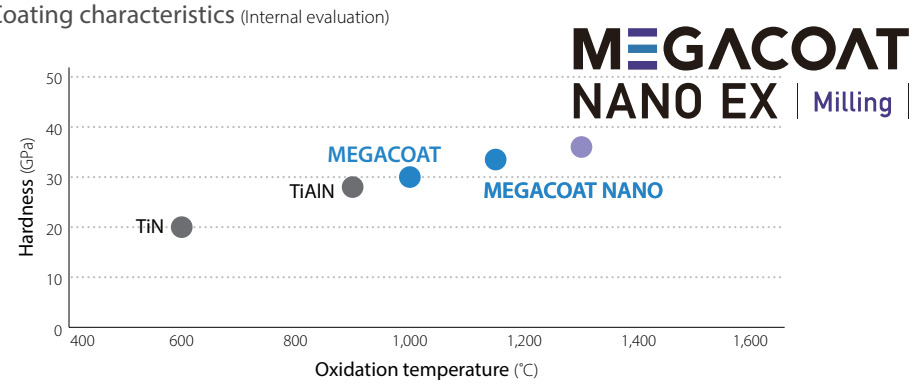
Long Tool Life with MEGACOAT NANO EX Coating Technology

For steel, stainless steel and cast iron

PR1825 / PR1835 / PR1810 New development MEGACOAT NANO EX

Coating characteristics (Internal evaluation)



For hardened material

PR015S MEGACOAT HARD PVD coating

For stainless steel and heat-resistant alloys

CA6535 CVD coating

For aluminum machining

PDL025 DLC coating

GW25 Non-coated Carbide

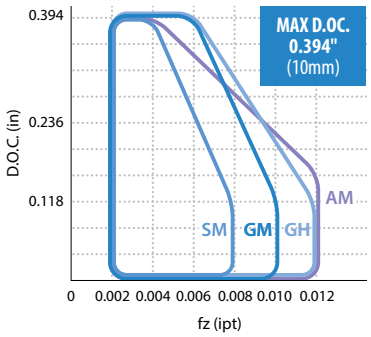
Various Chipbreakers for a Wide Range of Applications

4 types of chipbreakers for a wide range of applications along with a large lineup of corner R(RE) for the GM chipbreaker

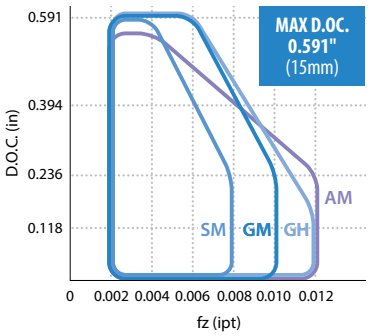
Chipbreaker	Application	Shape
GM	General Purpose	
SM	Low Cutting Force	
GH	Heavy Milling	
AM	Non-ferrous Metals / Aluminum	

Chipbreaker Recommended Applications (Shouldering)

LOMU10 Type



LOMU15 Type



Chips (GM Chipbreaker)

Grooving

Shouldering

Corner Radius Lineup

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

LOMU100404ER-GM
LOMU150504ER-GM

LOMU100408ER-GM
LOMU150508ER-GM

LOMU150510ER-GM

LOMU100412ER-GM
LOMU150512ER-GM

LOMU100416ER-GM
LOMU150516ER-GM

LOMU100420ER-GM
LOMU150520ER-GM

MEW (End Mill)

Cylindrical Shank (Standard) Shown

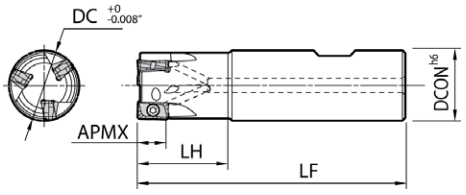


Fig. 1

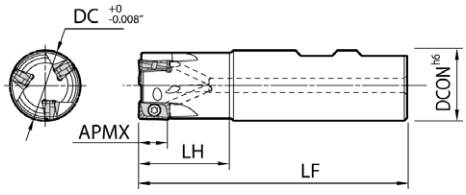


Fig. 2

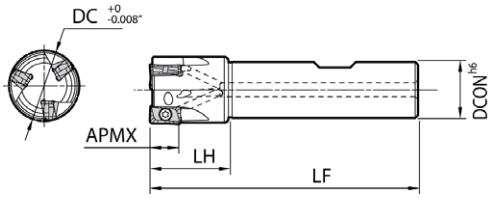


Fig. 3

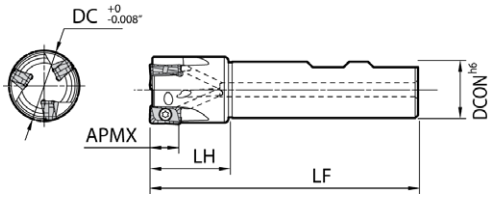


Fig. 4

Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions DC	DCON	LF	LH	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Fig.	Spare Parts: Anti-Seize Compound	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts ➡ M93
Inch	Weldon	Standard Shank	MEW 0625-W500-10-2T	●	2	0.625	0.500	2.75	0.969	0.393	+7	-22	No	43,900	3	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
			0625-W625-10-2T	●	2		0.625	3.00	1.046				Yes		1				
			0750-W625-10-2T	●	2	0.750			1.145			-20		42,000	4				
			0750-W750-10-2T	●	2		0.750	3.25	1.170						1				
			0750-W750-10-3T	●	3										1				
			0750-W750-4-10-3T	●	3			4.00	1.921						1				
			1000-W750-10-3T	●	3	1.000		3.25	1.219					37,200	4				
			1000-W100-10-2T	●	2		1.000		1.413						2				
			1000-W100-10-3T	●	3										2				
			1000-W100-475-10-3T	●	3			4.75							2				
			1250-W100-10-4T	●	4	1.250		3.75	1.469					34,000	4				
			1250-W125-10-3T	●	3		1.250	4.00	1.663						2				
			1250-W125-10-4T	●	4										2				
			1500-W125-10-5T	●	5	1.500		4.125	2.070			-19		30,700	4				
		Long Overhang	MEW 1000-W100-45-10-3T	●	3	1.000	1.000	4.50	2.163	0.393	+7	-20	Yes	37,200	2	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
		Standard Shank	MEW 1000-W750-15-2T	●	2	1.000	0.750	3.25	1.219	0.590	+10	-22	Yes	34,700	4	P-37	SB-4090TRP	DTPM-15	LOGT1505... LOMU1505...
			1000-W100-15-2T	●	2		1.000	3.75	1.413						2				
			1000-W100-475-15-2T	●	2			4.75							2				
			1250-W100-15-2T	●	2	1.250		3.75	1.469					30,100	4				
			1250-W125-15-2T	●	2		1.250	4.00	1.663						2				
			1250-W125-15-3T	●	3										2				
			1500-W125-15-3T	●	3	1.500		4.125	2.069			-21		25,600	4				
			1500-W125-15-4T	●	4										4				

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

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MEW (End Mill)

Cylindrical Shank (Standard) Shown

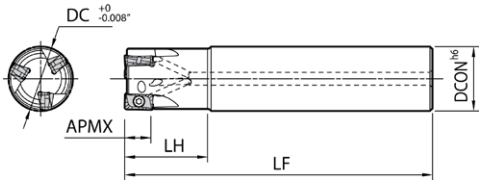


Fig. 1

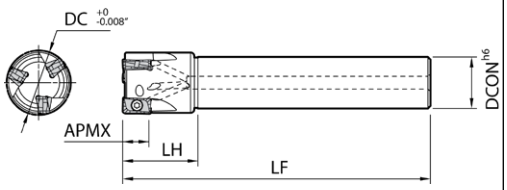


Fig. 2

Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions					A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Fig.	Spare Parts			Applicable Inserts ➡ M93
						DC	DCON	LF	LH	APMX						Anti-Seize Compound	Insert Screw	Wrench	
Inch	Cylindrical	Long Shank	MEW 0625-S625-6-10-2T	●	2	0.625	0.625	6.00	1.500	0.393	+7	-22	Yes	43,900	1	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
			0750-S750-7-10-2T	●	2	0.750	0.750	7.00	1.586					42,000	1				
			1000-S100-7-10-3T	●	3	1.000	1.000		1.980			-20		37,200	1				
			1000-S100-8-10-2T	●	2			8.00						37,200	1				
			1000-S100-8-10-3T	●	3									37,200	1				
			MEW 1250-S125-8-15-3T	●	3	1.250	1.250	8.00	1.980	0.590	+10	-22	Yes	30,100	1	P-37	SB-4090TRP	DTPM-15	LOGT1505... LOMU1505...
			1500-S125-8-15-4T	●	4	1.500			2.069			-21		25,600	2				

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

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MEW (End Mill)

Cylindrical Shank (Standard) Shown

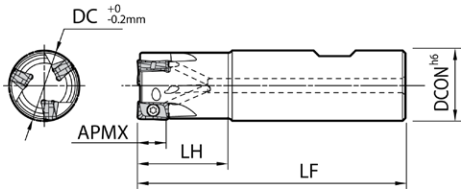


Fig. 1

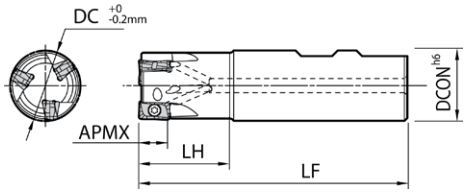


Fig. 2

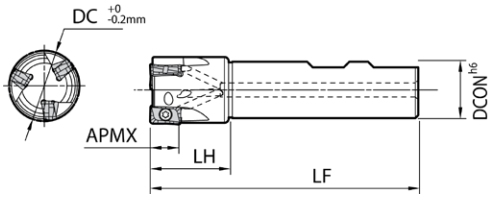


Fig. 3

Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions DC	DCON	LF	LH	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Fig.	Spare Parts: Anti-Seize Compound	Insert Screw	Wrench	Applicable Inserts ➡ M93
mm	Weldon, Standard Shank: MEW 16-W16-10-2T	□	2	16	16	75	25	10	+7	-22	Yes	43,750	1	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
	MEW 20-W20-10-2T	□	2	20	20	77	25	10	+7	-20	Yes	41,000	1	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
	MEW 20-W20-10-3T	●	3	20	20	77	25	10	+7	-20	Yes	41,000	1	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
	MEW 25-W25-10-3T	●	3	25	25	90	32	10	+7	-20	Yes	37,500	2	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
	MEW 32-W32-10-4T	□	4	32	32	102	40	10	+7	-20	Yes	33,900	2	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
	MEW 40-W32-10-5T	●	5	40	32	111	50	10	+7	-19	Yes	30,000	3	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
	MEW 25-W25-15-2T	□	2	25	25	90	32	15	+10	-22	Yes	35,000	2	P-37	SB-4090TRP	DTPM-15	LOGT1505... LOMU1505...
	MEW 32-W32-15-3T	□	3	32	32	102	40	15	+10	-21	Yes	30,000	2	P-37	SB-4090TRP	DTPM-15	LOGT1505... LOMU1505...
	MEW 40-W32-15-4T	□	4	40	32	111	50	15	+10	-21	Yes	25,000	3	P-37	SB-4090TRP	DTPM-15	LOGT1505... LOMU1505...

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

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MEW (End Mill)

Cylindrical Shank (Standard) Shown

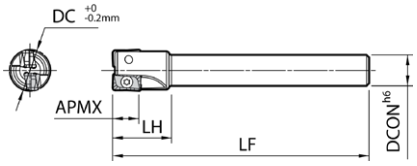


Fig. 1

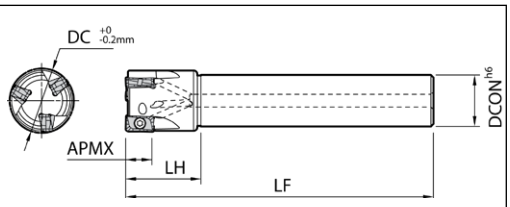


Fig. 2

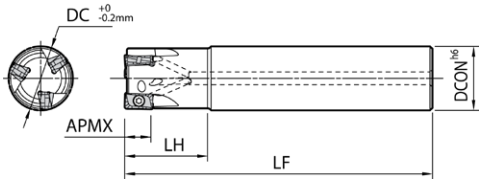


Fig. 3

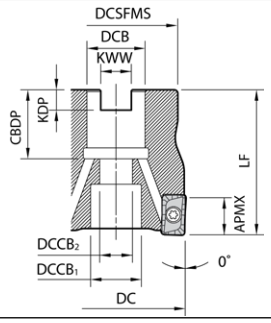
Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions DC	DCON	LF	LH	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Fig.	Spare Parts: Anti-Seize Compound	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts ➡ M93
mm	Cylindrical	Standard Shank	MEW 16-S12-10-2T	●		16	12	100	23	10	+7	-22	No	43,750	1	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
			16-S16-10-2T	●			16		26		+7	-22	Yes	43,750	3				
			18-S16-10-2T	●	2	18			25		+7	-21		43,000	2				
			20-S16-10-2T	●		20		110	26		+7	-20		41,000	2				
			20-S20-10-2T	●			20		30		+7	-20		41,000	3				
			20-S20-10-3T	●	3	20					+7	-20		41,000	3				
			22-S20-10-3T	●		22			26		+7	-20		39,600	2				
			25-S20-10-3T	●		25		120	29		+7	-20		37,500	2				
			25-S25-10-2T	●	2	25	25		32		+7	-20		37,500	3				
			25-S25-10-3T	●	3						+7	-20		37,500	3				
			28-S25-10-3T	●		28			29		+7	-20		35,800	2				
			30-S25-10-4T	●	4	30		130	32		+7	-20		34,800	2				
			32-S25-10-4T	●		32					+7	-20		33,900	2				
			32-S32-10-3T	●	3	32	32	130	40		+7	-20		33,900	3				
			32-S32-10-4T	●	4						+7	-20		33,900	3				
			40-S32-10-5T	●	5	40		150	50		+7	-19		30,000	2				
			50-S32-10-5T	●		50		120	40		+7	-19		22,500	2				
		Long Shank	MEW 20-S20-10-150-2T	●	2	20	20	150	40	10	+7	-20	Yes	41,000	3	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
			25-S25-10-170-2T	●		25	25	170	50					37,500	3				
		Standard Shank	MEW 25-S20-15-2T	●		25	20	120	29	15	+10	-22	Yes	35,000	2	P-37	SB-4090TRP	DTPM-15	LOGT1505... LOMU1505...
			25-S25-15-2T	●	2		25		32		+10	-22		35,000	3				
			32-S25-15-2T	●		32		130			+10	-22		30,000	2				
			32-S32-15-2T	●			32		40		+10	-22		30,000	3				
			32-S32-15-3T	●	3						+10	-22		30,000	3				
			40-S32-15-3T	●		40		150	50		+10	-21		25,000	2				
			40-S32-15-4T	●	4						+10	-21		25,000	2				
			50-S32-15-4T	●		50		120	40		+10	-21		17,000	2				

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

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MEW (Face Mill)



Toolholder Dimensions

Unit	Part Number	Std. Item R	No. of Inserts	Dimensions DC	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Applicable Inserts ➡ M93
Inch	MEW 1500R-10-5T	●	5	1.50	1.457	0.750	0.669	0.433	1.575	0.826	0.188	0.312	0.393	+7°	-19°	Yes	30,700	0.2	LOGT1004... LOMU1004...
	2000R-10-5T	●	5	2.00	1.811												22,300	0.4	
	2500R-10-6T	●	6	2.50	1.969												20,400	0.6	
	MEW 2000R-15-4T	●	4	2.00	1.811	0.750	0.669	0.433	1.575	0.826	0.188	0.312	0.590	+10°	-21°	Yes	16,800	0.4	LOGT1505... LOMU1505...
	2000R-15-5T	●	5														16,800	0.4	
	2500R-15-5T	●	5	2.50	1.969												14,400	0.5	
	3000R-15-6T	●	6	3.00	2.362	1.000	0.866	0.551	1.969	1.063	0.236	0.381			-20°		12,250	1.0	
	4000R-15-8T	●	8	4.00	3.504	1.500	2.047	-		1.181	0.393	0.625					10,400	1.8	

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 (Inch End Mill/Face Mill)

Part Number	Spare Parts: Insert Screw	Wrench	Anti-Seize Compound	Arbor Bolt	Applicable Inserts ➡ M93: General Purpose	Low Cutting Force	Tough Edge (For Heavy Milling)	Non-ferrous Metals
MEW ...-10-_T	SB-3065TRP	DTPM-8	P-37	-	LOMU10...-GM	LOMU10...-SM	LOMU10...-GH	LOGT10...-AM
MEW 1500R-10-5T	Recommended tightening torque for insert clamp 1.2N-m			HH3/8-1.25 (HH3/8-1.25H)				
2000R-10-5T								
2500R-10-6T								
MEW ...-15-_T	SB-4090TRP	DTPM-15	P-37	-	LOMU15...-GM	LOMU15...-SM	LOMU15...-GH	LOGT15...-AM
MEW 2000R-15-4T	Recommended tightening torque for insert clamp 3.5N-m			HH3/8-1.25 (HH3/8-1.25H)				
2500R-15-5T								
3000R-15-6T								
4000R-15-8T				-				

Coat anti-seize compound thinly on portion of taper and thread prior to installation.
Optional Through-Coolant Bolt available in ( )

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.

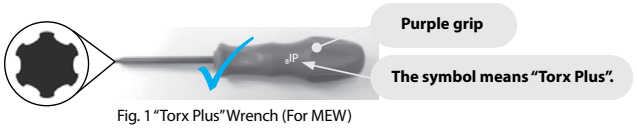


Fig. 1 "Torx Plus" Wrench (For MEW)

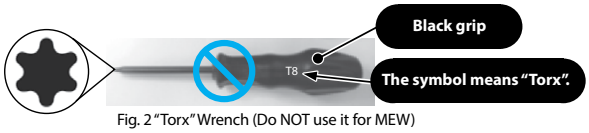
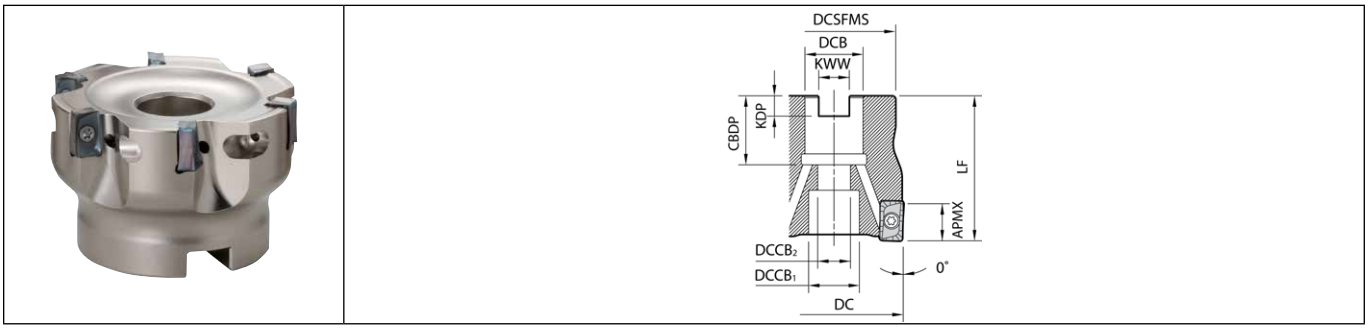


Fig. 2 "Torx" Wrench (Do NOT use it for MEW)

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MEW (Face Mill)



Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions										A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Applicable Inserts ➡ M93
		R		DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX						
mm	MEW 032R-10-4T-M	●	4	32	30	16	14	9	35	19	5.6	8.4	10	+7	-20	Yes	33,900	0.1	LOGT1004... LOMU1004...
	040R-10-5T-M	●	5	40	34				40						-19		30,000	0.2	
	050R-10-5T-M	●		50	45	22	18	11		21	6.3	10.4					22,500	0.4	
	063R-10-6T-M	●	6	63	47												20,500	0.5	
	MEW 040R-15-4T-M	●	4	40	34	16	14	9	40	19	5.6	8.4	15	+10	-21	Yes	25,000	0.2	LOGT1505... LOMU1505...
	050R-15-4T-M	●		50	45	22	18	11		21	6.3	10.4					17,000	0.3	
	063R-15-5T-M	●	5	63	47												14,500	0.5	
	080R-15-6T-M	●	6	80	60	27	20	13	50	25	7	12.4			-20		12,000	1	
	080R-15-6T	●				25.4				27	6	9.5							

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 (Metric End Mill/Face Mill)

Part Number	Spare Parts				Applicable Inserts ➡ M93			
	Insert Screw	Wrench	Anti-Seize Compound	Arbor Bolt	General Purpose	Low Cutting Force	Tough Edge (For Heavy Milling)	Non-ferrous Metals
MEW ...-10-_T	SB-3065TRP	DTPM-8	P-37	-	LOMU10...-GM	LOMU10...-SM	LOMU10...-GH	LOGT10...-AM
MEW 032R-10_-M				HH8×25 (HH8X25H)				
040R-10_-M								
050R-10_-M	Recommended tightening torque for insert clamp 1.2N·m							
063R-10_-M				HH10×30 (HH10X30H)				
MEW ...-15-_T	SB-4090TRP	DTPM-15	P-37	-	LOMU15...-GM	LOMU15...-SM	LOMU15...-GH	LOGT15...-AM
MEW 040R-15_-M				HH8×25 (HH8X25H)				
050R-15_-M				HH10×30 (HH10X30H)				
063R-15_-M	Recommended tightening torque for insert clamp 3.5N·m							
080R-15_(-M)				HH12×35 (HH12X35H)				

Coat anti-seize compound thinly on portion of taper and thread prior to installation.
Optional Through-Coolant Bolt available in ( )

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
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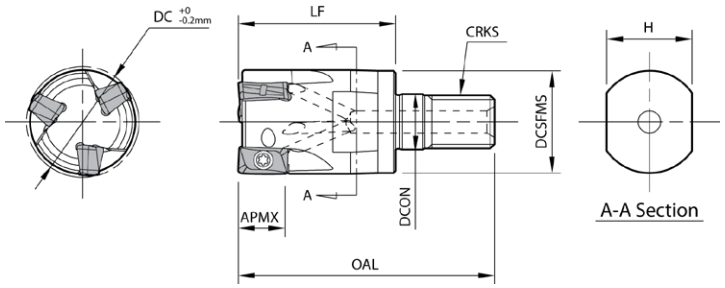
MEW (Modular Type)



Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions								A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Applicable Inserts ➡ M93
				DC	DCON	DCSFMS	OAL	LF	APMX	CRKS	H					
mm	MEW 16-M08-10-2T	●	2	16	8.5	14.7	42	25	10	M8x1.25	12	+7	-22	Yes	43,750	LOGT1004... LOMU1004...
	20-M10-10-2T	●	2	20	10.5	18.7	48	30	10	M10x1.5	15	+7	-20	Yes	41,000	LOGT1004... LOMU1004...
	20-M10-10-3T	●	3	20	10.5	18.7	48	30	10	M10x1.5	15	+7	-20	Yes	41,000	LOGT1004... LOMU1004...
	25-M12-10-3T	●	3	25	12.5	23	56	35	10	M12x1.75	19	+7	-20	Yes	37,500	LOGT1004... LOMU1004...
	32-M16-10-4T	●	4	32	17	30	62	40	10	M16x2.0	24	+7	-20	Yes	33,900	LOGT1004... LOMU1004...
	MEW 25-M12-15-2T	●	2	25	12.5	23	56	35	15	M12x1.75	19	+10	-22	Yes	35,000	LOGT1505... LOMU1505...
	32-M16-15-3T	●	3	32	17	30	62	40	15	M16x2.0	24	+10	-22	Yes	30,000	LOGT1505... LOMU1505...

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 **M324** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

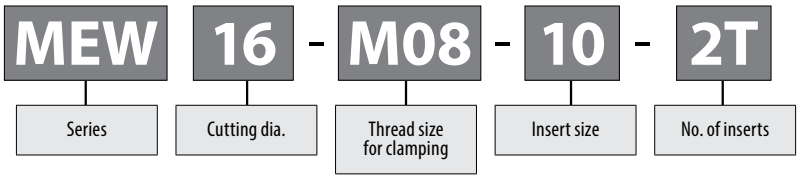
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Spare Parts and Applicable Inserts (MEW Modular Type)

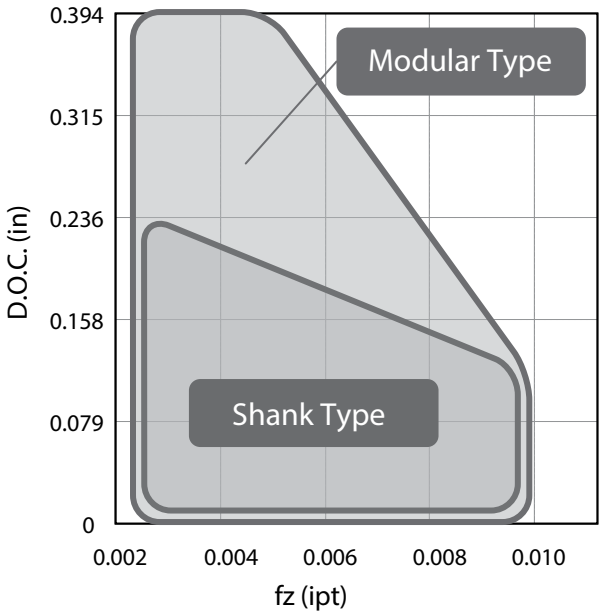
Part Number	Spare Parts			Applicable Inserts → M93			
	Insert Screw	Wrench	Anti-Seize Compound	General Purpose	Low Cutting Force	Tough Edge (For Heavy Milling)	Non-ferrous Metals
MEW 16-M08-10-2T 20-M10-10-2T 20-M10-10-3T 25-M12-10-3T 32-M16-10-4T	SB-3065TRP	DTPM-8	P-37	LOMU10…-GM	LOMU10…-SM	LOMU10…-GH	LOGT10…-AM
	Recommended tightening torque for insert clamp 1.2N·m						
MEW 25-M12-15-2T 32-M16-15-3T	SB-4090TRP	DTPM-15	P-37	LOMU15…-GM	LOMU15…-SM	LOMU15…-GH	LOGT15…-AM
	Recommended tightening torque for insert clamp 3.5N·m						

Coat anti-seize compound thinly on portion of taper and thread prior to installation.

Modular End Mill Head Identification System



Modular End Mill Features



<Cutting Conditions>

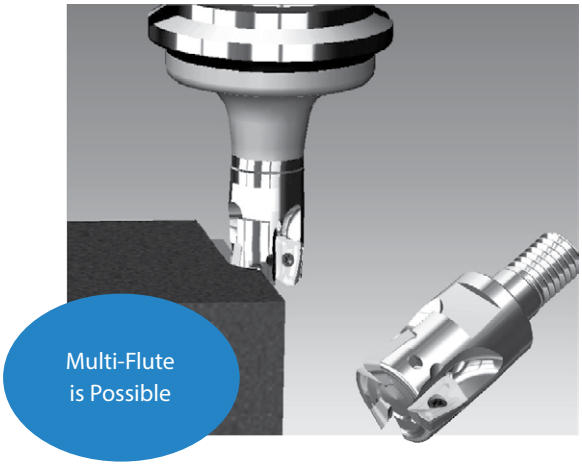
· Cutting Speed : Vc = 490 sfm (n = 2,390min^{-1})
· Width of Cut : ae = 0.394" (Shouldering)
· Workpiece Material : 1055 Dry
· Machine : BT30 M/C

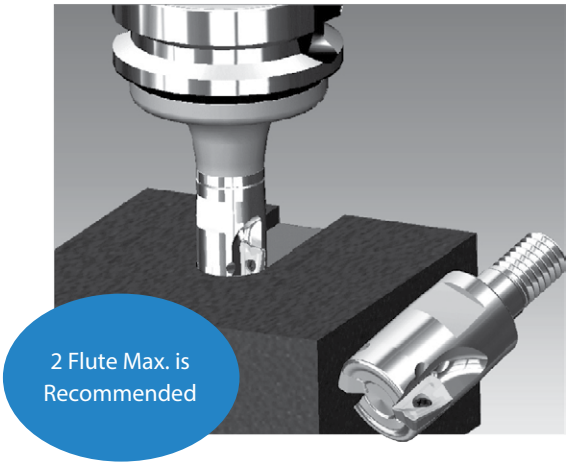
<Cutting Tool>

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

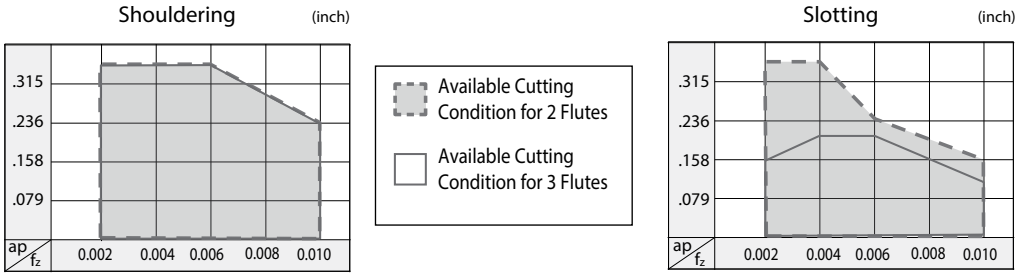
Flute Recommendation for Shouldering and Slotting

Shouldering (ae = 0.394")	Slotting





Modular End Mill Cutting Conditions by Application



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

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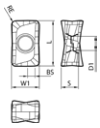
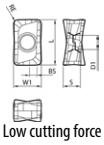
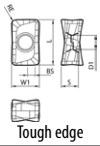
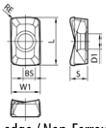
LOMU/LOGT

Usage Classification													
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel				☆			★	☆		P
	Mold and die steel				☆			★	☆		
	Austenitic stainless steel					☆		☆	★		M
	Martensitic stainless steel	★							☆		
	Precipitation hardened stainless steel					☆			★		
	Gray cast iron			☆			★				K
	Nodular cast iron			☆			★				
	Non-ferrous metals		★							☆	N
	Heat-resistant alloy	★							☆		S
	Titanium alloy					☆			★		
	Hard materials (≤ 60 HRC)			★							H

Insert		Part Number	No. of Edges	Dimensions (mm) S	D1	RE	L	W1	BS	Carbide CVD CA6535	DLC PDL025	PVD PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	- GW25	Applicable Toolholder M84~M90
	 General purpose	LOMU 100404ER-GM	4	4	3.4	0.4	10.9	6.6	2.1	●			△	●	●	●	●	●		MEW...-10-... MEWH...-10-...
		LOMU 100408ER-GM				0.8			1.7	●			△	●	●	●	●	●		
		LOMU 100412ER-GM				1.2			1.3	●			△	●	●	●	●	●		
		LOMU 100416ER-GM				1.6			1	●			△	●	●	●	●	●		
		LOMU 100420ER-GM				2			1	●			△	●	●	●	●	●		
		LOMU 150504ER-GM	4	5.6	4.8	0.4	15.7	9.2	2.2	●			△	●	●	●	●	●		MEW...-15-... MEWH...-15-...
		LOMU 150508ER-GM				0.8			1.8	●			△	●	●	●	●	●		
		LOMU 150510ER-GM				1			1.6					●			●			
		LOMU 150512ER-GM				1.2			1.4	●			△	●	●	●	●	●		
		LOMU 150516ER-GM				1.6			1	●			△	●	●	●	●	●		
		LOMU 150520ER-GM				2			0.6	●			△	●	●	●	●	●		
	 Low cutting force	LOMU 100408ER-SM	4	4	3.4	0.8	10.9	6.6	1.7	●			△	●	●	●	●	●		MEW...-10-... MEWH...-10-...
		LOMU 150508ER-SM	4	5.6	4.8	0.8	15.7	9.2	1.8	●			△	●	●	●	●	●		MEW...-15-... MEWH...-15-...
	 Tough edge	LOMU 100408ER-GH	4	4	3.4	0.8	10.9	6.6	1.7	●		●	△	●	●	●	●	●		MEW...-10-... MEWH...-10-...
		LOMU 150508ER-GH	4	5.6	4.8	0.8	15.7	9.2	1.8	●		●	△	●	●	●	●	●		MEW...-15-... MEWH...-15-...
	 2-edge / Non-Ferrous Metals	LOGT 100408FR-AM	2	4	3.6	0.8	11.2	6.8	2.8		●								●	MEW...-10-...
		LOGT 150508FR-AM	2	5.6	4.9	0.8	15.9	8.9	2.9		●								●	MEW...-15-...

Right-hand Insert Shown

Recommended Cutting Conditions M94

LOMU and LOGT inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

How to Mount Insert

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

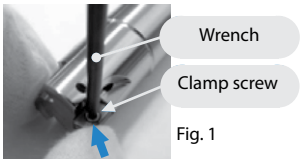


Fig. 1

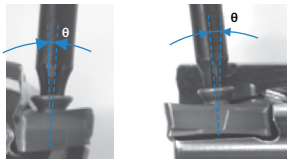


Fig. 2

Recommended Cutting Conditions

Chipbreaker	Workpiece Material	Feed Rate fz : ipt		Recommended Insert Grade / Cutting Speed (Vc: sfm)						
		Toolholder Part Numbers		MEGACOAT NANO EX (MEGACOAT NANO)			MEGACOAT HARD	CVD	DLC	Uncoated Carbide
		MEW0625~MEW0750 MEW16~MEW18	MEW1000~MEW1500 MEW1500R~MEW3000R MEW20~MEW40 MEW040R~MEW080R	PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	PR015S	CA6535	PDL025	GW25
GM	Carbon Steel	0.002 - **0.004** - 0.008	0.003 - **0.006** - 0.010	☆ 390-**590**-820	★ 390-**590**-820	-	-	-	-	-
	Alloy Steel	0.002 - **0.004** - 0.006	0.003 - **0.006** - 0.008	☆ 330-**520**-720	★ 330-**520**-720	-	-	-	-	-
	Mold Steel	0.002 - **0.003** - 0.005	0.003 - **0.005** - 0.008	☆ 260-**460**-590	★ 260-**460**-590	-	-	-	-	-
	Austenitic Stainless Steel	0.002 - **0.003** - 0.005	0.003 - **0.005** - 0.006	☆ 330-**520**-660	☆ 330-**520**-660	-	-	-	-	-
	Martensitic Stainless Steel	0.002 - **0.003** - 0.005	0.003 - **0.005** - 0.008	☆ 490-**660**-820	-	-	-	★ 590-**790**-980	-	-
	Precipitation Hardened Stainless Steel	0.002 - **0.003** - 0.005	0.003 - **0.005** - 0.008	★ 300-**390**-490	-	-	-	-	-	-
	Gray Cast Iron	0.002 - **0.004** - 0.007	0.003 - **0.007** - 0.010	-	-	★ 390-**590**-820	-	-	-	-
	Nodular Cast Iron	0.002 - **0.003** - 0.005	0.003 - **0.006** - 0.008	-	-	★ 330-**490**-660	-	-	-	-
	Ni-base Heat-Resistant Alloy	0.002 - **0.003** - 0.005	0.003 - **0.005** - 0.006	☆ 70-**100**-160	-	-	-	★ 70-**100**-160	-	-
	Titanium Alloy	0.002 - **0.003** - 0.005	0.003 - **0.006** - 0.008	☆ 130-**200**-260	-	☆ 100-**160**-230	-	-	-	-
SM	Carbon Steel	0.002 - **0.004** - 0.007	0.003 - **0.006** - 0.008	☆ 390-**590**-820	★ 390-**590**-820	-	-	-	-	-
	Alloy Steel	0.002 - **0.003** - 0.005	0.003 - **0.005** - 0.007	☆ 330-**520**-720	★ 330-**520**-720	-	-	-	-	-
	Mold Steel	0.002 - **0.003** - 0.005	0.003 - **0.004** - 0.006	☆ 260-**460**-590	★ 260-**460**-590	-	-	-	-	-
	Austenitic Stainless Steel	0.002 - **0.003** - 0.005	0.003 - **0.004** - 0.006	★ 330-**520**-660	☆ 330-**520**-660	-	-	-	-	-
	Martensitic Stainless Steel	0.002 - **0.003** - 0.005	0.003 - **0.004** - 0.006	☆ 490-**660**-820	-	-	-	★ 590-**790**-980	-	-
	Precipitation Hardened Stainless Steel	0.002 - **0.003** - 0.005	0.003 - **0.004** - 0.006	☆ 300-**390**-490	-	-	-	-	-	-
	Ni-base Heat-Resistant Alloy	0.002 - **0.003** - 0.004	0.003 - **0.004** - 0.005	☆ 70-**100**-160	-	-	-	★ 70-**100**-160	-	-
	Titanium Alloy	0.002 - **0.003** - 0.005	0.003 - **0.005** - 0.006	★ 130-**200**-260	-	☆ 100-**160**-230	-	-	-	-
GH	Carbon Steel	0.002 - **0.004** - 0.008	0.003 - **0.008** - 0.012	☆ 390-**590**-820	★ 390-**590**-820	-	-	-	-	-
	Alloy Steel	0.002 - **0.004** - 0.006	0.003 - **0.008** - 0.010	☆ 330-**520**-720	★ 330-**520**-720	-	-	-	-	-
	Mold Steel	0.002 - **0.003** - 0.005	0.003 - **0.006** - 0.009	☆ 260-**460**-590	★ 260-**460**-590	-	-	-	-	-
	Austenitic Stainless Steel	0.002 - **0.003** - 0.005	0.003 - **0.005** - 0.006	☆ 330-**520**-660	☆ 330-**520**-660	-	-	-	-	-
	Martensitic Stainless Steel	0.002 - **0.003** - 0.005	0.003 - **0.005** - 0.008	☆ 490-**660**-820	-	-	-	☆ 590-**790**-980	-	-
	Precipitation Hardened Stainless Steel	0.002 - **0.003** - 0.005	0.003 - **0.005** - 0.008	☆ 300-**390**-490	-	-	-	-	-	-
	Gray Cast Iron	0.002 - **0.004** - 0.008	0.003 - **0.009** - 0.012	-	-	☆ 390-**590**-820	-	-	-	-
	Nodular Cast Iron	0.002 - **0.003** - 0.006	0.003 - **0.007** - 0.010	-	-	☆ 330-**490**-660	-	-	-	-
	Ni-base Heat-Resistant Alloy	0.002 - **0.003** - 0.005	0.003 - **0.005** - 0.006	☆ 70-**100**-160	-	-	-	☆ 70-**100**-160	-	-
	Titanium Alloy	0.002 - **0.003** - 0.005	0.003 - **0.006** - 0.008	☆ 130-**200**-260	-	☆ 100-**160**-230	-	-	-	-
	Hardened Materials (≤ 60 HRC)	0.002 - **0.003** - 0.005	0.003 - **0.006** - 0.009	-	-	-	★ 200-**260**-330	-	-	-
AM	Alminum (Si < 13%)	0.002 - **0.005** - 0.008	0.005 - **0.007** - 0.012	-	-	-	-	-	★ 660-2,950	☆ 660-980
	Alminum (Si > 13%)	0.002 - **0.003** - 0.005	0.002 - **0.005** - 0.008	-	-	-	-	-		

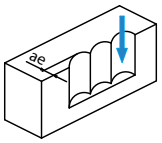
Bold numbers in the table indicate the most recommended value of feed (f). Adjust cutting speed and feed rate according to the actual machining conditions.
Coolant is recommended for Ni-base heat-resistant alloy and titanium alloy with MEW.

★ : 1st Recommendation ☆ : 2nd Recommendation

Ramping, helical milling and vertical milling (Plunging)

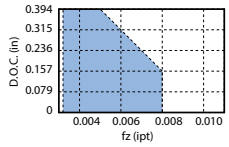
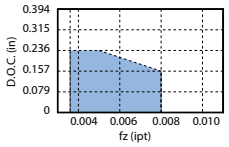
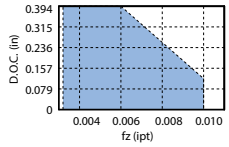
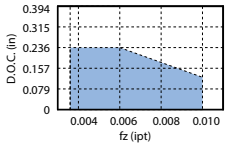
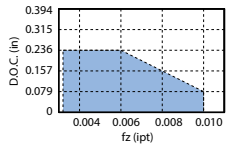
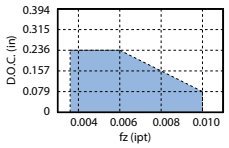
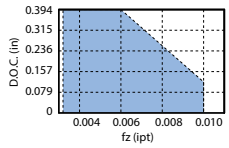
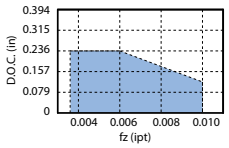
1. Available for vertical milling (plunging).
2. NOT available for ramping and helical milling, because interference between workpiece and insert may occur.

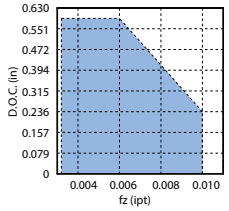
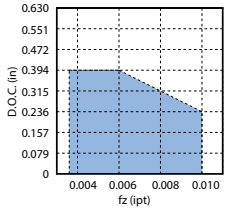
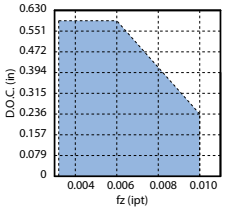
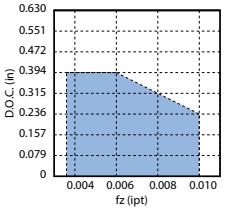
Vertical Milling (Plunging)



Insert description	Max. width of cut
LOMU10 type	5mm
LOMU15 type	7mm

Cutting Performance

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

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

<Cutting Conditions>
· Vc = 600 sfm
· GM Chipbreaker
· Workpiece Material: 1049
· Overhang Length
1. End Mill: Same length as LH of the dimension
2. Face Mill: LF of the dimension + minimum overhang length of the arbor

Case Studies

1018

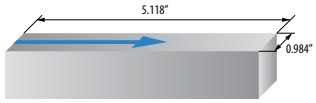
· Construction Equipment Part
· Vc = 820 sfm
· D.O.C. x ae = 0.158" x 0.787"
· fz = 0.006 ipt (Vf = 53 ipm)
· Wet
· MEW32-S32-10-4T(4 flutes)
· LOMU100408ER-GM (PR1525)

PR1525	Chip evacuation rate =108cc/min
Competitor A (Positive cutter)	Chip evacuation rate =72cc/min

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

15-5PH (42HRC)

· Aircraft Part
· Vc = 590 sfm
· D.O.C. x ae = 0.079" x 0.984"
· fz = 0.004 ipt (Vf = 28 ipm)
· Wet
· MEW32-S32-10-4T(4 flutes)
· LOMU100408ER-GM (PR1525)



PR1525	Chip evacuation rate = 35.8cc/min (Further machining possible)
Competitor B (Positive cutter)	Chip evacuation rate = 26.8cc/min (Unable to continue machining)

No chattering and more stable milling is possible with MEW.
Despite the milling difficulty because of the properties of the material (42HRC), PR1525 kept good cutting edge form, minimizing wear and adhesion.
(User evaluation)

MEC (End Mill)

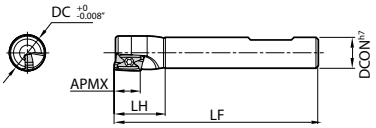


Fig. 1

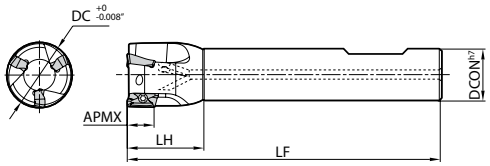


Fig. 2

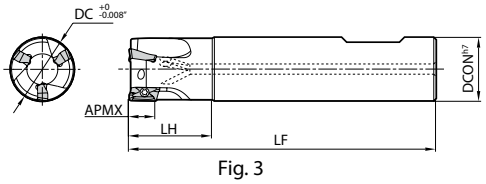


Fig. 3

Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions DC	Dimensions DCON	Dimensions LF	Dimensions LH	Dimensions APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Fig.	Spare Parts: Anti-Seize Compound	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts ➡ M104~M105
Inch	Weldon	Standard Shank	MEC 0500-S500-11	●	1	0.500	0.500	2.650	0.787	0.400	+12	-21	No	50,800	1	P-37	SB-2545TR	DTM-8	BDMT1103...
			MEC 0625-S500-11T	●	2	0.625	0.500	2.750	0.906	0.400	+18	-14	No	43,750	1	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
			0625-S625-11T	●			0.625	3.000	1.024				Yes	43,750	3				
			0750-S625-11T	●	3	0.750	0.625	3.050			+20	-10		41,000	2				
			0750-S750-11T	●		0.750	0.750	3.250	1.142					41,000	3				
			1000-S750-11T	●		1.000	0.750				+21	-10		37,500	2				
			1000-S100-11T	●			1.000	3.750	1.260					37,500	3				
			1250-S100-11T	●	4	1.250	1.000				+23	-9		33,900	2				
			1250-S125-11T	●			1.250	4.000	1.575					33,900	3				
			1500-S125-11T	●	5	1.500	1.250	4.350	1.969		+24	-8		30,000	2				
			MEC 1000-S750-17	●	2	1.000	0.750	3.500	1.417	0.618	+16	-11	Yes	35,000	2	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...
			1000-S100-17	●		1.000	1.000	3.750						35,000	3				
			1250-S100-17	●	3	1.250	1.000	4.000	1.575		+17	-7		30,000	2				
			1250-S125-17	●			1.250							30,000	3				
			1500-S125-17	●	4	1.500	1.250	4.350	1.969		+19			25,000	2				

Max. revolution : When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
For more details, see "Warning" on page **M107**.
Coat Anti-seize Compound (P-37) thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MEC (End Mill)

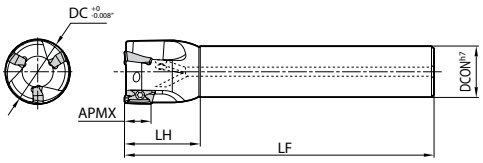


Fig. 1

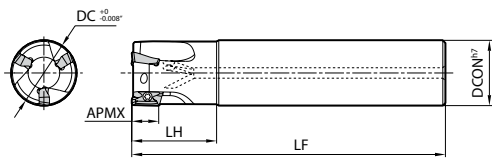


Fig. 2

Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions DC	DCON	LF	LH	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Fig.	Spare Parts: Anti-Seize Compound	Insert Screw	Wrench	Applicable Inserts ➡ M104~M105
Inch	Cylindrical	Long Shank	MEC 0750-S750-5.2-11T	●	2	0.750	0.750	5.200	2.362	0.400	+20	-10	Yes	41,000	2	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
			1000-S100-6.3-11T	●		1.000	1.000	6.300			+21			37,500	2				
			1250-S125-7.9-11T	●		1.250	1.250	7.870	2.559		+23	-9		33,900	2				
			1500-S125-9.5-11T	●		1.500	1.250	9.450				-8		30,000	1				
			MEC 1000-S100-6.3-17	●	2	1.000	1.000	6.300	2.362	0.618	+16	-11	Yes	35,000	2	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...
			1250-S125-7.9-17	●		1.250	1.250	7.870	2.559		+17	-7		30,000	2				
			1500-S125-9.5-17	●		1.500	1.250	9.450						25,000	1				

Max. revolution : When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
For more details, see "Warning" on page **M107**.
Coat Anti-seize Compound (P-37) thinly on portion of taper and thread prior to installation.

MEC (End Mill)

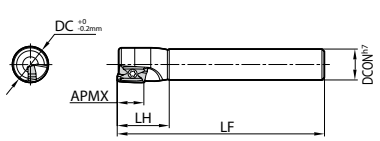


Fig. 1

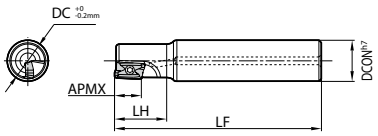


Fig. 2

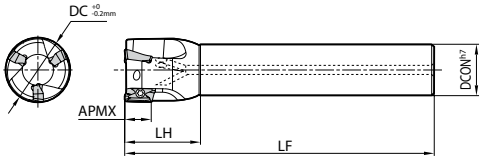


Fig. 3

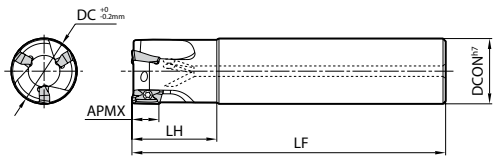


Fig. 4

Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions DC	DCON	LF	LH	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Fig.	Spare Parts: Anti-Seize Compound	Insert Screw	Wrench	Applicable Inserts ➡ M104~M105
mm	Cylindrical	Standard Shank	MEC 10-S10-11	●	1	10	10	80	17	10	+10	-24	No	54,800	1	P-37	SB-2545TR	DTM-8	BDMT1103...
			10-S16-11	●			16						Yes	54,800	2				
			12-S10-11	●		12	10		20		+12	-21	No	50,800	1				
			12-S12-11	●			12							50,800	1				
			12-S16-11	●			16						Yes	50,800	2				
			13-S12-11	●		13	12					-19	No	49,200	1				
			14-S12-11	●		14								47,700	1				
			14-S16-11	●			16						Yes	47,700	2				
			MEC 16-S12-11T	●	2	16	12	100	23	10	+18	-14	No	43,750	1	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
			16-S16-11T	●			16		30				Yes	43,750	4				
			17-S16-11T	●		17			23			-13		43,500	3				
			18-S16-11T	●		18					+19			43,000	3				
			19-S16-11T	●	3	19		110	26		+20	-10		42,000	3				
			20-S16-11T	●		20								41,000	3				
			20-S20-11T	●			20		30					41,000	4				
			21-S20-11T	●		21			26			-9		40,300	3				
			22-S20-11T	●		22					+21	-10		39,600	3				
			24-S20-11T	●		24		120	29					38,200	3				
			25-S20-11T	●		25								37,500	3				
			25-S20-11T-4	●	4									37,500	3				
			25-S25-11T	●	3		25		32					37,500	4				
			25-S25-11T-4	●	4									37,500	4				
			28-S25-11T	●	3	28		130	29		+22	-9		35,800	3				
			30-S25-11T	●	4	30			32		+23			34,800	3				
			32-S25-11T	●		32								33,900	3				
			32-S25-11T-5	●	5									33,900	3				
			32-S32-11T	●	4		32		40					33,900	4				
			32-S32-11T-5	●	5									33,900	4				
			40-S32-11T	●		40		150	50			-8		30,000	3				
			50-S32-11T	●		50						-7		22,500	3				

Max. revolution : When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
For more details, see "Warning" on page **M107**.
Coat Anti-seize Compound (P-37) thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions DC	DCON	LF	LH	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Fig.	Spare Parts: Anti-Seize Compound	Insert Screw	Wrench	Applicable Inserts ➡ M104~M105
mm	Cylindrical	Long Shank	MEC 20-S18-170-11T	●	2	20	18	170	30	10	+20	-10	Yes	41,000	3	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
			20-S20-140-11T	●			20	140	60						4				
			20-S20-170-11T	●				170							4				
			22-S20-170-11T	●		22			30					39,600	3				
			25-S23-210-11T	●		25	23	210	32		+21			37,500	3				
			25-S25-160-11T	●			25	160	60						4				
			25-S25-210-11T	●				210							4				
			28-S25-210-11T	●		28			32		+22	-9		35,800	3				
			32-S32-200-11T	●		32	32	200	65		+23			33,900	4				
			32-S32-250-11T	●				250							4				
			35-S32-250-11T	●		35			40					32,600	3				
			40-S32-240-11T	●		40		240	65			-8		30,000	3				
			MEC 20-S20-150-11T-3	●	3	20	20	150	60	10	+20	-10	Yes	41,000	4	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
			25-S25-170-11T-3	●		25	25	170			+21			37,500	4				
			25-S25-170-11T-4	●	4										4				
			30-S25-180-11T-3	●	3	30		180	32		+23	-9		34,800	3				
			32-S32-200-11T-3	●		32	32	200	65					33,900	4				
			32-S32-200-11T-4	●	4										4				
			32-S32-200-11T-5	●	5										4				

Max. revolution : When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
For more details, see "Warning" on page **M107**.
Coat Anti-seize Compound (P-37) thinly on portion of taper and thread prior to installation.

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MEC (End Mill)

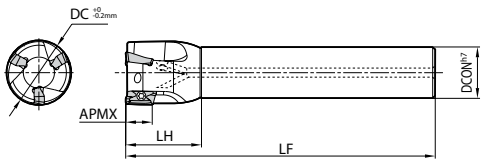

Fig. 1

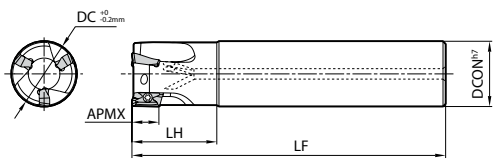

Fig. 2

Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions					A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Fig.	Spare Parts: Anti-Seize Compound	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts ➡ M104~M105
						DC	DCON	LF	LH	APMX									
mm	Cylindrical	Standard Shank	MEC 25-S20-17	●	2	25	20	120	36	15.7	+16	-11	Yes	35,000	1	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...
			25-S25-17	●			25								2				
			32-S25-17	●	3	32		130	40		+17	-7		30,000	1				
			32-S32-17	●			32								2				
			40-S32-17	●	4	40		150	50		+19			25,000	1				
			50-S32-17	●		50								17,000	1				
		Long shank	MEC 25-S25-160-17	●	2	25	25	160	60	15.7	+16	-11	Yes	35,000	2	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...
			25-S25-210-17	●				210							2				
			28-S25-210-17	●		28			36					32,500	1				
			32-S32-200-17	●		32	32	200	65		+17	-7		30,000	2				
			32-S32-250-17	●				250							2				
			35-S32-250-17	●		35			40					27,700	1				
			40-S32-240-17	●		40		240	65		+19			25,000	1				
			MEC 32-S32-250-17-3	●	3	32	32	250	65	15.7	+17	-7	Yes	30,000	2	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...
			40-S32-250-17-3	●		40					+19			25,000	1				
			40-S32-250-17-4	●	4										1				
			50-S42-250-17-4	●		50	42		64			-6		17,000	1				

Max. revolution : When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
For more details, see "Warning" on page **M107**.
Coat Anti-seize Compound (P-37) thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
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MEC (Face Mill)

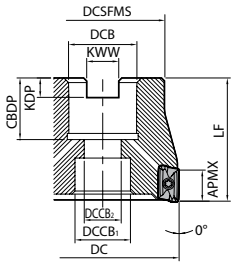


Fig. 1

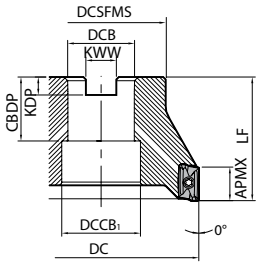


Fig. 2

Toolholder Dimensions

Unit	Part Number	Std. Item R	No. of Inserts	Dimensions DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts: Anti-Seize Compound	Insert Screw	Wrench	Applicable Inserts ⇒ M104~M105
Inch	Inch Bore Dia.																						
	MEC 1500R-11T-5T	●	5	1.500	1.263		0.63			0.807							30,700	0.2	1				
	2000R-11T-5T	●	5	2.000	1.606	0.750	0.646	0.417	1.575	0.819	0.188	0.312					22,300	0.3	1				
	2500R-11T-6T	●	6	2.500	1.594		0.63			0.819			0.400	+23	-7	Yes	20,400	0.7	1	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
	3000R-11T-7T	●	7	3.000	1.917	1.000	0.827	0.555	1.969	0.878	0.223	0.375					18,500	1.0	1				
	4000R-11T-9TN	●	9	4.000	2.622	1.500	1.969	-	2.48	1.654	0.375	0.625					16,800	1.6	1				
	MEC 2000R-17-4T	●	4	2.000	1.606	0.750	0.646	0.417	1.575	0.819	0.188	0.312					16,800	0.4	1				
	2000R-17-5T	●	5														16,800	0.4	1				
	2500R-17-5T	●	5	2.500	1.634		0.646			0.819			0.618	+19	-7	Yes	14,400	0.8	1	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...
	3000R-17-6T	●	6	3.000	1.969	1.000	0.827	0.555	1.969	0.878	0.223	0.375					12,250	1.0	1				
	4000R-17-7TN	●	7	4.000	2.622	1.500	1.969	-	2.48	1.654	0.375	0.625					10,400	1.8	2				

Max. revolution : When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
For more details, see "Warning" on page **M107**.
Coat Anti-seize Compound (P-37) thinly on portion of taper and thread prior to installation.

When using center-through Air/Coolant/Mist
If center through Air (Coolant, Mist) is used, please use appropriate arbor and clamp with arbor bolt (Table1)

For good shoulder finishes by MEC multistage ap.
In order to obtain a smooth finished shoulder wall with multiple passes of MEC milling cutter, please keep D.O.C. 0.217" (5.5mm) or less for 11T3 type insert and also keep D.O.C. 0.354" (9mm) or less for 1704 type insert.

Table 1

Part Number	Arbor Bolt (Attachment)	Wrench
MEC1500R···· MEC2000R···· MEC2500R····	HH3/8-1.25H	5/16" Hex
MEC3000R····	HH1/2-1.25H	3/8" Hex
MEC4000R····	HH3/4-2.3H	5/8" Hex

Wrench sold separately.

MEC (Face Mill)

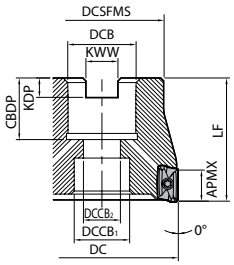


Fig. 1

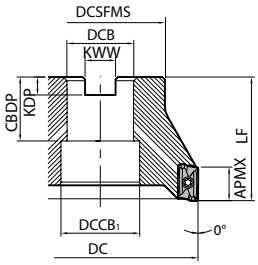


Fig. 2

Toolholder Dimensions

Unit			Part Number	Std. Item R	No. of Inserts	Dimensions DC	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts: Anti-Seize Compound	Insert Screw	Wrench	Applicable Inserts M104~M105
mm	Inch Bore Dia.	Coarse Pitch	MEC 063R-11-6T	●	6	63	50	1.000"	20	14	50	1.024"	0.236"	0.375"	10	+23	-7	Yes	20,500	0.8	1	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
			080R-11-7T	●	7	80	52.5												18,500	1	1				
			100R-11-9TN	●	9	100	65	1.250"	26	17.6	63	1.260"	0.315"	0.500"					17,000	1.8	1				
		Fine pitch	MEC 063R-11-8T	●	8	63	50	1.000"	20	14	50	1.024"	0.236"	0.375"	10	+23	-7	Yes	20,500	0.8	1	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
			080R-11-10T	●	10	80	52.5												18,500	1	1				
		Coarse Pitch	MEC 063R-17-5T	●	5	63	50	1.000"	20	14	50	1.024"	0.236"	0.375"	15.7	+19	-7	Yes	14,500	0.8	1	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...
			080R-17-6T	●	6	80	52.5												12,000	1	1				
			100R-17-7TN	●	7	100	65	1.250"	26	17.6	63	1.260"	0.315"	0.500"					10,500	1.8	1				
			125R-17-9T	●	9	125	80	1.500"	45	32		1.496"	0.394"	0.625"					8,900	3.4	1				
		Fine Pitch	MEC 063R-17-6T	●	6	63	50	1.000"	20	14	50	1.024"	0.236"	0.375"	15.7	+19	-7	Yes	14,500	0.8	1	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...
			080R-17-8T	●	8	80	52.5												12,000	1	1				
			100R-17-9TN	●	9	100	65	1.250"	26	17.6	63	1.260"	0.315"	0.500"					10,500	1.8	1				
	Metric Bore Dia.	Coarse Pitch	MEC 040R-11-5T-M	●	5	40	34	16	14	8.5	40	20	5.6	8.5	10	+23	-7	Yes	30,000	0.2	1	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
			050R-11-5T-M	●		50	40	22	18	12		22	6.3	10.4					22,500	0.3	1				
			063R-11-6T-M	●	6	63													20,500	0.7	1				
			080R-11-7T-M	●	7	80	52.5	27	20	14	50	26	7	12.4					18,500	1	1				
			100R-11-9T-MN	●	9	100	65	32	26	17.6	55		8	14.4					17,000	1.6	1				
			125R-11-11T-M	●	11	125	85	40	45	32	63	33	9.5	16.4					15,000	3.1	1				
		Fine Pitch	MEC 032R-11-5T-M	●	5	32	30	16	11.5	8.5	35	20	5.6	8.4	10	+23	-7	Yes	33,900	0.1	1	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
			040R-11-6T-M	●	6	40	34		14		40								30,000	0.2	1				
			080R-11-10T-M	●	10	80	52.5	27	20	14	50	26.5	7	12.4					18,500	0.9	1				
			100R-11-11T-M	●	11	100	65	32	26	17.6	55	26	8	14.4					17,000	1.7	1				
		Coarse Pitch	MEC 040R-17-4T-M	●	4	40	34	16	14	8.5	40	20	5.6	8.5	15.7	+19	-7	Yes	25,000	0.3	1	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...
			050R-17-4T-M	●		50	40	22	18	12		22	6.3	10.4					17,000	0.4	1				
			063R-17-5T-M	●	5	63													14,500	0.6	1				
			080R-17-6T-M	●	6	80	52.5	27	20	14	50	26	7	12.4					12,000	1	1				
			100R-17-7T-MN	●	7	100	65	32	26	17.6	55		8						10,500	1.8	1				
			125R-17-9T-M	●	9	125	85	40	45	32	63	33	9.5	16.4					8,900	3.1	1				
			160R-17-12T-M	●	12	160	110		68	-								No	7,400	4.5	2				

Max. revolution : When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
For more details, see "Warning" on page **M107**.
Coat Anti-seize Compound (P-37) thinly on portion of taper and thread prior to installation.

When using center-through Air/Coolant/Mist

If center through Air (Coolant, Mist) is used, please use appropriate arbor and clamp with arbor bolt (Table1)

For good shoulder finishes with MEC multistage D.O.C.

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

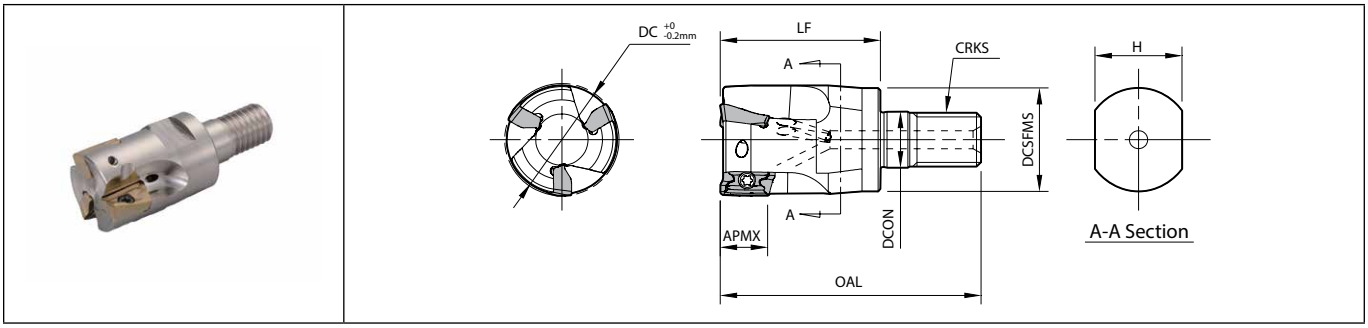
Table 1

Part Number	Arbor Bolt (Attachment)	Wrench
MEC032R·····M	SP8X35	LW-5 (Double width 5 mm)
MEC040R·····M	HH8X25H	LW-5 (Double width 5 mm)
MEC050R·····M MEC063R·····M	HH10X30H	LW-6 (Double width 6 mm)
MEC063R···· MEC080R····(-M)	HH12X35H	LW-8 (Double width 8 mm)
MEC100R····N/M	HH16X52H	LW-12 (Double width 12 mm)
MEC125R····	HF20X53H	LW-14 (Double width 14 mm)
MEC160R····	HF24X60H	LW-17 (Double width 17 mm)

Wrench sold separately.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MEC (Modular Head)



Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions								A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Applicable Inserts ➡ M104~M105
				DC	DCON	DCSFMS	OAL	LF	APMX	CRKS	H					
mm	MEC 16-M08-11T-2T	●	2	16	8.5	14.7	42	25	10	M8x1.25	12	+18	-14	Yes	43,750	BDGT11T3... BDMT11T3...
	20-M10-11T-2T	●		20	10.5	18.7	48	30		M10x1.5	15	+20	-10		41,000	
	20-M10-11T-3T	●	3												41,000	
	25-M12-11T-3T	●		25	12.5	23	56	35		M12x1.75	19	+21			37,500	
	32-M16-11T-4T	●	4	32	17	30	62	40		M16x2.0	24	+23	-9		33,900	
	MEC 25-M12-17-2T	●	2	25	12.5	23	56	35	15.7	M12x1.75	19	+16	-11	Yes	35,000	BDGT1704... BDMT1704...
	32-M16-17-3T	●	3	32	17	30	62	40		M16x2.0	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.
For more details, see "Warning" on page **M107**.
See page **M324** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

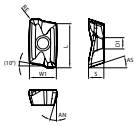
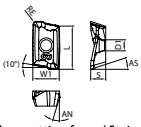
Spare Parts for MEC Modular Head

Part Number	Spare Parts		
	Insert Screw	Wrench	Anti-Seize Compound
MEC 16-M08-11T-2T	SB-2555TRG	DTM-8	P-37
20-M10-11T-2T			
20-M10-11T-3T			
25-M12-11T-3T	Recommended tightening torque for insert clamp 1.2N·m		
32-M16-11T-4T			
MEC 25-M12-17-2T	SB-4070TRN	DTM-15	P-37
32-M16-17-3T	Recommended tightening torque for insert clamp 3.5N·m		

Coat anti-seize compound thinly on portion of taper and thread prior to installation.

BDGT/BDMT

Usage Classification										
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel				★	☆		P
	Mold and die steel				★	☆		
	Austenitic stainless steel		☆		☆	★		M
	Martensitic stainless steel	★				☆		
	Precipitation hardened stainless steel		☆			★		
	Gray cast iron			★				K
	Nodular cast iron			★				
	Non-ferrous metals							N
	Heat-resistant alloy	★				☆		S
	Titanium alloy		☆			★		
	Hard materials							H

Insert		Part Number	No. of Edges	Dimensions (mm) S	D1	RE	L	INSL	LE	W1	Angle (°) AN	AS	Carbide CVD CA6535	PVD PR1535	PR1810	PR1825	PR1835	Cermet - TN100M	Applicable Toolholder ➡ M96~ M103
		BDMT 110302ER-JT	2	3	2.8	0.2	11	-	-	6.3	15	18	●	●	●	●	●		MEC...-11
		BDMT 110304ER-JT				0.4							●	●	●	●	●		
		BDMT 110308ER-JT				0.8							●	●	●	●	●		
		BDMT 11T302ER-JT	2	3.8	2.8	0.2	11	-	-	6.7	13	18		●	●	●	●		MEC...-11T(...) MEC...-11-...
		BDMT 11T304ER-JT				0.4							●	●	●	●	●	●	
		BDMT 11T308ER-JT				0.8							●	●	●	●	●	●	
		BDMT 11T312ER-JT				1.2							●	●	●	●	●		
		BDMT 11T316ER-JT				1.6							●	●	●	●	●		
		BDMT 11T320ER-JT				2							●	●	●	●	●		
		BDMT 11T324ER-JT				2.4							●	●	●	●	●		
		BDMT 11T331ER-JT				3.1							●	●	●	●	●		
		BDMT 170404ER-JT	2	4.9	4.4	0.4	17	-	-	9.6	13	18	●	●	●	●	●		MEC...-17(...) MEC...-17-...
		BDMT 170408ER-JT				0.8							●	●	●	●	●	●	
		BDMT 170412ER-JT				1.2							●	●	●	●	●		
		BDMT 170416ER-JT				1.6							●	●	●	●	●		
		BDMT 170420ER-JT				2							●	●	●	●	●		
		BDMT 170424ER-JT				2.4							●	●	●	●	●		
		BDMT 170431ER-JT				3.1							●	●	●	●	●		
		BDMT 170440ER-JT				4								●	●	●	●		
	 Low cutting force / Stainless steel	BDMT 110302ER-JS	2	3	2.8	0.2	11	-	-	6.3	15	18	●	●		●	●		MEC...-11
		BDMT 110304ER-JS				0.4							●	●		●	●		
		BDMT 110308ER-JS				0.8							●	●		●	●		
		BDMT 11T302ER-JS	2	3.8	2.8	0.2	11	-	-	6.7	13	18	●	●		●	●		MEC...-11T(...) MEC...-11-...
		BDMT 11T304ER-JS				0.4							●	●		●	●		
		BDMT 11T308ER-JS				0.8							●	●		●	●		
		BDMT 170404ER-JS	2	4.9	4.4	0.4	17	-	-	9.6	13	18	●	●		●	●		MEC...-17(...) MEC...-17-...
		BDMT 170408ER-JS				0.8							●	●		●	●		

Right-hand Insert Shown

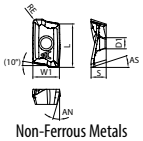
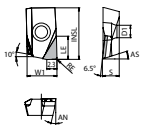
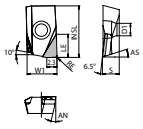
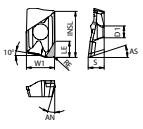
Recommended Cutting Conditions ➡ **M106~M107**

Standard BDMT / BDGT Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

BDGT/BDMT

Usage Classification		
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel	P
	Mold and die steel	P
	Austenitic stainless steel	M
	Martensitic stainless steel	M
	Precipitation hardened stainless steel	M
	Gray cast iron	K
	Nodular cast iron	K
	Non-ferrous metals ★ ☆ □ ■	N
	Heat-resistant alloy	S
	Titanium alloy ☆ □ ■	S
	Hard materials	H

Insert		Part Number	No. of Edges	Dimensions (mm) S	D1	RE	L	INSL	LE	W1	Angle (°) AN	AS	Carbide DLC PDL025	Carbide - GW25	PCD - KPD001	PCD - KPD230	Applicable Toolholder ⇒ M96~M103
	 Non-Ferrous Metals	BDGT 11T302FR-JA	2	3.8	2.8	0.2	11	-	-	6.7	13	18	●	●			MEC...-11T(...) MEC...-11-...
		11T304FR-JA				0.4							●	●			
		11T308FR-JA				0.8							●	●			
		BDGT 170404FR-JA	2	4.9	4.4	0.4	17	-	-	9.6	13	18	●	●			MEC...-17(...) MEC...-17-...
		170408FR-JA				0.8							●	●			
		170420FR-JA				2							●	●			
		170431FR-JA				3.1							●	●			
		BDGT 11T302FR	1	3.8	2.8	0.2	-	11.5	3.8	6.7	13	18			●	●	MEC...-11T(...) MEC...-11-...
		11T304FR				0.4									●	●	
		11T308FR				0.8									●	●	
		BDGT 11T302FR-LE	1	3.8	2.8	0.2	-	11.5	5.2	6.7	13	18			●	●	MEC...-11T(...) MEC...-11-...
		11T304FR-LE				0.4									●	●	
		11T308FR-LE				0.8									●	●	
		BDMT 11T302FR	1	3.8	2.8	0.2	-	11	3.6	6.7	13	18			●	●	MEC...-11T(...) MEC...-11-...
		11T304FR				0.4									●	●	
		BDMT 170402FR	1	4.9	4.4	0.2	-	17	4.4	9.6	13	18			●	●	MEC...-17(...) MEC...-17-...
		170404FR				0.4									●	●	

Right-hand Insert Shown

Recommended Cutting Conditions ⇒ M107

Standard BDMT / BDGT Inserts are sold in 10 piece boxes

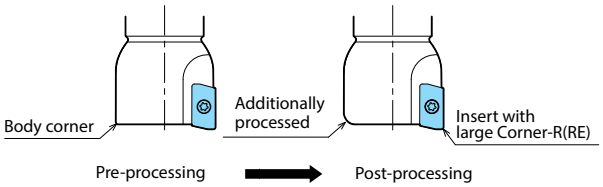
PCD Inserts are sold in 1 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

When using inserts with corner-R (RE)1.6mm or larger, additional modifications of the cutter body will be necessary. Ref. to the chart below for the recommended modifications.

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

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



Recommended Cutting Conditions

JT Chipbreaker

Workpiece Material	Feed Rate fz (ipt)		Recommended Insert Grade Vc (sfm)				
	Toolholder Description		Cermet	MEGACOAT NANO EX (MEGACOAT NANO)			CVD Coated Carbide
	MEC0500~MEC0750 MEC10~MEC19	MEC1000~MEC1500 MEC20~MEC40 MEC1500R~MEC4000R MEC040R~MEC160R	TN100M	PR1835 (PR1535)	PR1825	PR1810	CA6535
Carbon Steel	0.002~**0.004**~0.006	0.003~**0.006**~0.010	☆ 390~**520**~660	☆ 390~**590**~820	★ 390~**590**~820	-	-
Alloy Steel	0.002~**0.004**~0.005	0.003~**0.006**~0.008	☆ 330~**460**~590	☆ 330~**520**~720	★ 330~**520**~720	-	-
Mold Steel	0.002~**0.003**~0.004	0.003~**0.005**~0.008	☆ 260~**390**~490	☆ 260~**460**~590	★ 260~**460**~590	-	-
Austenitic Stainless Steel	0.002~**0.003**~0.004	0.003~**0.005**~0.006	-	☆ 330~**520**~660	☆ 330~**520**~660	-	-
Martensitic Stainless Steel	0.002~**0.003**~0.004	0.003~**0.005**~0.008	-	☆ 490~**660**~820	-	-	★ 590~**790**~980
Precipitation Hardened Stainless Steel	0.002~**0.003**~0.004	0.003~**0.005**~0.008	-	★ 300~**390**~490	-	-	-
Gray Cast Iron	0.002~**0.004**~0.006	0.003~**0.007**~0.010	-	-	-	★ 390~**590**~820	-
Nodular Cast Iron	0.002~**0.003**~0.004	0.003~**0.006**~0.008	-	-	-	★ 330~**490**~660	-
Ni-base Heat Resistant Alloy	0.002~**0.003**~0.004	0.003~**0.005**~0.006	-	☆ 70~**100**~160	-	-	★ 70~**100**~160
Titanium Alloys	0.002~**0.003**~0.004	0.003~**0.006**~0.008	-	☆ 130~**200**~260	-	-	-

Bold numbers in the table indicate the most recommended values. Adjust cutting speed and feed rate according to the actual machining conditions.
Coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

★ : 1st Recommendation ☆ : 2nd Recommendation

JS Chipbreaker

Workpiece Material	Feed Rate fz (ipt)		Recommended Insert Grade Vc (sfm)		
	Toolholder Description		MEGACOAT NANO EX (MEGACOAT NANO)		CVD Coated Carbide
	MEC0500~MEC0750 MEC10~MEC19	MEC1000~MEC1500 MEC20~MEC40 MEC1500R~MEC4000R MEC040R~MEC160R	PR1835 (PR1535)	PR1825	CA6535
Carbon Steel	0.002~**0.004**~0.005	0.003~**0.006**~0.007	☆ 390~**590**~820	★ 390~**590**~820	-
Alloy Steel	0.002~**0.003**~0.004	0.003~**0.005**~0.006	☆ 330~**520**~720	★ 330~**520**~720	-
Mold Steel	0.002~**0.003**~0.004	0.003~**0.004**~0.005	☆ 260~**460**~590	★ 260~**460**~590	-
Austenitic Stainless Steel	0.002~**0.003**~0.004	0.003~**0.004**~0.005	★ 330~**520**~660	☆ 330~**520**~660	-
Martensitic Stainless Steel	0.002~**0.003**~0.004	0.003~**0.004**~0.005	☆ 490~**660**~820	-	★ 590~**790**~980
Precipitation Hardened Stainless Steel	0.002~**0.003**~0.004	0.003~**0.004**~0.005	☆ 300~**390**~490	-	-
Ni-base Heat Resistant Alloy	0.002~**0.003**~0.004	0.003~**0.004**~0.005	☆ 70~**100**~160	-	★ 70~**100**~160
Titanium Alloys	0.002~**0.003**~0.004	0.003~**0.004**~0.005	★ 130~**200**~260	-	-

Bold numbers in the table indicate the most recommended values. Adjust cutting speed and feed rate according to the actual machining conditions. Coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

★ : 1st Recommendation ☆ : 2nd Recommendation

JA Chipbreaker

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade Vc (sfm)	
		DLC Coated Carbide	Carbide
		PDL025	GW25
Aluminum Alloy (Si 13% or Less)	0.002~0.012	660~3,280	660~2,620
Aluminum Alloy (Si 13% and Over)	0.002~0.008	660~980	660~980

PCD

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade Vc (sfm)
		PCD
		KPD230 (KPD001)
Aluminum Alloy (Si 13% or Less)	0.002~0.008	1640~4,920
Aluminum Alloy (Si 13% and Over)	0.002~0.006	980~3,280

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

Warning about Max. Revolution indicated on main body

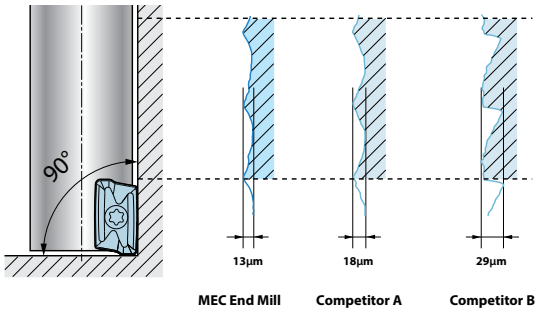
1. When running the end mill and the face mill at revolutions exceeding the maximum revolution limit, the inserts or toolholder may be damaged due to the centrifugal force.
2. For actual practical revolution, please set within recommended cutting condition.
3. When using at a higher revolution (over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

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

Features of MEC

Great 90° Shoulders

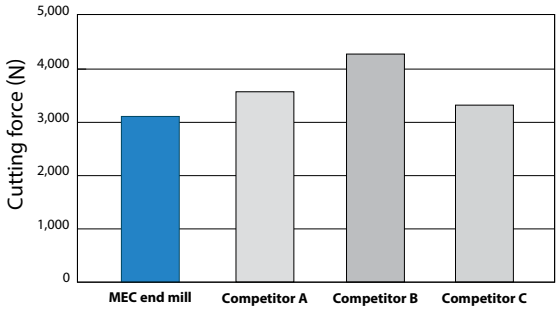
Cutting Surface Comparison



(Internal evaluation)

Low Cutting Force

Cutting Force Comparison

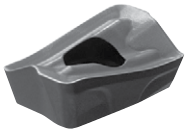


Tool dia. ø0.750" 1049
Vc = 400 sfm Shouldering D.O.C. x ae = 0.354" x 0.394"
fz = 0.008 ipt Dry

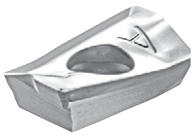
(Internal evaluation)

Chipbreaker

JT Chipbreaker
(General Purpose)

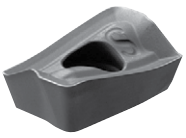


JA Chipbreaker
(For Aluminum)



JS Chipbreaker
(Low Cutting Force)

Cutting Force
20% Lower

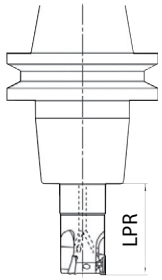


Cutting performance of mec end mill

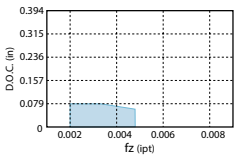
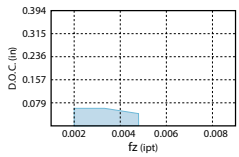
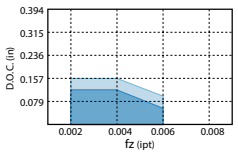
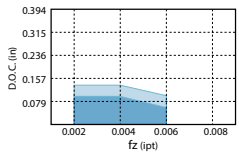
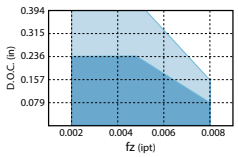
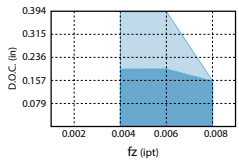
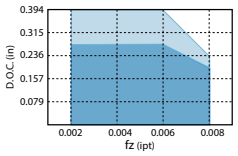
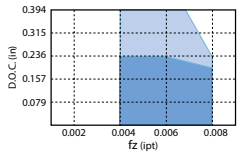
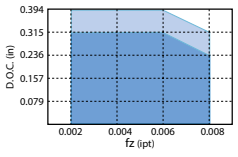
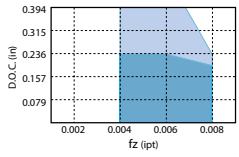
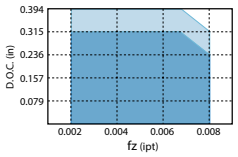
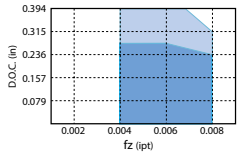
1. Overhang Length 10mm insert (Standard shank with JT chipbreaker)

Cutting Dia.	Description	Overhang Length LPR (in)	
ø10mm	MEC10-S10-11	0.670	-
ø0.005" ø12mm	MEC0500... MEC12-S16-11	0.787	1.180
ø0.625" ø16mm	MEC0625-S625-11T MEC16-S16-11T	1.180	1.790
ø0.0750" ø20mm	MEC0750-S750-11T MEC20-S20-11T	1.180	1.790
ø1.000" ø25mm	MEC1000-S100-11T MEC25-S25-11T	1.260	1.890
ø32mm	MEC1250-S125-11T MEC32-S32-11T	1.580	2.360

Shape



(Vc = 400 sfm Workpiece material: 1049)

Description	Shouldering (Cutting Width ae=DC/2)	Slotting Ramping and helical milling
MEC10-S10-11		
MEC0500... MEC12-S16-11		
MEC0625-S625-11T MEC16-S16-11T		
MEC0750-S750-11T MEC20-S20-11T		
MEC1000-S100-11T MEC25-S25-11T		
MEC1250-S125-11T MEC32-S32-11T		

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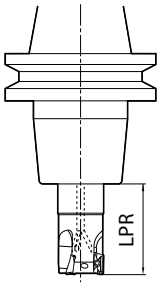
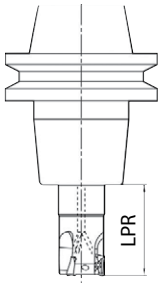
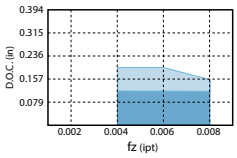
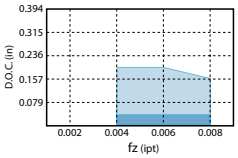
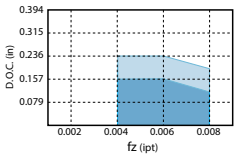
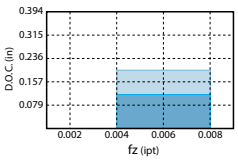
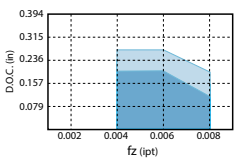
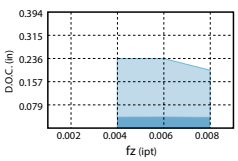
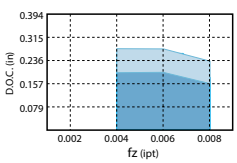
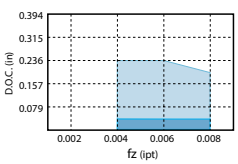
2. Overhang Length 10mm Insert (Long shank with JT chipbreaker)

Cutting Dia.	Description	Overhang Length LPR (in)		Shape
ø0.750" ø20mm Long Shank	MEC0750-S750-5.2-11T MEC20-S20-140-11T	2.362	3.543	
ø1.000" ø25mm Long Shank	MEC1000-S100-6.3-11T MEC25-S25-160-11T	2.362	3.957	
ø1.250" ø32mm Long Shank	MEC1250-S125-7.9-11T MEC32-S32-200-11T	3.957	5.118	
ø1.500" ø40mm Long Shank	MEC1500-S125-9.5-11T MEC40-S32-240-11T	3.957	5.119	

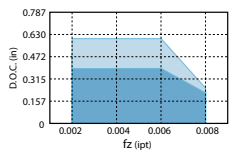
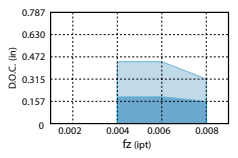
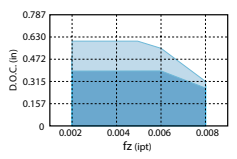
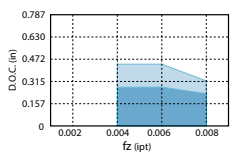
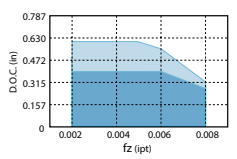
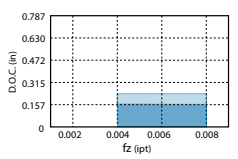
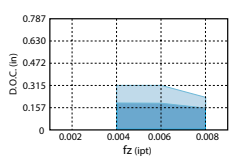
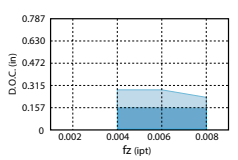
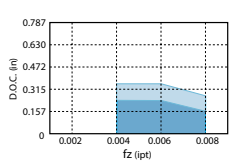
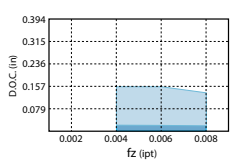
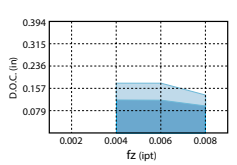
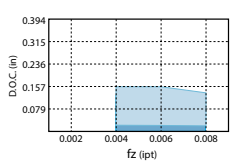
3. Overhang Length 15.7mm Insert (JT chipbreaker)

Cutting Dia.	Description	Overhang Length LPR (in)		Shape
ø1.000" ø25mm	MEC1000-S100-17 MEC25-S25-17	1.417	2.126	
ø1.250" ø32mm	MEC1250-S125-17 MEC32-S32-17	1.575	2.362	
ø1.500" ø40mm	MEC1500-S125-17 MEC40-S32-17	1.969	2.953	
ø1.000" ø25mm Long Shank	MEC1000-S100-6.3-17 MEC25-S25-160-17	2.362	3.937	
ø1.250" ø32mm Long Shank	MEC1250-S125-7.9-17 MEC32-S32-200-17	3.937	5.118	
ø1.500" ø40mm Long Shank	MEC1500-S125-9.5-17 MEC40-S32-240-17	3.937	5.118	

(Vc = 400 sfm Workpiece Material: 1049)

Description	Shouldering (Cutting Width ae=DC/2)	Slotting Ramping and helical milling
MEC0750-S750-5.2-11T MEC20-S20-140-11T Long shank		
MEC1000-S100-6.3-11T MEC25-S25-160-11T Long shank		
MEC1250-S125-7.9-11T MEC32-S32-200-11T Long shank		
MEC1500-S125-9.5-11T MEC40-S32-240-11T Long shank		

(Vc = 400 sfm Workpiece Material: 1049)

Description	Shouldering (Cutting Width ae=DC/2)	Slotting Ramping and helical milling
MEC1000-S100-17 MEC25-S25-17		
MEC1250-S125-17 MEC32-S32-17		
MEC1500-S125-17 MEC40-S32-17		
MEC1000-S100-6.3-17 MEC25-S25-160-17 Long shank		
MEC1250-S125-7.9-17 MEC32-S32-200-17 Long shank		
MEC1500-S125-9.5-17 MEC40-S32-240-17 Long shank		

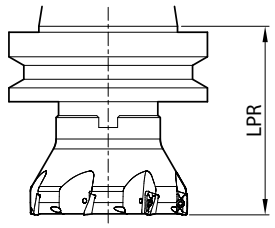
Cutting Performance of MEC Face Mill

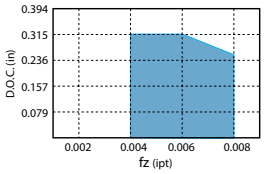
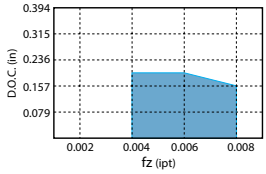
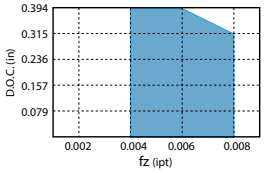
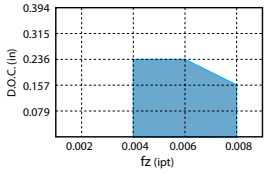
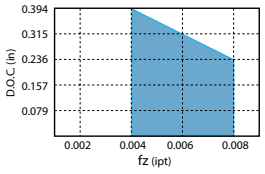
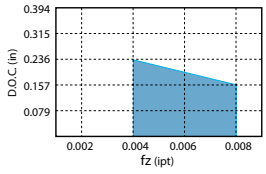
Overhand Length 10mm Insert (JT chipbreaker)

(Vc = 400 sfm Workpiece Material: 1049)

Cutting Dia.	Description	Overhang Length LPR (in)
ø32mm	MEC032R-11-5T-M	4.331
ø1.5000" ø40mm	MEC1500R-11T-5T MEC040R-11-T-◯M	4.528
ø2.000" ø50mm	MEC2000R-11T-5T MEC050R-11-◯T-M	3.937
ø2.500" ø63mm	MEC2500R-11T-6T MEC063R-11-◯T MEC063R-11-◯T-M	3.740
ø3.000" ø80mm	MEC3000R-11T-7T MEC080R-11-◯T MEC080R-11-◯T-M	
ø4.000" ø100mm	MEC4000R-11T-9TN MEC100R-11-9TN MEC100R-11-9T-MN	4.252
ø125mm	MEC125R-11-11T MEC125R-11-11T-M	

Shape



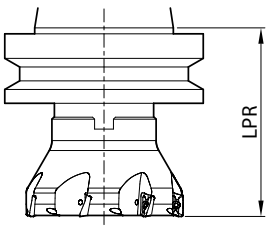
Description	Shouldering (Cutting Width ae=DC/2)	Slotting
MEC1500R-11T-5T MEC040R-11-◯T-M		
MEC2000R-11T-5T ~ MEC4000R-11T-9TN MEC050R-11-◯T-M ~ MEC100R-11-9TN(-MN)		
MEC125R-11-11T(-M)		

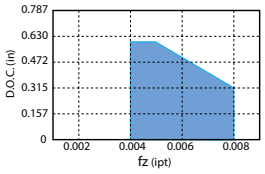
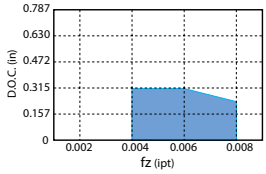
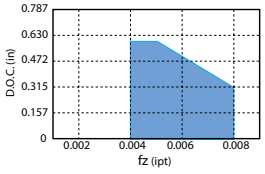
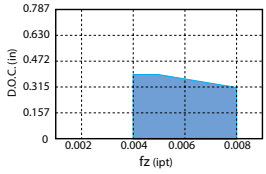
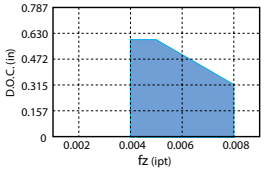
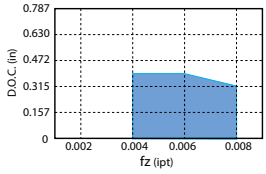
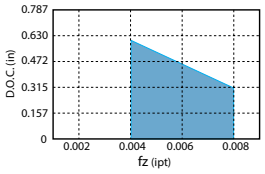
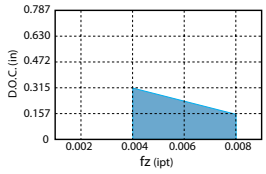
Overhand Length 15.7mm Insert (JT chipbreaker)

(Vc = 400 sfm Workpiece Material: 1049)

Cutting Dia.	Description	Overhang Length LPR (in)
ø40mm	MEC040R-17-4T-M	4.528
ø2.000" ø50mm	MEC2000R-17-◯T MEC050R-17-◯T-M	3.937
ø2.500" ø63mm	MEC2500R-17-4T MEC063R-17-◯T MEC063R-17-◯T-M	3.740
ø3.000" ø80mm	MEC3000R-17-6T MEC080R-17-◯T MEC080R-17-◯T-M	
ø4.000" ø100mm	MEC4000R-17-7T MEC100R-17-◯TN MEC100R-17-◯T-MN	4.252
ø125mm	MEC125R-17-9T MEC125R-17-9T-M	
ø160mm	MEC160R-17-12T MEC160R-17-12T-M	

Shape



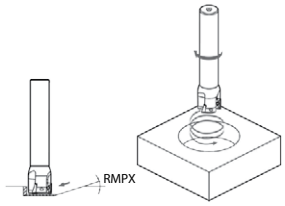
Description	Shouldering (Cutting Width ae=DC/2)	Slotting
MEC040R-17-4T-M		
MEC2000R-17-◯T MEC050R-17-◯T-M		
MEC2500R-17-4T ~ MEC4000R-17-7T MEC063R-17-◯T(-M) ~ MEC100R-17-◯TN(-MN)		
MEC125R-17-9T(-M) MEC160R-17-12T(-M)		

Ramping, Helical Milling and Vertical Milling (Plunging)

Ramping/Helical Milling

Ramping angle is recommended under RMPX.

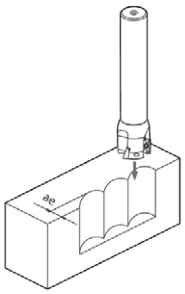
Refer to each tool's cutting performance list for sinking depth per revolution when helical milling.
Use compressed air when during machining.



Cutting Dia.	Applicable Inserts	Max. Ramping Angle (RMPX)
ø0.625", ø16~ø18mm	BDMT11T3.. BDGT11T3..	3°
ø0.750", ø19~Ø21mm		5°
ø1.000", ø22~ø25mm		2.5°
ø1.250", ø28~ø32mm		1.5°
ø1.500", ø40mm		0.7°
ø50mm~		Not recommended
ø1.000", ø25mm	BDMT1704.. BDGT1704..	8°
ø1.250", ø32mm		5°
ø1.500", ø40mm		2.5°
ø50mm~		Not recommended

BDMT1103 type is not recommended for ramping and helical milling.

Vertical Milling (Plunging)



Cutting Dia.	Applicable Inserts	Max. Width of Cut (ae)
ø0.625" ø16~ø19mm	BDMT11T3.. BDGT11T3..	0.060" 1.5 mm
ø0.750"~ø4.000" ø20~ø160mm	BDMT11T3.. BDGT11T3..	0.197" 5 mm
ø1.000"~ø4.000" ø25~ø160mm	BDMT1704.. BDGT1704..	0.315" 8 mm

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

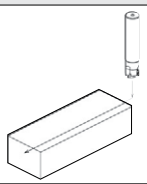
Minimum Cutting Dia. for Helical Milling

MEC Insert	Cutting Dia.	ø0.625"	ø0.750"	ø1.000"	ø1.250"	ø1.500"	ø16mm	ø18mm	ø20mm	ø22mm	ø25mm	ø28mm	ø30mm	ø32mm	ø40mm	ø50mm
BD_T11T3..	Min. Cutting Dia.	ø0.827"	ø1.102"	ø1.575"	ø2.087"	ø2.598"	ø21mm	ø25mm	ø29mm	ø33mm	ø39mm	ø45mm	ø49mm	ø53mm	ø69mm	Not recommended for helical milling
	Min. Cutting Dia. for Flat Bottom	ø1.102"	ø1.339"	ø1.850"	ø2.362"	ø2.835"	ø28mm	ø32mm	ø36mm	ø40mm	ø46mm	ø52mm	ø56mm	ø60mm	ø76mm	
MEC Insert	Cutting Dia.	ø1.000"	ø1.250"	ø1.500"	ø25mm	ø32mm	ø40mm	ø50mm								
BD_T1704..	Min. Cutting Dia.	ø1.339"	ø1.850"	ø2.362"	ø34mm	ø48mm	ø64mm	Helical milling is not recommended.								
	Min. Cutting Dia. for Flat Bottom	ø1.850"	ø2.323"	ø2.835"	ø46mm	ø60mm	ø76mm									

Case Studies

Pre-Hardened Tool Steel

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



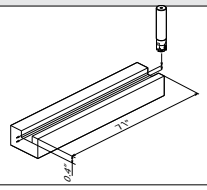
MEC	Chip removal amount =28.1in^3 (Further machining possible)
Competitor's end mill A	Chip removal amount = 1.1in^3 (Chipping occurred)

Competitor's end mill A [ø25 (2 flutes) Vc = 40 m/min fz = 0.075 mm/t ap x ae = 2 x 3 mm] 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)

Structural Steel

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



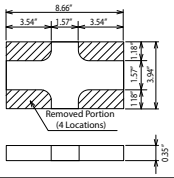
MEC	23 pcs/edge
Competitor's end mill B	10~11pcs/edge

MEC extended the tool life for more than twice.

(User evaluation)

304

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



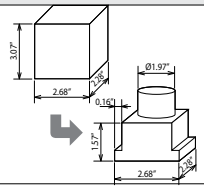
MEC	4pcs/edge or more
Competitor's end mill C	1pc/edge or less

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)

Die Steel

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



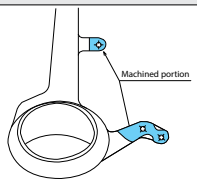
MEC	2 hours (Small wear: extendible)
Competitor's end mill D	2 hours (Halted due to insert breakage)

MEC had better cutting performance/insert life 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 flutes type) was used with Vf = 936 mm/min (fz = 0.15 mm/t).

(User evaluation)

4118

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



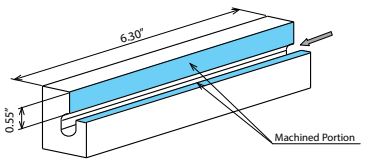
MEC	150 pcs/edge
Competitor's end mill E	40pcs/edge

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 Alloy

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



MEC	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)

MECX (End Mill)

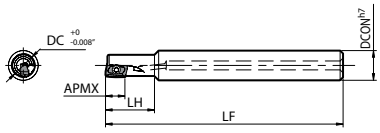


Fig. 1

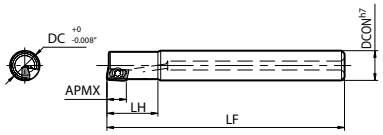


Fig. 2

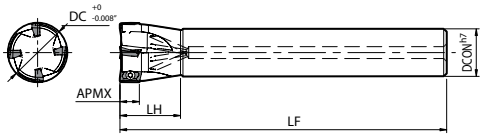


Fig. 3

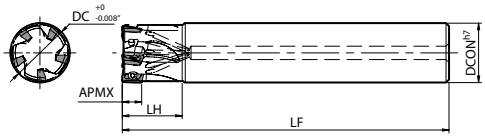


Fig. 4

Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions DC	DCON	LF	LH	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Fig.	Spare Parts: Anti-Seize Compound	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts (M114)
Inch	Standard Shank	Standard Pitch	MECX 0375-S375-07-1T	●	1	0.375	0.375	3.00	0.669	0.236	+12.8	-19.7	Yes	47,150	1	P-37	SB-2035TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS
			0500-S500-07-2T	●	2	0.500	0.500	3.27	0.709		+14.3	-12.9		45,800	1				
			0625-S625-07-3T	●	3	0.625	0.625	3.50	0.787		+16.3	-11.3		43,300	2		SB-2042TRG		
			0750-S625-07-4T	●	4	0.750		4.00				-10.9		40,900	3				
			0750-S750-07-4T	●	4		0.750							40,900	2				
			0750-S750-07-5T	●	5									40,900	2				
			1000-S100-07-5T	●	5	1.000	1.000	4.50	0.984			-9.5		36,900	2				
			1000-S100-07-7T	●	7									36,900	2				
			1000-S750-07-5T	●	5		0.750							36,900	3				
			1000-S750-07-7T	●	7									36,900	3				
			1250-S125-07-6T	●	6	1.250	1.250	5.00	1.181			-8.9		33,700	2		SB-2035TRG		
			1250-S125-07-8T	●	8									33,700	4				
	Long Shank	Standard Pitch	MECXL 0625-S625-07-3T	●	3	0.625	0.625	5.10	2.175	0.236	+16.3	-11.3	Yes	43,300	4	P-37	SB-2042TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS
			0750-S750-07-4T	●	4	0.750	0.750	5.50	2.362			-10.9		40,900	4				
			1000-S100-07-5T	●	5	1.000	1.000	6.30				-9.5		36,900	4				
			1250-S125-07-6T	●	6	1.250	1.250	7.90	2.559			-8.9		33,700	4				
mm	Standard Shank	Standard Pitch	MECX 08-S10-07-1T	●	1	8	10	80	16	6	+11.7	-24	Yes	48,100	1	P-37	SB-2035TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS
			10-S10-07-1T	●		10			17		+12.8	-18.7		47,100	2				
			12-S12-07-2T	●	2	12	12		18		+14.3	-13.7		46,200	4				
			14-S12-07-2T	●		14					+16.3	-12.1		44,800	3				
			16-S16-07-3T	●	3	16	16	100	20		+16.3	-11.3		43,200	4		SB-2042TRG		
			17-S16-07-3T	●		17					+16.3	-11		42,400	3				
			18-S16-07-3T	●		18					+16.3	-10.9		41,600	3				
			20-S16-07-4T	●	4	20	16	110	20		+16.3	-10.4		40,200	3				
			20-S20-07-4T	●			20				+16.3	-10.4		40,200	4				
			21-S20-07-4T	●		21					+16.3	-10.1		39,500	3				
			25-S20-07-5T	●	5	25	20	120	25		+16.3	-9.7		37,000	3				
			25-S25-07-5T	●			25				+16.3	-9.7		37,000	4				
			26-S25-07-5T	●		26					+16.3	-9.5		36,500	3				
			33-S32-07-6T	●	6	33	32	130	30		+16.3	-8.8		33,100	3				
		Fine Pitch	MECX 16-S16-07-4T	●	4	16	16	100	20	6	+16.3	-11.3	Yes	43,200	4	P-37	SB-2042TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS
			20-S16-07-5T	●	5	20		110			+16.3	-10.4		40,200	3				
			20-S20-07-5T	●			20				+16.3	-10.4		40,200	4				
			25-S20-07-7T	●	7	25		120	25		+16.3	-9.7		37,000	3				
			25-S25-07-7T	●			25				+16.3	-9.7		37,000	4				
			32-S32-07-8T	●	8	32	32	130	30		+16.3	-8.9		33,600	4				
	Long Shank	Standard Pitch	MECX 17-S16-130-07-3T	●	3	17	16	130	20	6	+16.3	-11	Yes	42,400	3	P-37	SB-2042TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS
			21-S20-140-07-4T	●	4	21	20	140			+16.3	-10.1		39,500	3				
			26-S25-160-07-5T	●	5	26	25	160	25		+16.3	-9.5		36,500	3				

Coat Anti-seize Compound(P-37) thinly on portion of taper and thread prior to installation.
Max. revolution : When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
For more details, see "Warning" on page **M115**.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MECX (Face Mill)

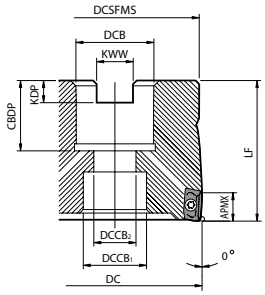


Fig. 1

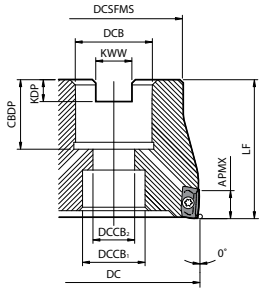


Fig. 2

Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions										A.R. MAX. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.
		R		DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX						
Inch	MECX 1250R-07-8T	●	8	1.250	1.181	0.75	0.630	0.417	1.575	0.807	0.187	0.313	0.236	+7	-8.9	Yes	33,600	0.15	1
	1500R-07-10T	●	10	1.500	1.496										-8.4		30,500	0.25	
	2000R-07-12T	●	12	2.000	1.575		0.646			0.819					-8.3		27,700	0.125	2
	2500R-07-14T	●	14	2.500			0.630								-7.9		24,900	0.50	
mm	MECX 032R-07-8T-M	●	8	32	30	16	14	8.5	40	20	5.5	8.5	6	+7	-8.9	Yes	33,600	0.15	1
	040R-07-10T-M	●	10	40	38	22	18	12		22	6.3	10.4			-8.4		30,500	0.25	

Spare Parts and Applicable Inserts

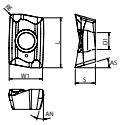
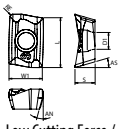
Unit	Part Number	Spare Parts				Applicable Inserts ➡ M114
		Anti-Seize Compound	Insert Screw	Wrench	Arbor Bolt	
Inch	MECX 1250R-07-8T 1500R-07-10T 2000R-07-12T 2500R-07-14T	P-37	SB-2042TRG	DTM-6	HH3/8-1.25H	BDMT0703...-JT BDMT0703...-JS
mm	MECX 032R-07-8T-M 040R-07-10T-M	P-37	SB-2042TRG	DTM-6	HH8x25H HH10x30H	BDMT0703...-JT BDMT0703...-JS

Coat Anti-seize Compound(P-37) thinly on portion of taper and thread prior to installation.
Max. revolution : When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
MECX032R comes with mounting bolt (HH8X25H) and MECX040R comes with mounting bolt (HH10X30H).
Max. revolution : When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
For more details, see "Warning" on page **M115**.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

BDMT

Usage Classification							
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel				★	☆	P
	Mold and die steel				★	☆	P
	Austenitic stainless steel		☆		☆	★	M
	Martensitic stainless steel	★				☆	M
	Precipitation hardened stainless steel		☆			★	M
	Gray cast iron			★			K
	Nodular cast iron			★			K
	Non-ferrous metals						N
	Heat-resistant alloy	★				☆	S
	Titanium alloy		☆			★	S
	Hard materials						H

Insert		Part Number	No. of Edges	Dimensions (mm)					Angle (°)		Carbide					Applicable Toolholder ➡ M112 M113
				S	D1	RE	L	W1	AN	AS	CVD	PVD				
											CA6535	PR1535	PR1810	PR1825	PR1835	
		BDMT 070302ER-JT	2	2.6	2.3	0.2	6.7	4.6	15	16	●	●	●	●	●	MECX...-07-...
		070304ER-JT				0.4					●	●	●	●	●	
		070308ER-JT				0.8					●	●	●	●	●	
	 Low Cutting Force / Stainless Steel	BDMT 070302ER-JS	2	2.6	2.3	0.2	6.7	4.6	15	16	●	●		●	●	MECX...-07-...
		070304ER-JS				0.4					●	●		●	●	
		070308ER-JS				0.8					●	●		●	●	

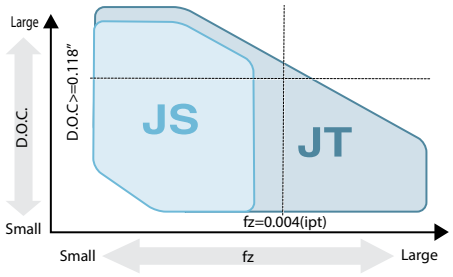
Right-hand Insert Shown

Recommended Cutting Conditions ➡ M115

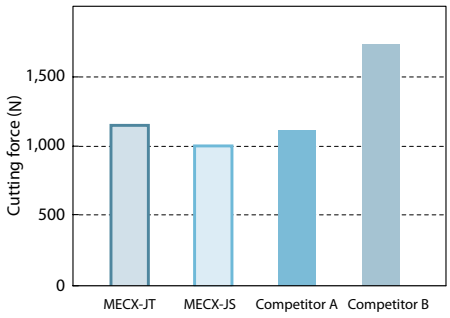
BDMT Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Chipbreaker Selection



Cutting Force Comparison (Internal Evaluation)



1045
Vc = 490 sfm
D.O.C. x ae = 0.197"x0.197"
fz = 0.003 ipt

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

Warning about max. revolution indicated on main body

1. Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter or the body may be damaged even under no load.
2. For actual practical revolution, please set within recommended cutting condition.
3. When using at a higher revolution (over 10,000 RPM), refer to the table to adjust the balance of MECX and suitable arbor.

RPM	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 (ipt)		Recommended Insert Grade Vc (sfm)			
	JS Chipbreaker	JT Chipbreaker	MEGACOAT NANO EX (MEGACOAT NANO)			CVD Coated Carbide
			PR1835 (PR1535)	PR1825	PR1810	CA6535
Carbon Steel	0.0016~**0.0031**~0.0039	0.0024~**0.0039**~0.0047	☆ 390~**590**~820	★ 390~**590**~820	-	-
Alloy Steel	0.0016~**0.0024**~0.0031	0.0024~**0.0031**~0.0039	☆ 330~**520**~720	★ 330~**520**~720	-	-
Mold Steel	0.0016~**0.0024**~0.0031	0.0024~**0.0031**~0.0039	☆ 260~**460**~590	★ 260~**460**~590	-	-
Austenitic Stainless Steel	0.0012~**0.0016**~0.0020	0.0020~**0.0024**~0.0028	★ 330~**520**~660	☆ 330~**520**~660	-	-
Martensitic Stainless Steel	0.0012~**0.0016**~0.0020	0.0020~**0.0024**~0.0039	☆ 490~**660**~820	-	-	★ 590~**790**~980
Precipitation Hardened Stainless Steel	0.0012~**0.0016**~0.0020	0.0020~**0.0024**~0.0039	★ 300~**390**~490	-	-	-
Gray Cast Iron	0.0016~**0.0031**~0.0039	0.0031~**0.0039**~0.0059	-	-	★ 390~**590**~820	-
Nodular Cast Iron	0.0016~**0.0024**~0.0031	0.0031~**0.0039**~0.0047	-	-	★ 330~**490**~660	-
Ni-base Heat Resistant Alloy	0.0012~**0.0016**~0.0020	0.0020~**0.0024**~0.0028	☆ 70~**100**~160	-	-	★ 70~**100**~160
Titanium Alloys	0.0016~**0.0024**~0.0031	0.0031~**0.0039**~0.0047	★ 130~**200**~260	-	-	-

Bold numbers in the table indicate the most recommended values. Adjust cutting speed and feed rate according to the actual machining conditions.
Coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

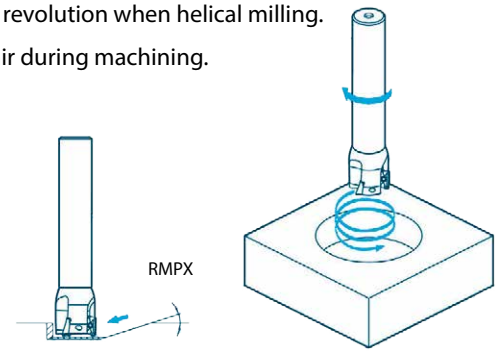
★ : 1st Recommendation ☆ : 2nd Recommendation

Ramping/Helical milling

Ramping angle is recommended under RMPX.

Refer to each tool's cutting performance list for sinking depth per revolution when helical milling.

Use compressed air during machining.



Cutting Dia.	Applicable Inserts	Max. Ramping ngle (RMPX)
ø0.375", ø8mm	BDMT0703 type	Not recommended
ø10mm		1.5°
ø0.500" ø12mm, ø14mm		2°
ø0.625", ø16mm		3°
ø17mm, ø18mm		1.5°
ø0.750", ø20mm		2°
ø21mm		1.8°
ø1.000", ø25mm		1.3°
ø26mm		1.2°
ø1.250", ø32mm		0.8°
ø33mm		0.5°

Guidance of minimum cutting dia. by helical milling

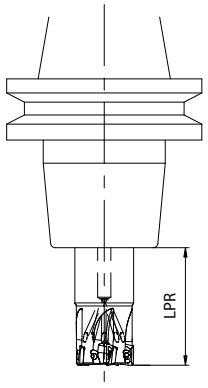
MECX	Cutting Dia.	ø0.375"	ø0.500"	ø0.625"	ø0.750"	ø8mm	ø10mm	ø12mm	ø14mm	ø16mm	ø17mm	ø18mm	ø20mm
BDMT0703..	Min. Cutting Dia.	ø0.512"	ø0.748"	ø0.984"	ø1.260"	Not recommended for helical milling	ø14mm	ø18mm	ø22mm	ø26mm	ø28mm	ø30mm	ø34mm
	Min. Cutting Dia. for Flat Bottom	ø0.630"	ø0.866"	ø1.142"	ø1.378"		ø17mm	ø21mm	ø25mm	ø29mm	ø31mm	ø33mm	ø37mm

MECX	Cutting Dia.	ø21mm	ø25mm	ø26mm	ø32mm	ø33mm
BDMT0703..	Min. Cutting Dia.	ø36mm	ø44mm	ø46mm	ø58mm	ø60mm
	Min. Cutting Dia. for Flat Bottom	ø39mm	ø47mm	ø49mm	ø61mm	ø63mm

MECX End Mill Cutting Performance

Cutting Dia.	Description	Overhang Length LPR (in)	
ø8mm	MECX08-S10-07-1T	0.630	-
ø0.375" ø10mm	MECX0375-S375-07-1T MECX10-S10-07-1T	0.670	-
ø0.500" ø12mm	MECX0500-S500-07-2T MECX12-S12-07-2T	0.709	1.180
ø0.625" ø16mm	MECX0625-S625-07-3T MECX16-S16-07-3T	0.787	1.570
ø0.750" ø20mm	MECX0750-S750-07-4T MECX20-S20-07-4T	0.787	1.570
ø1.000" ø25mm	MECX1000-S100-07-5T MECX25-S25-07-5T	1.000	1.970
ø1.250" ø32mm	MECX1250-S125-07-6T MECX32-S32-07-6T	1.180	1.970

Shape



* Machining with extended Overhang length is not recommended for ø8mm ø0.375", or ø10mm.

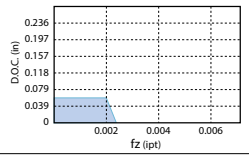
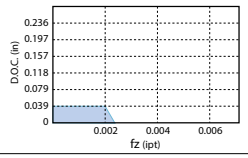
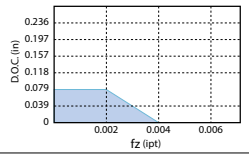
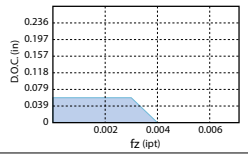
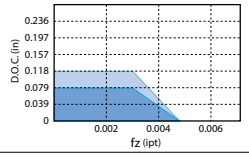
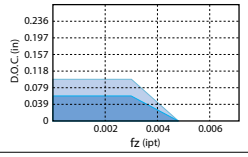
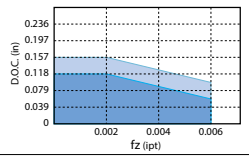
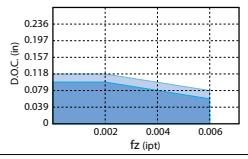
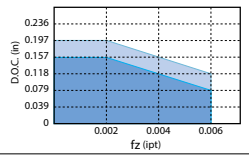
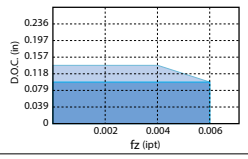
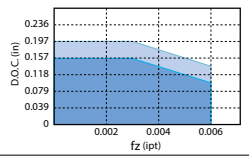
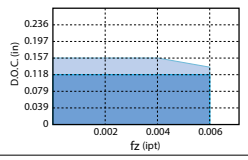
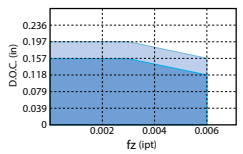
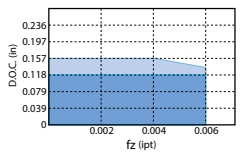
* The cutting performance list shows applicable range of JT chipbreaker with Standard flute-number type.

For multi-edge type, use with 70% or less of D.O.C.

* Cutting conditions of JS chipbreaker

1. For MECX08~MECX12
   Decrease the feed rate by 25% according to cutting capability list.
2. For MECX16 and over
   Decrease the feed rate and D.O.C. by 30% according to cutting capability list.

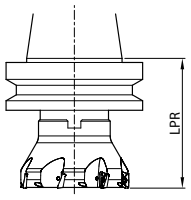
(Vc = 400 sfm Workpiece Material: 1049)

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

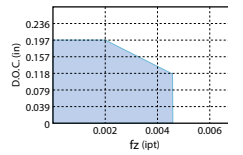
MECX Face Mill Cutting Performance

Cutting Dia.	Description	Overhang Length LPR (in)
ø1.250" ø32mm	MECX1250R-07-8T MECX032R-07-8T-M	3.937
ø1.500" ø40mm	MECX1500R-07-10T MECX040R-07-10T-M	
ø2.000"	MECX2000R-07-12T	
ø2.500"	MECX2500R-07-14T	

Shape



(Vc = 400 sfm Workpiece Material: 1049)

Description	Shouldering (Cutting Width ae=DC/2)
MECX1250R-07-8T MECX1500R-07-10T MECX2000R-07-12T MECX2500R-07-14T MECX032R-07-8T-M MECX040R-07-10T-M	

* Use JT chipbreaker.

* Slotting is not recommended.

High Performance Milling

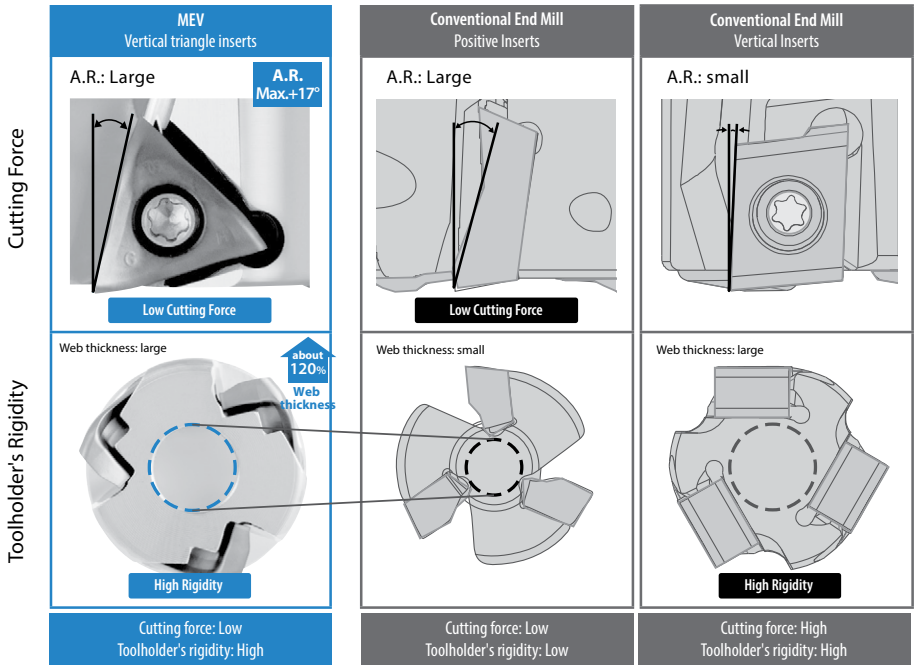
M-THREE (MEV)

Newly Developed Triangular Inserts Provide Low Cutting Forces and Increased Rigidity High Performance, Economical, and Multi-functional Milling Solutions

1 High performance: low cutting force and high rigidity

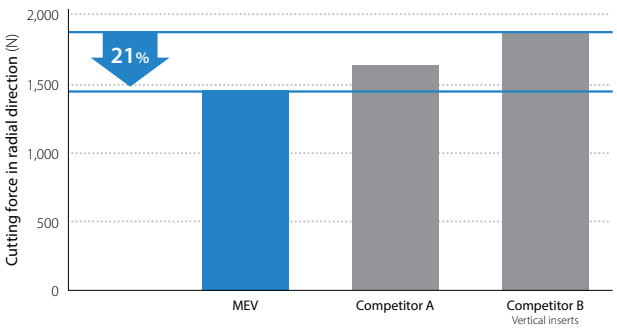
Newly developed vertical triangle inserts with 3 cutting edges for stable machining and reduced chattering

MEV vs Competitor



Keeping the max rake angle at 17°, provides lower cutting forces than the positive insert types of competitors

Cuttting Force Comparison (internal Evaluation)

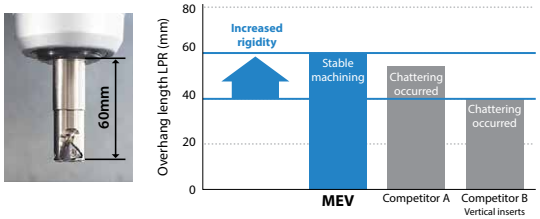


Cutting Conditions: Vc = 655 sfm, D.O.C. × ae = 0.118" × 0.709", fz = 0.004 ipt, Ø0.750" (3 flutes), Dry Workpiece : 4140H

Low cutting force and large optimal web thickness provides excellent chattering resistance

Chattering Resistance Comparison (internal Evaluation)

Shouldering



Cutting Conditions: Vc = 655 sfm, D.O.C. × ae = 0.118" × 0.71", fz = 0.004 ipt, Ø0.750" (3 flutes), Dry Workpiece : 4140H

Slotting

Cutting Conditions: Vc = 655 SFM, D.O.C. = 0.118" (Slotting), fz = 0.004 ipt, Ø0.750" (3 flutes), Dry Workpiece : 4140H

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1 The economical choice: 3 cutting edge insert with long tool life

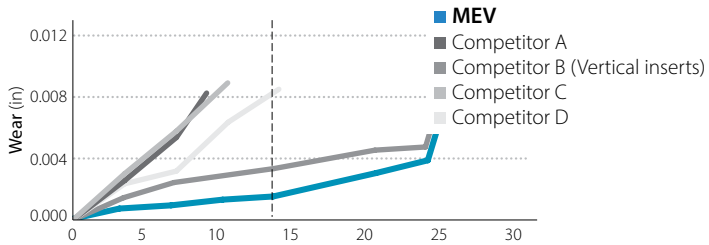
Insert

Unique triangle inserts with 3 cutting edges

PR15-series utilizes excellent MEGACOAT NANO coating technology with wear and adhesion resistance

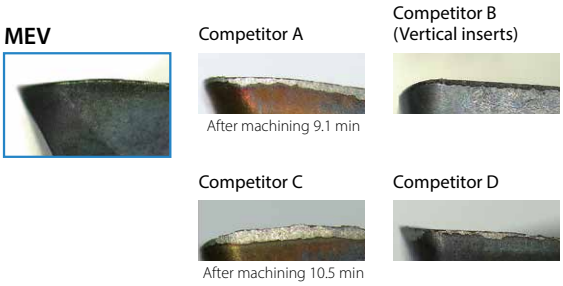
Long Tool Life with Excellent Wear Resistance

Wear resistance comparison (internal evaluation)



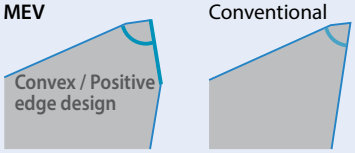
Cutting conditions : Vc = 590 sfm, D.O.C. × ae = 0.118" × 0.394", fz = 0.004 ipt, Ø0.750", Dry
Workpiece : D2 (30~35HS)

Cutting Edge (after machining 14 min)



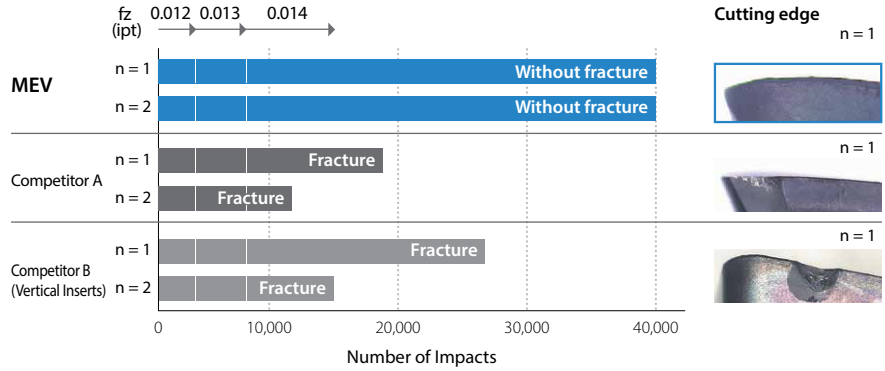
Improved Stability with Superior Fracture Resistance

Cutting edge cross-section



The MEV features a larger cutting edge to increase strength

Wear resistance comparison (internal evaluation)



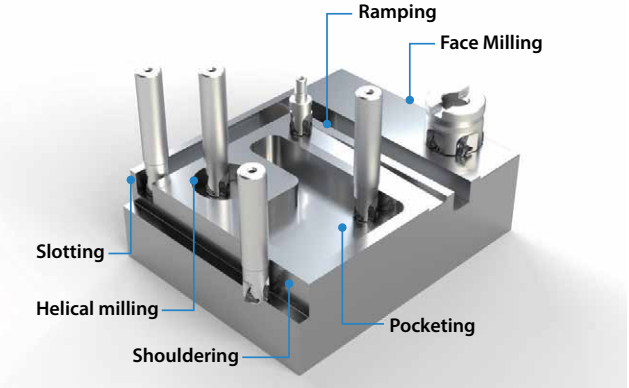
Cutting conditions : Vc = 390 sfm, D.O.C. × ae = 0.079" × 0.393", fz = 0.012" - 0.014" ipt, Ø0.750" (1 Flute), Dry
Workpiece : 4140H

1 Multi-functional: The MEV can perform a wide variety of machining processes

Great performance in shouldering, slotting, and ramping applications (D.O.C. 6mm or less)

Chip Example (Slotting)

Cutting Conditions : Vc = 490 sfm,
D.O.C. = 0.236" (Slotting)
fz = 0.008 ipt, Ø0.750" (3 insert), Dry
Workpice : SS400



MEV (End Mill)

Weldon Shank

Cylindrical Shank

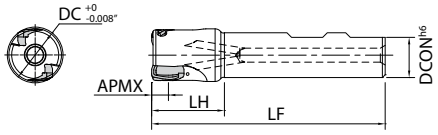


Fig. 1

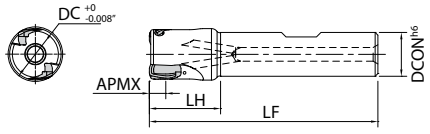


Fig. 2

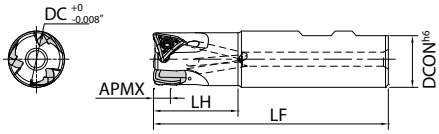


Fig. 3

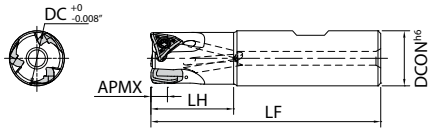


Fig. 4

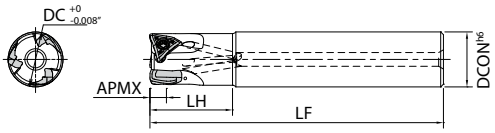


Fig. 5

Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions DC	DCON	LF	LH	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts: Anti-Seize Compound	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts ➡ M123
Inch	Weldon	Standard Shank	MEV 0750-W625-06-2T	●	2	0.750	0.625	3.056	1.150	0.236	+17	-38	Yes	32,000	0.1	2	P-37	SB-3076TRP	DTPM-10	TOMT0605...-GM TOMT0605...-SM
			0750-W750-06-2T	●	2		0.750	3.229							0.2	4				
			1000-W750-06-3T	●	3	1.000		3.231	1.200			-37		25,000	0.2	2				
			1000-W100-06-3T	●	3		1.000	3.737	1.400						0.3	3				
			1250-W100-06-4T	●	4	1.250		3.731	1.450					20,000	0.4	1				
			1250-W125-06-4T	●	4		1.250	3.987	1.650			-35			0.5	3				
			1500-W125-06-5T	●	5	1.500		4.331	2.050					16,000	0.7	1				
	Cylindrical	Long Shank	MEV 0750-S750-6-06-2T	●	2	0.750	0.750	6.000	1.600	0.236	+17	-38	Yes	32,000	0.3	5	P-37	SB-3076TRP	DTPM-10	TOMT0605...-GM TOMT0605...-SM
			1000-S100-7-06-2T	●	2	1.000	1.000	7.000	2.000			-37		25,000	0.6	5				
			1000-S100-7-06-3T	●	3										0.6	5				
			1250-S125-8-06-4T	●	4	1.250	1.250	8.000	2.600			-35		20,000	1.1	5				

Recommended tightening torque for insert screw 2.0N-m

Max. revolution : When running end mill or face mill 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 prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MEV (End Mill)

Cylindrical Shank

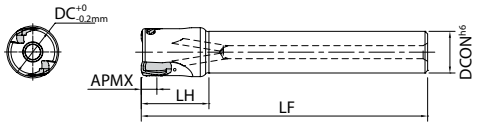


Fig. 1

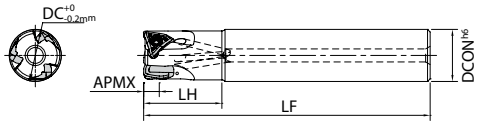


Fig. 2

Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions DC	DCON	LF	LH	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts: Anti-Seize Compound	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts ➡ M123
mm	Cylindrical	Standard Shank	MEV 20-S16-06-2T	●	2		16		26						0.2	1				
			20-S20-06-2T	●	2	20		110	30			-38		32,000	0.2	2				
			20-S20-06-3T	●	3		20								0.2	2				
			22-S20-06-3T	●	3	22			26					29,000	0.2	1				
			25-S20-06-3T	●	3				29						0.3	1				
			25-S25-06-2T	●	2	25		120	32			-37		25,000	0.4	2				
			25-S25-06-3T	●	3		25								0.4	2				
			28-S25-06-3T	●	3	28			29	6	+17		Yes	23,000	0.4	1	P-37	SB-3076TRP	DTPM-10	TOMT0605...-GM TOMT0605...-SM
			30-S25-06-4T	●	4	30			32					21,500	0.5	1		Recommended tightening torque for insert screw 2.0N·m		
			32-S25-06-4T	●	4										0.5	1				
			32-S32-06-3T	●	3	32		130	40			-36		20,000	0.7	2				
			32-S32-06-4T	●	4		32								0.7	2				
			40-S32-06-5T	●	5	40		150	50					16,000	1	1				
			50-S32-06-5T	●	5	50		120	40		+16			13,000	0.9	1				
		Long Shank	MEV 20-S18-06-150-2T	●	2		18		30							1				
			20-S18-06-150-3T	●	3	20		150				-38		32,000	0.3	1				
			20-S20-06-150-2T	●	2		20		40							2				
			20-S20-06-150-3T	●	3											2				
			25-S25-06-170-2T	●	2	25	25	170	50	6	+17	-37	Yes	25,000	0.6	2	P-37	SB-3076TRP	DTPM-10	TOMT0605...-GM TOMT0605...-SM
			25-S25-06-170-3T	●	3											2		Recommended tightening torque for insert screw 2.0N·m		
			32-S32-06-200-2T	●	2	32	32	200	65			-36		20,000	1.1	2				
			32-S32-06-200-3T	●	3							-35				2				

Max. revolution : When running end mill or face mill 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 prior to installation.

MEV (Face Mill)

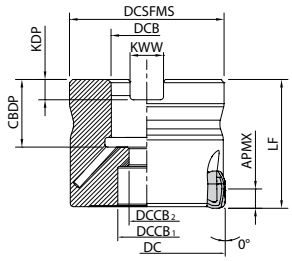


Fig. 1

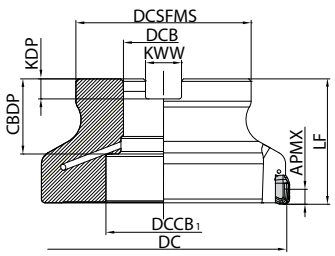


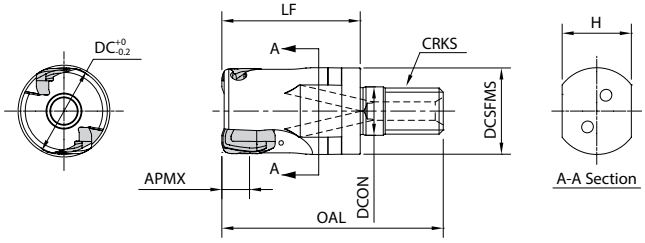
Fig. 2

Toolholder Dimensions

Unit		Part Number	Std. Item	No. of Inserts	Dimensions										A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts				Applicable Inserts M123
			R		DC	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX							Anti-Seize Compound	Arbor Bolt	Insert Screw	Wrench	
Inch	Inch Bore Dia.	MEV 1500R-06-5T	●	5	1.500	1.457	0.750	0.669	0.433	1.575	0.750	0.187	0.312	0.236	+17	-35	Yes	16,000	0.2	1	P-37	HH3/8-1.25	SB-3076TRP	DTPM-10	TOMT0605..-GM TOMT0605..-SM
		2000R-06-6T	●	6	2.000	1.811									+16			12,500	0.4	1					
		2500R-06-6T	●	6	2.500	1.969												10,000	0.6	1					
mm	Inch Bore Dia.	MEV 080R-06-7T	●	7	80	60	1.000"	20	13	50	1.063"	0.236"	0.375"	6	+15	-35	Yes	7,900	1.1	1	P-37	HH12X35	SB-3076TRP	DTPM-10	TOMT0605..-GM TOMT0605..-SM
		100R-06-9T	●	9	100	70	1.250"	46	-	63	1.339"	0.315"	0.500"		+15	-35		6,300	1.4	2		-			
	Metric Bore Dia.	MEV 032R-06-4T-M	●	4	32	30	16	13.5	9	35	19	5.6	8.4		+17	-36		20,000	0.1	1		HH8X25			
		040R-06-5T-M	●	5	40	38	16	15	9	40	19	5.6	8.4		+17	-36		16,000	0.2	1		HH8X25			
		050R-06-5T-M	●		50	48	22	18	11	40	21	6.3	10.4		+16	-36		13,000	0.4	1		HH10X30			
		063R-06-6T-M	●	6	63	48	22	18	11	40	21	6.3	10.4		+16	-35		10,000	0.6	1		HH10X30			
		080R-06-7T-M	●	7	80	60	27	20	13	50	24	7	12.4		+15	-35		7,900	1.1	1		HH12X35			
		100R-06-9T-M	●	9	100	70	32	46	-	50	30	8	14.4		+15	-35		6,300	1.4	2		-			

Max. revolution : When running end mill or face mill 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 prior to installation.
Recommended tightening torque for insert screw 2.0N·m

MEV (Modular Head)



Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions								A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Spare Parts			Applicable Inserts M123
				DC	DCON	DCSFMS	OAL	LF	APMX	CRKS	H					Anti-Seize Compound	Insert Screw	Wrench	
mm	MEV 20-M10-06-2T	●	2	20	10.5	18.7	48	30	6	M10x1.5	15	+17	-38	Yes	32,000	P-37	SB-3076TRP	DTPM-10	TOMT0605...-GM TOMT0605...-SM
	20-M10-06-3T	●	3														Recommended tightening torque for insert screw 2.0N·m		
	25-M12-06-3T	●		25	12.5	23	56	35		M12x1.75	19		-37		25,000				
	32-M16-06-4T	●	4	32	17	30	62	40		M16x2.0	24		-36		20,000				

Max. revolution : When running end mill or face mill 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 prior to installation.
See page **M324** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

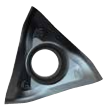
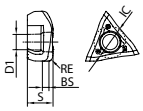
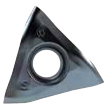
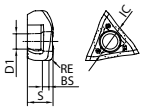
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

TOMT

Usage Classification

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

Carbon steel / Alloy steel			★	☆	P
Mold and die steel			★	☆	P
Austenitic stainless steel			☆	★	M
Martensitic stainless steel	★			☆	M
Precipitation hardened stainless steel				★	M
Gray cast iron		★			K
Nodular cast iron		★			K
Non-ferrous metals					N
Heat-resistant alloy	★			☆	S
Titanium alloy				★	S
Hard materials					H

Insert		Part Number	No. of Edges	Dimensions (mm) IC	S	D1	RE	BS	Carbide CVD CA6535	PVD PR1510	PVD PR1525	PVD PR1535	Applicable Toolholder ⇒ M120~M122
	 General purpose	TOMT 060504ER-GM	3	7.2	5.7	3.4	0.4	1.9	●	●	●	●	MEV...-06-…
		TOMT 060508ER-GM					0.8	1.5	●	●	●	●	
	 Low cutting force	TOMT 060508ER-SM	3	7.2	5.7	3.4	0.8	1.5	●		●	●	MEV...-06-…

Right-hand Insert Shown

Recommended Cutting Conditions ⇒ M124

TOMT Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Chipbreaker	Workpiece Material	Feed (fz: ipt)	Recommended Insert Grade (Vc: sfm)			
			MEGACOAT NANO			CVD Coated Carbide
			PR1535	PR1525	PR1510	CA6535
GM	Carbon steel	0.003~**0.006**~0.010	☆ 390~**590**~820	★ 390~**590**~820	-	-
	Alloy steel	0.003~**0.006**~0.008	☆ 330~**520**~720	★ 330~**520**~720	-	-
	Mold steel	0.003~**0.005**~0.008	☆ 260~**460**~590	★ 260~**460**~590	-	-
	Austenitic stainless steel	0.003~**0.005**~0.006	☆ 330~**520**~660	☆ 330~**520**~660	-	-
	Martensitic stainless steel	0.003~**0.005**~0.008	☆ 490~**660**~820	-	-	★ 590~**790**~980
	Precipitation hardened stainless steel	0.003~**0.005**~0.008	★ 300~**390**~490	-	-	-
	Gray cast iron	0.003~**0.007**~0.010	-	☆ 390~**590**~820	★ 390~**590**~820	-
	Nodular cast iron	0.003~**0.006**~0.008	-	☆ 330~**490**~660	★ 330~**490**~660	-
	Ni-base heat-resistant alloy	0.003~**0.005**~0.006	☆ 70~**100**~160	-	-	★ 70~**100**~160
	Titanium alloy	0.003~**0.006**~0.008	☆ 130~**200**~260	-	☆ 100~**160**~230	-
SM	Carbon steel	0.003~**0.006**~0.008	☆ 390~**590**~820	★ 390~**590**~820	-	-
	Alloy steel	0.003~**0.005**~0.007	☆ 330~**520**~720	★ 330~**520**~720	-	-
	Mold steel	0.003~**0.004**~0.006	☆ 260~**460**~590	★ 260~**460**~590	-	-
	Austenitic stainless steel	0.003~**0.004**~0.006	★ 330~**520**~660	☆ 330~**520**~660	-	-
	Martensitic stainless steel	0.003~**0.004**~0.006	☆ 490~**660**~820	-	-	★ 590~**790**~980
	Precipitation hardened stainless steel	0.003~**0.004**~0.006	☆ 300~**390**~490	-	-	-
	Ni-base heat-resistant alloy	0.003~**0.004**~0.005	☆ 70~**100**~160	-	-	★ 70~**100**~160
	Titanium alloy	0.003~**0.005**~0.006	★ 130~**200**~260	-	-	-

The number in **bold font** is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
Cutting with coolant is recommended for ni-base heat resistant alloy and titanium alloy.
Cutting with coolant is recommended to get good finishing.

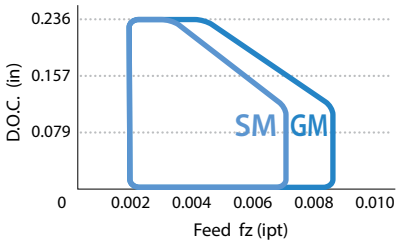
★ : 1st Recommendation ☆ : 2nd Recommendation

Recommended Chipbreaker Range

GM type for General purpose: Edge shape optimized for various machining applications
SM type with low cutting force design: Sharp cutting and large rake angle

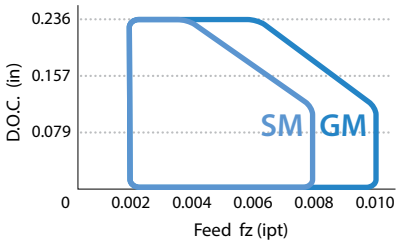
Cutter Dia. : Ø0.750"~Ø2.000" (Ø20mm~Ø50mm)

Shouldering



Cutting conditions : Vc = 490 sfm, ae = DC/2, Workpiece : 1049

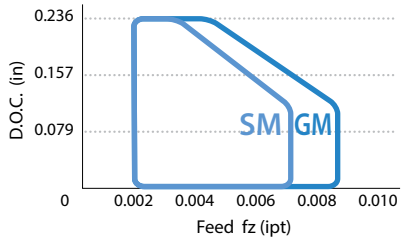
Slotting



Cutting conditions : Vc = 490 sfm, ae = DC, Workpiece : 1049

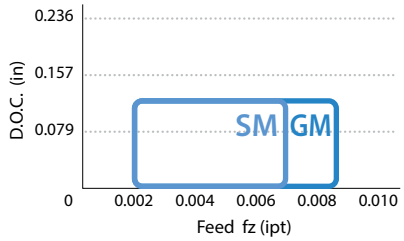
Cutter Dia. : Ø2.500"~Ø4.000" (Ø63mm~Ø100mm)

Shouldering (Width of cut ae ≤ DC/4)



Cutting Conditions : Vc = 490 sfm, ae = DC/4, Workpiece : 1049

Shouldering (Width of cut ae ≥ DC/4), Slotting



Cutting conditions : Vc = 490 sfm, ae = DC, Workpiece : 1049

800.823.7284
www.kyocera precisiontools.com

Ramping Reference Data

	Cutter Dia. DC (in)	0.750"	-	1.000"	-	-	1.250"	1.500"	2.000"
Description	Cutter Dia. DC (mm)	20mm	22mm	25mm	28mm	30mm	32mm	40mm	50mm
MEV··· -06- ···	Max. Ramping Angle RMPX	1.00°	0.80°	0.65°	0.60°	0.55°	0.50°	0.40°	0.30°
	tan RMPX	0.017	0.014	0.011	0.010	0.010	0.009	0.007	0.005

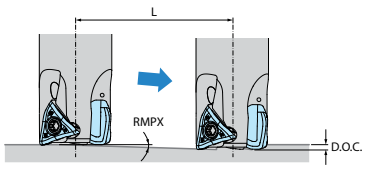
Decrease ramping angle if chips become excessively long.

Guide for Ramping

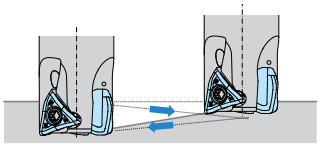
Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
Feed rate should be 70% or under of the above cutting conditions.

Formula of the cutting length (L) at Max. ramping angle

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



For two-way ramping, the ramping angle should be half of RMPX.

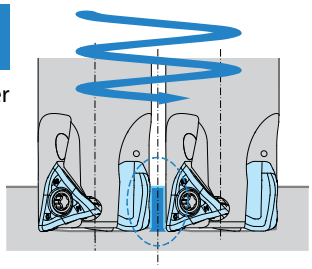


Guide for Helical milling

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

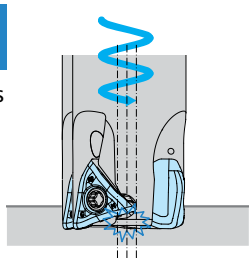
⃠Exceeding Max. Cutting Dia.

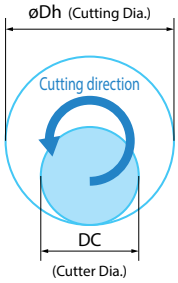
Center core part remains after machining



⃠Under Min. Cutting Dia.

Center core part interferes with toolholder



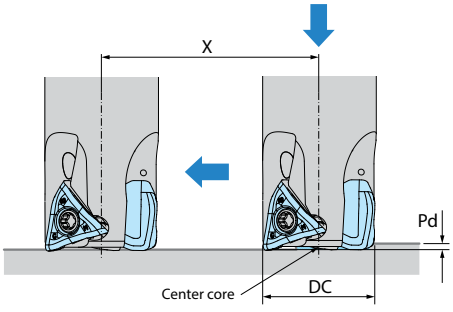


Unit : inch

Description	Min. Cutting Dia.	Max. Cutting Dia.
MEV··· -06- ···	2×DC–0.197"	2×DC–0.079"

For helical milling, stay within Min. cutting dia. and Max. cutting dia. Keep machine depth (h) per rotation less than max. D.O.C. (S) in the cutter dimensions chart.
Use caution to eliminate incidences caused by producing long chips.

Guide for Drilling



Unit : in

Description	Max. Cutting Depth Pd	Min. Cutting Length X for Flat Bottom Surface
MEV··· -06- ···	0.010"	DC–0.118"

It is recommended to reduce feed by 25% of recommendation until the center core is removed when traversing after drilling. Axial feed rate recommendation per revolution is f < 0.004 ipr.

MEWH (End Mill)

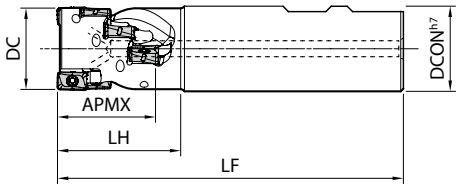


Fig. 1

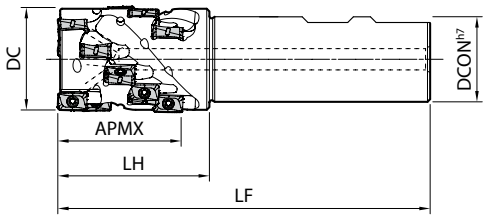


Fig. 2

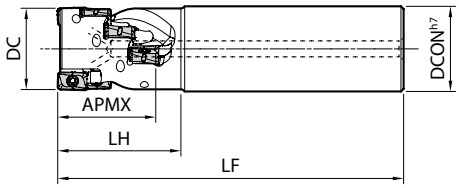


Fig. 3

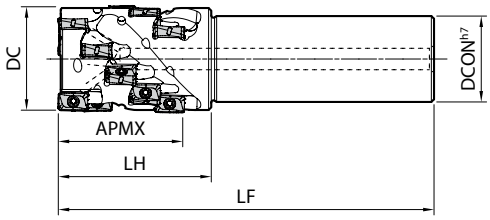


Fig. 4

Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	No. of Flutes	No. of Stages	Dimensions DC	DCON	LF	LH	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Fig.	Spare Parts: Anti-Seize Compound	Insert Screw	Wrench	Applicable Inserts
Inch	MEWH 1000-W100-10-3-2T	●	6	2	3	1.000	1.000	3.806	1.523	1.102	+13	-20	Yes	1	P-37	SB-3065TRP	DTPM-8	LOMU1004...
	1250-W125-10-4-2T	●	8		4	1.250	1.250	4.161	1.878	1.456				1		Recommended tightening torque for insert clamp 1.2N·m		
	1500-W125-10-5-3T	●	15	3	5	1.500		4.610	2.244	1.811				2				
	1500-W150-10-5-3T	●					1.500	4.957	2.267					2				
	MEWH 1500-W125-15-4-2T	●	2	4	8	1.500	1.250	4.846	2.480	2.086	+13	-20	Yes	2	P-37	SB-4090TRP	DTPM-15	LOMU1505...
	2000-W150-15-4-3T	●	3		12	2.000	1.500	5.252						2		Recommended tightening torque for insert clamp 3.5N·m		
mm	MEWH 025-S25-10-3-2T	●	6	2	3	25	25	120	37	28	+13	-20	Yes	3	P-37	SB-3065TRP	DTPM-8	LOMU1004...
	032-S32-10-4-2T	●	8		4	32	32	130	46	37				3		Recommended tightening torque for insert clamp 1.2N·m		
	040-S32-10-5-2T	●	10		5	40		140	57	46				4				
	040-S32-10-5-3T	●	15	3										4				
	MEWH 040-S32-15-4-2T	●	8	2	4	40	32	160	63	53	+13	-20	Yes	4	P-37	SB-4090TRP	DTPM-15	LOMU1505...
	050-S42-15-4-2T	●				50	42							4		Recommended tightening torque for insert clamp 3.5N·m		
	050-S42-15-4-3T	●	12	3										4				

Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.
Aluminum machining is not recommended (AM chipbreaker is not available for MEWH)

M MILLING
45°-70° Lead Angle
75° Lead Angle
88°-90° Lead Angle
Finish Milling
High Feed Milling
Multi-Functional
Slot Mills
Ball-Nose Radius
Other Applications

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MEWH (Shell Mill)

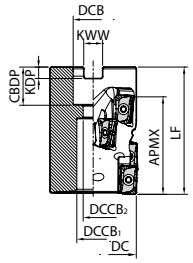


Fig. 1

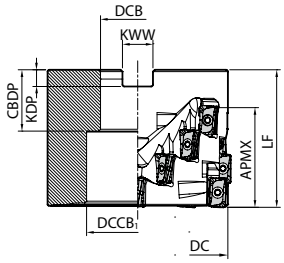


Fig. 2

Toolholder Dimensions

Unit	Part Number	Std. Item R	No. of Inserts	No. of Flutes	No. of Stages	Dimensions DC	DCB	DCB1	DCB2	LF	CBDP	KDP	KWW	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Fig.	Spare Parts: Anti-Seize Compound	Arbor Bolt	Insert Screw	Wrench	Applicable Inserts (M128 M93)
Inch	MEWH 2000R-15-4-3T	●	12	3	4	2.00	0.75	0.669	0.433	2.756	0.750	0.187	0.312	2.086	+13	-20	No	1	P-37	HH3/8-1.25	SB-4090TRP	DTPM-15	LOMU1505..
	3000R-15-4-4T	●	16	4	4	3.00	1.00	0.866	0.551		1.063	0.236	0.381					1		HH1/2-1.25	Recommended tightening torque for insert clamp 3.5N·m		
mm	MEWH 040R-10-4-3T-M	●	12	3	4	40	16	15	9	53	19	5.6	8.4	37	+13	-20	No	1	P-37	HH8X25	SB-3065TRP	DTPM-8	LOMU1004...
	050R-10-5-3T-M	●	15		5	50	22	18	11	64	21	6.3	10.4	46				1		HH10X30	Recommended tightening torque for insert clamp 1.2N·m		
	MEWH 050R-15-4-3T-M	●	12	3	4	50	22	18	11	70	21	6.3	10.4	53	+13	-20	No	1	P-37	HH10X30	SB-4090TRP	DTPM-15	LOMU1505...
	063R-15-3-3T-M	●	9		3	63	27	20	13	58	24	7	12.4	41				1		HH12X35	Recommended tightening torque for insert clamp 3.5N·m		
	080R-15-4-4T-M	●	16	4	4	80	32	26	18	70	28	8	14.4	53				1		HH16X45			
	100R-15-4-5T-M	●	20	5		100	40	55	-	74	33	9	16.4					2		-			

Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.
Aluminum machining is not recommended (AM chipbreaker is not available for MEWH)

Guidance of applicable inserts for MEWH

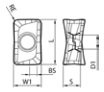
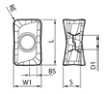
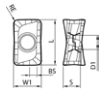
Insert Location	Toolholder Part Number										
	MEWH...10...					MEWH...15...					
	Corner-R(RE) (mm)					Corner-R(RE) (mm)					
Bottom inserts	0.4	0.8	1.2	1.6	2.0	0.4	0.8	1.0	1.2	1.6	2.0
*Middle inserts	0.4 / 0.8	0.4 / 0.8	0.4 / 0.8	0.4	0.4	0.4~1.6	0.4~1.6	0.4~1.6	0.4~1.6	0.4~1.6	0.4~1.6

* 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.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

LOMU

Usage Classification											
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel				☆			★	☆	P
	Mold and die steel				☆			★	☆	P
	Austenitic stainless steel					☆		☆	★	M
	Martensitic stainless steel	★							☆	M
	Precipitation hardened stainless steel					☆			★	M
	Gray cast iron			☆			★			K
	Nodular cast iron			☆			★			K
	Non-ferrous metals									N
	Heat-resistant alloy	★							☆	S
	Titanium alloy					☆			★	S
	Hard materials (≤ 60 HRC)		★							H

Insert		Part Number		Dimensions (mm)						Carbide								Applicable Toolholder ➡ M126 M127 M84~M90
				S	D1	RE	L	W1	BS	CVD	PVD							
										CA6535	PR0155	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	
	 General Purpose	LOMU 100404ER-GM		4	3.4	0.4	10.9	6.6	2.1	●		△	●	●	●	●	●	MEWH...-10-.. MEW...-10-...
		LOMU 100408ER-GM				0.8			1.7	●		△	●	●	●	●	●	
		LOMU 100412ER-GM				1.2			1.3	●		△	●	●	●	●	●	
		LOMU 100416ER-GM				1.6			1	●		△	●	●	●	●	●	
		LOMU 100420ER-GM				2			1	●		△	●	●	●	●	●	
		LOMU 150504ER-GM		5.6	4.8	0.4	15.7	9.2	2.2	●		△	●	●	●	●	●	MEWH...-15-... MEW...-15-...
		LOMU 150508ER-GM				0.8			1.8	●		△	●	●	●	●	●	
		LOMU 150510ER-GM				1			1.6				●			●		
		LOMU 150512ER-GM				1.2			1.4	●		△	●	●	●	●	●	
		LOMU 150516ER-GM				1.6			1	●		△	●	●	●	●	●	
		LOMU 150520ER-GM				2			0.6	●		△	●	●	●	●	●	
	 Low Cutting Force	LOMU 100408ER-SM		4	3.4	0.8	10.9	6.6	1.7	●		△	●	●	●	●	●	MEWH...-10-... MEW...-10-...
		LOMU 150508ER-SM		5.6	4.8	0.8	15.7	9.2	1.8	●		△	●	●	●	●	●	MEWH...-15-... MEW...-15-...
	 Tough Edge	LOMU 100408ER-GH		4	3.4	0.8	10.9	6.6	1.7	●	●	△	●	●	●	●	●	MEWH...-10-... MEW...-10-...
		LOMU 150508ER-GH		5.6	4.8	0.8	15.7	9.2	1.8	●	●	△	●	●	●	●	●	MEWH...-15-... MEW...-15-...

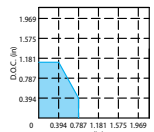
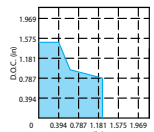
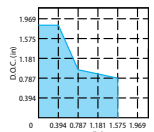
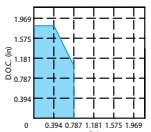
Right-hand Insert Shown

Recommended Cutting Conditions ➡ M129

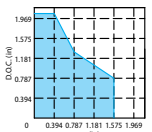
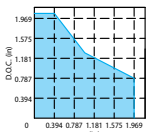
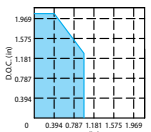
Cutting Performance

LOMU Inserts are sold in 10 piece boxes

LOMU1004 Inserts

Cutting Dia.	Description	2 Flute D.O.C. x ae	Description	3 Flute D.O.C. x ae
ø1.000" ø25mm	MEWH1000 -W100-10-3-2T MEWH025 -S25-10-3-2T		-	-
ø1.250" ø32mm	MEW1250 -W125-10-4-2T MEWH032 -S32-10-4-2T		-	-
ø1.500" ø40mm	MEWH1500 -W125-10-5-2T MEWH040 -S32-10-5-2T		MEWH1500 -W150-10-5-3T MEWH040 -S32-10-5-3T	

LOMU1505 Inserts

Cutting Dia.	Description	2 Flute D.O.C. x ae	Description	3 Flute D.O.C. x ae
ø1.500" ø40mm	MEWH1500 -W125-15-4-2T MEWH040 -S32-15-4-2T		-	-
ø2.000" ø50mm	MEWH2000 -W150-15-4-2T MEWH050 -S42-15-4-2T		MEWH2000 -W150-15-4-3T MEWH050 -S42-15-4-3T	

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

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Chipbreaker	Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade Vc (sfm)			
		Toolholder Part Number	MEGACOAT NANO EX (MEGACOAT NANO)			CVD Carbide
		End Mill / Shell Mill	PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	CA6535
		MEWH1000..~MEWH4000.. MEWH025..~MEWH050..				
GM	Carbon Steel	0.002~**0.004**~0.008	☆ 390~**590**~820	★ 390~**590**~820	-	-
	Alloy Steel	0.002~**0.004**~0.006	☆ 330~**520**~720	★ 330~**520**~720	-	-
	Mold Steel	0.002~**0.003**~0.005	☆ 260~**460**~590	★ 260~**460**~590	-	-
	Austenitic Stainless Steel	0.002~**0.003**~0.005	☆ 330~**520**~660	☆ 330~**520**~660	-	-
	Martensitic Stainless Steel	0.002~**0.003**~0.004	☆ 490~**660**~820	-	-	★ 590~**790**~980
	Precipitation Hardened Stainless Steel	0.002~**0.003**~0.004	★ 300~**390**~490	-	-	-
	Gray Cast Iron	0.002~**0.004**~0.007	-	-	★ 390~**590**~820	-
	Nodular Cast Iron	0.002~**0.003**~0.005	-	-	★ 330~**490**~660	-
	Ni-base Heat Resistant Alloy	0.002~**0.003**~0.004	☆ 70~**100**~160	-	-	★ 70~**100**~160
	Titanium Alloys	0.002~**0.003**~0.005	☆ 130~**200**~260	-	☆ 100~**160**~230	-
SM	Carbon Steel	0.002~**0.004**~0.007	☆ 390~**590**~820	★ 390~**590**~820	-	-
	Alloy Steel	0.002~**0.003**~0.005	☆ 330~**520**~720	★ 330~**520**~720	-	-
	Mold Steel	0.002~**0.003**~0.005	☆ 260~**460**~590	★ 260~**460**~590	-	-
	Austenitic Stainless Steel	0.002~**0.003**~0.005	★ 330~**520**~660	☆ 330~**520**~660	-	-
	Martensitic Stainless Steel	0.002~**0.003**~0.004	☆ 490~**660**~820	-	-	★ 590~**790**~980
	Precipitation Hardened Stainless Steel	0.002~**0.003**~0.004	☆ 300~**390**~490	-	-	-
	Ni-base Heat Resistant Alloy	0.002~**0.003**~0.004	☆ 70~**100**~160	-	-	★ 70~**100**~160
	Titanium Alloys	0.002~**0.003**~0.005	★ 130~**200**~260	-	☆ 100~**160**~230	-
GH	Carbon Steel	0.002~**0.004**~0.008	☆ 390~**590**~820	★ 390~**590**~820	-	-
	Alloy Steel	0.002~**0.004**~0.006	☆ 330~**520**~720	★ 330~**520**~720	-	-
	Mold Steel	0.002~**0.003**~0.005	☆ 260~**460**~590	★ 260~**460**~590	-	-
	Austenitic Stainless Steel	0.002~**0.003**~0.005	☆ 330~**520**~660	☆ 330~**520**~660	-	-
	Martensitic Stainless Steel	0.002~**0.003**~0.004	☆ 490~**660**~820	-	-	☆ 590~**790**~980
	Precipitation Hardened Stainless Steel	0.002~**0.003**~0.004	☆ 300~**390**~490	-	-	-
	Gray Cast Iron	0.002~**0.004**~0.008	-	-	☆ 390~**590**~820	-
	Nodular Cast Iron	0.002~**0.003**~0.006	-	-	☆ 330~**490**~660	-
	Ni-base Heat Resistant Alloy	0.002~**0.003**~0.004	☆ 70~**100**~160	-	-	☆ 70~**100**~160
	Titanium Alloys	0.002~**0.003**~0.005	☆ 130~**200**~260	-	☆ 100~**160**~230	-

The number in **bold font** is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

★ : 1st Recommendation ☆ : 2nd Recommendation

Coolant is recommended for ni-base heat resistant alloy and titanium alloy.

MECH (Helical End Mill, with coolant hole for bottom insert)

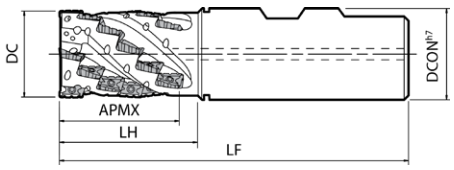


Fig. 1

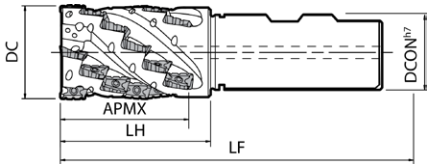


Fig. 2

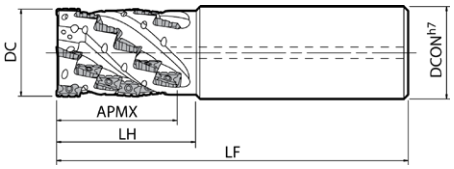


Fig. 3

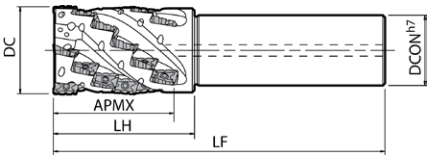


Fig. 4

Toolholder Dimensions

Unit		Part Number	Std. Item	No. of Inserts	No. of Flutes	No. of Stages	Dimensions DC	DCON	LF	LH	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Fig.	Spare Parts: Anti-Seize Compound	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts ➡ M132
Inch	Weldon Shank	MECH 1000-W100-11-4-2T	●	8	2	4	1.00	1.00	4.17	1.81	1.46	+21	-10	No	2	P-37	SB-2555TRG	DTM-8	BDMT11T3...-N2 + BDMT11T3...-N3
		1250-W125-11-5-2T	●	10		5	1.25	1.25	4.52	2.17	1.81		-9		2				
		1250-W125-11-5-4T	●	20	4										2				
		1500-W125-11-6-4T	●	24		6	1.50		4.90	2.52	2.16	+23	-8		2				
		1500-W150-11-6-4T	●						5.28						1				
		2000-W150-11-7-4T	●	28		7	2.00	1.50	5.73	2.95	2.52		-7		2				
		2000-W1500-11-7-6T	●	42	6										2				
		MECH 1500-W125-17-4-2T	●	8	2	4	1.50	1.25	5.26	2.87	2.32	+19	-7	No	2	P-37	SB-4070TRN	DTM-15	BDMT1704...-N3 + BDMT1704...-N4
		1500-W150-17-4-2T	●					1.50	5.64						1				
		2000-W1500-17-5-4T	●	20	4	5	2.00		6.26	3.46	2.91				2				
mm	Cylindrical Shank	MECH 025-S25-11-4-2T	●	8	2	4	25	25	120	46	37	+21	-10	Yes	3	P-37	SB-2555TRG	DTM-8	BDMT11T3...-N2 + BDMT11T3...-N3
		032-S32-11-5-2T	●	10		5	32	32	140	55	46		-9		3				
		032-S32-11-5-4T	●	20	4										3				
		040-S32-11-6-4T	●	24		6	40		150	64	55	+23	-8		4				
		040-S42-11-6-4T	●					42	160						3				
		050-S42-11-7-4T	●	28		7	50		172	75	64		-7		4				
		050-S42-11-7-6T	●	42	6										4				
		MECH 040-S32-17-4-2T	●	8	2	4	40	32	160	73	59	+19	-7	Yes	4	P-37	SB-4070TRN	DTM-15	BDMT1704...-N3 + BDMT1704...-N4
		040-S42-17-4-2T	●					42	170						3				
		050-S42-17-5-4T	●	20	4	5	50		185	88	74		-6		4				

For installation of notched insert, see page **M134**.
Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MECH (Shell Mill, without coolant hole)

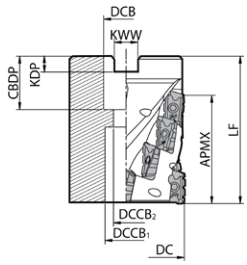


Fig. 1

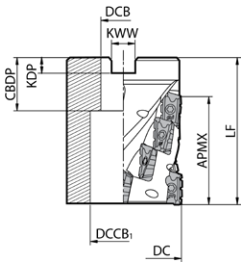


Fig. 2

Toolholder Dimensions

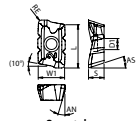
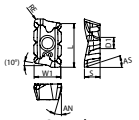
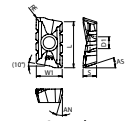
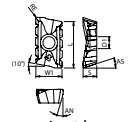
Unit		Part Number	Std. Item R	No. of Inserts	No. of Flutes	No. of Stages	Dimensions DC	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Fig.	Spare Parts: Anti-Seize Compound	Arbor Bolt	Insert Screw	Wrench	Applicable Inserts ➔ M132
Inch	Inch Bore	MECH 2000R-11-5-6T	●	30	6	5	2.00	0.75	0.63	0.417	2.480	0.750	0.197	0.313	1.811	+23	-8	No	1	P-37	HH3/8-1.25	SB-2555TRG	DTM-8	BDMT11T3...-N2 + BDMT11T3...-N3
		2000R-17-2-4T	●	8	4	2					2.047				1.181	+19	-7				HH3/8-1.25	SB-4070TRN	DTM-15	BDMT1704...-N3 + BDMT1704...-N4
		2000R-17-4-4T	●	16	4	4					3.070				2.322									
mm	Inch Bore	MECH 063R-17-3-4T	●	12	4	3	63	1.00"	20	14	70	1.024"	0.236"	0.375"	45	+19	-7	No	1	P-37	HH12X35	SB-4070TRN	DTM-15	BDMT1704...-N3 + BDMT1704...-N4
		080R-17-4-6T	●	24	6	4	80	1.25"	26	18	85	1.260"	0.315"	0.500"	59				1		HH16X45			
		100R-17-4-6T	●				100	1.50"	56	-		1.496"	0.394"	0.625"					2		-			
	Metric Bore Dia.	MECH 040R-11-4-4T-M	●	16	4	4	40	16	15	9	50	19	5.6	8.4	37	+23	-8	No	1	P-37	HH8X25	SB-2555TRG	DTM-8	BDMT11T3...-N2 + BDMT11T3...-N3
		050R-11-5-6T-M	●	30	6	5	50	22	18	11	63	21	6.3	10.4	46				1		HH10X30			
		MECH 050R-17-2-4T-M	●	8	4	2	50	22	18	11	52	21	6.3	10.4	30	+19	-7	No	1	P-37	HH10X30	SB-4070TRN	DTM-15	BDMT1704...-N3 + BDMT1704...-N4
		050R-17-4-4T-M	●	16		4					78				59				1		HH10X40			
		063R-17-3-4T-M	●	12		3	63	27	20	14	70	24	7	12.4	45				1		HH12X35			
		080R-17-4-6T-M	●	24	6	4	80	32	26	18	85	28	8	14.4	59				1		HH16X45			
		100R-17-4-6T-M	●				100	40	56	-		30	9	16.4					2		-			

For installation of notched insert, see page **M134**.
Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

BDMT

Usage Classification					
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel			★	☆	P
	Mold and die steel			★	☆	
	Austenitic stainless steel					M
	Martensitic stainless steel					
	Precipitation hardened stainless steel					
	Gray cast iron		★			K
	Nodular cast iron		★			
	Non-ferrous metals					N
	Heat-resistant alloy					S
	Titanium alloy	☆			★	
	Hard materials					H

Insert		Part Number	No. of Edges	Dimensions (mm)					Angle (°)		Carbide				Applicable Toolholder ➡ M130~ M131
				S	D1	RE	L	W1	AN	AS	PVD				
											PR1535	PR1810	PR1825	PR1835	
	 2-notch	BDMT 11T308ER-N2	2	3.8	2.8	0.8	11	6.7	13	18	●	●	●	●	MECH...11...
	 3-notch	BDMT 11T308ER-N3	2	3.8	2.8	0.8	11	6.7	13	18	●	●	●	●	MECH...11...
	 3-notch	BDMT 170408ER-N3	2	4.9	4.4	0.8	17	9.6	13	18	●	●	●	●	MECH...17...
	 4-notch	BDMT 170408ER-N4	2	4.9	4.4	0.8	17	9.6	13	18	●	●	●	●	MECH...17...

Right-hand Insert Shown

Recommended Cutting Conditions ➡ M135

BDMT Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

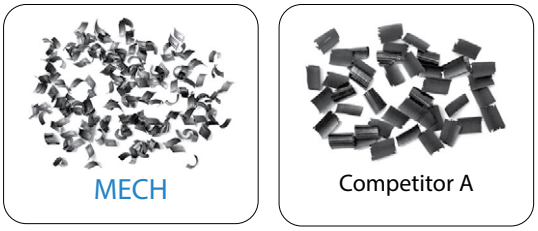
Applicable Inserts

Part Number	Applicable Inserts					
	2-Notched	+	3-Notched	3-Notched	+	4-Notched
MECH...-11-	BDMT 11T308ER-N2	+	BDMT 11T308ER-N3	-		
MECH...-17-		-		BDMT 170408ER-N3	+	BDMT 170408ER-N4

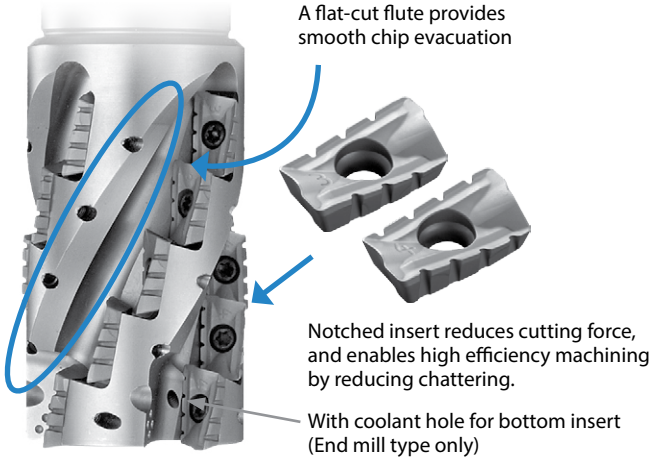
Enhanced Chip Evacuation

Smooth chip evacuation

Notched insert breaks chips into small pieces

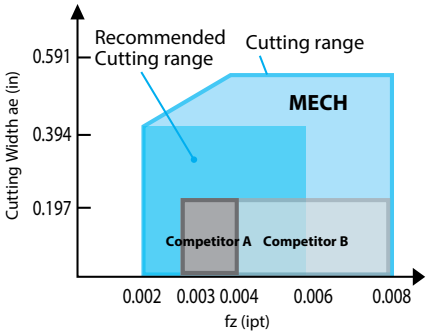


Workpiece Material: SS400
Vc = 400 sfm
D.O.C. × ae = 1.575"×0.394"
fz = 0.005 ipt
MECH032-S32-11-5-4T



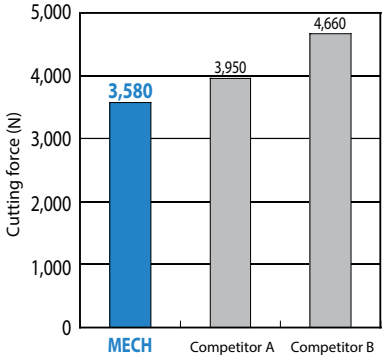
Low Cutting Force

Low cutting force due to notched inserts



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

Cutting force comparison (Principal force)



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

(Internal evaluation)

Number of Inserts to Install

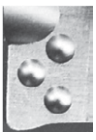
Description		No. of Flutes	No. of Inserts	No. of Inserts			
				BDMT11T308ER-		BDMT170408ER-	
				N2	N3	N3	N4
MECH	1000-W1000-11-4-2T 025-S25-11-4-2T	2	8	4	4	-	-
	1250-W1250-11-5-2T 032-S32-11-5-2T		10	5	5		
	1250-W1250-11-5-4T 032-S32-11-5-4T	4	20	10	10		
	1500-W1250-11-6-2T 040-S32-11-6-4T		24	12	12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

Description		No. of Flutes	No. of Inserts	No. of Inserts			
				BDMT11T308ER-		BDMT170408ER-	
				N2	N3	N3	N4
MECH	040R-11-4-4T-M	4	16	8	8	-	-
	2000R-11-5-6T 050R-11-5-6T-M	6	30	15	15		
MECH	2000R-17-2-4T 050R-17-2-4T-M	4	8	-	-	4	4
	2000R-17-4-4T 050R-17-4-4T-M		16			8	8
	063R-17-3-4T-M		12			6	6
	080R-17-4-6T-M	6	24			12	12
	100R-17-4-6T-M						
MECH	063R-17-3-4T	4	12			6	6
	080R-17-4-6T	6	24			12	12
	100R-17-4-6T						
MECH	050R11-8-4T-BT50	4	32	16	16	-	-
	050R17-7-4T-BT50		28	-	-	14	14
	063R17-7-4T-BT50						
	080R17-7-4T-BT50						
	100R17-7-6T-BT50	6	42			21	21

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 Number	2	3	3	4
Marks				

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

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

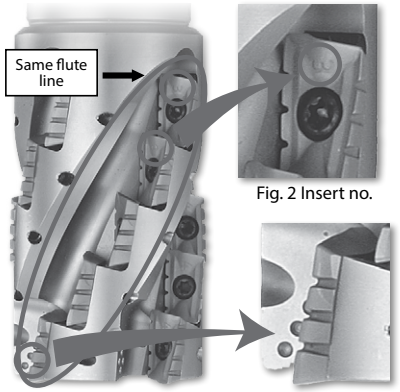


Fig. 1 Same flute line

Fig. 2 Insert no.

Fig. 3 Marks

Recommended Cutting Conditions
(When using a notched insert)

Workpiece Material	fz (ipt)	Recommended Insert Grades (Vc: sfm)			
		MEGACOAT NANO EX			MEGACOAT NANO
		PR1810	PR1825	PR1835	PR1535
Carbon steel	0.003~0.004~0.006	-	★ 390~**590**~820	☆ 390~**590**~820	☆ 390~**590**~820
Alloy steel	0.003~0.004~0.006	-	★ 330~**520**~720	☆ 330~**520**~720	☆ 330~**520**~720
Mold steel	0.003~0.004~0.006	-	★ 260~**460**~590	☆ 260~**460**~590	☆ 260~**460**~590
Gray cast iron	0.003~0.006~0.007	★ 390~**590**~820	-	-	-
Nodular cast iron	0.003~0.006~0.007	★ 330~**490**~720	-	-	-
*Titanium alloys	0.003~0.004~0.006	-	-	★ 130~**200**~260	☆ 130~**200**~260

* Machining with coolant is recommended for titanium alloys.

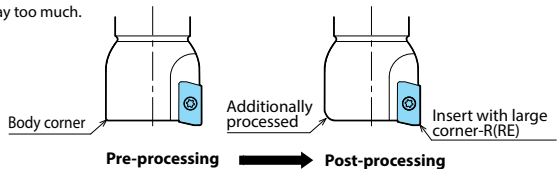
★ : 1st Recommendation ☆ : 2nd Recommendation

1. The recommended cutting conditions above are for notched inserts.
2. If using an insert without notch, the cutting depth (D.O.C.) and width (ae) should be 60% or less of those of a notched insert.

When using inserts with corner-R(RE) 1.6mm 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.



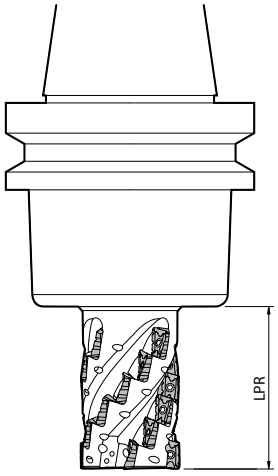
Cutting Performance

(Machining center equivalent to AC15/18.5kW)

MECH End Mill

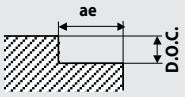
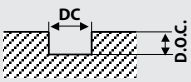
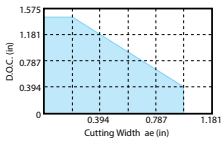
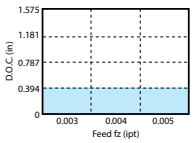
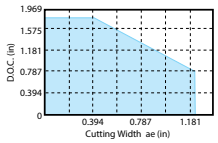
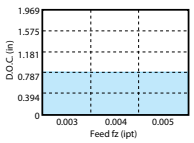
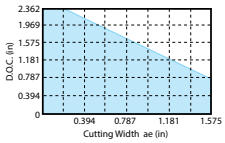
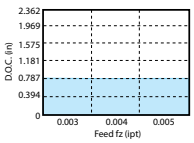
Cutting Dia.	Description	Overhang Length LPR (in)
ø1.000" ø25mm	MECH1000-W1000-11-4-2T MECH025-S25-11-4-2T	1.89
ø1.250" ø32mm	MECH1250-W1250-11-5-2T MECH032-S32-11-5-2T	2.24
	MECH1250-W1250-11-5-4T MECH032-S32-11-5-4T	
ø1.500" ø40mm	MECH1500-W1250-11-6-4T MECH040-S32-11-6-4T	2.56
	MECH1500-W1500-11-6-4T MECH040-S42-11-6-4T	
ø2.000" ø50mm	MECH2000-W1500-11-7-4T MECH050-S42-11-7-4T	2.99
	MECH2000-W1500-11-7-6T MECH050-S42-11-7-6T	
ø1.500" ø40mm	MECH1500-W1250-17-4-2T MECH040-S32-17-4-2T	2.91
	MECH1500-W1500-17-4-2T MECH040-S42-17-4-2T	
ø2.000" ø50mm	MECH2000-W1500-17-5-4T MECH050-S42-17-5-4T	3.50

Shape

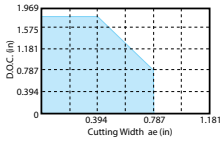
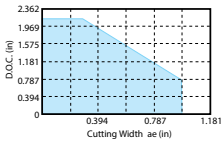
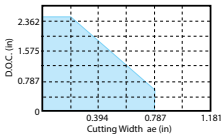
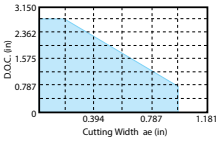


2 flute type

(Workpiece Material: 1049)

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

4 flute / 6 flute

MECH1250-W1250-11-5-4T MECH032-S32-11-5-4T	
MECH1500-W1250-11-6-4T MECH1500-W1500-11-6-4T MECH040-S32-11-6-4T MECH040-S42-11-6-4T	
MECH2000-W1500-11-7-4T MECH050-S42-11-7-4T	
MECH2000-W1500-11-7-6T MECH050-S42-11-7-6T	
MECH2000-W1500-17-5-4T MECH050-S42-17-5-4T	

4 flute/6 flute type are not recommended for slotting.

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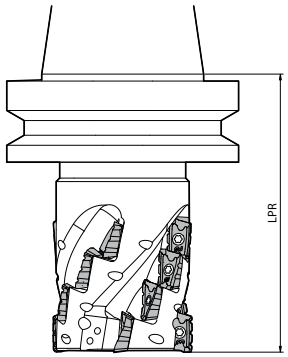
MECH Shell Mill

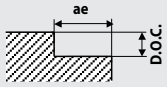
(Workpiece Material: 1049)

Cutting Dia.	Description	Overhang Length LPR (in)
ø40mm	MECH040R-11-4-4T-M	4.92
ø2.000" ø50mm	MECH2000R-11-5-6T MECH050R-11-5-6T-M	4.84
	MECH2000R-17-2-4T MECH050R-17-2-4T-M	4.41
	MECH2000R-17-4-4T MECH050R-17-4-4T-M	5.43
ø63mm	MECH063R-17-3-4T-□	4.53
ø80mm	MECH080R-17-4-6T-□	5.12
ø100mm	MECH100R-17-4-6T-□	5.12

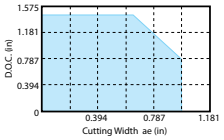
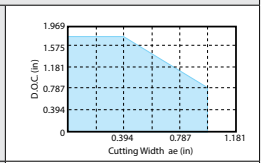
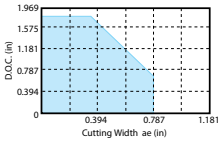
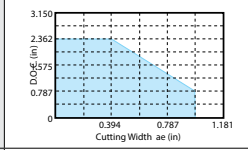
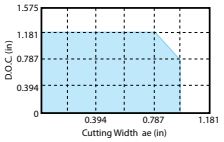
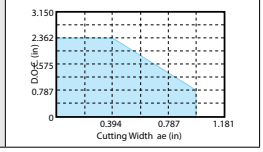
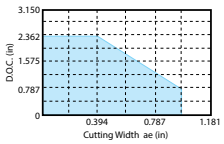
Shape



Shouldering



Cutting Speed: Vc = 330~590 sfm
Feed: fz = 0.003~0.006 ipt

MECH040R-11-4-4T-M		MECH063R-17-3-4T-□	
MECH2000R-11-5-6T MECH050R-11-5-6T-M		MECH080R-17-4-6T-□	
MECH2000R-17-2-4T MECH050R-17-2-4T-M		MECH100R-17-4-6T-□	
MECH2000R-17-4-4T MECH050R-17-4-4T-M			

Slotting is not recommended.

Helical End Mill for Titanium Alloy Machining

MECHT

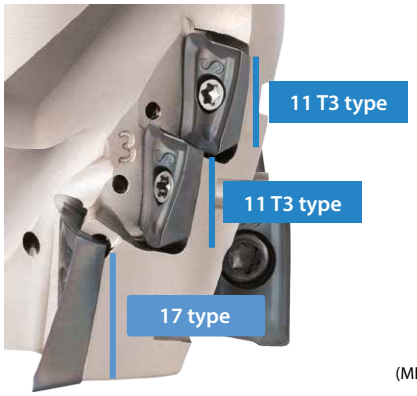
Insert Size Combination Improves Roughing Capabilities Maintains Stable Machining and Long Tool Life

1 Developed to reduce chattering and chip recutting issues

Unique Insert Combination

The larger bottom inserts are positioned to handle larger cutting forces (excluding ø32mm)

Stable machining with improved fracture resistance



(MECHT50R-1711 type)

New Design for High Reliability

Bottom inserts are held in place by double-faced contacts

Bore dia.

Larger bore diameter improves fastening power and reduces chattering

ø50mm cutter with a ø27mm bore (conventional bore: ø22mm)

Toolholder hardness Hardened 15% more than conventional holders

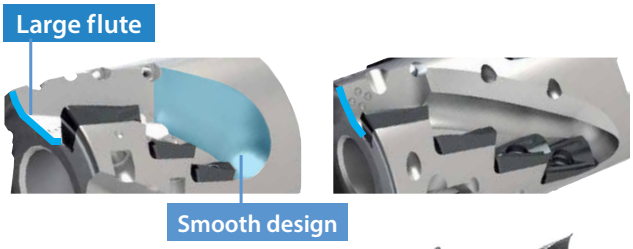
Toolholder spec Custom ordering available

Excellent Chip Evacuation

New flute design

Large, smooth flutes prevent chip clogging

MECHT (ø50mm-4T 3 stages) Conventional (ø50mm-4T 4 stages)

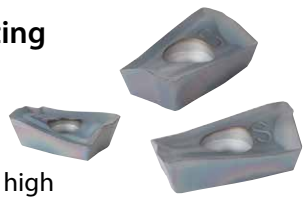


All inserts have coolant holes
Optimized hole diameter controls flow amount and pressure

Smooth chip evacuation as well as superior cooling of the cutting edge

Chips example

2 Longer tool life with low-resistance js chipbreaker and tough pvd coating



Low cutting force **JS chipbreaker**

Heat at the cutting edge is suppressed due to sharp cutting performance. Long tool life.

Greater toughness **PR1835**

Fracture resistant with a tough substrate and high heat-resistant MEGACOAT NANO EX coating technology

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MECHT

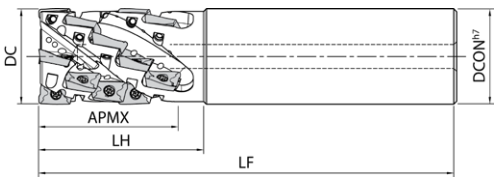


Fig. 1

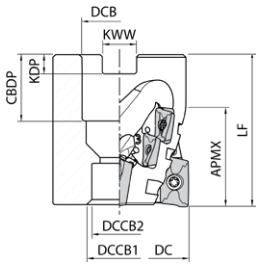


Fig. 2

Toolholder Dimensions

Unit		Part Number	Std. Item	No. of Inserts	No. of Flutes	No. of Stages	Dimensions					A.R. Max. (°)	R.R. max. (°)	Coolant Hole	Fig.	Spare Parts		Applicable Inserts ➡ M140	
							DC	DCON	LF	LH	APMX					Insert Screw	Wrench	Stages	
																		1st	2nd or higher
mm	Helical End Mill	MECHT 32-S32-11-5-4T	●	20	4	5	32	32	140	55	46	+23	-9	Yes	1	SB-2555TRG	DTM-8	BDMT11T3..	BDMT11T308..

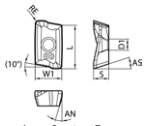
Unit		Part Number	Std. Item	No. of Inserts	No. of Flutes	No. of Stages	Dimensions									A.R. Max. (°)	R.R. max. (°)	Coolant Hole	Fig.	Spare Parts			Applicable Inserts ➡ M140	
							DC	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX					Arbor Bolt	Insert Screw	Wrench	Stages	
																							1st	2nd or higher
mm	Helical Shell Mill	MECHT 50R-1711-3-4T-M	●	12	4	3	50	27	20	14	55	24	7	12.4	34	+19	-7	Yes	2	HH12X40	SB-2555TRG SB-4070TRN	DTM-8 DTM-15	BDMT1704..	BDMT11T308..
		50R-1711-4-5T-M	●	20	5	4					65				43					HH12X50				
		63R-17-4-5T-M	●				63				80				60					HH12X65	SB-4070TRN	DTM-15	BDMT1704..	BDMT170408..
		80R-17-4-6T-M	●	24	6		80	32	26	17		28	8	14.4						HH16X65				

Use inserts with Corner-R of 0.8mm or less for the 2nd or higher stages
Machining with coolant is recommended (Internal coolant pressure 218 psi or more)
Coat Anti-seize Compound(P-37) thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

BDMT

Usage Classification															
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)													Carbon steel / Alloy steel		P
													Mold and die steel		
													Austenitic stainless steel		M
													Martensitic stainless steel		
													Precipitation hardened stainless steel		
													Gray cast iron		K
													Nodular cast iron		
													Non-ferrous metals		N
													Heat-resistant alloy		S
													Titanium alloy	☆ ★	
													Hard materials		H

Insert		Part Number	No. of Edges	Dimensions (mm)					Angle (°)		Carbide		Applicable Toolholder ➡ M139
				S	D1	RE	L	W1	AN	AS	PVD		
											PR1535	PR1835	
	 Low Cutting Force	BDMT 11T302ER-JS	2	3.8	2.8	0.2	11	6.7	13	18	●	●	MECHT...11...
		BDMT 11T304ER-JS				0.4					●	●	
		BDMT 11T308ER-JS				0.8					●	●	
		BDMT 170404ER-JS	2	4.9	4.4	0.4	17	9.6	13	18	●	●	MECHT...17...
		BDMT 170408ER-JS				0.8					●	●	

Right-hand Insert Shown

Recommended Cutting Conditions ➡ M141

BDMT Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Workpiece Material	Applications	Depth and Width of Cut (in)		Feed Rate fz (ipt)	Recommended Insert Grade Vc (sfm)
					MEGACOAT NANO EX (MEGACOAT NANO)
		D.O.C.	W.O.C.		PR1835 (PR1535)
Titanium Alloy	Shouldering	~Length of Cut (APMX)	~0.5DC	0.004~**0.005**~0.006	100~**130**~200
	Slotting	~0.5DC	1DC	0.002~**0.003**~0.004	100~**130**~160

Double-Sided, 6-Edge Insert, 90° Milling

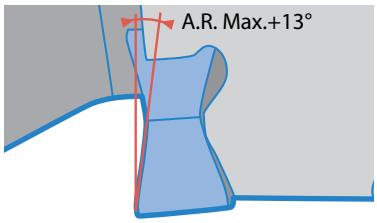
M-SIX (MFWN)

Low Cutting Forces for Reduced Chattering
Superior Fracture Resistance

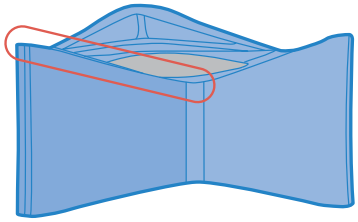
1 Sharp Cutting due to Lower Cutting Forces

Low Cutting Force due to Steep Rake Angle

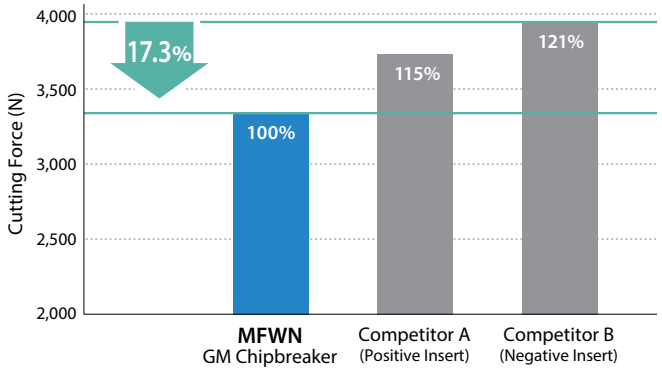
Dynamic Slant Design Reduces Initial Impact when Cutting Edge Enters the Workpiece



Dynamic Slant Design



Cutting Force Comparison (In-house Evaluation)

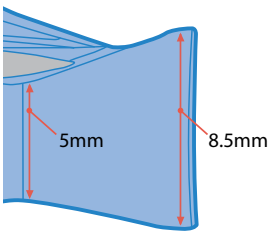


Cutting Force is the Resultant Force of the Principal Force and the Feed Force

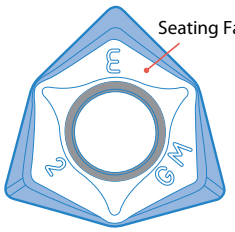
Cutting Conditions: Vc = 590 sfm, D.O.C. × ae = 0.275" × 0.400", fz = 0.008 ipt
Workpiece: 1049 Cutter Dia. Ø5.000"

2 Superior Fracture Resistance with Thick Edge Design

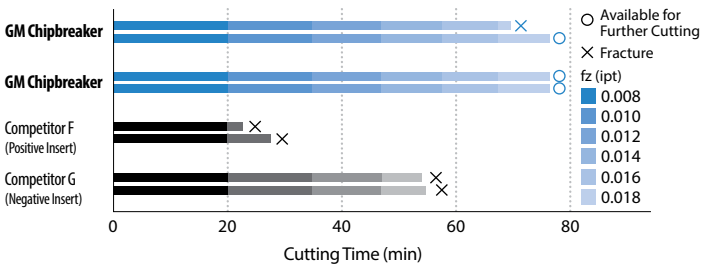
Cutting Edge Thickness: 5 - 8.5mm



Stable Clamping with the Unique Insert Face Design



Fracture Resistance Comparison (In-house Evaluation)



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

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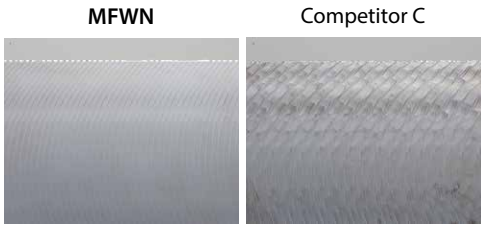
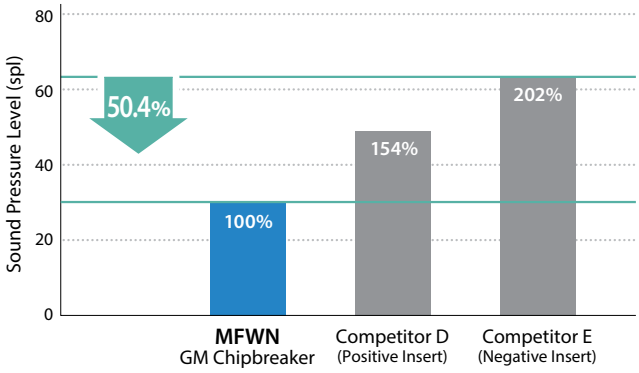
3 Reduced Chattering Even with Extended Milling Adapters

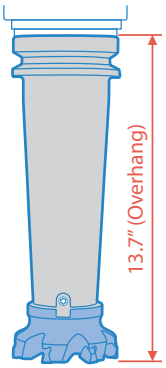
Resistant to Chattering due to Low Cutting Force Design and applicable to long overhang

Surface Roughness Comparison (In-house Evaluation)



Cutting Noise Comparison (In-house Evaluation)



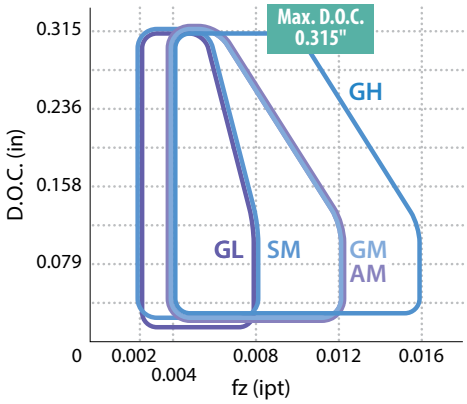


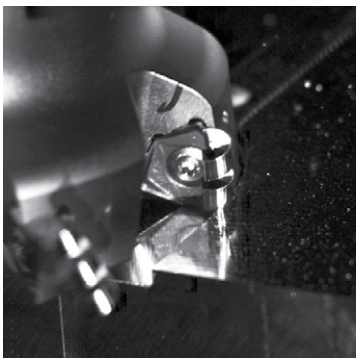
Cutting Conditions: Vc = 660 sfm, D.O.C. × ae = 0.118" × 0.590", fz = 0.004 ipt
Workpiece: 1049 Cutter Dia. Ø3.000" (7 Inserts)

4 Extensive Insert Lineup Covering Various Applications

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

Application Range





Smooth Chip Evacuation

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

MFWN (Face Mill)

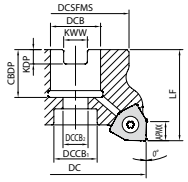


Fig. 1

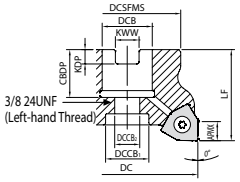


Fig. 2

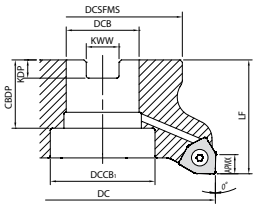


Fig. 3

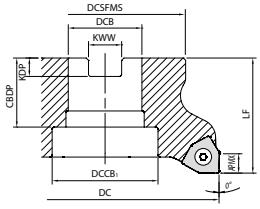


Fig. 4

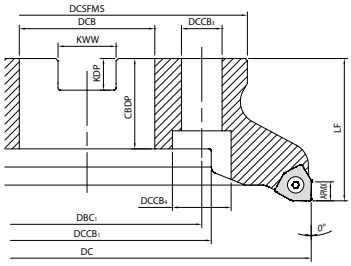


Fig. 5

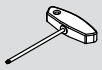
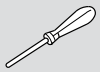
Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions														A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Applicable Inserts ➡ M149
				R		DC	DCSFMS	DCB	DCCB1	DCCB2	DCCB3	DCCB4	DBC1	LF	CBDP	KDP	KWW	APMX								
Inch	Inch Bore Dia.	Coarse Pitch	MFWN 902500R-3T	●	3	2.500	1.890	0.750	0.669	0.433				1.575	0.750	0.187	0.312			-10		14,000	0.4	1	
			903000R-4T	●	4	3.000	2.283	1.000	0.875	0.551				1.968	1.063	0.236	0.381			-9	Yes	12,000	0.8	1	
			904000R-5T	●	5	4.000	2.756	1.500	2.047		-	-	-		1.142	0.393	0.625			-8		10,500	1.1	3	WNEU0806...
			905000R-6T	●	6	5.000	3.425		2.175					2.480	1.496	0.393	0.625	0.315	+13	-7.5		9,500	2.5	3	WNGT0806...
			906000R-8T	●	8	6.000	4.016	2.000	2.835	-					1.496	0.433	0.752					8,000	3.4	4	WNMU0806...
			908000R-10T	●	10	8.000	5.591	2.500	3.937		0.709	1.024	4.000	2.480	1.575	0.551	1.008			-7	No	7,500	6.0	5	
			9010000R-12T	●	12	10.000																6,500	8.2	5	
		Fine Pitch	MFWN 902000R-4T	●	4	2.000	1.752	0.750	0.500	3/8 24UNF				1.968	0.830	0.187	0.312			-12		14,000	0.4	2	
			902500R-4T	●	4	2.500	1.890		0.669	0.433				1.575	0.750	0.187	0.312			-10		14,000	0.5	1	
			903000R-5T	●	5	3.000	2.283	1.000	0.875	0.551	-	-	-	1.968	1.063	0.236	0.381	0.315	+13	-9	Yes	12,000	0.8	1	WNEU0806...
			904000R-7T	●	7	4.000	2.756	1.500	2.047	-					1.142	0.393	0.625			-8		10,500	1.0	3	WNGT0806...
			905000R-8T	●	8	5.000	3.425		2.175					2.480	1.496	0.393	0.625			-7.5		9,500	2.5	3	WNMU0806...
		Extra Fine Pitch	MFWN 902500R-5T	●	5	2.500	1.890	0.750	0.669	0.433				1.575	0.750	0.187	0.312			-10		14,000	0.4	1	
			903000R-7T	●	7	3.000	2.283	1.000	0.875	0.551				1.968	1.063	0.236	0.381			-9	Yes	12,000	0.8	1	
			904000R-9T	●	9	4.000	2.756	1.500	2.047		-	-	-		1.142	0.393	0.625	0.315	+13	-8		10,500	1.0	3	WNEU0806...
			905000R-12T	●	12	5.000	3.425		2.175	-				2.480	1.496	0.393	0.625			-7.5		9,500	2.4	3	WNGT0806...
			906000R-14T	●	14	6.000	4.016	2.000	2.835						1.496	0.433	0.752			-7	No	8,000	3.4	4	WNMU0806...

Max. revolution : When running the end mill or face mill at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Spare Parts (Inch Cutters)

Part Number		Spare Parts								
		Insert Screw	Wrench		Shim	Shim Screw	Wrench	Anti-Seize Compound	Arbor Bolt	Mounting Screw
			TTW	DTM						
										
Coarse Pitch	MFWN 902500R-3T	SB-50140TR	TTW-15	-	MFWN-90	SPW-7050	LW-5	P-37	HH3/8-1.25 (HH3/8-1.25H)	-
	MFWN 903000R-4T	Recommended tightening torque for insert screw 4.2N•m			Recommended tightening torque for shim clamp 6.0N•m				HH1/2-1.25 (HH1/2-1.25H)	-
	MFWN 904000R-5T ~ 9010000R-12T								-	-
Fine Pitch	MFWN 902000R-4T	SB-50140TR	TTW-15	-	-	-	-	P-37	-	XNS610*
	MFWN 902500R-4T	Recommended tightening torque for insert screw 4.2N•m							HH3/8-1.25 (HH3/8-1.25H)	-
	MFWN 903000R-5T								HH1/2-1.25 (HH1/2-1.25H)	-
	MFWN 904000R-7T ~ 9010000R-14T								-	-
Extra Fine Pitch	MFWN 902500R-5T	SB-50140TR	TTW-15	-	-	-	-	P-37	HH3/8-1.25 (HH3/8-1.25H)	-
	MFWN 903000R-7T	SB-40140TRN	-	DTM-15					HH1/2-1.25 (HH1/2-1.25H)	-
	MFWN 904000R-9T ~ 9010000R-18T	Recommended tightening torque for insert screw 3.5N•m							-	-

Coat anti-seize compound thinly on portion of taper and thread prior to installation.
If through spindle coolant is required, please order arbor bolt in ( ) separately.
*Differential screw (3/8-24UNF)

MFWN (Face Mill)

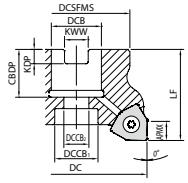


Fig. 1

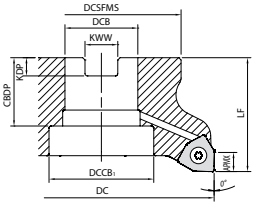


Fig. 2

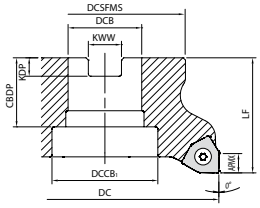


Fig. 3

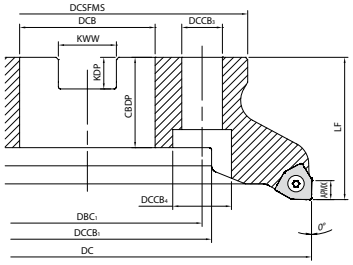


Fig. 4

Toolholder Dimensions

Unit	Part Number			Std. Item	No. of Inserts	Dimensions													A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Applicable Inserts ➡ M149
				R		DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	$DCCB_3$	$DCCB_4$	DBC_1	LF	CBDP	KDP	KWW	APMX							
mm	Inch Bore Dia.	Coarse Pitch	MFWN	90080R-4T	●	4	80	60	1.000"	20	13	-	-	-	50	1.063"	0.236"	0.375"	8	+13	-9		12,000	1	1	WNEU0806... WNGT0806... WNMU0806...
				90100R-5T	●	5	100	70	1.250"	46						1.339"	0.315"	0.500"			-8	Yes	10,500	1.3	2	
				90125R-6T	●	6	125	87	1.500"	55					63	1.496"	0.394"	0.625"			-7.5		9,500	2.6	2	
				90160R-8T	●	8	160	102	2.000"	72	-						0.433"	0.750"				No	8,000	3.9	3	
				90200R-10T	●	10	200	142	1.875"	110		18	26	4.000"		1.575"	0.551"	1.000"			-7		7,500	6.3	4	
				90250R-12T	●	12	250																6,500	8.7	4	
		Fine Pitch	MFWN	90080R-5T	●	5	80	60	1.000"	20	13	-	-	-	50	1.063"	0.236"	0.375"	8	+13	-9		13,500	1	1	WNEU0806... WNGT0806... WNMU0806...
				90100R-7T	●	7	100	70	1.250"	46						1.339"	0.315"	0.500"			-8	Yes	12,000	1.4	2	
				90125R-8T	●	8	125	87	1.500"	55					63	1.496"	0.394"	0.625"			-7.5		10,500	2.7	2	
				90160R-10T	●	10	160	102	2.000"	72	-						0.433"	0.750"				No	9,000	4	3	
				90200R-12T	●	12	200	142	1.875"	110		18	26	4.000"		1.575"	0.551"	1.000"			-7		8,000	6.6	4	
				90250R-14T	●	14	250																7,000	8.9	4	
		Extra Fine Pitch	MFWN	90080R-7T	●	7	80	60	1.000"	20	13	-	-	-	50	1.063"	0.236"	0.375"	8	+13	-9		10,500	1.1	1	WNEU0806... WNGT0806... WNMU0806...
				90100R-9T	●	9	100	70	1.250"	46						1.339"	0.315"	0.500"			-8	Yes	9,500	1.3	2	
				90125R-12T	●	12	125	87	1.500"	55					63	1.496"	0.394"	0.625"			-7.5		8,000	2.7	2	
				90160R-14T	●	14	160	102	2.000"	72	-						0.433"	0.750"				No	7,000	4.1	3	
				90200R-16T	●	16	200	142	1.875"	110		18	26	4.000"		1.575"	0.551"	1.000"			-7		6,500	6.7	4	
				90250R-18T	●	18	250																5,500	9.1	4	

Max. revolution : When running the end mill or face mill at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
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Toolholder Dimensions

Unit			Part Number	Std. Item R	No. of Inserts	Dimensions DC	DCSFMS	DCB	DCCB1	DCCB2	DCCB3	DCCB4	DBC1	LF	CBDP	KDP	KWW	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Applicable Inserts ➡ M149
mm	Metric Bore Dia.	Coarse Pitch	MFWN 90063R-3T-M	●	3	63	47	22	19	11	-	-	-	40	21	6.3	10.4	8	+13	-10	Yes	14,000	0.5	1	WNEU0806... WNGT0806... WNMU0806...
			90080R-4T-M	●	4	80	60	27	20	13				50	24	7	12.4			-9		12,000	1	1	
			90100R-5T-M	●	5	100	70	32	46						30	8	14.4			-8		10,500	1.3	2	
			90125R-6T-M	●	6	125	87	40	55					63	33	9	16.4			-7.5		9,500	2.5	2	
			90160R-8T-M	●	8	160	102		68	-	14	20	66.7		32						No	8,000	3.8	4	
			90200R-10T-M	●	10	200	142	60	110		18	26	101.6		40	14	25.7			-7		7,500	6	4	
			90250R-12T-M	●	12	250																6,500	8.4	4	
		Fine Pitch	MFWN 90063R-4T-M	●	4	63	47	22	19	11	-	-	-	40	21	6.3	10.4	8	+13	-10	Yes	16,000	0.5	1	WNEU0806... WNGT0806... WNMU0806...
			90080R-5T-M	●	5	80	60	27	20	13				50	24	7	12.4			-9		13,500	1	1	
			90100R-7T-M	●	7	100	70	32	46						30	8	14.4			-8		12,000	1.3	2	
			90125R-8T-M	●	8	125	87	40	55					63	33	9	16.4			-7.5		10,500	2.6	2	
			90160R-10T-M	●	10	160	102		68	-	14	20	66.7		32						No	9,000	3.9	4	
			90200R-12T-M	●	12	200	142	60	110		18	26	101.6		40	14	25.7			-7		8,000	6.3	4	
			90250R-14T-M	●	14	250																7,000	8.7	4	
		Extra Fine Pitch	MFWN 90063R-5T-M	●	5	63	47	22	19	11	-	-	-	40	21	6.3	10.4	8	+13	-10	Yes	16,000	0.5	1	WNEU0806... WNGT0806... WNMU0806...
			90080R-7T-M	●	7	80	60	27	20	13				50	24	7	12.4			-9		10,500	1.1	1	
			90100R-9T-M	●	9	100	70	32	46						30	8	14.4			-8		9,500	1.3	2	
			90125R-12T-M	●	12	125	87	40	55	-				63	33	9	16.4			-7.5		8,000	2.6	2	
			90160R-14T-M	●	14	160	102		68		14	20	66.7		32					-7	No	7,000	3.9	4	

Max. revolution : When running the end mill or face mill at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

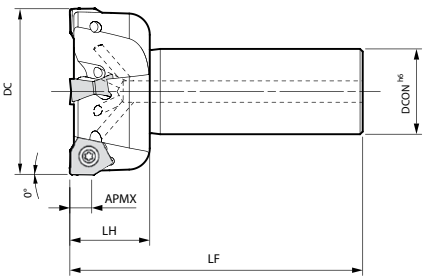
Spare Parts (Metric Cutters)

Part Number		Spare Parts: Insert Screw	Wrench: TTW	Wrench: DTM	Shim	Shim Screw	Wrench	Anti-Seize Compound	Arbor Bolt
Coarse Pitch	MFWN 90063R-3T-M	SB-50140TR	TTW-15	-	MFWN-90	SPW-7050	LW-5	P-37	HH10X30 (HH10X1.25H)
	MFWN 90080R-4T(-M)	Recommended tightening torque for insert screw 4.2N•m			Recommended tightening torque for shim clamp 6.0N•m				HH12X35 (HH12X35H)
	MFWN 90100R-5T(-M) ~ 90250R-12T(-M)								-
Fine Pitch	MFWN 90063R-4T-M	SB-50140TR	TTW-15	-	-	-	-	P-37	HH10X30 (HH10X1.25H)
	MFWN 90080R-5T(-M)	Recommended tightening torque for insert screw 4.2N•m							HH12X35 (HH12X35H)
	MFWN 90100R-7T(-M) ~ 90250R-14T(-M)								-
Extra Fine Pitch	MFWN 90063R-5T-M	SB-50140TR	TTW-15	-	-	-	-	P-37	HH10X30 (HH10X1.25H)
	MFWN 90080R-7T(-M)	SB-40140TRN	-	DTM-15					HH12X35 (HH12X35H)
	MFWN 90100R-9T(-M) ~ 90250R-18T	Recommended tightening torque for insert screw 3.5N•m							-

Coat anti-seize compound thinly on portion of taper and thread prior to installation.
If through spindle coolant is required, please order arbor bolt in ( ) separately.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MFWN (End Mill)



Toolholder Dimensions

Unit		Part Number	Std. Item R	No. of Inserts	Dimensions DC	DCON	LF	LH	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Spare Parts: Insert Screw	Spare Parts: Wrench	Spare Parts: Anti-Seize Compound	Applicable Inserts ➡ M149
Inch	Weldon Shank	MFWN 902000R-W125-3T	●	3	2.000	1.250	3.600	1.180	0.315	+13	-12	Yes	18,500	SB-50140TR	TTW-15	P-37	WNEU0806...
		902500R-W125-4T	●	4	2.500						-10		16,000	Recommended tightening torque for insert clamp 4.2N•m			WNGT0806...
		903000R-W125-5T	●	5	3.000						-8		13,500				WNMU0806...
mm	Cylindrical Shank	MFWN 90050R-S32-3T	●	3	50	32	110	30	8	+13	-12	Yes	18,500	SB-50140TR	TTW-15	P-37	WNEU0806...
		90063R-S32-4T	●	4	63						-10		16,000	Recommended tightening torque for insert clamp 4.2N•m			WNGT0806...
		90080R-S32-5T	●	5	80						-9		13,500				WNMU0806...

Max. revolution : When running the end mill or face mill 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 prior to installation.

How to Mount Inserts

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 angled to the pocket floor. (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 pocket floor of the holder or between the insert side surfaces and the constraint surface of the holder. If there is any clearance, remove the insert and mount it again according to the above steps.
6. To index the cutting edge of the insert, turn the insert counterclockwise (Ref. to Fig. 4). The insert corner identification number is stamped on the top surface of the insert.

Fig. 1

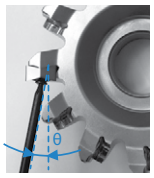


Fig. 2

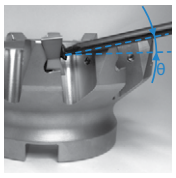


Fig. 3

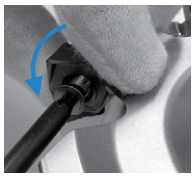


Fig. 4

How to Replace 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 pocket floor (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 pocket floor. If there is any clearance, remove the insert and mount it again according to the above steps.

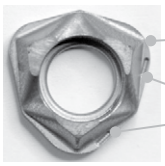


Fig. 1

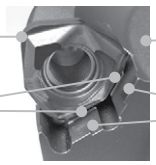


Fig. 2

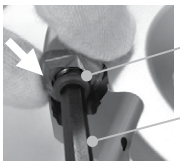
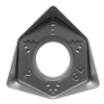
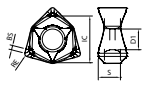
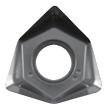
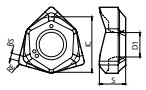
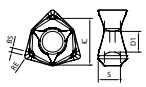
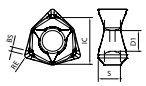
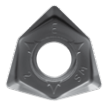
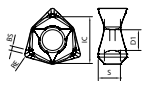


Fig. 3

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

WNEU/WNMU/WNGT

Usage Classification													
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel				☆			★	☆		■	P
	Mold and die steel				☆			★	☆		■	
	Austenitic stainless steel					☆		☆	★			M
	Martensitic stainless steel	★							☆			
	Precipitation hardened stainless steel					☆			★			
	Gray cast iron				☆			★				K
	Nodular cast iron				☆			★				
	Non-ferrous metals		★								☆	N
	Heat-resistant alloy	★							☆			S
	Titanium alloy					☆			★			
	Hard materials (≤ 60 HRC)			★								H

Insert		Part Number	No. of Edges	Dimensions (mm)					Carbide								Cermet		Applicable Toolholder ➡ M144 M146 M147 M148
				IC	S	D1	RE	BS	CVD	DLC	PVD						-	-	
									CA6535	PDL025	PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	GW25	TN620M	
	 Surface Finish Oriented	WNEU 080608EN-GL	6	14.02	6.65	6.2	0.8	1.5	●			△	●	●	●	●	●		●	MFWN90...
	 3-Edge / Non-Ferrous Metals	WNGT 080608FN-AM	3	14.02	6.65	6.2	0.8	1.5		●								●		MFWN90...
	 Tough Edge	WNMU 080608EN-GH	6	14.02	6.65	6.2	0.8	1.3	●		●	△	●	●	●	●	●			MFWN90...
	 General Purpose	WNMU 080604EN-GM 080608EN-GM	6	14.02	6.65	6.2	0.4 0.8	1.7 1.3	● ●			△ △	● ●	● ●	● ●	● ●	● ●		● ●	MFWN90...
	 Low Cutting Force	WNMU 080608EN-SM	6	14.02	6.65	6.2	0.8	1.3	●			△	●	●	●	●	●			MFWN90...

Recommended Cutting Conditions ➡ M150

WNMU / WNEU / WNGT Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Chipbreaker	Workpiece Material	Feed Rate fz (ipt) ( ) : TN620M	Recommended Insert Grade (Vc sfm)							
			Cermet	MEGACOAT NANO EX (MEGACOAT NANO)			MEGACOAT HARD	CVD Coated Carbide	DLC Coated Carbide	Carbide
			TN620M	PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	PR015S	CA6535	PDL025	GW25
GM	Carbon Steel	0.004~**0.008**~0.012 (0.002~**0.004**~0.006)	★ 660~**820**~980	☆ 390~**590**~820	★ 390~**590**~820	-	-	-	-	-
	Alloy Steel	0.004~**0.008**~0.012 (0.002~**0.004**~0.006)	★ 590~**720**~820	☆ 330~**520**~720	★ 330~**520**~720	-	-	-	-	-
	Mold Steel	0.004~**0.006**~0.010 (0.002~**0.004**~0.005)	★ 490~**590**~720	☆ 260~**460**~590	☆ 260~**460**~590	-	-	-	-	-
	Austenitic Stainless Steel	0.004~**0.006**~0.010	-	☆ 330~**520**~660	☆ 330~**520**~660	-	-	-	-	-
	Martensitic Stainless Steel	0.004~**0.006**~0.010	-	☆ 490~**660**~820	-	-	-	☆ 590~**790**~980	-	-
	Precipitation Hardened Stainless Steel	0.004~**0.006**~0.010	-	★ 300~**390**~490	-	-	-	-	-	-
	Gray Cast Iron	0.004~**0.008**~0.012	-	-	-	★ 390~**590**~820	-	-	-	-
	Nodular Cast Iron	0.004~**0.006**~0.010	-	-	-	★ 330~**490**~660	-	-	-	-
	Ni-base Heat Resistant Alloy	0.004~**0.005**~0.008	-	☆ 70~**100**~160	-	-	-	★ 70~**130**~160	-	-
SM *(GL)	Carbon Steel	0.002~**0.005**~0.008 (0.002~**0.003**~0.005)	★ 660~**820**~980	☆ 390~**590**~820	☆ 390~**590**~820	-	-	-	-	-
	Alloy Steel	0.002~**0.005**~0.008 (0.002~**0.003**~0.005)	★ 590~**720**~820	☆ 330~**520**~720	☆ 330~**520**~720	-	-	-	-	-
	Mold Steel	0.002~**0.003**~0.006 (0.002~**0.003**~0.004)	★ 490~**590**~720	☆ 260~**460**~590	☆ 260~**460**~590	-	-	-	-	-
	Austenitic Stainless Steel	0.002~**0.005**~0.008	-	★ 330~**520**~660	☆ 330~**520**~660	-	-	-	-	-
	Martensitic Stainless Steel	0.002~**0.005**~0.008	-	☆ 490~**660**~820	-	-	-	☆ 590~**790**~980	-	-
	Precipitation Hardened Stainless Steel	0.002~**0.005**~0.008	-	☆ 300~**390**~490	-	-	-	-	-	-
	Gray Cast Iron	0.002~**0.005**~0.008	-	-	-	☆ 390~**590**~820	-	-	-	-
	Nodular Cast Iron	0.002~**0.003**~0.006	-	-	-	☆ 330~**490**~660	-	-	-	-
	Ni-base Heat Resistant Alloy	0.002~**0.004**~0.006	-	☆ 70~**100**~160	-	-	-	☆ 70~**130**~160	-	-
	Titanium Alloy	0.002~**0.003**~0.006	-	★ 130~**200**~260	-	-	-	-	-	-
GH	Carbon Steel	0.008~**0.012**~0.016	-	☆ 390~**590**~820	☆ 390~**590**~820	-	-	-	-	-
	Alloy Steel	0.008~**0.012**~0.016	-	☆ 330~**520**~720	☆ 330~**520**~720	-	-	-	-	-
	Mold Steel	0.006~**0.008**~0.012	-	☆ 260~**460**~590	☆ 260~**460**~590	-	-	-	-	-
	Austenitic Stainless Steel	0.008~**0.010**~0.012	-	☆ 330~**520**~660	☆ 330~**520**~660	-	-	-	-	-
	Martensitic Stainless Steel	0.008~**0.010**~0.012	-	☆ 490~**660**~820	-	-	-	☆ 590~**790**~980	-	-
	Precipitation Hardened Stainless Steel	0.008~**0.010**~0.012	-	☆ 300~**390**~490	-	-	-	-	-	-
	Gray Cast Iron	0.008~**0.012**~0.016	-	-	-	☆ 390~**590**~820	-	-	-	-
	Nodular Cast Iron	0.006~**0.008**~0.012	-	-	-	☆ 330~**490**~660	-	-	-	-
	Ni-base Heat Resistant Alloy	0.006~**0.008**~0.010	-	☆ 70~**100**~160	-	-	-	☆ 70~**130**~160	-	-
	Hardened Material (≤ 60 HRC)	0.006~**0.008**~0.010	-	-	-	-	★ 260~**330**~390	-	-	-
AM	Non-ferrous Material	0.004~**0.008**~0.012	-	-	-	-	-	-	★ 660~**1970**~2950	☆ 660~**1640**~2620

★ : 1st Recommendation ☆ : 2nd Recommendation

The figures in bold font represent the center value of the recommended cutting conditions.
Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation
Machining with coolant is recommended for Ni-base Heat-resistant alloy and Titanium Alloy *GL chiphreaker is recommended for surface finish oriented milling
When using GH chipbreaker for fine pitch cutters, recommended feed is fz ≦ 0.012 ipt
GH chipbreaker is not recommended for extra fine pitch cutter

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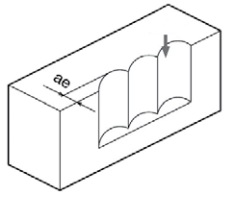
Applicable Chipbreaker

Cutter	Chipbreaker			
	GM	SM (GL)	GH	AM
Coarse Pitch (with Shim)	✓	✓	✓	✓
Fine Pitch (without Shim)	✓	✓	✓ (fz 0 0.012 ipt Recommended)	✓
Extra Fine Pitch (without Shim)	✓	✓	Not Recommended	Not Recommended

Cutter Type and Insert Selection Guide

Purpose	Cutter			Chipbreaker				
	Coarse Pitch	Fine Pitch	Extra-Fine Pitch	GM	SM	GH	GL	AM
General Milling for Steel and Alloy Steel		✓		✓				
Steel and Alloy Steel (to prevent chattering due to low rigidity machine or poor clamping power)	✓				✓			
Productivity Oriented (D.O.C. 0.157" and over, fz 0.010 ipt and over)	✓					✓		
Surface Roughness Oriented	✓	✓					✓	
General Milling for Stainless Steel		✓			✓			
Stainless Steel (to prevent chattering due to low rigidity machine or poor clamping power)	✓				✓			
Cast Iron Milling (Improved Efficiency)			✓	✓				
Cast Iron (D.O.C. 0.157" and over, fz 0.010 ipt and over)	✓					✓		
General Milling for Aluminum Alloys		✓						✓
Aluminum Alloys (to prevent chattering due to low rigidity)	✓							✓

Plunging



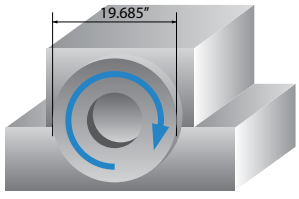
Cutting Dia.	MAX. Width of Cut (ae)
All Items	0.315"

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

Case Study

No.50

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



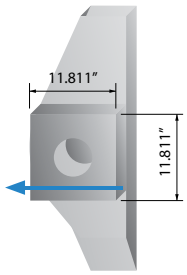
PR1510	Chip evacuation rate = 163cc/min
Competitor A (Positive cutter)	Chip evacuation rate = 68cc/min

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

(User evaluation)

Manganese Steel

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



PR1525	Machining efficiency: 2 pcs/edge
Competitor B (Negative cutter) (Vertical inserts)	1 pc/edge

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

(User evaluation)

Low Cutting Force 90° Milling

MFWN Mini

Economical small diameter MFWN series milling cutters
Additional fine pitch, small diameter toolholders available

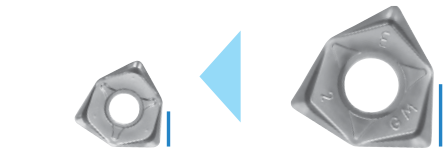
1 Cost-Efficient 6-Edge Inserts

Smaller insert design technology maintains original MFWN cutting performance
Can be used up to 0.197" (5mm) depth of cut.

Smaller Insert Size

MFWN Mini
05 size

MFWN
08 size



D.O.C. ~0.197" (~5mm)

D.O.C. ~0.315" (~8mm)

Increased Versatility

Large small-diameter lineup

High-efficiency machining with fine pitch styles

1 ~ 3 additional flutes

Expanded lineup of smaller diameters

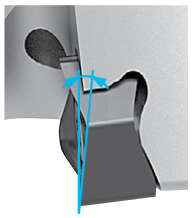
Face Mill ø50
End Mill ø25 - ø40

2 Fracture-Resistant Inserts and Low Cutting Forces

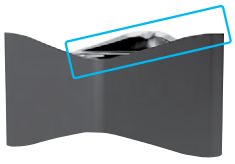
Low cutting force and high chattering-resistance

Sharp cutting by large rake angle
"Large slant edge" design reduces shock when cutting edge enters the workpiece

A.R. Max +11°

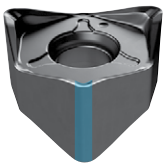


"Large slant edge" design

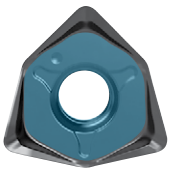


Superior fracture resistance with thick edge design

Stable clamping strength with unique insert face Design



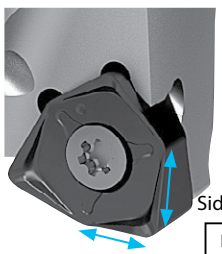
Cutting edge thickness: 5.2mm
(3.1mm at the thinnest point)



Optimized seating surface

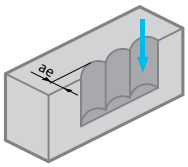
Neutral inserts for various uses

Symmetrical side and bottom cutting edges provide a wide range of machining applications



Bottom edge

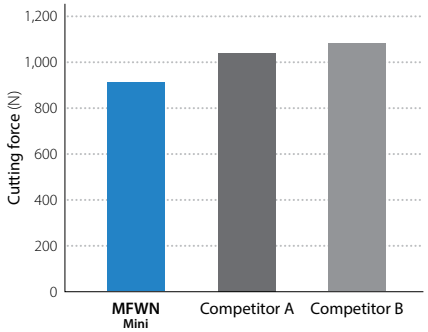
Plunging possible



Side edge

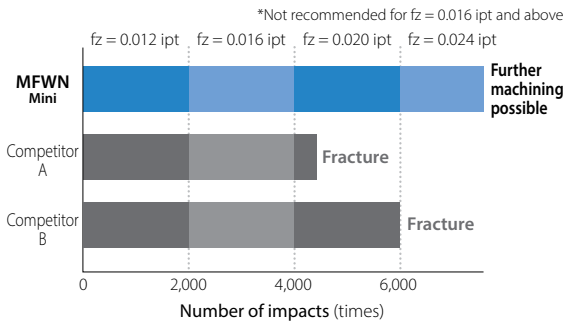
Left-handed toolholders are also available (Custom order)

Cutting Force comparison (Internal Evaluation)



Cutting conditions : Vc = 490 sfm, fz = 0.006 ipt, D.O.C. x ae = 0.059" x 1.378", Dry
Cutting Dia. ø63mm Workpiece : 4140

Fracture Resistance Comparison (Internal Evaluation)



Cutting conditions : Vc = 390 sfm, D.O.C. x ae = 0.059" x 1.181", Dry
Cutting Dia. ø63mm Workpiece : Mold Steel 37 ~ 43 HRC

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MFWN Mini (Face Mill)

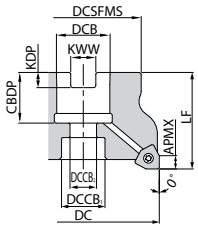


Fig. 1

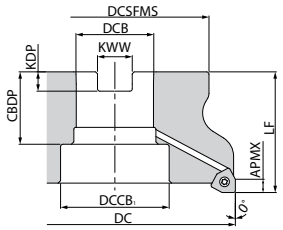


Fig. 2

Toolholder Dimensions

Unit			Part Number		Std. Item	No. of Inserts	Dimensions									A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Applicable Inserts ➡ M155
				R		DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX							
mm	Inch Bore Dia.	Fine Pitch	MFWN	90080R-05-7T	●	7	80	70	1.000"	20	13	50	1.063"	0.236"	0.375"	5	+11	-7	Yes	10,900	1.3	1	WNMU0504...
				90100R-05-8T	●	8	100	78	1.250"	45	-		1.339"	0.315"	0.500"					9,700	1.6	2	
				90125R-05-11T	●	11	125	89	1.500"	55		63	1.496"	0.394"	0.625"					8,700	2.9	2	
		Extra Fine Pitch	MFWN	90080R-05-9T	●	9	80	70	1.000"	20	13	50	1.063"	0.236"	0.375"	5	+11	-7	Yes	10,900	1.2	1	WNMU0504...
				90100R-05-11T	●	11	100	78	1.250"	45	-		1.339"	0.315"	0.500"					9,700	1.6	2	
				90125R-05-14T	●	14	125	89	1.500"	55		63	1.496"	0.394"	0.625"					8,700	2.8	2	
	Metric Bore Dia.	Fine Pitch	MFWN	90050R-05-5T-M	●	5	50	48	22	17.5	11	40	21	6.3	10.4	5	+11	-9	Yes	13,800	0.4	1	WNMU0504...
				90063R-05-6T-M	●	6	63			18								-8		12,300	0.5	1	
				90080R-05-7T-M	●	7	80	70	27	20	13	50	24	7	12.4			-7		10,900	1.2	1	
				90100R-05-8T-M	●	8	100	78	32	45	-		30	8	14.4					9,700	1.6	2	
				90125R-05-11T-M	●	11	125	89	40	55		63	33	9	16.4					8,700	2.8	2	
		Extra Fine Pitch	MFWN	90050R-05-6T-M	●	6	50	48	22	17.5	11	40	21	6.3	10.4	5	+11	-9	Yes	13,800	0.4	1	WNMU0504...
				90063R-05-7T-M	●	7	63			18								-8		12,300	0.5	1	
				90080R-05-9T-M	●	9	80	70	27	20	13	50	24	7	12.4			-7		10,900	1.2	1	
				90100R-05-11T-M	●	11	100	78	32	45	-		30	8	14.4					9,700	1.5	2	
				90125R-05-14T-M	●	14	125	89	40	55		63	33	9	16.4					8,700	2.7	2	

Max. revolution : When running the end mill or face mill at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

Spare Parts

	Part Number		Insert Screw	Wrench	Anti-seize Compound	Arbor Bolt
Fine Pitch	MFWN	90050R-05-5T-M	SB-3065TRP	DTPM-8	P-37	HH10×30
		90063R-05-6T-M				HH10×30
		90080R-05-7T(-M)	Recommended tightening torque for insert screw 1.2N•m			HH12×35
		90100R-05-8T(-M)				-
		90125R-05-11T(-M)				
Extra Fine Pitch	MFWN	90050R-05-6T-M	SB-3065TRP	DTPM-8	P-37	HH10×30
		90063R-05-7T-M				HH10×30
		90080R-05-9T(-M)	Recommended tightening torque for insert screw 1.2N•m			HH12×35
		90100R-05-11T(-M)				-
		90125R-05-14T(-M)				

Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MFWN Mini (End Mill)

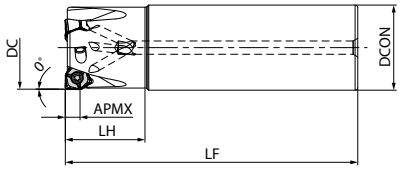


Fig. 1

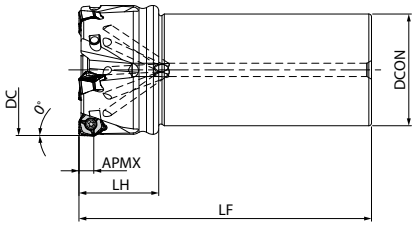


Fig. 2

Toolholder Dimensions

Unit		Part Number	Std. Item R	No. of Inserts	Dimensions DC	Dimensions DCON	Dimensions LF	Dimensions LH	Dimensions APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Fig.	Spare Parts: Insert Screw	Spare Parts: Wrench	Spare Parts: Anti-Seize Compound	Applicable Inserts M155
mm	Cylindrical Shank	MFWN 90025R-S25-05-2T	●	2	25	25	120	32	5	+11	-14.5	Yes	19,500	1	SB-3065TRP	DTPM-8	P-37	WNMU0504...
		90032R-S32-05-3T	●	3	32	32	130	40			-12		17,200	1				
		90040R-S32-05-4T	●	4	40		150	50			-10		15,400	2				
		90050R-S32-05-5T	●	5	50		110	30			-9		13,800	2				
		90063R-S32-05-6T	●	6	63						-8		12,300	2				
		90080R-S32-05-7T	●	7	80						-7		10,900	2				

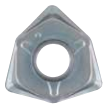
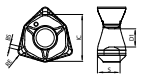
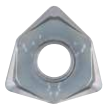
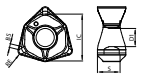
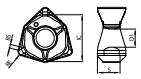
Recommended tightening torque for insert screw 1.2N•m

Max. revolution : When running the end mill or face mill 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 prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

WNMU

Usage Classification										
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel			☆			★	☆	P
	Mold and die steel			☆			★	☆	P
	Austenitic stainless steel				☆		☆	★	M
	Martensitic stainless steel							☆	M
	Precipitation hardened stainless steel				☆			★	M
	Gray cast iron		☆			★			K
	Nodular cast iron		☆			★			K
	Non-ferrous metals								N
	Heat-resistant alloy							☆	S
	Titanium alloy				☆			★	S
	Hard materials (≤ 60 HRC)	★							H

Insert		Part Number	No. of Edges	Dimensions (mm)					Carbide						Applicable Toolholder ➡ M153 M154
				IC	S	D1	RE	BS	PVD						
									PR0155	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835
	 General Purpose	WNMU 050408EN-GM	6	8.8	4.2	3.4	0.8	0.7		△	●	●	●	●	MFWN90...-05-...
	 Low Cutting Force	WNMU 050408EN-SM	6	8.8	4.2	3.4	0.8	0.7		△	●	●	●	●	MFWN90...-05-...
	 Tough Edge	WNMU 050408EN-GH	6	8.8	4.2	3.4	0.8	0.7	●	△	●	●	●	●	MFWN90...-05-...

Recommended Cutting Conditions ➡ M156

WNMU Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

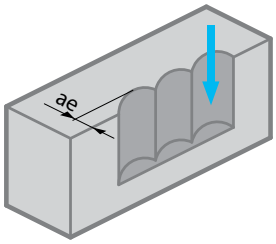
Recommended Cutting Conditions

Chipbreaker	Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade (Vc sfm)			
			MEGACOAT NANO EX (MEGACOAT NANO)			MEGACOAT HARD
			PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	PR015S
GM	Carbon Steel	0.004~**0.008**~0.010	☆ 390~**590**~820	★ 390~**590**~820	-	-
	Alloy Steel	0.004~**0.008**~0.010	☆ 330~**520**~720	★ 330~**520**~720	-	-
	Mold Steel	0.004~**0.006**~0.008	☆ 260~**460**~590	★ 260~**460**~590	-	-
	Austenitic Stainless Steel	0.004~**0.006**~0.008	☆ 330~**520**~660	☆ 330~**520**~660	-	-
	Martensitic Stainless Steel	0.004~**0.006**~0.008	☆ 490~**660**~820	-	-	-
	Precipitation Hardened Stainless Steel	0.004~**0.006**~0.008	★ 300~**390**~490	-	-	-
	Gray Cast Iron	0.004~**0.008**~0.010	-	-	★ 390~**590**~820	-
	Nodular Cast Iron	0.004~**0.006**~0.008	-	-	★ 330~**490**~660	-
	Ni-base Heat Resistant Alloy	0.004~**0.005**~0.006	☆ 70~**100**~160	-	-	-
SM	Carbon Steel	0.002~**0.005**~0.008	☆ 390~**590**~820	☆ 390~**590**~820	-	-
	Alloy Steel	0.002~**0.005**~0.008	☆ 330~**520**~720	☆ 330~**520**~720	-	-
	Mold Steel	0.002~**0.003**~0.006	☆ 260~**460**~590	☆ 260~**460**~590	-	-
	Austenitic Stainless Steel	0.002~**0.005**~0.008	★ 330~**520**~660	☆ 330~**520**~660	-	-
	Martensitic Stainless Steel	0.002~**0.005**~0.008	☆ 490~**660**~820	-	-	-
	Precipitation Hardened Stainless Steel	0.002~**0.005**~0.008	☆ 300~**390**~490	-	-	-
	Gray Cast Iron	0.002~**0.005**~0.008	-	-	☆ 390~**590**~820	-
	Nodular Cast Iron	0.002~**0.003**~0.006	-	-	☆ 330~**490**~660	-
	Ni-base Heat Resistant Alloy	0.002~**0.003**~0.006	★ 70~**100**~160	-	-	-
	Titanium Alloy	0.002~**0.003**~0.006	★ 130~**200**~260	-	☆ 130~**200**~260	-
GH	Carbon Steel	0.006~**0.008**~0.012	☆ 390~**590**~820	☆ 390~**590**~820	-	-
	Alloy Steel	0.006~**0.008**~0.012	☆ 330~**520**~720	☆ 390~**520**~720	-	-
	Mold Steel	0.006~**0.008**~0.010	☆ 260~**460**~590	☆ 260~**460**~590	-	-
	Austenitic Stainless Steel	0.006~**0.008**~0.010	☆ 330~**520**~660	☆ 330~**520**~660	-	-
	Martensitic Stainless Steel	0.006~**0.008**~0.010	☆ 490~**660**~820	-	-	-
	Precipitation Hardened Stainless Steel	0.006~**0.008**~0.010	☆ 300~**390**~490	-	-	-
	Gray Cast Iron	0.006~**0.008**~0.012	-	☆ 390~**590**~820	☆ 390~**590**~820	-
	Nodular Cast Iron	0.006~**0.008**~0.010	-	☆ 330~**490**~660	☆ 330~**490**~660	-
	Ni-base Heat Resistant Alloy	0.004~**0.006**~0.008	☆ 70~**100**~160	-	-	-
	Hardened Material (≤ 60 HRC)	0.002~**0.003**~0.006	-	-	-	★ 160~**260**~330

The figures in bold font represent the center value of the recommended cutting conditions.
Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation
Machining with coolant is recommended for Ni-base Heat-resistant alloy and Titanium Alloy
When using GH chipbreaker for fine pitch cutters, recommended feed is fz ≦ 0.008 ipt

★ : 1st Recommendation ☆ : 2nd Recommendation

Plunging



Available for Plunging

Cutting Dia.	Maximum Width of Cut (ae)
All Cutters	5mm

Ramping and helical milling are not recommended due to interference between workpiece and flank face

Applicable Chipbreaker

Cutter type	Chipbreaker		
	GM	SM	GH
Fine Pitch	✓	✓	✓
Extra Fine Pitch	✓	✓	(Feed rate is recommended fz=0.008 ipt or under)

How to Mount Inserts

1. Completely eliminate chips and dust from the insert mounting side.
2. Insert Screw
   · Apply anti-seize compound on portion of taper and thread of clamp screw.
   · After mounting a insert screw on the top edge of wrench, tighten the screw while keeping the insert pushed against the shim seat surface and holder surface (Fig.1)
3. When tightening the screw, make sure that the wrench is parallel to the screw.
   Recommended tightening torque . . . 1.2N·m
4. After tightening, check that there is no gap between the insert and the surface of the shim, or between the side surface of insert and the holder surface.
   If there is a gap, remount the insert using the directions above.

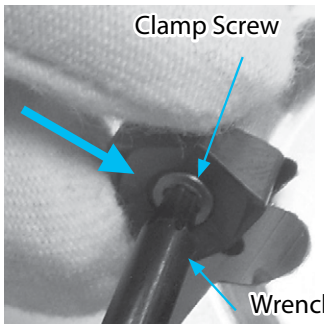


Fig. 1

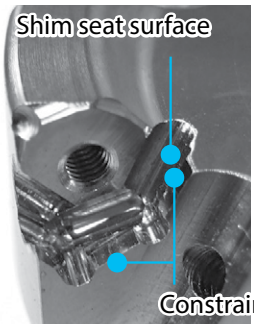


Fig. 2

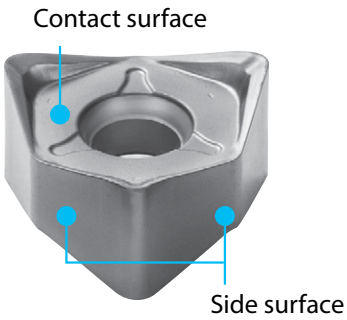


Fig. 3

88˚ Lead, High Efficiency Cutter

MFSN88

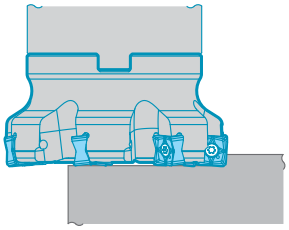
Economical double-sided 8-edge insert suitable for shoulder roughing
Reduces chattering with a low cutting force design

1 Economical double-sided 8-edge insert suitable for shoulder roughing

Cost reduction with nearly 90˚ corners

Shoulder roughing

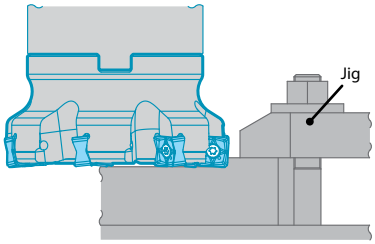
Cost reduction by switching from 90˚ cutter with positive inserts



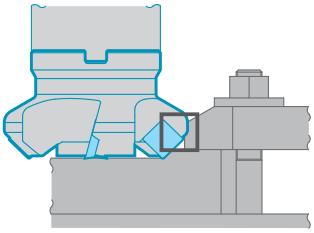
See page **M127** for unmachined corner portion

Facing without interfering with fixtures

MFSN88



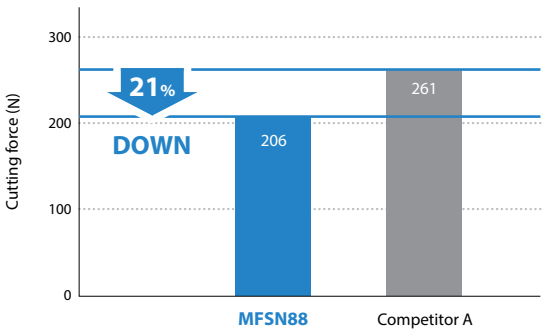
Conventional 45˚ cutter



2 Reduces chattering with a low cutting force design

Chatter resistant medium to roughing machining range

Cutting force comparison (Internal evaluation)



Cutting force is thrust force

Cutting Conditions : Vc = 660 sfm, f = 0.006 ipt, D.O.C. = 0.118"
Cutter Diameter Ø63mm, Workpiece : 1049 Steel

3 Extended tool life with MEGACOAT NANO technology

Insert grade and chipbreaker lineup for various machining application

1st Recommendation (General purpose)
GM chipbreaker

Tough edge
GH chipbreaker

For stainless steel
SM chipbreaker

800.823.7284
www.kyoceraprecisiontools.com

MFSN88 (Face Mill)

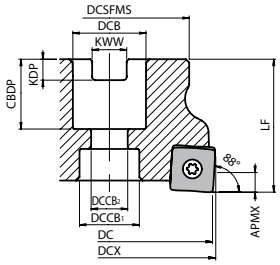


Fig. 1

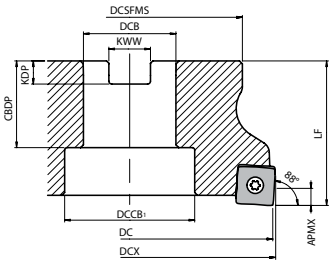


Fig. 2

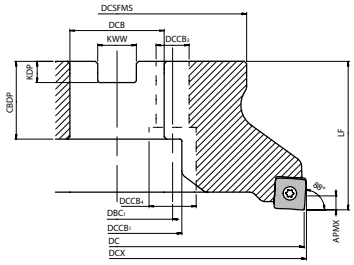


Fig. 3

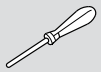
Toolholder Dimensions

Unit			Part Number		Std. Item	No. of Inserts	Dimensions														A.R. Max. (°)	R.R. (°)	Coolant Hole	Weight (kg)	Fig.	Applicable Inserts ➡ M162
				R		DC	DCX	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	$DCCB_3$	$DCCB_4$	DBC_1	LF	CBDP	KDP	KWW							
mm	Inch Bore Dia.	Fine Pitch	MFSN	88080R-6T-G	●	6	80	82	70	1.000"	20	13	-	-	-	50	1.063"	0.236"	0.375"	+10	-9	No	1.1	1	SNMU1305...
				88100R-7T-G	●	7	100	102	78	1.250"	45						1.339"	0.315"	0.500"		-8		1.5	2	
				88125R-9T-G	●	9	125	127	89	1.500"	55	-				63	1.496"	0.394"	0.625"		-7.5		2.5	2	
				88160R-11T-G	●	11	160	162	110	2.000"	70							0.433"	0.750"		-7		4.1	2	
		Extra Fine Pitch	MFSN	88080R-9T-G	●	9	80	82	70	1.000"	20	13	-	-	-	50	1.063"	0.236"	0.375"	+10	-9	No	1.1	1	SNMU1305...
				88100R-11T-G	●	11	100	102	78	1.250"	45						1.339"	0.315"	0.500"		-8		1.5	2	
				88125R-13T-G	●	13	125	127	89	1.500"	55	-				63	1.496"	0.394"	0.625"		-7.5		2.6	2	
				88160R-15T-G	●	15	160	162	110	2.000"	70							0.433"	0.750"		-7		4.3	2	
	Metric Bore Dia.	Fine Pitch	MFSN	88050R-4T-M-G	●	4	50	52	48	22	17.5	11	-	-	-	40	21	6.3	10.4	+10	-12	No	0.3	1	SNMU1305...
				88063R-5T-M-G	●	5	63	65			18										-10		0.4	1	
				88080R-6T-M-G	●	6	80	82	70	27	20	13				50	24	7	12.4		-9		1.1	1	
				88100R-7T-M-G	●	7	100	102	78	32	45						30	8	14.4		-8		1.4	2	
				88125R-9T-M-G	●	9	125	127	89	40	55	-				63	33	9	16.4		-7.5		2.4	2	
				88160R-11T-M-G	●	11	160	162	110				14	20	66.7						-7		4.2	3	
		Extra Fine Pitch	MFSN	88050R-5T-M-G	●	5	50	52	48	22	17.5	11	-	-	-	40	21	6.3	10.4	+10	-12	No	0.3	1	SNMU1305...
				88063R-7T-M-G	●	7	63	65			18										-10		0.4	1	
				88080R-9T-M-G	●	9	80	82	70	27	20	13				50	24	7	12.4		-9		1.1	1	
				88100R-11T-M-G	●	11	100	102	78	32	45						30	8	14.4		-8		1.4	2	
				88125R-13T-M-G	●	13	125	127	89	40	55	-				63	33	9	16.4		-7.5		2.5	2	
				88160R-15T-M-G	●	15	160	162	110				14	20	66.7						-7		4.3	3	

APMX : 5mm (GM, SM, GH Chipbreakers, Coated Carbide), 3mm (GM Chipbreaker, Cermet)

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Spare Parts (for Both Metric and Inch Bore Dia.)

Part Number			Insert Screw	Wrench	Anti-Seize Compound	Arbor Bolt
						
Fine Pitch	MFSN	88050R-4T-M-G	SB-4090TRP	DTPM-15	P-37	HH10X30
		88063R-5T-M-G				HH10X30
		88080R-6T(-M)-G				HH12X35
		88100R-7T(-M)-G	Recommended tightening torque for insert screw 3.5N•m			-
		88125R-9T(-M)-G				
		88160R-11T(-M)-G				
Extra Fine Pitch	MFSN	88050R-5T-M-G	SB-4090TRP	DTPM-15	P-37	HH10X30
		88063R-7T-M-G				HH10X30
		88080R-9T(-M)-G				HH12X35
		88100R-11T(-M)-G	Recommended tightening torque for insert screw 3.5N•m			-
		88125R-13T(-M)-G				
		88160R-15T(-M)-G				

Coat anti-seize compound thinly on portion of taper and thread prior to installation.

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MFSN88 (End Mill)

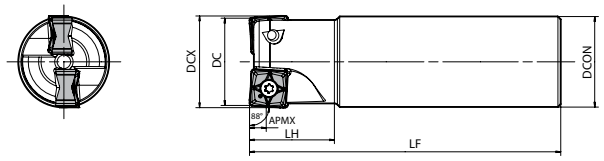


Fig. 1

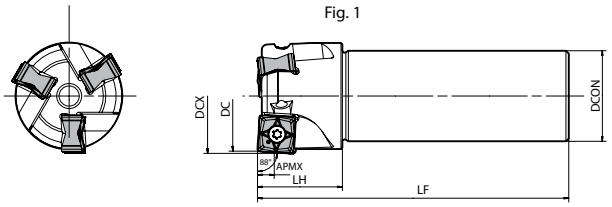


Fig. 2

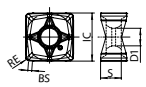
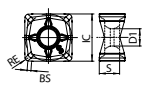
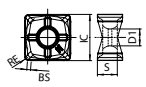
Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions					A.R. Max. (°)	R.R. (°)	Coolant Hole	Fig.	Spare Parts			Applicable Inserts ➡ M162
		R		DC	DCX	DCON	LF	LH					Insert Screw	Wrench	Anti-Seize Compound	
mm	MFSN 88032R-S32-2T-G	●	2	32	34	32	110	30	+10	-15.5	No	1	SB-4090TRP	DTPM-15	P-37	SNMU1305...
	88040R-S32-3T-G	●	3	40	42					-13		2				

APMX : 5mm (GM, SM, GH Chipbreakers, Coated Carbide), 3mm (GM Chipbreaker, Cermet)
Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.
Recommended tightening torque for insert clamp : 3.5N·m

SNMU

Usage Classification										
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel			☆			★	☆	■	P
	Mold and die steel			☆			★	☆	■	
	Austenitic stainless steel				☆		☆	★		M
	Martensitic stainless steel							☆		
	Precipitation hardened stainless steel				☆			★		
	Gray cast iron		☆			★				K
	Nodular cast iron		☆			★				
	Non-ferrous metals									N
	Heat-resistant alloy							☆		S
	Titanium alloy				☆			★		
	Hard materials (≤ 60 HRC)	★								H

Insert		Part Number	Dimensions (mm)					Carbide						Cermet	Applicable Toolholder ➡ M159 M161
			IC	S	D1	RE	BS	PVD						-	
								PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	TN620M	
	 General Purpose	SNMU 130508EN-GM	13	5.51	4.7	0.8	1		△	●	●	●	●	●	●	MFSN88...
	 Low Cutting Force	SNMU 130508EN-SM	13	5.51	4.7	0.8	1		△	●	●	●	●	●		MFSN88...
	 Tough Edge	SNMU 130508EN-GH	13	5.51	4.7	0.8	1	●	△	●	●	●	●	●		MFSN88...

Recommended Cutting Conditions ➡ **M163**

SNMU Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Coated Carbide

Chipbreaker	Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grades (Cutting Speed Vc : sfm)			
			MEGACOAT NANO EX (MEGACOAT NANO)			MEGACOAT HARD
			PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	PR015S
GM	Carbon Steel	0.0039~**0.0079**~0.0118	☆ 390~**590**~820	★ 390~**590**~820	-	-
	Alloy Steel	0.0039~**0.0079**~0.0118	☆ 330~**520**~720	★ 330~**520**~720	-	-
	Mold Steel	0.0039~**0.0059**~0.0098	★ 260~**460**~590	★ 260~**460**~590	-	-
	Austinitic Stainless Steel	0.0039~**0.0059**~0.0098	☆ 330~**490**~660	☆ 330~**490**~660	-	-
	Martensitic Stainless Steel	0.0039~**0.0059**~0.0098	☆ 330~**490**~660	-	-	-
	Precipitation Hardened Stainless Steel	0.0039~**0.0059**~0.0098	★ 300~**390**~490	-	-	-
	Gray Cast Iron	0.0039~**0.0079**~0.0118	-	-	★ 390~**590**~820	-
	Nodular Cast Iron	0.0039~**0.0059**~0.0098	-	-	★ 330~**490**~660	-
	Ni-base Heat Resistant Alloys	0.0039~**0.0047**~0.0079	☆ 70~**100**~160	-	-	-
SM	Carbon Steel	0.0024~**0.0047**~0.0079	-	☆ 390~**590**~820	-	-
	Alloy Steel	0.0024~**0.0047**~0.0079	-	☆ 330~**520**~720	-	-
	Mold Steel	0.0024~**0.0031**~0.0059	-	☆ 260~**460**~590	-	-
	Austinitic Stainless Steel	0.0024~**0.0047**~0.0079	★ 330~**490**~660	☆ 330~**490**~660	-	-
	Martensitic Stainless Steel	0.0024~**0.0047**~0.0079	★ 330~**490**~660	-	-	-
	Precipitation Hardened Stainless Steel	0.0024~**0.0047**~0.0079	☆ 300~**390**~490	-	-	-
	Gray Cast Iron	0.0024~**0.0047**~0.0079	-	-	☆ 390~**590**~820	-
	Nodular Cast Iron	0.0024~**0.0039**~0.0059	-	-	☆ 330~**490**~660	-
	Ni-base Heat Resistant Alloys	0.0024~**0.0031**~0.0059	★ 70~**100**~160	-	-	-
	Titanium Alloys	0.0024~**0.0031**~0.0059	★ 130~**200**~260	-	-	-
GH	Carbon Steel	0.0059~**0.0098**~0.0138	-	☆ 390~**590**~820	-	-
	Alloy Steel	0.0059~**0.0098**~0.0138	-	☆ 330~**520**~720	-	-
	Mold Steel	0.0039~**0.0079**~0.0118	-	☆ 260~**460**~590	-	-
	Gray Cast Iron	0.0059~**0.0098**~0.0138	-	-	☆ 390~**590**~820	-
	Nodular Cast Iron	0.0039~**0.0079**~0.0118	-	-	☆ 330~**490**~660	-
	Hardened Materials (≤ 60 HRC)	0.0039~**0.0079**~0.0118	-	-	-	★ 260~**330**~390

The figures in bold font represent the center value of the recommended cutting conditions.
Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation
Machining with coolant is recommended for Ni-base Heat-resistant alloy and Titanium Alloy

★ : 1st Recommendation ☆: 2nd Recommendation

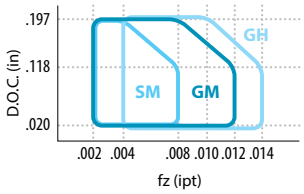
Cermet

Chipbreaker	Workpiece Material	Feed (fz: ipt)	Recommended insert grades (Vc: sfm)
			Cermet
			TN620M
GM	Carbon steel	0.002~**0.005**~0.006	★ 660~**820**~980
	Alloy steel	0.002~**0.005**~0.006	★ 590~**720**~820
	Mold steel	0.002~**0.004**~0.005	★ 490~**590**~720

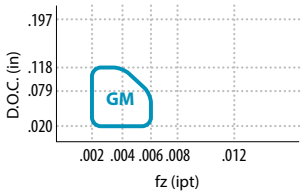
★ : 1st Recommendation

Applicable Chipbreaker Range

Coated Carbide



Cermet



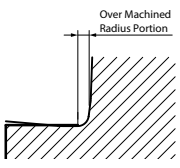
Applicable Chipbreaker

Cutter Type	Chipbreaker		
	GM	SM	GH
Fine Pitch	✓	✓	✓
Extra Fine Pitch	✓	✓	△ (Feed rate is recommended fz=0.008 ipt or under)

Not recommended for plunging.

Reference Data for Unmachined Corner Portion

D.O.C.	1 mm	2 mm	3 mm	4 mm	5 mm
Over Machined Radius Portion	0.12 mm	0.24 mm	0.27 mm	0.31 mm	0.34 mm



Over machined radius portion to 90°cutter

Face Mills for Heavy Milling

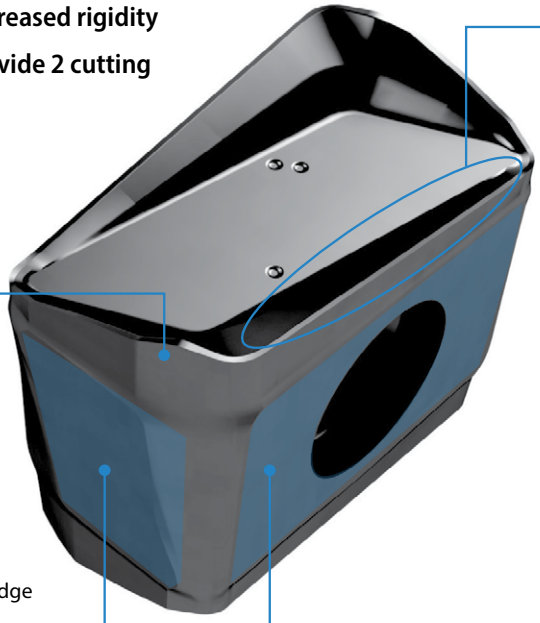
MFLN

Tough 4-edge tangential inserts for reliable heavy milling at large D.O.C. and high feed rates
Three lead angle options (including MFLN45 and MFLN70) for optimized machining in various applications

1 Tough and Reliable Inserts for Stable Heavy Milling

Inserts up to 20mm long offer increased rigidity

Tangentially mounted inserts provide 2 cutting edges on each side

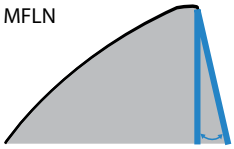


Obtuse Edge Design

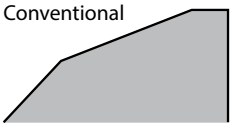
Increases the cutting edge angle only at the tip to maintain both strength and sharpness

Cross-section view of cutting edge

MFLN



Conventional



Corner Chamfer

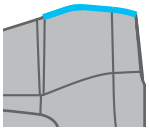
(only available on MFLN90)

Both general corner-R type and chamfered corner type available

Prevents chattering and insert fracturing

Convex cutting edge ridge

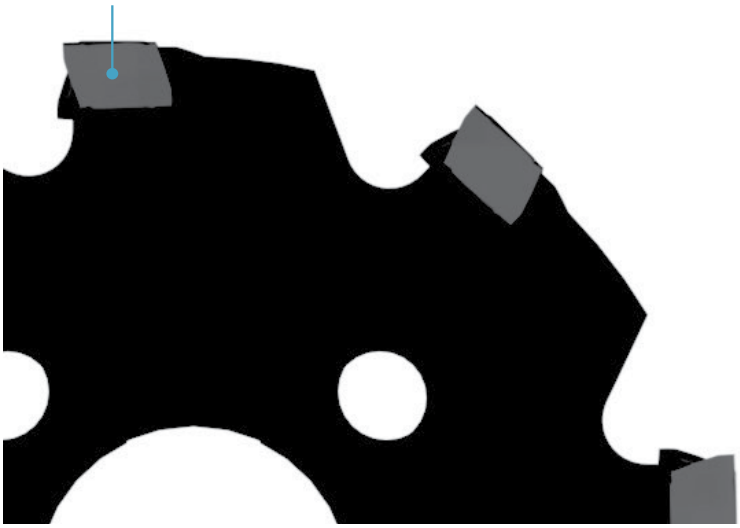
Reduced impact forces when entering the workpiece



Wide Flat Mounting Surface

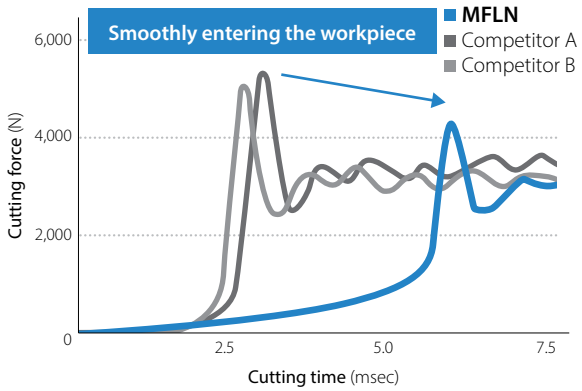
Holds insert firmly in heavy milling applications

Tangentially mounted inserts increase rigidity



Cutting forces when entering the workpiece (internal evaluation)

MFLN90: Insert - chamfered corner type



Cutting Conditions : Vc = 490 sfm, D.O.C. × ae = 0.197" × 2.95", fz = 0.012 ipt
ø125mm (1 insert), Dry Workpiece : 1049

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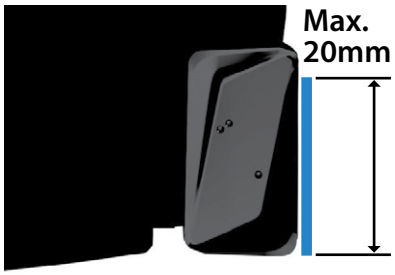
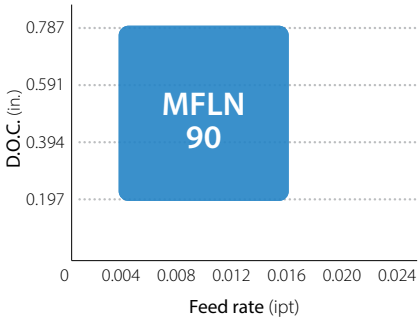
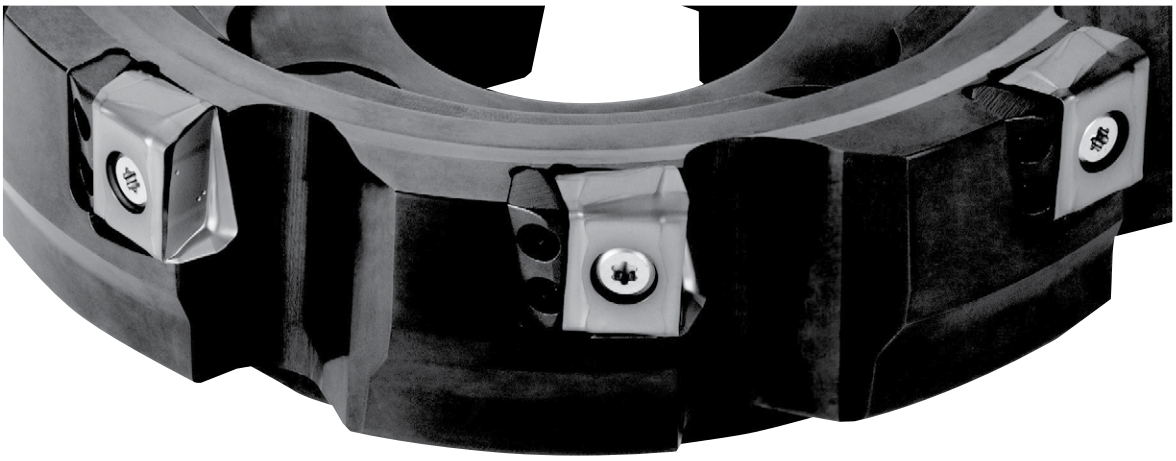
2 Large D.O.C. and High Feed Rates

MFLN90
Lead Angle 90°



Applicable range



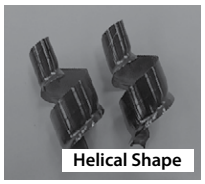


Chip Comparison (Internal Evaluation)

Helix-shaped chips prevent chip recutting and provide stable machining at high feed rates.

MFLN90 Stable

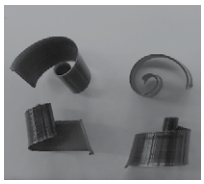
fz = 0.012 ipt



fz = 0.016 ipt

Competitor A Unstable

fz = 0.012 ipt



fz = 0.016 ipt

Competitor B Unstable

fz = 0.012 ipt

fz = 0.016 ipt

Cutting Conditions : Vc = 490 sfm, ap × ae = 0.394" × 3.937", fz = 0.012, 0.016 ipt, ø125mm (1 insert), Dry Workpiece : 1049

MFLN90

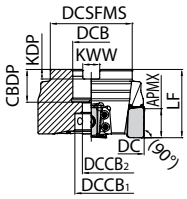


Fig. 1

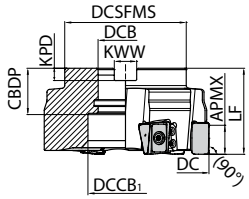


Fig. 2

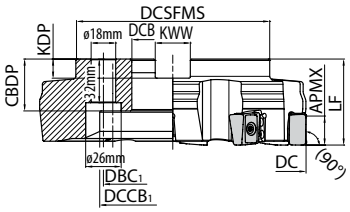


Fig. 3

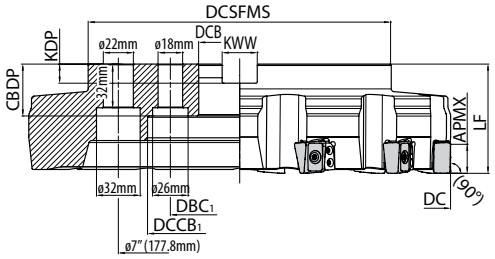


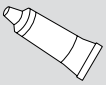
Fig. 4

Toolholder Dimensions

Unit	Part Number		Std. Item R	No. of Inserts	Dimensions DC	DCSFMS	DCB	DCCB1	DCCB2	DBC1	LF	CBDP	KDP	KWW	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Applicable Inserts ⇒ M167
mm	Inch Bore Dia.	MFLN 90080R-4T	●	4	80	60	1.000"	24	13	-	50	1.063"	0.236"	0.375"	20	+4.5	-16.5	Yes	5,970	1	1	LOGU221616ER-GM LOGU2216PAER-GM
		90100R-4T	●		100	70	1.250"	45	-			1.339"	0.315"	0.500"			-14.5		4,780	1.6	2	
		90125R-6T	●	6	125	89	1.500"	55			63	1.496"	0.394"	0.625"			-13.5	No	3,820	3	2	
		90160R-7T	●	7	160	110	2.000"	90					0.433"	0.750"					2,990	4.6	2	
		90200R-8T	●	8	200	142	1.875"	132		101.6			0.551"	1.000"					2,390	7.2	3	
		90250R-10T	●	10	250			172									-13		1,910	10.5	3	
		90315R-12T	□	12	315	222		205			80								1,520	21.8	4	
	Metric Bore Dia.	MFLN 90080R-4T-M	●	4	80	60	27	24	13	-	50	24	7	12.4	20	+4.5	-16.5	Yes	5,970	1	1	LOGU221616ER-GM LOGU2216PAER-GM
		90100R-4T-M	●		100	70	32	45				30	8	14.4			-14.5		4,780	1.5	2	
		90125R-6T-M	●	6	125	89	40	55			63	33	9	16.4			-13.5	No	3,820	2.9	2	
		90160R-7T-M	●	7	160	110		90		66.7									2,990	4.5	3	
		90200R-8T-M	●	8	200	142	60	132	-			38	14	25.7					2,390	6.9	3	
		90250R-10T-M	●	10	250			172		101.6							-13		1,910	10.3	3	
		90315R-12T-M	□	12	315	222		205			80								1,520	20.9	4	

Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.

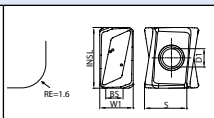
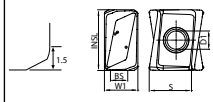
Spare Parts

Part Number	Spare Parts: Insert Screw	Wrench	Shim	Shim Screw	Wrench	Anti-Seize Compound	Arbor Bolt
							
MFLN ○○080R-4T(-M)	SB-60200TRP	TTP-20	MAP-2216	SB-40140TR	DTM-15	P-37	HH12X35
○○100R-4T(-M) ~ ○○315R-12T(-M)	Recommended tightening torque for insert screw 6.0N•m		Recommended tightening torque for shim screw 3.5N•m				–

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

LOGU

Usage Classification						
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel	☆		★	☆	P
	Mold and die steel	☆		★	☆	
	Austenitic stainless steel					M
	Martensitic stainless steel					
	Precipitation hardened stainless steel					
	Gray cast iron	☆		★	☆	K
	Nodular cast iron	☆		★	☆	
	Non-ferrous metals					N
	Heat-resistant alloy					S
	Titanium alloy					
	Hard materials					H

Insert		Part Number	Dimensions (mm)						Carbide				Applicable Toolholder ⇒ M166 M46 M47
			S	D1	RE	W1	INSL	BS	PVD				
									PR1525	PR1535	PR1825	PR1835	
	 Corner-R	LOGU 221616ER-GM	16.6	6.8	1.6	12.5	22.8	6.3	●	●	●	●	MFLN90... MFLN45... MFLN70...
	 Corner Chamfer	LOGU 2216PAER-GM	16.9	6.8	-	12.5	22.8	4.8	●	●	●	●	MFLN90...

Recommended Cutting Conditions ⇒ M168

LOGU Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

	Workpiece Material	D.O.C. (in)		fz: ipt	Recommended Insert Grades (Cutting Speed Vc : sfm)	
					MEGACOAT NANO EX (MEGACOAT NANO)	
		Width of Cut ≦0.5×DC	Width of Cut >0.5×DC		PR1825 (PR1525)	PR1835 (PR1535)
MFLN 90	Carbon steel	~0.709	~0.591	0.004~**0.008**~0.016	★ 330~**490**~590	☆ 260~**390**~490
	Alloy steel				★ 330~**490**~590	☆ 260~**390**~490
	Mold steel				★ 260~**390**~490	☆ 230~**330**~390
	Gray cast iron	~0.787	~0.709	0.004~**0.008**~0.016	★ 330~**490**~590	☆ 260~**390**~490
	Nodular cast iron				★ 330~**490**~590	☆ 260~**390**~490

The table above provides recommendations based on product specifications.
Before using the product, check the machine's specifications such as power.
The number in **bold** font is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
Dry machining is recommended.

★ : 1st Recommendation ☆: 2nd Recommendation

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www.kyoceraprecisiontools.com

How to Mount Inserts

1 . Completely eliminate chips and dust from the insert mounting side.
2. After mounting a clamp screw on the top edge of wrench, tighten the screw while keeping the insert pushed against the shim seat surface and holder surface (Fig.1,2)
3. Make sure that the identification on the top of the insert is the same in each pocket.(Fig.3)
4. Tighten the wrench (TTP-20) in while holding parallel to the clamp screw.
5. Tighten the insert clamp screw at an appropriate torque. (Recommended torque: 6.0 N·m)
6. After tightening, check that there is no gap between the insert and the surface of the shim, or between the side surface of insert and the holder surface. If there is a gap, remount the insert using the directions above.

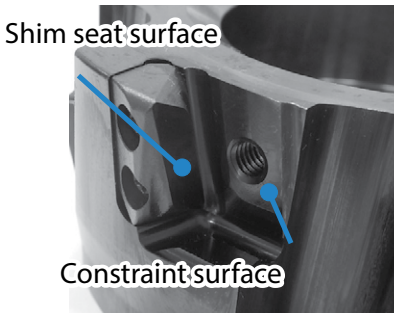


Fig.1

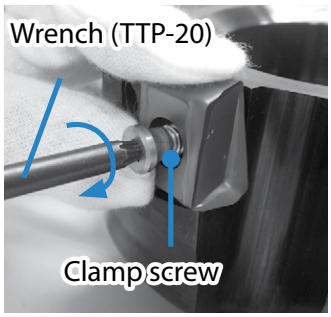


Fig.2

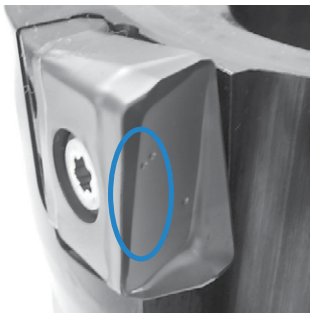


Fig.3

How to Replace Shim

1. Completely eliminate chips and dust from the shim mounting side.
2. Coat medium strength screw locking adhesive on the screws.
3. Tighten the screw keeping the shim pushed against the pocket surface of toolholder.
4. After tightening both screws temporarily, tighten them with appropriate torque. (Recommended torque:3.5 N·m)
5. Please check that there is no gap between the shim and the pocket surfaces of toolholder.

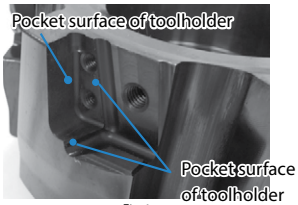


Fig.1

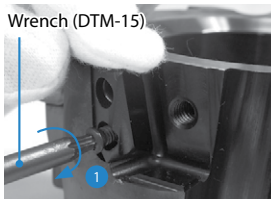


Fig.2

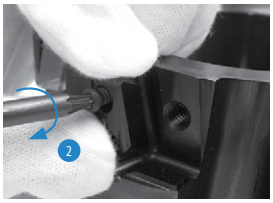
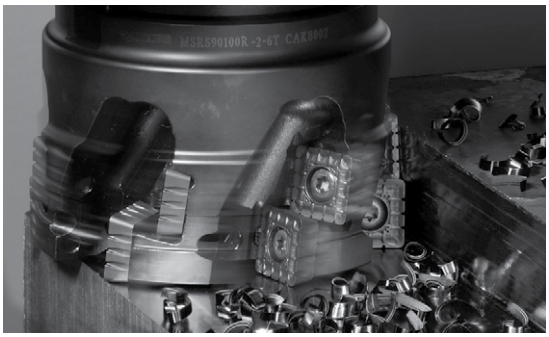


Fig.3

Fig.4

MSRS90 Face Mill for Heavy Milling



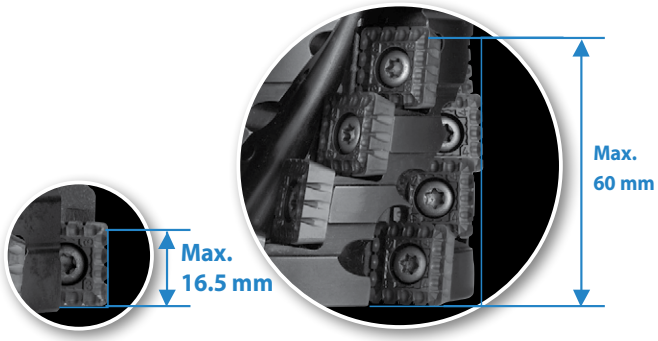
NB3

+

NB4

Wide selection of cutting edge lengths available

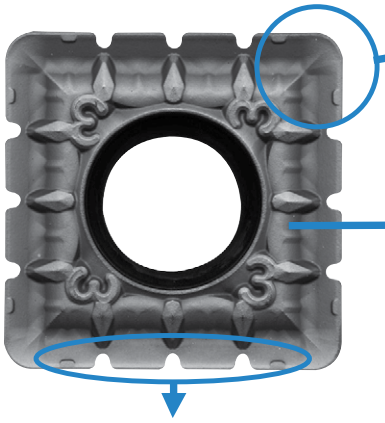
1, 2, and 4-Stage (ø3.00in, ø80mm, ø100mm)



High Efficiency, Low Cutting Force and Low Vibration Milling Cutte Neutral and Corner-R insert

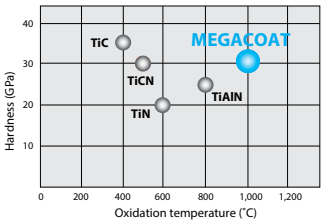
Applicable to shouldering (Cutting edge angle: 90˚),
high feed milling (Cutting edge angle: 30˚), plunging, and side cutter.

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



Neutral insert with corner-R is available to various applications

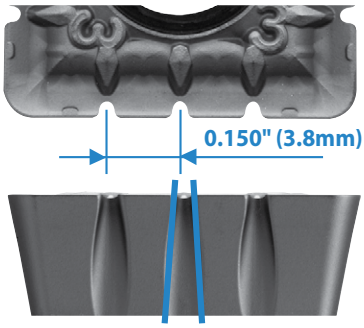
Long Tool Life: MEGACOAT



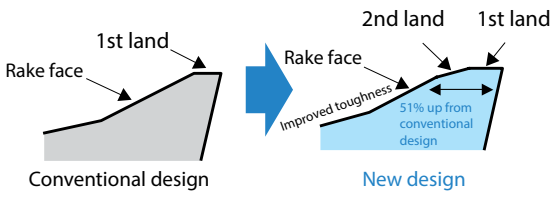
High hardness and high oxidation resistance long tool life: MEGACOAT

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.



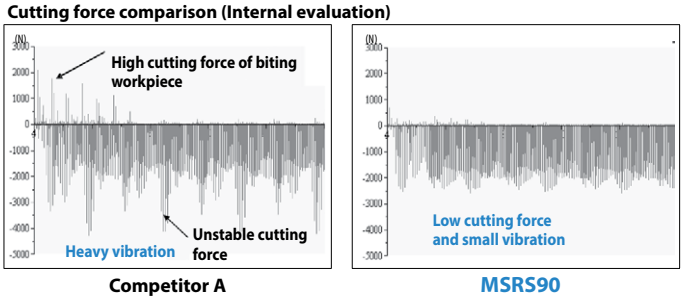
For neutral (Right/Left) hand
Applicable for various cutting edge angle.
Cutting edge length: 18mm



Edge preparation

Low cutting force (Notched insert benefit)

Cutting force comparison (Internal evaluation)



Competitor A | MSRS90

Notched insert realizes lower cutting force and smaller vibration

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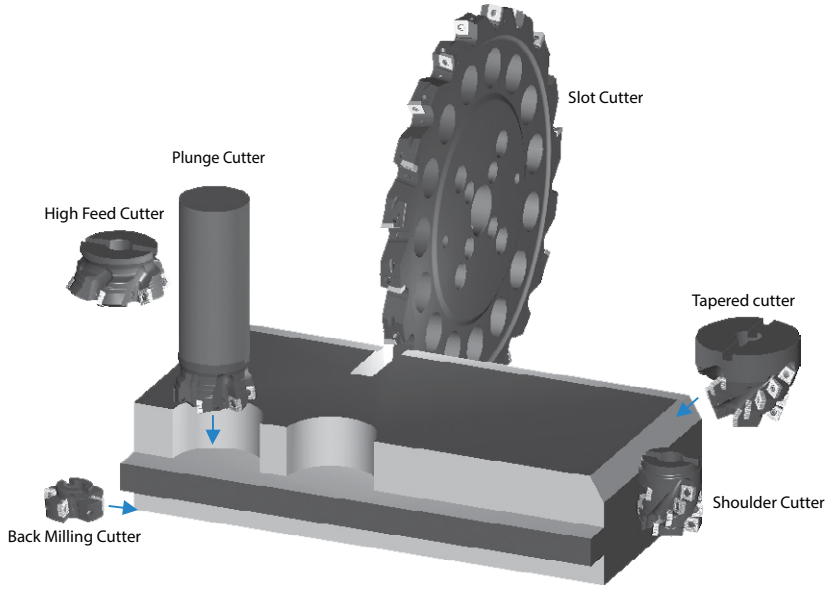
www.kyocera precisiontools.com

Applicable Inserts: Available for a Variety of Applications

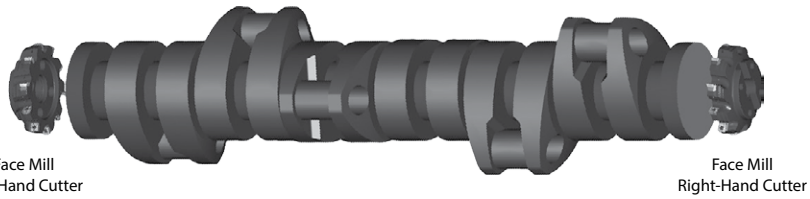
Applications	Chipbreaker Selection	3-Notched	4-Notched	Without Notch
General Purpose	Standard	NB3 +	NB4	
Low Cutting Force	Low Cutting Force	NB3P +	NB4P	
Edge Strength Oriented	Without Notch (Usable with Notched Inserts)	(NB3 or	NB4) +	

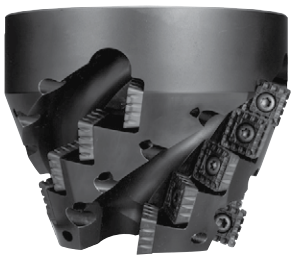
Various Cutting Possibilities with Custom-Designed and Standard Cutters



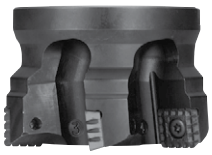
The custom-designed milling cutters can be customized for your requirements such as diameter, cutting edge angle, number of insert stages, etc.

Shaft length determination





Tapered Cutter



Plunge Cutter

45˚ Face Mill

High Feed Cutter

Shoulder Cutter

MSRS90

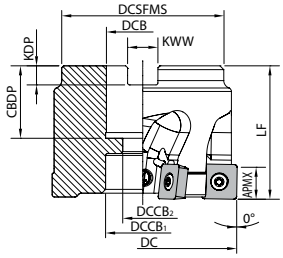


Fig. 1

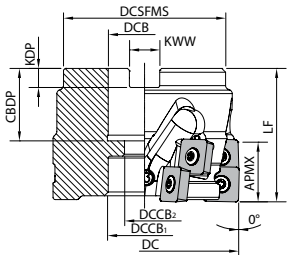


Fig. 2

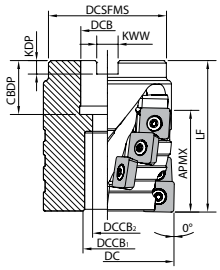


Fig. 3

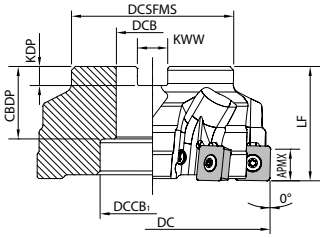


Fig. 4

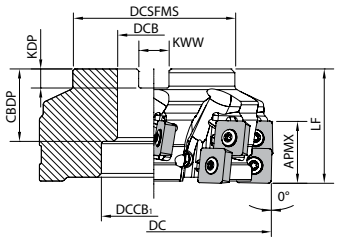


Fig. 5

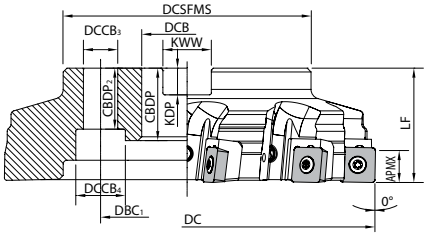


Fig. 6

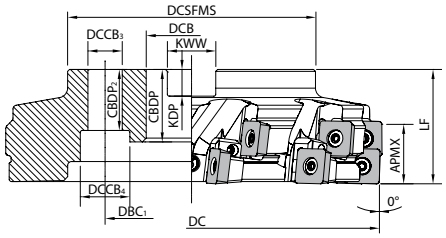


Fig. 7

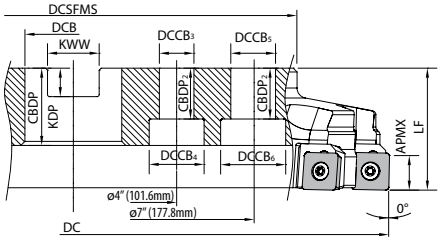


Fig. 8

Toolholder Dimensions

Unit		Part Number	Std. Item	No. of Inserts	No. of Flutes	No. of Stages	Dimensions										A.R. (°)	R.R. (°)	Coolant Hole	Weight (kg)	Fig.	Applicable Inserts M174
			R				DC	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX						
Inch	Inch Bore Dia.	MSRS 903000R-1-4T	●	4	4	1	3.00	2.75	1.00	0.87	0.55	2.36	1.06	0.24	0.38	0.65	+7	-10	No	2.4	1	SPMT180616EN-...
		903000R-2-4T	●	8	4	2										1.22				2.2	2	
		904000R-1-6T	●	6	6	1	4.00	3.35	1.50	2.05	-	2.76	1.14	0.39	0.63	0.65				4.4	4	

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

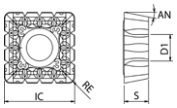
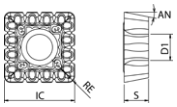
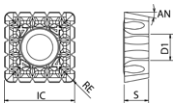
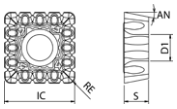
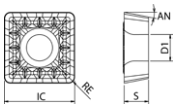
Toolholder Dimensions

Unit		Part Number	Std. Item R	No. of Inserts	No. of Flutes	No. of Stages	Dimensions DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	$DCCB_3$	$DCCB_4$	$DCCB_5$	$DCCB_6$	DBC_1	LF	CBDP	$CBDP_2$	KDP	KWW	APMX	A.R. (°)	R.R. (°)	Coolant Hole	Weight (kg)	Fig.	Applicable Inserts ➡ M174
mm	Inch Bore Dia.	MSRS 90080R-1-4T	●	4	4	1	80	70	1.250"	27	18	-	-	-	-	-	60	1.260"	-	0.315"	0.500"	16.5	+7	-10	No	1.4	1	SPMT180616EN-...
		90080R-2-4T	●	8		2																31				1.2	2	
		90080R-4-4T	●	16		4											85					60				1.5	3	
		90100R-1-6T	●	6	6	1	100	85	1.500"	39	21						70	1.496"		0.394"	0.625"	16.5				2.3	1	
		90100R-2-6T	●	12		2																31				2.1	2	
		90100R-4-6T	□	24		4											90					60				3.2	3	
		90125R-1-8T	□	8	8	1	125			55				-	-		60					16.5				2.6	4	
		90125R-2-8T	□	16		2																31				2.4	5	
		90160R-1-8T	●	8		1	160	100	2.000"	70										0.433"	0.750"	16.5				4.3	4	
		90160R-2-8T	□	16		2																31				4.1	5	
		90200R-1-10T	●	10	10	1	200	130	1.875"	-	-	18	26			4.000"			1.260"	0.551"	1.000"	16.5				6.7	6	
		90200R-2-10T	□	20		2																31				6.6	7	
		90250R-1-12T	●	12	12	1	250															16.5				12.6	6	
		90250R-2-12T	□	24		2																31				12.5	7	
		90315R-1-14T	●	14	14	1	315	220				17	27	22	32	-			0.984"			16.5				16.1	8	
		90315R-2-14T	□	28		2																31				16		
	Metric Bore Dia.	MSRS 90080R-1-4T-M	●	4	4	1	80	70	27	20	13	-	-	-	-	-	60	24	-	7	12.4	16.5	+7	-10	No	1.3	1	SPMT180616EN-...
		90080R-2-4T-M	●	8		2																31				1.1	2	
		90080R-4-4T-M	●	16		4											85					60				1.4	3	
		90100R-1-6T-M	●	6	6	1	100	85	32	45							70	30		8	14.4	16.5				2.2	1	
		90100R-2-6T-M	●	12		2																31				2	2	
		90100R-4-6T-M	□	24		4											90					60				3.1	3	
		90125R-1-8T-M	●	8	8	1	125		40	55				-	-		60	33		9	16.4	16.5				2.6	4	
		90125R-2-8T-M	□	16		2																31				2.4	5	
		90160R-1-8T-M	●	8		1	160	110			-	14	20			66.7			28			16.5				4.2	6	
		90160R-2-8T-M	□	16		2																31				4	7	
		90200R-1-10T-M	●	10	10	1	200	140	60	-		18	26			101.6	60	40	32	14	25.7	16.5				6.7	6	
		90200R-2-10T-M	□	20		2																31				6.6	7	
		90250R-1-12T-M	●	12	12	1	250															16.5				12.6	6	
		90250R-2-12T-M	□	24		2																31				12.5	7	
		90315R-1-14T-M	●	14	14	1	315	220				17	27	22	32	-			25			16.5				16.1	8	
		90315R-2-14T-M	□	28		2																31				16		

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

SPMT

Usage Classification				
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel		★	P
	Mold and die steel		★	
	Austenitic stainless steel			M
	Martensitic stainless steel			
	Precipitation hardened stainless steel			
	Gray cast iron	★		K
	Nodular cast iron	★		
	Non-ferrous metals			N
	Heat-resistant alloy			S
	Titanium alloy			
	Hard materials			H

Insert		Part Number	No. of Edges	Dimensions (mm)				Angle (°)	Carbide		Applicable Toolholder ⇨ M172 M173
				IC	S	D1	RE	AN	PVD		
									PR1810	PR1835	
	 3-Notch	SPMT 180616EN-NB3	4	18	6.35	6.8	1.6	11	●	●	MSRS90...
	 3-Notch / Low Notch Force	SPMT 180616EN-NB3P	4	18	6.35	6.8	1.6	11	●	●	MSRS90...
	 4-Notch	SPMT 180616EN-NB4	4	18	6.35	6.8	1.6	11	●	●	MSRS90...
	 4-Notch / Low Cutting Force	SPMT 180616EN-NB4P	4	18	6.35	6.8	1.6	11	●	●	MSRS90...
	 Without Notch	SPMT 180616EN-V	4	18	6.35	6.8	1.6	11	●	●	MSRS90...

Recommended Cutting Conditions ⇨ M175

SPMT Inserts are sold in 10 piece boxes

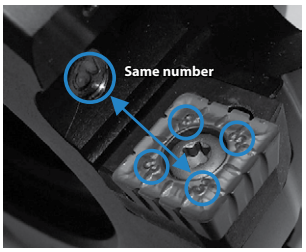
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

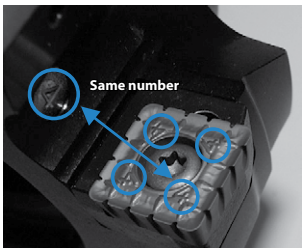
Caution when Installing Notched Insert

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

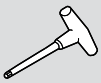
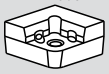
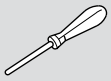
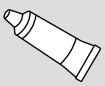
Description	No. of Inserts	No. of Flutes	No. of Stages	No. of Inserts	
				Notched	
				NB3(P)	NB4(P)
MSRS 90100R-1-6T	6	6	1	3	3
90100R-2-6T	12		2	6	6
90100R-4-6T	24		4	12	12

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





Spare Parts

Part Number			Spare Parts							
			Insert Screw	Wrench	Cartridge		Clamp screw	Wrench	Anti-seize Compound	Arbor Bolt
					MAP-1806M 	MAP-1806S (Bottom Edge Only)				
Without Cartridge	MSRS	903000R-1-4T	SB-60120TR	TT-25L	-	-	-	-	P-37	HH1/2-1.25
		903000R-2-4T								-
		904000R-1-6T								HH12X35
Without Cartridge	MSRS	90080R-○-4T-M			-	-	-	-		
		90100R-○-6T-M								
		90125R-○-8T-M								
With Cartridge	MSRS	90160R-○-8T-M ~ 90315R-○-14T-M			MAP-1806M*1	MAP-1806S*2	SB-40140TR	DT-15		-
			Recommended tightening torque for insert screw 7.5N·m		Recommended tightening torque for cartridge screw 3.5N·m					
Without Cartridge	MSRS	90080R-○-4T			-	-	-	-		HH16X45
		90100R-○-6T								HH20X55
		90125R-○-8T								
With Cartridge	MSRS	90160R-○-8T ~ 90315R-○-14T			MAP-1806M*1	MAP-1806S*2	SB-40140TR	DT-15		-
					Recommended tightening torque for cartridge screw 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 prior to installation.

Recommended Cutting Conditions

Workpiece material	fz (ipt)		Vc (sfm)	
	Standard NB3+NB4	Low Cutting Force NB3P+NB4P	MEGACOAT NANO EX	
			PR1810	PR1835
Soft steel	0.004~**0.008**~0.010	0.004~**0.008**~0.010	-	★ 400~**500**~725
Carbon steel	0.004~**0.008**~0.010	0.004~**0.008**~0.010	-	★ 325~**500**~650
Alloy steel	0.004~**0.006**~0.008	0.004~**0.006**~0.008	-	★ 325~**500**~650
Mold steel	0.004~**0.006**~0.008	0.004~**0.005**~0.006	-	★ 325~**500**~600
Gray cast iron	0.004~**0.008**~0.012	0.004~**0.008**~0.010	★ 325~**600**~825	-
Nodular cast iron	0.004~**0.008**~0.010	0.004~**0.007**~0.008	★ 325~**600**~725	-
Stainless steel	Not Recommended			
Aluminum/Copper	Not Recommended			

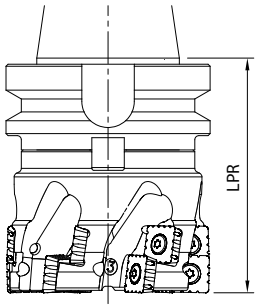
★: 1st Recommendation ☆: 2nd Recommendation

Cutting Conditions (Shouldering)

Using MSRS90100R-1-6T

Workpiece Material	Overhang Length LPR (in)	Cutting Conditions		(D.O.C. × ae)	Chip Evacuation Rate (in^3/min)
		Cutting Speed Vc (sfm)	Feed fz (ipt)		
Cast iron	≤ 4.72	590	0.008	0.59 × 3.15	50.41
	4.72~7.87	590	0.008	0.59 × 1.57	25.20
	≥ 7.91	425	0.004	0.59 × 1.57	16.05
Carbon steel	≤ 4.72	490	0.008	0.59 × 3.15	42.05
	4.72~7.87	490	0.008	0.59 × 1.57	20.99
	≥ 7.91	325	0.004	0.59 × 1.57	13.97

Overhang Length LPR (in)



Using MSRS90100R-2-6T

Workpiece Material	Overhang Length LPR (in)	Cutting Conditions		(D.O.C. × ae)	Chip Evacuation Rate (in^3/min)
		Cutting Speed Vc (sfm)	Feed fz (ipt)		
Cast iron	≤ 4.72	590	0.008	1.18 × 1.97	62.97
	4.72~7.87	590	0.008	1.18 × 1.18	37.77
	≥ 7.91	425	0.004	1.18 × 0.98	20.08
Carbon steel	≤ 4.72	490	0.008	1.18 × 1.97	52.54
	4.72~7.87	490	0.008	1.18 × 1.18	31.55
	≥ 7.91	325	0.004	1.18 × 0.98	17.51

Using MSRS90100R-4-6T

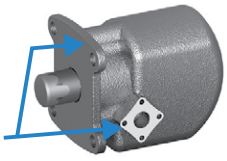
Workpiece Material	Overhang Length LPR (in)	Cutting Conditions		(D.O.C. × ae)	Chip Evacuation Rate (in^3/min)
		Cutting Speed Vc (sfm)	Feed fz (ipt)		
Cast iron	≤ 5.51	590	0.008	2.36 × 0.79	50.41
	5.51~7.87	590	0.008	2.36 × 0.39	25.20
	≥ 7.91	425	0.004	2.36 × 0.39	16.05
Carbon steel	≤ 5.51	490	0.008	2.36 × 0.79	42.05
	5.51~7.87	490	0.008	2.36 × 0.39	20.99
	≥ 7.91	325	0.004	2.36 × 0.39	13.97

Case Studies

Ductile Iron, 60-40-8

Industrial Parts
- Vc = 490 sfm
- D.O.C. × ae = 0.236" × 2.559"
- fz = 0.006 ipt
(Vf = 16.93 ipm)

MSRS90100R-1-6T(ø100mm ·6 flutes)
SPMT180616EN-NB3/NB4
(PR1210)



MSRS90 (PR1210)	**Chip Removal = 15.7 in^3/min**
Competitor B	**9.3 in^3/min**

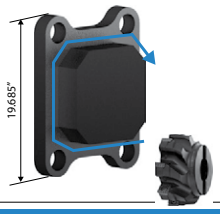
- MSRS90 more than doubled the machining efficiency compared with competitor B.
- Competitor B machined with 2 passes (D.O.C. × ae = 0.118×2.56").
MSRS90 machined with only 1 pass.
- Cutting time was reduced.

(User evaluation)

Chrome-Moly Steel

Construction Machine Part
- Vc = 660 sfm
- D.O.C. × ae = 0.394" × 1.968"
- fz = 0.004 ipt
(Vf = 15.748 ipm)

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



MSRS90 (PR1230)	**Chip Removal = 12.2 in^3/min**
Competitor C	**9.3 in^3/min**

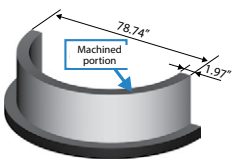
- MSRS90 improved the machining efficiency to 1.3 times that of competitor C.
- Competitor C machined with D.O.C.× ae = 0.20x1.97"
- Tool cost is reduced to 1/3 although competitor C is expensive using 2-corner insert.
MSRS90 reduced machining cost as well as improved machining efficiency.

(User evaluation)

Tool Steel

Shipbuilding Parts
- Vc = 490 sfm
- D.O.C. × ae = 0.394" × 0.394"~1.968"
- fz = 0.004 ipt
(Vf = 9.449 ipm)

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



MSRS90 (PR1230)	**Chip Removal = 7.32 in^3/min**
Competitor D	**3.66 in^3/min**

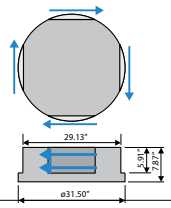
- MSRS90 more than doubled the machining efficiency compared with competitor D.
- Competitor D machined with D.O.C.× ae = 0.197×0.394~1.968"
➡ Low cutting force of MSRS90 enabled twice as large D.O.C. as that of competitor.
- It can double the D.O.C. as well as increase the cutting speed (Vc = 325 increases to 490 sfm).
➡ Machining efficiency was improved by MSRS90 (by achieving reduction in cutting time).

(User evaluation)

Structural Steel

Power Generation Parts
- Vc = 530 sfm
- D.O.C. × ae = 0.394" × 0~0.787"
- fz = 0.006 ipt
(Vf = 19.69 ipm)

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



MSRS90 (PR1230)	**12 Faces/Edge**
Competitor E	**8 Faces/Edge**

- MSRS90 showed 1.5 times longer tool life than that of competitor E.
- Competitor E machined with 2 passes on a side (D.O.C.× ae = 0.472×0~0.394").
- Competitor E was poor in feed rate (Vf = 15.748ipm). Machining efficiency was improved with MSRS90 (by achieving reduction in cutting time).
- Although competitor E is load due to high cutting force. MSRS90 operates fairly quietly.

(User evaluation)

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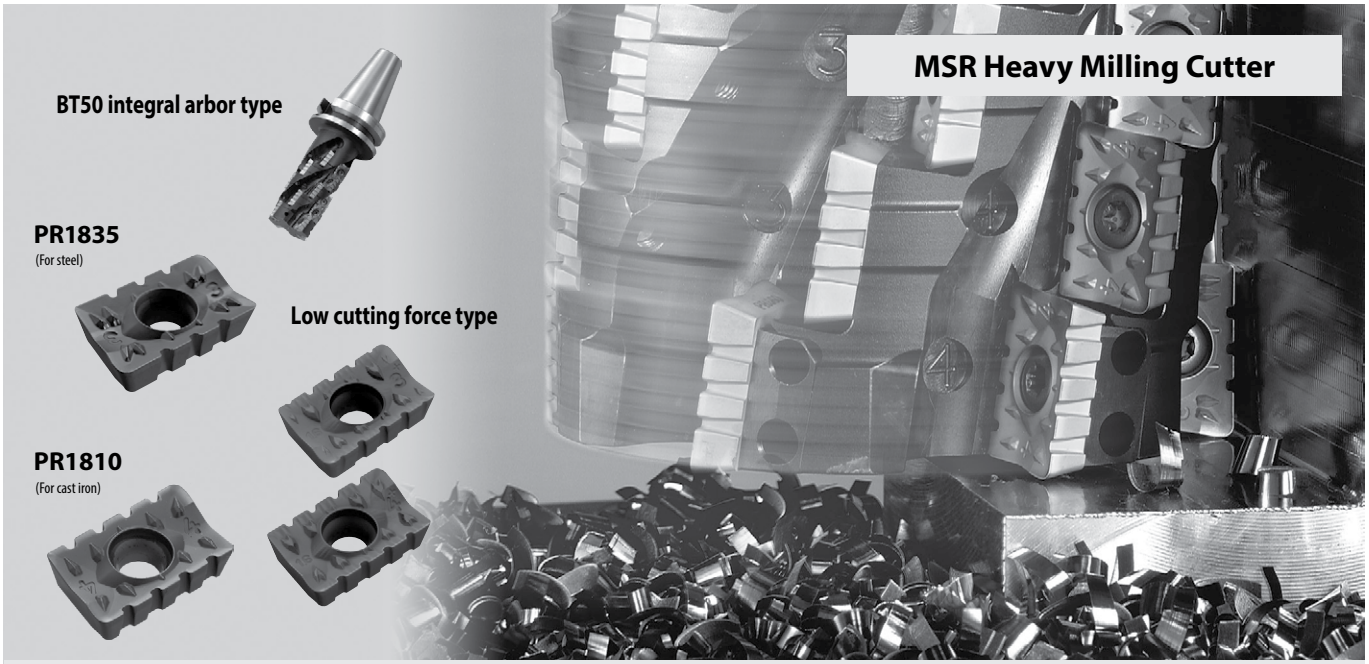


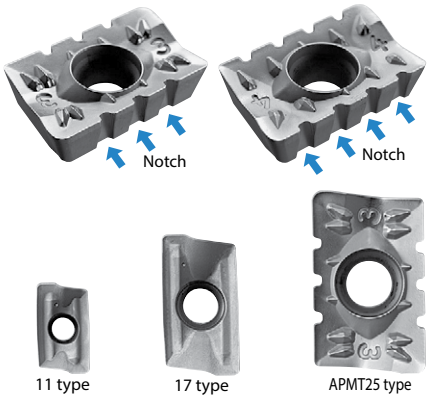
Notched insert reduces cutting force, and enables high feed rates by reducing chattering.

Improved chip evacuation and low cutting force with the special chipbreaker.

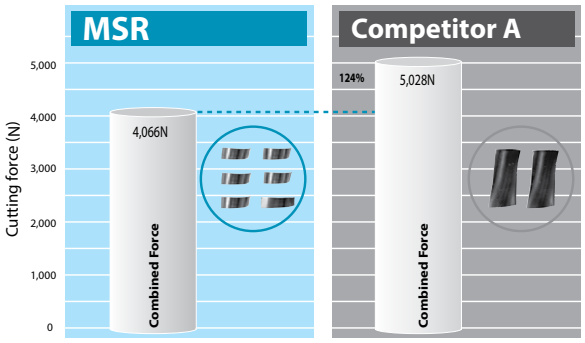
Enables heavy milling and deep cutting, and also drastically improves machining efficiency. (Reduction of cutting time)

Notched Insert

Size comparison (full-scale)



Cutting Force Comparison



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

MSR (Face Mill)

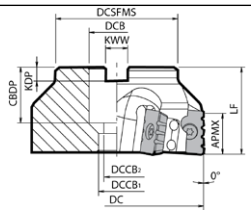


Fig. 1

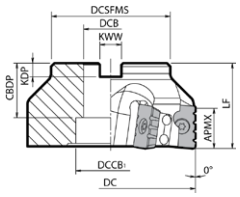


Fig. 2

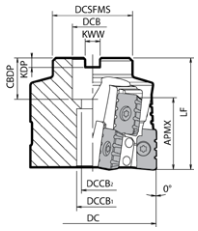


Fig. 3

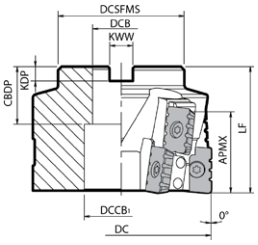


Fig. 4

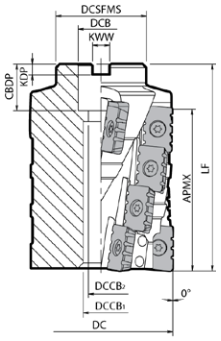


Fig. 5

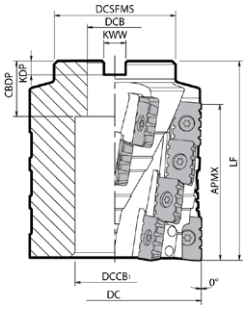


Fig. 6

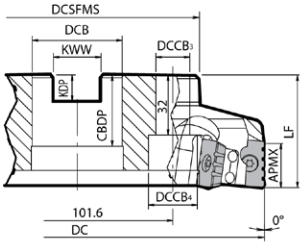


Fig. 7

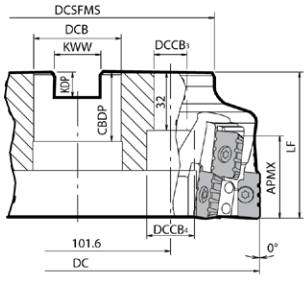


Fig. 8

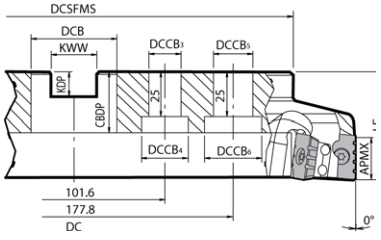


Fig. 9

Toolholder Dimensions

Unit		Part Number	Std. Item R	No. of Inserts	No. of Flutes	No. of Stages	Dimensions DC	DCSFMS	DCB	DCCB1	LF	CBDP	KDP	KWW	APMX	A.R. (°)	R.R. (°)	Coolant Hole	Weight (kg)	Fig.	Applicable Inserts M181
Inch	Inch Bore Dia.	MSR 3000R-1	●	4	4	1	3.00	2.25	1.00	0.790	1.970	1.020	0.240	0.375	0.925	+9	-5	No	0.8	2	APMT2506...
		4000R-1-1.5ID	●	6	6	1	4.00	2.75	1.50	1.610	1.970	1.260	0.310	0.500	0.925				14.7	2	
		4000R-2-1.5ID	●	12	6	2					2.760				1.770				16	4	

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Toolholder Dimensions

Unit		Part Number	Std. Item R	No. of Inserts	No. of Flutes	No. of Stages	Dimensions DC	DCSFMS	DCB	DCCB1	DCCB2	DCCB3	DCCB4	DCCB5	DCCB6	LF	CBDP	KDP	KWW	APMX	A.R. (°)	R.R. (°)	Coolant Hole	Weight (kg)	Fig.	Applicable Inserts ➡ M181
mm	Inch Bore Dia.	MSR 063R-1	●	4	4	1	63	50	1.000"	20	14	-	-	-	-	65	1.024"	0.236"	0.375"	23.5	+9	-8	No	0.8	1	APMT2506...
		063R-2	●	8		2										85				45				1	3	
		080R-1	●	4		1	80	55								50				23.5				1.1	1	
		080R-2	●	8		2										70				45				1.6	3	
		080R-2-31.75	●					70	1.250"	27	18						1.260"	0.315"	0.500"					1.7	3	
		080R-4	●	16		4		55	1.000"	20	14					115	1.024"	0.236"	0.375"	90				2.6	5	
		080R-4-31.75	●							27	18						1.260"	0.315"	0.500"					2.7	5	
		100R-1	●	6	6	1	100	70	1.250"	42	-	-	-	-	-	50				23.5		-5		1.6	2	
		100R-2	●	12		2										70				45				2.2	4	
		100R-4	●	24		4										115				90				3.6	6	
		125R-1	●	6		1	125	85	1.500"	54						60	1.496"	0.394"	0.625"	23.5				3.5	2	
		125R-2	●	12		2										70				45				3.8	4	
		125R-4	●	24		4										115				90				6.1	6	
		160R-1	●	8	8	1	160	100	2.000"	68						60		0.433"	0.750"	23.5				5.8	2	
		160R-2	●	16		2										70				45				6.4	4	
		160R-4	●	32		4										115				90				10.7	6	
		200R-1	●	10	10	1	200	130	1.875"	-		18	26			60		0.551"	1.000"	23.5				7.5	7	
		200R-2	●	20		2										80				45				10.4	8	
		250R-1	●	12	12	1	250									60				23.5				10.9	7	
		250R-2	●	24		2										80				45				14.7	8	
		315R-1	□	14	14	1	315	220				17	27	22	32	60	1.378			23.5				16	9	
	Metric Bore Dia.	MSR 063R-1M	●	4	4	1	63	50	27	20	14	-	-	-	-	65	22	7.2	12.4	23.5	+9	-8	No	0.7	1	APMT2506...
		063R-2M	●	8		2										85				45				0.9	3	
		080R-1M	●	4		1	80	55								50				23.5				1	1	
		080R-2M	●	8		2										70				45				1.5	3	
		080R-4M	●	16		4										115				90				2.5	5	
		100R-1M	●	6	6	1	100	70	32	42						50	28	8	14.4	23.5		-5		1.5	2	
		100R-2M	●	12		2										70				45				2	4	
		100R-4M	●	24		4										115				90				3.2	6	
		125R-1M	●	6		1	125	85	40	58						60	30	9	16.4	23.5				3.4	2	
		125R-2M	●	12		2										70				45				3.7	4	
		125R-4M	●	24		4										115				90				6	6	
		160R-1M	●	8	8	1	160	100		68						60		10		23.5				6.1	2	
		160R-2M	●	16		2										70				45				6.8	4	
		200R-1M	●	10	10	1	200	130	60	-		18	26			60	38	15	25.4	23.5				7	7	
		200R-2M	●	20		2										80				45				9.9	8	
		250R-1M	●	12	12	1	250									60				23.5				10.3	7	
		250R-2M	●	24		2										80				45				14.2	8	
		315R-1M	□	14	14	1	315	230				17	27	22	32	60	35			23.5				15.5	9	

Spare Parts (Inch and Metric Face Mills)

Part Number	Spare Parts: Insert Screw	Wrench	Shim	Shim Screw	Wrench	Anti-seize Compound
MSR 063R-○□	SB-60120TR for Insert Screw	TT-25L	-	-	-	P-37
MSR 3000R... 4000R...			MAP-2506	SB-40140TR for Shim Screw	DT-15	
MSR 080R-○□ ～ 315R-○□						

Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.

Shim is not available for MSR063R (DC = 63mm).
Arbor bolt (HH12X35) is included for MSR063R / MSR080R (Metric).
Arbor bolt (HH12X40) is included for MSR063R / MSR080R (Inch Bore Dia.).
Arbor bolt (HH16X45) is included for MSR080R-○-31.75.
It is not recommended using only top edge part (under D.O.C. = 1.181" / 30mm) for 4 stages type.
If D.O.C. is small, use 1 stage or 2 stages type.
Deep slotting is not recommended for these cutters.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MSR (Integral Arbor)

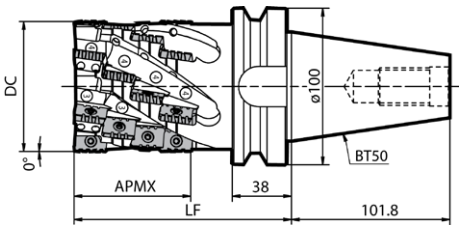


Fig. 1

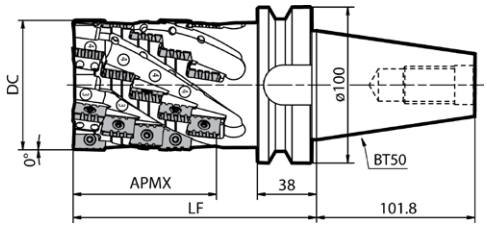


Fig. 2

Toolholder Dimensions

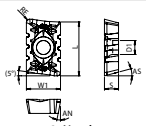
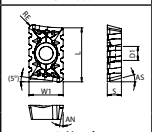
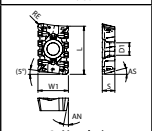
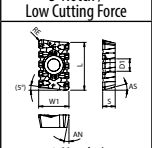
Unit	Part Number	Std. Item R	No. of Inserts	No. of Flutes	No. of Stages	Dimensions DC	Dimensions LF	Dimensions APMX	A.R. (°)	R.R. (°)	Coolant Hole	Weight (kg)	Fig.	Spare Parts: Anti-Seize Compound	Spare Parts: Cartridge	Spare Parts: Cartridge Screw	Spare Parts: Wrench	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts ➔ M181
mm	MSR 063R-BT50-4	●	16	4	4	63	160	90	+9	-8	No	5.7	1	P-37	-	-	-	SB-60120TR	TT-25L	APMT2506...
	063R-BT50-5	●	20		5		180	111				6.2	2							
	080R-BT50-4	●	16		4	80	160	90				6.9	1		MAP-2506	SB-40140TR	DT-15	SB-60120TR		
	080R-BT50-5	●	20		5		180	111				7.4	2							
	100R-BT50-4	●	24	6	4	100	160	90		-5		9.6	1							
	100R-BT50-5	●	30		5		180	111				10.5	2							

Shim is not available for MSR063R (DC = 63mm).
It is not recommended using only top edge part (under D.O.C. = 1.181" / 30mm) for 4 stages / 5 stages type. If D.O.C. is small, use previous page's 1 stage type or 2 stages type.
Deep slotting is not recommended for this cutter.
Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

APMT

Usage Classification				
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel		★	P
	Mold and die steel		★	
	Austenitic stainless steel			M
	Martensitic stainless steel			
	Precipitation hardened stainless steel			
	Gray cast iron	★		K
	Nodular cast iron	★		
	Non-ferrous metals			N
	Heat-resistant alloy			S
	Titanium alloy			
	Hard materials			H

Insert		Part Number	No. of Edges	Dimensions (mm)					Angle (°)		Carbide PVD		Applicable Toolholder ➔ M178 M179 M180
				S	D1	RE	L	W1	AN	AS	PR1810	PR1835	
	 3-Notch	APMT 250608ER-NB3	2	6.35	6.5	0.8	25	15.875	11	15	●	●	MSR...
		APMT 250616ER-NB3				1.6					●	●	
		APMT 250640ER-NB3				4						●	
		APMT 250616EL-NB3	2	6.35	6.5	1.6	25	15.875	11	15		●	
	 4-Notch	APMT 250608ER-NB4	2	6.35	6.5	0.8	25	15.875	11	15	●	●	MSR...
		APMT 250616ER-NB4				1.6					●	●	
		APMT 250640ER-NB4				4						●	
		APMT 250616EL-NB4	2	6.35	6.5	1.6	25	15.875	11	15		●	
	 3-Notch / Low Cutting Force	APMT 250616ER-NB3P	2	6.35	6.5	1.6	25	15.875	11	15	●	●	MSR...
	 4-Notch / Low Cutting Force	APMT 250616ER-NB4P	2	6.35	6.5	1.6	25	15.875	11	15	●	●	MSR...

Right-hand Insert Shown

Recommended Cutting Conditions ➔ M182

APMT Inserts are sold in 10 piece boxes

Caution when Installing Notched Inserts (MSR)

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

1 . (3) is for APMT2506○○ER-NB3

2. (4) is for APMT2506○○ER-NB4

(No. of Inserts – Example)

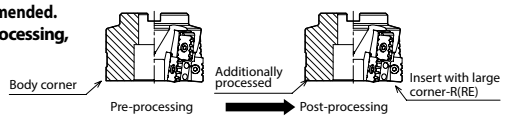
Description	No. of Inserts	No. of Flutes	No. of Inserts	
			Notched	
			NB3	NB4
MSR 100R-1	6	6	3	3
100R-2	12		6	6
100R-4	24		12	12

Caution when Installing Insert with Corner-R(RE) 4.0mm

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.**



● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Workpiece Material	fz (ipt)		Recommended Insert Grades (Cutting Speed Vc: sfm)	
	Low Cutting Force	General Purpose	MEGACOAT	
	NB3P+NB4P	NB3+NB4	PR1810	PR1835
Carbon steel	0.008	0.006	-	★ 330~490~660
Cast iron	0.008	0.006	★ 330~490~660	-
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.
• 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.

★ : 1st Recommendation

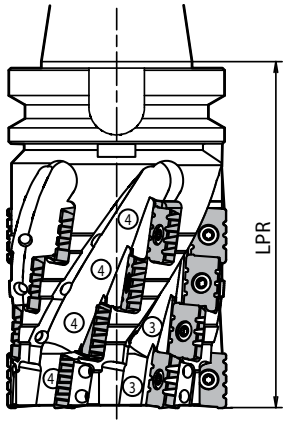
Cutting Conditions

1. Shouldering

Using MSR100R-1

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

Overhang Length LPR (in)



Using MSR100R-2

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

Using MSR100R-4

Workpiece Material	Overhang Length LPR (in)	Cutting Conditions		D.O.C. x ae (in)	Chip Removal Rate (in^3/min)
		Cutting Speed Vc (sfm)	Feed fz (ipt)		
Carbon steel	≤ 7.09	590	0.008	2.95 × 0.79	63.16
	7.09~11.02	590	0.008	2.95 × 0.39	31.61
	≥ 1.06	400	0.008	2.95 × 0.39	21.05
Cast iron	≤ 7.09	500	0.008	2.95 × 0.79	52.66
	7.09~11.02	500	0.008	2.95 × 0.39	26.30
	≥ 11.06	325	0.008	2.95 × 0.39	17.39

2. Slotting

Using MSR100R-1

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

Using MSR100R-2

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

Using MSR160R-1

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

Using MSR160R-2

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

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

MTP90 (End Mill)

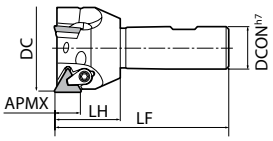


Fig. 1

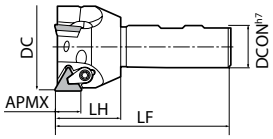


Fig. 2

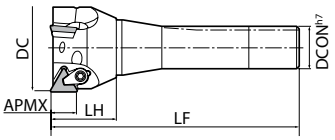


Fig. 3

Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions					A.R. (°)	R.R. (°)	Coolant Hole	Fig.	Spare Parts								Applicable Inserts ➡ M185
				DC	DCON	LF	LH	APMX					Clamp Set	Clamp	Clamp Screw	Wrench	Wrench	Shim	Shim Screw	Wrench	
Inch	MTP 90-075-75W	●	2	0.75	0.75	3.28	1.25	0.34	+3	-3	No	2	CPS-2S	-	-	FT-15	-	-	-	-	TPG22... TPM22...
	90-100-75W	●	3	1.00								2									
	MTP 90-125-75W	●	2	1.25	0.75	3.28	1.25	0.53	+5	0	No	2	CPS-3	-	-	-	LW-3	KPT-32	SH3X6	LW-2	TPK32..., TPMR32..., TPG32..., TPM32...
	90-150-75W	●	3	1.50								2									
	90-200-75W	●	3	2.00	0.75	3.53	1.50	0.53				2									
	MTP 90-200-125W	●	3	2.00	1.25	3.90	1.69	0.71	+8	0	No	3	-	CP-8W	W8X18	-	LW-4	KPT-42	SH3X6	LW-2	TPK43... TPKR43... TPMR43...
	90-250-125W	●	3	2.50								3									
	MTP 90-200-R8	●	3	2.00	0.949	6.00	2.003	0.53	+5		No	4	CPS-3	-	-	-	LW-3	KPT-32	SH3X6	LW-2	TPK32..., TPMR32..., TPG32..., TPM32...

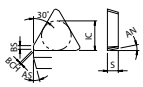
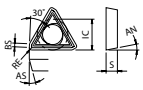
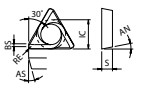
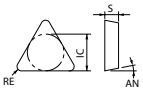
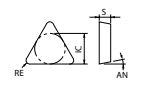
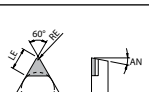
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

TP Inserts

Usage Classification

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

Carbon steel / Alloy steel	★	☆		☆		■	□				P
Mold and die steel	★	☆		☆		■	□				P
Stainless steel	☆	★		☆							M
Gray cast iron			★		☆						K
Nodular cast iron			★								K
Non-ferrous metals					★				■	□	N
Heat-resistant alloy		★									S
Titanium alloy		★	★		☆				■	□	S
Hard materials	□			□							H

Insert		Part Number ANSI	Part Number ISO	No. of Edges	Dimension (in) IC	S	BCH	RE	BS	LE	Angle (°) AN	AS	Carbide PVD PR1825	PR1535	PR1210	PR1225	Carbide - KW10	Cermet - TN100M	TN610	TN60	PCD - KPD001	KPD010	Applicable Toolholder M184
		TPK 32PDTR	TPKN 1603PDFR	3	3/8	1/8	0.028	-	0.047	-	11	15			●	●		●					MTP90-125-75W MTP90-150-75W MTP90-200-75W MTP90-200-R8
		TPK 32PDFR	TPKN 1603PDTR	3	3/8	1/8	0.028	-	0.047	-	11	15					●						
		TPK 43PDTR	TPKN 2204PDFR	3	1/2	3/16	0.028	-	0.063	-	11	15			●	●		●					MTP90-200-125W MTP90-250-125W
		TPK 43PDFR	TPKN 2204PDTR	3	1/2	3/16	0.028	-	0.063	-	11	15					●						
		TPKR 43PDER-S	TPKR 2204PDER-S	3	1/2	3/16	-	0.039	0.055	-	11	15				●							MTP90-200-125W MTP90-250-125W
		TPMR 32PDER-H	TPMR 1603PDER-H	3	3/8	1/8	-	0.031	0.047	-	11	15	●										MTP90-125-75W MTP90-150-75W MTP90-200-75W MTP90-200-R8
		TPMR 43PDER-H	TPMR 2204PDER-H	3	1/2	3/16	-	0.039	0.055	-	11	15	●										MTP90-200-125W MTP90-250-125W
	 Without Chipbreaker	TPG 2205 221 222	TPGN 110302 110304 110308	3	1/4	1/8	-	0.008 0.016 0.031	-	-	11	-					● ● ●		● ● ●	● ● ●			MTP90-075-75W MTP90-100-75W
		TPG 321 322	TPGN 160304 160308	3	3/8	1/8	-	0.016 0.031	-	-	11	-		● ●			● ●		● ●	● ●			MTP90-125-75W MTP90-150-75W MTP90-200-75W MTP90-200-R8
	 Without Chipbreaker	TPM 221 222	TPMN 110304 110308	3	1/4	1/8	-	0.016 0.031	-	-	11	-					● ●						MTP90-075-75W MTP90-100-75W
		TPM 321 322 323	TPMN 160304 160308 160312	3	3/8	1/8	-	0.016 0.031 0.047	-	-	11	-					● ● ●	● ● ●					MTP90-125-75W MTP90-150-75W MTP90-200-75W MTP90-200-R8
		TPG 2205 221	TPGN 110302 110304	1	1/4	1/8	-	0.008 0.016	-	0.154 0.146	11	-									● ● ● ●	● ● ● ●	MTP90-075-75W MTP90-100-75W
		TPG 321 322	TPGN 160304 160308	3	3/8	1/8	-	0.016 0.031	-	-	11	-									● ●	● ●	MTP90-125-75W MTP90-150-75W MTP90-200-75W MTP90-200-R8

Right-hand Insert Shown

TP Inserts are sold in 10 piece boxes

PCD Inserts are sold in 1 piece boxes

Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade (Vc sfm) MEGACOAT NANO EX PR1825	MEGACOAT NANO PR1535	MEGACOAT PR1225	MEGACOAT PR1210	Carbide KW10	Cermet TN100M	Cermet TN610	Cermet TN60	PCD KPD001 (KPD010)
Carbon Steel	~0.010	★390~820	☆390~820	☆390~820	-	-	★390~660	☆390~660	☆390~660	-
Alloy Steel	~0.010	★330~720	☆330~720	☆330~720	-	-	★330~590	☆330~590	☆330~590	-
Mold Steel	~0.008	★260~590	☆260~590	☆260~590	-	-	★330~590	☆330~590	☆330~590	-
Stainless Steel	~0.008	☆390~720	★390~720	☆390~720	-	-	☆390~660	-	-	-
Cast Iron	~0.010	-	-	-	☆330~720	☆260~490	-	-	-	-
Non-ferrous Metals	~0.008	-	-	-	-	★330~980	-	-	-	★980~2620
Heat-resistant Alloy	~0.006	-	★70~160	-	-	-	-	-	-	-
Titanium Alloy	~0.006	-	★130~260	-	-	-	-	-	-	-
Hard Materials (~45HRc)	~0.006	☆160~330	-	☆160~330	-	-	-	-	-	-

★ : 1st Recommendation ☆: 2nd Recommendation

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

DMC-SX

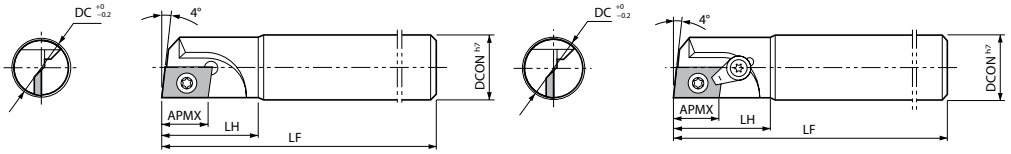


Fig. 1

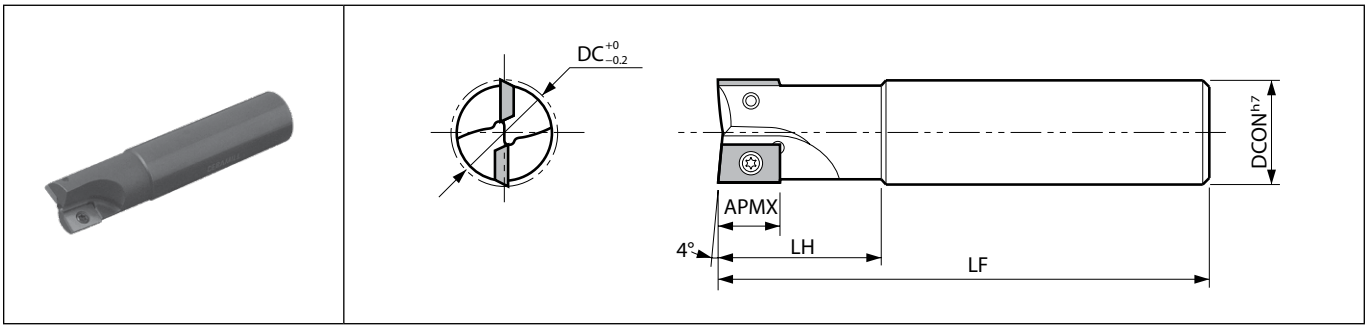
Fig. 2

Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions DC	DCON	LF	LH	APMX	A.R. (°)	R.R. (°)	Coolant Hole	Fig.	Spare Parts: Clamp Set	Screw	Wrench	Applicable Inserts ➡ M188
mm	DMC 316SXT	●	1	16	16	90	30	14	+3	-3	No	1	-	SB-4060TR	FT-15	NDCT32... NDCW32...
	320SX	●		20	20	110						2	CPS-2TR	SB-4065TR		
	325SX	●	2	25	25	120	40			-2		2				
	332SX	●		32	32	130				0		2				
	340SX	●		40		150						2				
	DMC 320SX-200	●	1	20	20	200	50	14	+3	-3	No	1	-	SB-4065TR	FT-15	NDCT32... NDCW32...
	325SX-220	●	2	25	25	220	60			-2		1				
	332SX-250	●		32	32	250	80			0		1				

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

DMC-H



Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions DC	DCON	LF	LH	APMX	A.R. (°)	R.R. (°)	Coolant Hole	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts ➡ M188
mm	DMC 316H	●	1	16	16	90	30	14	+5	-3.5	No	SB-4060TR	FT-15	NDCT32...X NDCW32...X..
	320H	●	1	20	20	110	30	14	+6	-2	No	SB-4060TR	FT-15	NDCT32...X NDCW32...X..
	325H	●	2	25	25	120	40	14	+8	-2	No	SB-4065TR	FT-15	NDCT32...X NDCW32...X..
	332H	●	2	32	32	130	40	14	+8	0	No	SB-4065TR	FT-15	NDCT32...X NDCW32...X..
	340H	●	2	40	32	150	40	14	+8	0	No	SB-4065TR	FT-15	NDCT32...X NDCW32...X..

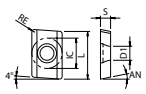
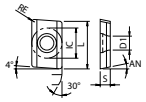
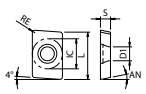
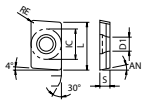
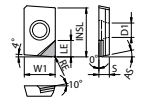
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

NDCT/NDCW

Usage Classification

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

Carbon steel / Alloy steel		■				P
Mold and die steel		■				
Austenitic stainless steel						M
Martensitic stainless steel						
Precipitation hardened stainless steel						
Gray cast iron	☆					K
Nodular cast iron						
Non-ferrous metals	★		□		■	N
Heat-resistant alloy						S
Titanium alloy	☆		□		■	
Hard materials						H

Insert		Part Number ANSI	Part Number ISO	No. of Edges	Dimensions (in)								Angle (°)		Carbide	Cermet	PCD			Applicable Toolholder ⇨ M186 M187
					IC	S	D1	RE	L	INSL	LE	W1	AN	AS	-	-	-			
															KW10	TN100M	KPD001	KPD010	KPD230	
		NDCT 322FR	NDCT 150308FR	2	3/8	1/8	0.177	0.031	0.591	-	-	-	15	-	●					DMC...SX(...)
		NDCT 322TRX	NDCT 150308TRX	2	3/8	1/8	0.173	0.031	0.591	-	-	-	15	-		●				DMC...SX(...) DMC...H
		NDCW 3205TR 321TR 322TR 325TR 3275TR 3210TR	NDCW 150302TR 150304TR 150308TR 150320TR 150330TR 150340TR	2	3/8	1/8	0.177	0.008 0.016 0.031 0.079 0.118 0.157	0.591	-	-	-	15	-		● ● ● ● ● ●				DMC...SX(...)
		NDCW 322TRX	NDCW 150308TRX	2	3/8	1/8	0.173	0.031	0.591	-	-	-	15	-		●				DMC...SX(...) DMC...H
		NDCW 322FRX	NDCW 150308FRX	2	3/8	1/8	0.173	0.031	0.591		-	-	15	-	●					
		NDCW 3205FRX 3205FRX-NE	NDCW 150302FRX 150302FRX-NE	1	-	1/8	0.173	0.008	-	0.591	0.224 0.201	3/8	-	15			●	●	●	DMC...SX(...) DMC...H

Right-hand Insert Shown

Recommended Cutting Conditions ⇨ M189

NDCT / NDCW Inserts are sold in 10 piece boxes

PCD Inserts are sold in 1 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

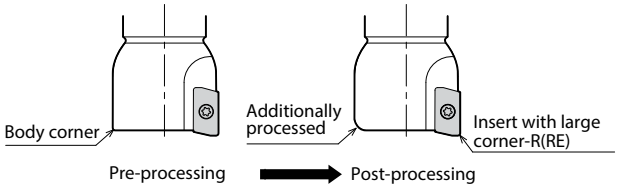
Recommended Cutting Conditions (DMC-SX)

Workpiece Material	fz (ipt)	Recommended Insert Grades (Vc: sfm)		Max. D.O.C. (in)		
		Cermet	Carbide			
		TN100M	KW10	Cutting Dia. (DC)	Slotting (D.O.C.)	Shouldering (D.O.C. x ae)
Carbon steel	~0.008	★ 390~660	-	ø16mm~	0.118	0.354 x 0.118
Alloy steel	~0.008	★ 330~590	-	ø16mm~	0.118	0.354 x 0.118
Mold steel	~0.006	★ 330~590	-	ø16mm~	0.118	0.354 x 0.118
Stainless steel	~0.006	☆ 390~660	-	ø16mm~	0.118	0.354 x 0.118
Cast iron	~0.008	-	★ 260~490	ø16mm~	0.118	0.354 x 0.118
Non-ferrous metals	~0.008	-	★ 330~980	ø16mm~	0.118	0.354 x 0.118

When installing inserts with corner-R(RE) over 2.0mm, grind off the corner part of the tool's insert pocket to avoid contact with the workpiece.
Additional modifications for the body will be necessary. Ref. table 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

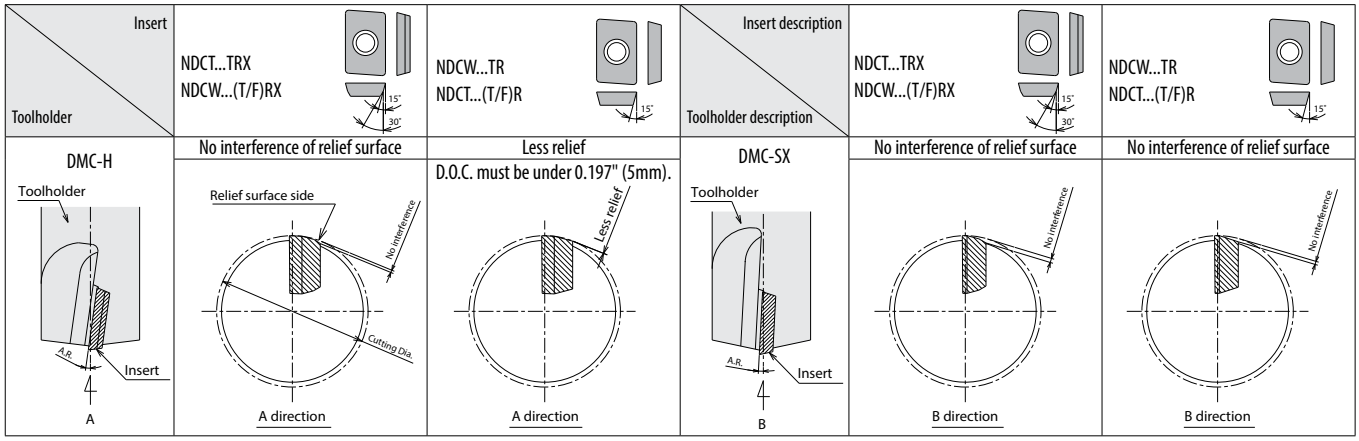
* Round- shaped additional processing is recommended.
When applying chamfer shaped additional processing, do not cut away too much.



Recommended Cutting Conditions (DMC-H)

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

Above inserts are also applicable to DMC○○○SX, but the conventional NDCW32○TR insert is not applicable for this end mill.



EM (End Mill / Extended Length End Mill)

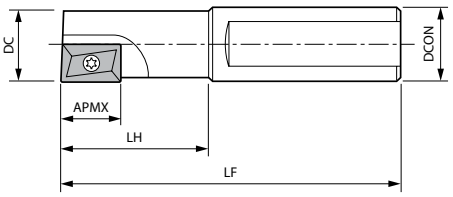


Fig. 1

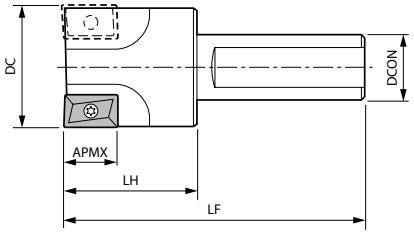


Fig. 2

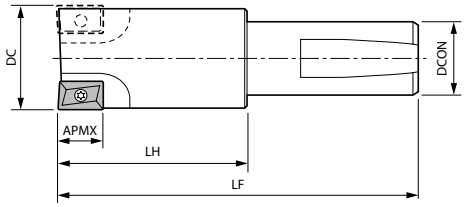


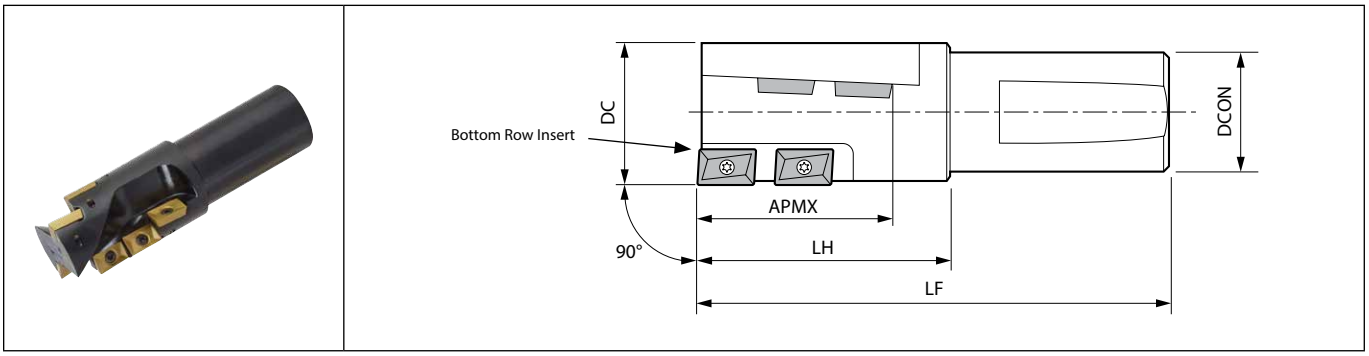
Fig. 3

Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions DC	DCON	LF	LH	APMX	A.R. (°)	R.R. (°)	Coolant Hole	Fig.	Max. Ramping Angle (°)	Insert Screw	Wrench	Applicable Inserts ➡ M193
Inch	EM 0437-09	●	1	7/16	1/2	2.78	1.00	0.37	+3	-11	No	1	3	SCR-04	T7	XPMT0902...
	0500-09	●		1/2						-9		1				
	0562-09	●		9/16						-7		1	8			
	0625-09	●	2	5/8	5/8	2.90			+5	-6		2				
	0750-09	●		3/4	3/4	3.03			+5	-2		2				
	1000-09-3F	●	3	1					+3	-2		2		SCR-01		
	EM 0625	●	1	5/8	3/4	2.90	1.00	0.60	+5	-14	No	1	3	SCR-16	T10	XPMT15T3...
	0688	●		11/16		3.40				-12		1				
	0750	●		3/4			1.50			-10		1	8			
	0875	●		7/8						-7		1				
	0938	●	2	15/16						-5		2				
	1000	●		1						-5		2				
	1000-100S	●			1	3.78				-5		2				
	1125	●		1-1/8	3/4	3.40				-4		2		SCR-30		
	1250	●		1-1/4						-3		2				
	1250-3F	●	3		1	3.78				-3		2				
	1375	●	2	1-3/8	3/4	3.40				-2		2				
	1500	●		1-1/2						-2		2				
	1500-3F	●	3		1	3.78				-2		2				
	EM 1000-2.5	●	2	1	3/4	4.40	2.50	0.60	+5	-5	No	3	8	SCR-16	T10	
	1000-3.5	●			1	5.78	3.50			-5		3				
	1250-2.5	●		1-1/4		4.78	2.50			-3		3		SCR-30		

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

EM-LE (Long Edge End Mill)



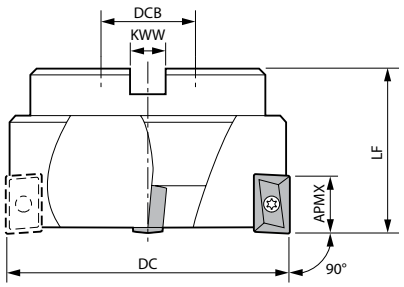
Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	No. of Flutes	Dimensions					A.R. (°)	R.R. (°)	Coolant Hole	Insert Screw	Wrench	Applicable Inserts ➡ M193
					DC	DCON	LF	LH	APMX						
Inch	EM 1500-2000-LE	●	8	2	1-1/2	1-1/4	4.91	2.63	2.00	+5	-2	No	SCR-30	T10	XPMT15T3...

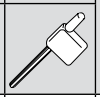
Insert Compatibility

Part Number	Bottom Row	Side Row
EM ...-LE	XPMT 15T3..	XPMT 15T308

FM90 (Fixed Pocket Face Mill)



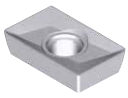
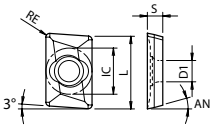
Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions					A.R. (°)	R.R. (°)	Coolant Hole	Insert Screw	Wrench	Applicable Inserts ➡ M193
				DC	DCB	LF	KWW	APMX						
Inch	FM 2000-90RH	●	3	2.0	3/4	1-13/32	5/16	0.6	+5	+3	No	SCR-30	T10	XPMT15T3...
	3000-90RH	●	4	3.0	1	1-25/32	3/8			+5				

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

XPMT

Usage Classification								
★: Roughing / 1st Choice ☆: Roughing / 2nd Choice ■: Finishing / 1st Choice □: Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel				★	■	P
	Mold and die steel	★			☆	■	P
	Stainless steel				★		M
	Gray cast iron		★				K
	Nodular cast iron		★				K
	Non-ferrous metals						N
	Heat-resistant alloy	★		☆	☆		S
	Titanium alloy		☆		★		S
	Hard materials						H

Insert	Part Number	No. of Edges	Dimensions (in) IC	S	D1	RE	INSL	Angle (°) AN	AS	Carbide CVD CA6535	Carbide PVD PR1510	Carbide PVD PR1525	Carbide PVD PR1535	Cermet TN100M	Applicable Toolholder ➡ M190 M191 M192 M296
 	XPMT 090208	2	1/4	0.094	0.110	0.031	0.375	11	-	●	●	●	●	●	CM...-09 EM...-09(-3F)
	XPMT 15T304	2	3/8	0.156	0.157	0.016	0.607	11	-	●	●		●	●	CM1000-... EM0625 EM0688
	15T308					0.031				●	●		●	●	EM0750 EM0875 EM0938
	15T316					0.063				●	●		●		EM1000(-100S) EM1125
	15T324					0.094				●	●		●		EM1250(-3F) EM1375
	15T331					0.122				●	●		●		EM1500(-3F) EM...-2.5 EM...-3.5
	15T364					0.250				●	●		●		EM...-LE FM...-90RH

*Toolholder modifications are necessary if using larger corner radius XPMT15T324, XPMT15T331, and XPMT15T364 inserts due to interference between the holder and workpiece.

Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade (Vc sfm) MEGACOAT NANO PR1535	MEGACOAT NANO PR1525	MEGACOAT NANO PR1510	CVD Coated Carbide CA6535	Cermet TN100M
Carbon Steel	0.003~0.006	★ 400~800	★ 400~800	-	-	★ 800~1400
Alloy Steel	0.003~0.006	★ 300~700	★ 300~700	-	-	★ 600~1200
Mold Steel	0.003~0.006	★ 250~600	★ 250~600	-	-	★ 400~700
Stainless Steel	0.002~0.006	★ 300~600	☆ 300~600	-	★ 550~950	☆ 300~800
Cast Iron	0.003~0.008	-	-	★ 400~800	-	☆ 400~1200
Non-ferrous Metals	0.005~0.007	-	-	-	-	☆ 1500~1800
Heat-resistant Alloy	0.002~0.005	☆ 70~160	-	-	★ 70~160	-
Titanium Alloy	0.002~0.005	☆ 130~260	-	☆ 100~230	-	-

★: 1st Recommendation ☆: 2nd Recommendation

XPMT Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Super Fine Pitch Cutter for Aluminum Machining

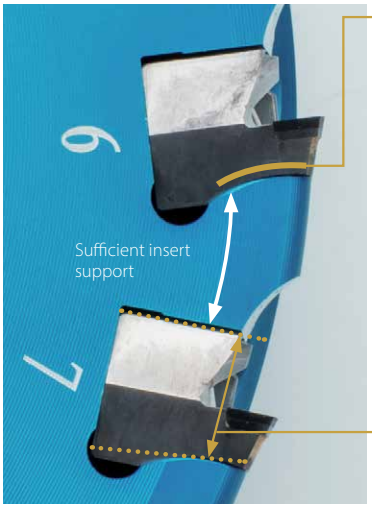
MD90

Improved efficiency in aluminum with super fine pitch specifications

High quality and high precision design with long tool life

1 Unique design provides efficiency and high quality machining results

High Efficiency Cutter design engineered with ultra-fine pitch specifications

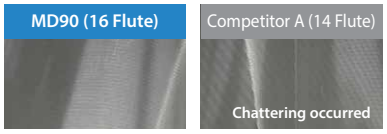


Curved Contact Surface

Maximized pitch maintains multiple inserts and rigidity

Reduces chattering by dispersing stress

Chatter Resistance Comparison
(Internal Evaluation)



Vc = 9,840 sfm, D.O.C. x ae = 0.008" x 2.756"
fz = 0.003 ipt Wet ADC12 ø80mm (Prototype)

Scatter Prevention

Firm insert hold

Ultra-Fine Pitch with Lightweight Design

Largest cutter diameter of ø125mm weighs less than 1.5 kg

Compatible with BT30

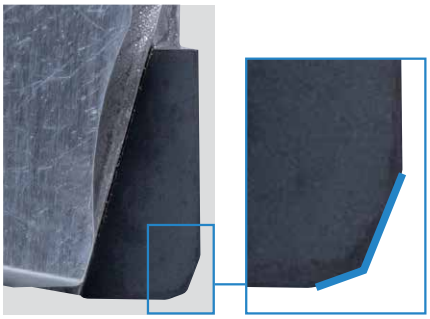
Cutting Dia.	No. of Inserts	Weight (kg)	Body
ø2.000"	10	0.37	Steel
ø2.500"	14	0.62	
ø40mm	6	0.26	
ø50mm	10	0.37	
ø63mm	14	0.62	
ø80mm	16	0.6	Aluminum
ø100mm	20	0.97	
ø125mm	24	1.49	

High Quality High machined surface quality, high precision and long tool life

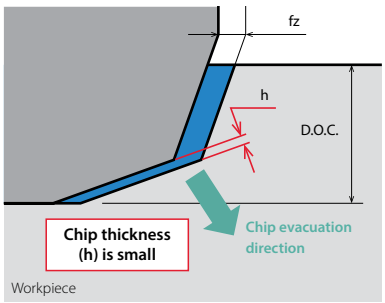
Suppresses Burr Formation

Double-Edge (Standard Type)

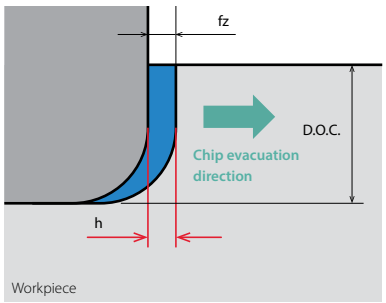
Controlls the chip evacuation direction and suppresses distortion caused by chip separation



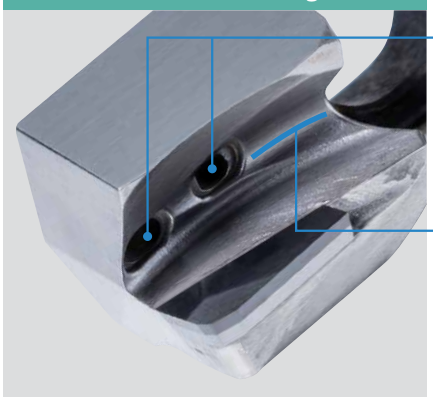
Double-Edge



Corner R



Stable Machining



Double Coolant Holes

Effective cooling of cutting edge and workpiece to achieve superior surface finishes

Suppresses chip biting and surface defects

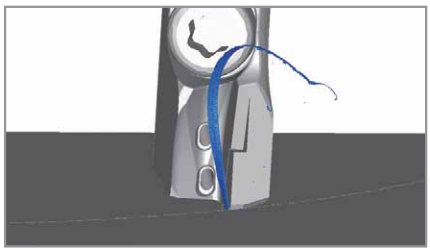
Streamlined Chip Pocket

Good chip control protects cutter body

Stable cutter balance delivers high-precision machining and longer tool life

Chip Evacuation Simulation

Evacuates chips along the pocket



● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Performance

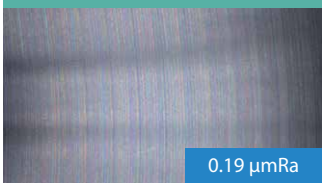
High-efficiency and high-quality machining performance with ultra-fine pitch specifications

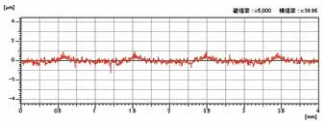
n = 9,900 rpm (Vc = 8,200 sfm)
Vf = 375 ipm (fz = 0.0024 ipt)
D.O.C. x ae = 0.012" x 1.969"
ADC12 Wet ø50mm
MD90-080RA-T16CSF
LNGX1807PDFR-G (KPD01A)
(Internal Evaluation)

Surface Finish Evaluation

Suppresses Burr Formation and Edge Chipping

Excellent Surface Finish





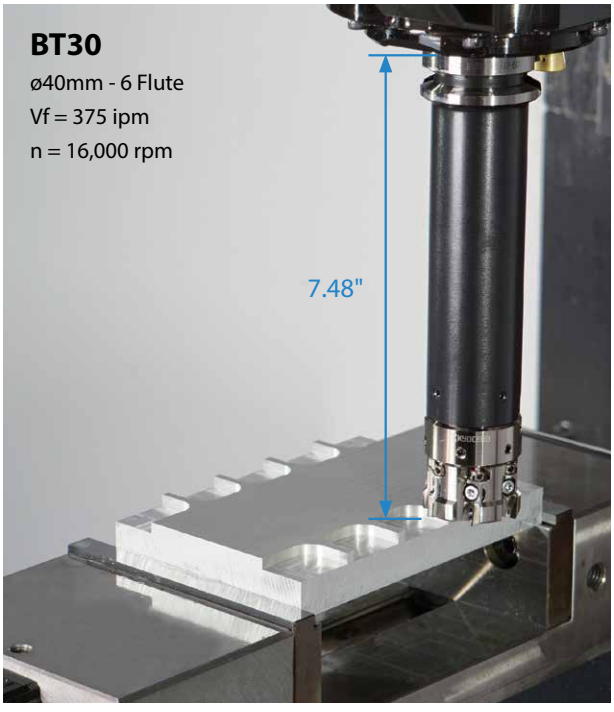
Machining Efficiency Comparison (Internal Evaluation)

		Efficiency
MD90 (16 Flute)	Vf = 375 ipm	↑
Competitor A (14 Flute)	Vf = 325 ipm	

Since the MD90 has a high number of cutting edges, table feed (Vf) can be improved.
Efficiency can be improved while maintaining the same machining quality as competitor.

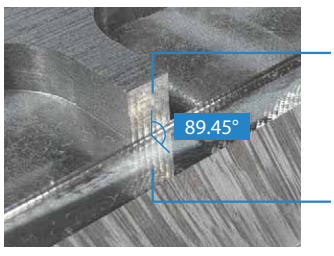
Stability

Stable machining even with a long overhang setup

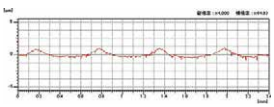


n = 16,000 rpm (Vc = 6,560 sfm)
Vf = 375 ipm (fz = 0.004 ipt)
D.O.C. x ae = 0.197" x 0.197" ADC12 Wet ø1.575" (6 Flutes)
MD90-040RS-T6CMSF
LNGX180704PDFR-RR (KPD01A)
(Internal Evaluation)

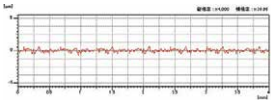
Surface finish evaluation



Wall Surface : 0.32µmRa



Bottom : 0.18µmRa



MD90 (Steel Body)

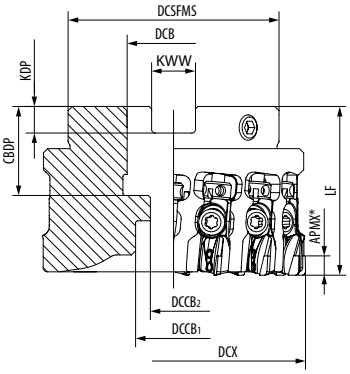


Fig. 1

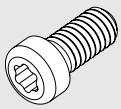
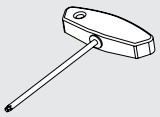
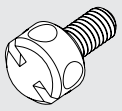
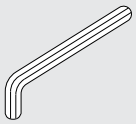
*Please refer to Page **M198** for APMX.

Toolholder Dimensions

Unit		Part Number	Std. Item	No. of Inserts	Dimensions									Rake Angle	Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts	Applicable Inserts ⇒ M198
		R			DCX	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	A.R.					Arbor Bolt Attached	
Inch	Inch Bore Dia.	MD90- 2000RS-T10CSF	●	10	2.000	1.910	0.750	0.669	0.433	1.575	0.750	0.187	0.313	+5°	Yes	25,000	0.37	1	HH3/8-1.25H	LNGX1807PDFR-G LNGX1807PDFR-L LNGX180704PDFR-RR LNGX180708PDFR-RR
		2500RS-T14CSF	●	14	2.500	1.750		0.750									0.62			
mm	Metric Bore Dia.	MD90- 040RS-T6CMSF	●	6	40	38.5	16	13.5	9	40	19	5.6	8.4	+5°	Yes	25,000	0.26	1	HH8X25H	
		050RS-T10CMSF	●	10	50	48.5	22	18	11		21	6.3	10.4				0.37		HH10X30H	
		063RS-T14CMSF	●	14	63	50											0.62			

Maximum number of revolutions
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece.
Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.
See applicable insert table for APMX

Spare Parts

Clamp Screw	Wrench	Adjustment Screw	Adjustment Wrench
			
BH4X8TR	TTW-15	AJ-3110	LW-2
Torque for insert clamp: 3.5 N.m		-	-

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MD90 (Aluminum Body)

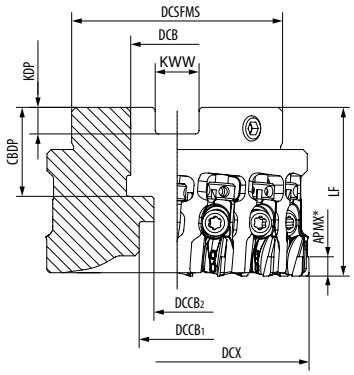


Fig. 1

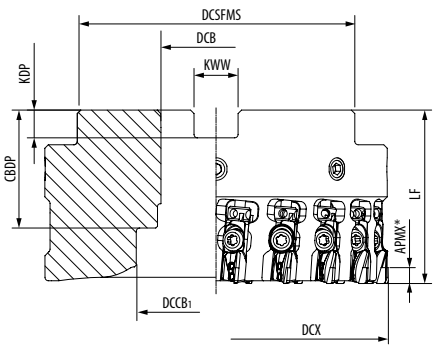


Fig. 2

*Please refer to Page **M198** for APMX.

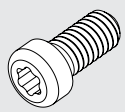
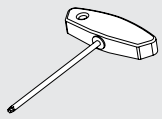
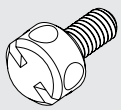
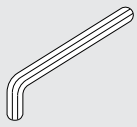
Toolholder Dimensions

Unit		Part Number	Std. Item	No. of Inserts	Dimensions									Rake Angle	Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts	Applicable Inserts ➡ M198
			R		DCX	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	A.R.					Arbor Bolt Attached Metric (Inch)	
mm	Inch Bore Dia.	MD90- 080RA-T16CSF	●	16	80	60	1.000"	20	13	50	1.063"	0.236"	0.375"	+5°	Yes	20,000	0.6	1	HH12X35H (HH1/2-1.25H)	LNGX1807PDFR-G LNGX1807PDFR-L LNGX180704PDFR-RR LNGX180708PDFR-RR
		100RA-T20C254SF	●	20	100	80										18,000	0.97			
		100RA-T20CSF	●				1.250"	45	-		1.339"	0.315"	0.500"				0.89	2	HF16X40HA	
		125RA-T24C254SF	●	24	125		1.000"	20	13	55	1.063"	0.236"	0.375"			16,000	1.49	1	HH12X35H (HH1/2-1.25H)	
		125RA-T24CSF	●				1.500"	55	-		1.496"	0.394"	0.625"				1.34	2	HF20X53HA (HH3/4-2.3H)	
	Metric Bore Dia.	MD90- 080RA-T16CMSF	●	16	80	60	27	20	13	50	24	7	12.4	+5°	Yes	20,000	0.6	1	HH12X35H	
		100RA-T20C27MSF	●	20	100	80										18,000	0.96			
		100RA-T20CMSF	●				32	45	-		30	8	14.4				0.88	2	HF16X40HA	
		125RA-T24C27MSF	●	24	125		27	20	13	55	24	7	12.4			16,000	1.48	1	HH12X35H	
		125RA-T24CMSF	●				40	55	-		33	9	16.4				1.31	2	HF20X53HA	

Inch thread coolant-through arbor bolts in ( ) can be substituted but are sold separately
HH1/2-1.25H ➡ HH12X35H
HH3/4-2.3H ➡ HF20X53HA

Maximum number of revolutions
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece.
Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.
See applicable insert table for APMX

Spare Parts

Clamp Screw	Wrench	Adjustment Screw	Adjustment Wrench
			
BH4X8TR	TTW-15	AJ-3110	LW-2
Torque for insert clamp: 3.5 N.m		-	-

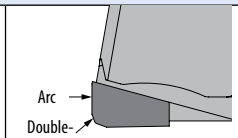
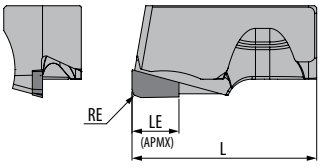
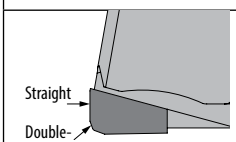
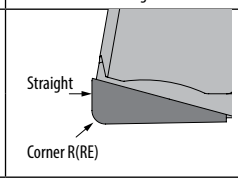
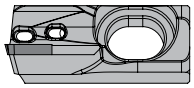
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

LNGX

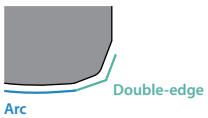
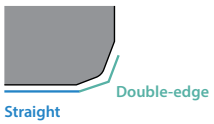
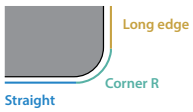
Usage Classification

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

Carbon steel / Alloy steel		P
Mold and die steel		
Austenitic stainless steel		M
Martensitic stainless steel		
Precipitation hardened stainless steel		
Gray cast iron		K
Nodular cast iron		
Non-ferrous metals	■	N
Heat-resistant alloy		S
Titanium alloy		
Hard materials		H

Insert			Part Number	Dimensions (mm) L	RE	LE (APMX)	PCD - KPD01A	Applicable Toolholder
Standard	 Arc, Double-edge, General Purpose	 RE, LE (APMX), L	LNGX 1807PDFR-G	18.1	-	4	●	MD90...RS...-SF MD90...RA...-SF
	 Straight, Double-edge, Low Cutting Force		LNGX 1807PDFR-L				●	
Long Edge	 Straight, Corner R(RE)		LNGX 180704PDFR-RR		0.4	8	●	
			LNGX 180708PDFR-RR		0.8		●	

The dimension indicated for LE (APMX) is for a new insert. Please note that it may change after regrinding.

Type	Shape	Features and Applications
G	 Double-edge, Arc	1st recommendation Suppresses burrs and ensures high-quality surface finish Achieves longer tool life and stable machining
L	 Double-edge, Straight	Low cutting force with straight wiper edge Provides suitable results even with lower rigidity workpieces or clamping power
RR	 Long edge, Corner R, Straight	Corner Radius (R) Suitable for machining with larger D.O.C and heavy loads

Polycrystalline Diamond — Average Particle Size : 1 µm

KPD01A Achieves both wear resistance and chipping resistance required for machining with ultra-fine pitch tools
Stable, high-efficiency machining is possible

Recommended Cutting Conditions

Workpiece	Property	Cutting Speed Vc (sfm)	Feed fz (ipt)	Recommended Grade
Aluminum Alloy	Si Ratio ≤ 12.5%	3280 - **6,560** - 9,840	0.002 - **0.004** - 0.008	KPD01A
	Si Ratio ≥ 12.5%	1,310 - **1,970** - 2,620	0.002 - **0.004** - 0.008	

Numbers in **Bold** are recommended starting 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

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

How to Install Inserts

1 Mount an Insert

2 Partially tighten

Torque : 1.0 N·m

3 Adjust insert runout

Insert Runout 5 µm or less

4 Fully tighten

Torque : 3.5 N·m

1 Mount inserts into all pockets

2 Partially tighten the clamp screw (Recommended torque 1.0 N.m)

3 Turn the screw with the wrench to adjust and make sure that all screw heights are within 5 µm of each other (Recommended)

4 Fully tighten the clamp screw with tightening torque 3.5 N.m

Precautions

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 parts may scatter due to the centrifugal force and cutting load

Confirm the total weight of the cutter and the arbor is within the machine's acceptable range

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

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
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

Milling Cutters for Aluminum Finishing

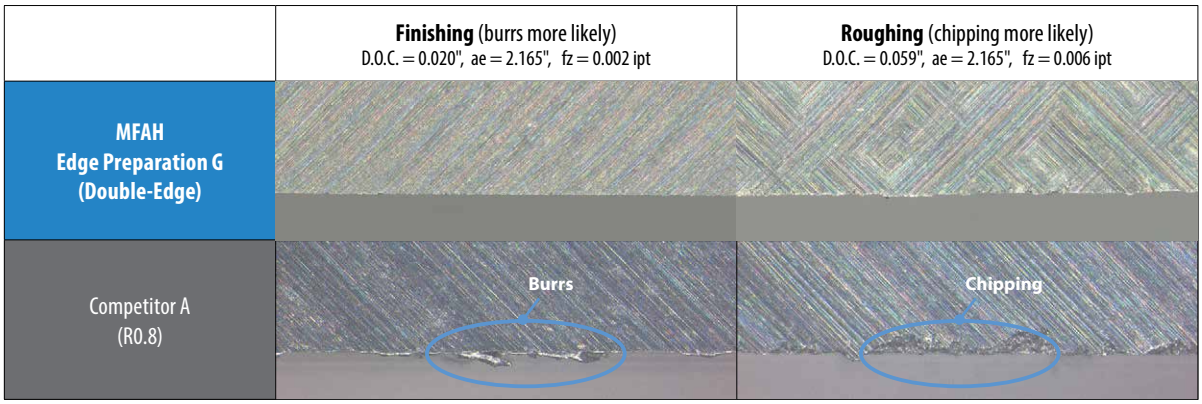
MFAH

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 Minimizes Burrs for High Quality Machining Results

Large true rake angle and dual cutting edge insert designs

Burr and chipping comparison (Internal evaluation)

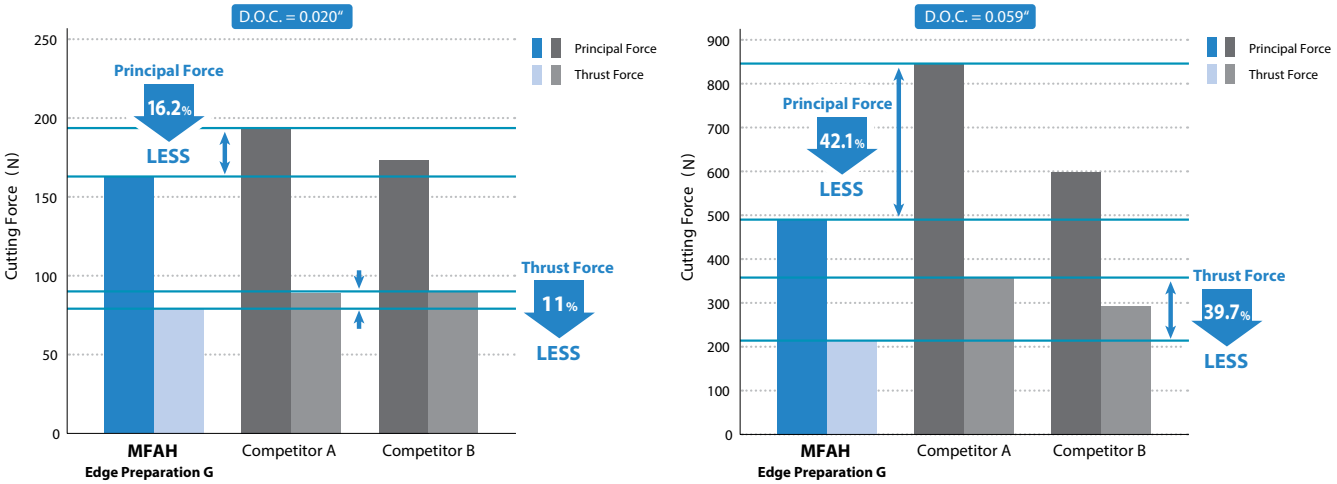


Cutting Conditions: Vc = 8,200 sfm, Wet, Cutting Dia. Ø80mm
MFAH080RS-10T-SF, ENET0905PAER-G KPD001
Workpiece: 383.0 Aluminum

2 Low Cutting Force Design

Low cutting force, reduced chattering and high efficiency machining

Cutting Force Comparison (Internal Evaluation)



Cutting Conditions: Vc = 8,200 sfm, ae = 2.165", fz = 0.004 ipt Wet, Cutting Dia. Ø80mm
MFAH080RS-10T-SF ENET0905PAER-G KPD001
Workpiece: 383.0 Aluminum

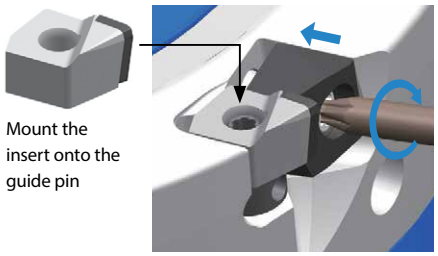
800.823.7284
www.kyoceraprecisiontools.com

3 Adjustable Blade Runout

Easily install inserts and adjust blade runout

Easy Insert Installment

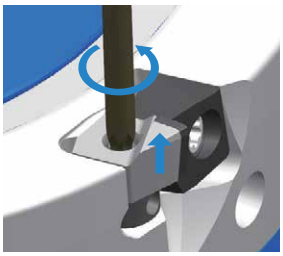
Guide pin allows for easier positioning



Mount the insert onto the guide pin

Easily Adjust Blade Runout

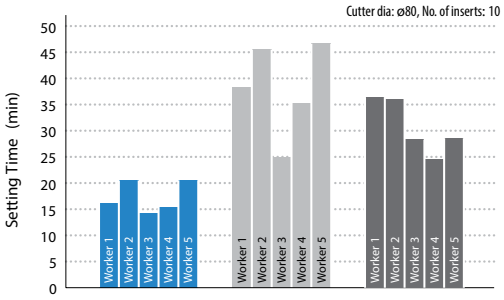
Adjustable from both the front and outer periphery



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

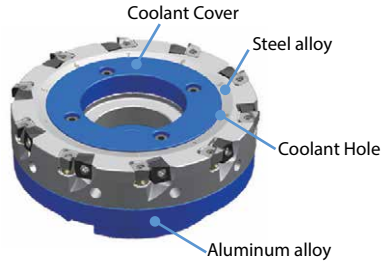
Steel body and light-weight hybrid body with internal coolant available

3 different edge designs offer a variety of machining applications

Cutter Body

Steel Body

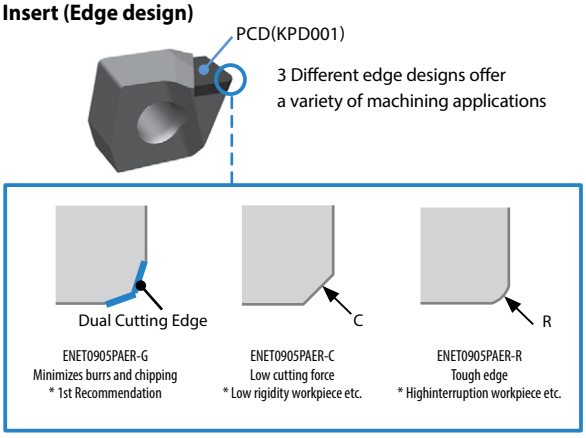
ø50mm~ø125mm



Light-weight Hybrid Body

ø80mm~ø315mm

Insert (Edge design)

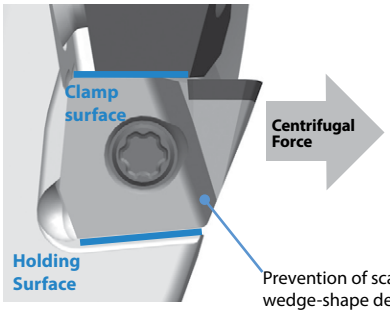


5 Safety Enhancements During High-Speed Revolution

Scattering Prevention Mechanism

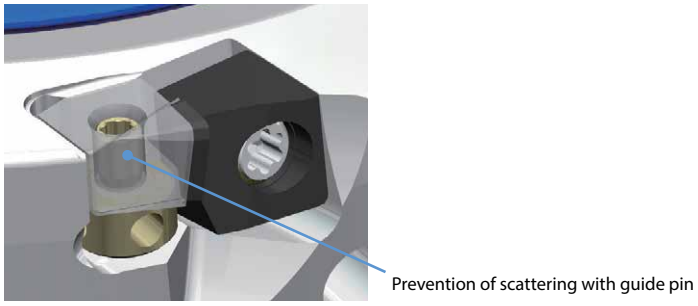
1 Prevention of scattering by wedge-shape design

New wedge-shape feature holds insert
Firmly in place and reduces chattering



2 Prevention of scattering with guide pin

Guide pins improve safety
During high-speed rotation



MFAH (Light-Weight Hybrid Body)

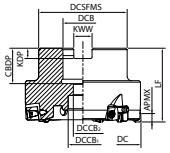


Fig. 1

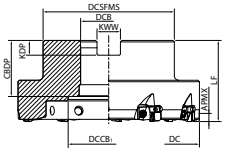


Fig. 2

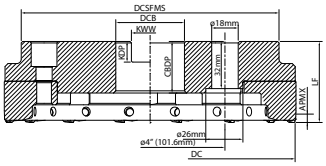


Fig. 3

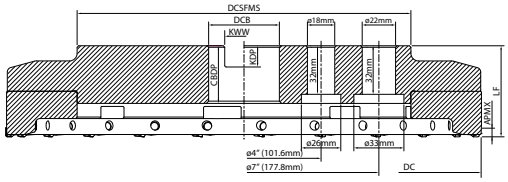


Fig. 4

Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions										Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts			Applicable Inserts ➡ M205
		R		DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX					Arbor Bolt Attached Metric (Inch)	Coolant Cover (Included if Listed)	Coolant Cover (Optional / Sold Separately)	
mm	Inch Bore Dia.	MFAH 080RA-6T-SF	●	6	80	62	1.000"	20	13		1.063"	0.236"	0.374"		14,600	0.83	1	HH12X35HC (HF0500X35HC)			ENET0905PAER-G ENET0905PAER-C ENET0905PAER-R
		080RA-10T-SF	●	10												0.78	1				
		100RA-8T-254-SF	●	8	100	62	1.000"	20	13		0.945"	0.236"	0.374"		13,000	1.21	1	HH12X35HC (HF0500X35HC)	-	-	
		100RA-8T-SF	●	8		85	1.250"	42	-	50	1.339"	0.315"	0.500"			1.33	2	HF16X44HC (HF0625X44HC)			
		100RA-12T-254-SF	●	12		62	1.000"	20	13		0.945"	0.236"	0.374"			1.16	1	HH12X35HC (HF0500X35HC)			
		100RA-12T-SF	●	12		85	1.250"	42	-		1.339"	0.315"	0.500"			1.29	2	HF16X44HC (HF0625X44HC)			
		125RA-10T-254-SF	●	10	125	60	1.000"	20	13		0.945"	0.236"	0.374"		11,400	1.8	1	HH12X35HC (HF0500X35HC)	CC-125-MFAH	-	
		125RA-10T-SF	●			89	1.500"	55	-	55	1.496"	0.394"	0.626"			2	2	HF20X53HA			
		125RA-16T-254-SF	●	16		60	1.000"	20	13	50	0.945"	0.236"	0.374"			1.74	1	HH12X35HC (HF0500X35HC)			
		125RA-16T-SF	●			89	1.500"	55				0.394"	0.626"	4.6		1.95	2	HF20X53HA			
		160RA-12T-SF	●	12	160	130	2.000"	70			1.496"	0.433"	0.752"		8,000	3.4	2	HF24X60HA	CC-160-MFAH		
		160RA-20T-SF	●	20												3.3	2				
		200RA-16T-SF	□	16	200	175	1.875"	126	-	55	1.378"	0.551"	1.000"		5,600	4.9	3	-	-	CC-200-MFAH	
		200RA-24T-SF	□	24												4.8	3				
		250RA-20T-SF	□	20	250	140		165							4,500	7	3			CC-250-MFAH	
		250RA-32T-SF	□	32												6.9	3				
		315RA-24T-SF	□	24	315	220		220		60	1.496"				3,500	11.7	4			CC-315-MFAH	
		315RA-40T-SF	□	40												11.5	4				

Confirm the total weight of the cutter and the arbor is within the machine's acceptable range.
Inch thread coolant-through arbor bolts in ( ) can be substituted but are sold separately
HF0500X35HC ➡ HH12X35HC
HF0625X44HC ➡ HH16X44HC

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions										Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts			Applicable Inserts ➡ M205
		R		DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX					Arbor Bolt (Attachment)	Coolant Cover (Attachment)	Coolant Cover (Sold Separately)	
mm	Metric Bore Dia. MFAH 080RA-6T-M-SF	●	6	80	62	27	20	13	50	27	7	12.4	4.6	Yes	14,600	0.82	1	HH12X35HC	-	-	ENET0905PAER-G ENET0905PAER-C ENET0905PAER-R
	080RA-10T-M-SF	●	10													0.78	1				
	100RA-8T-M27-SF	●	8	100	62	27	20	13		24	7	12.4			13,000	1.2	1	HH12X35HC			
	100RA-8T-M-SF	●	8		85	32	42	-		30	8	14.4				1.32	2	HF16X48HC			
	100RA-12T-M27-SF	●	12		62	27	20	13		24	7	12.4				1.15	1	HH12X35HC			
	100RA-12T-M-SF	●	12		85	32	42	-		30	8	14.4				1.27	2	HF16X48HC			
	125RA-10T-M27-SF	●	10	125	60	27	20	13		24	7	12.4			11,400	1.8	1	HH12X35H	CC-125-MFAH		
	125RA-10T-M-SF	●	10		94	40	55	-	55	33	9	16.4				2.1	2	HF20X53HA			
	125RA-16T-M27-SF	●	16		60	27	20	13	50	24	7	12.4				1.73	1	HH12X35H			
	125RA-16T-M-SF	●	16		94	40	55	-		33	9	16.4				2.1	2	HF20X53HA			
	160RA-12T-M-SF	●	12	160	125	40	57	-	55	33	9	16.4			8,000	3.5	2	HF20X53HA	CC-160-MFAH		
	160RA-20T-M-SF	●	20													3.4	2				
	200RA-16T-M-SF	□	16	200	175	60	126	-		35	14	25.7			5,600	4.7	3	-	-	CC-200-MFAH	
	200RA-24T-M-SF	□	24													4.6	3				
	250RA-20T-M-SF	□	20	250	140		165								4,500	6.9	3			CC-250-MFAH	
	250RA-32T-M-SF	□	32													6.8	3				
	315RA-24T-M-SF	□	24	315	220		220		60	38					3,500	11.7	4			CC-315-MFAH	
	315RA-40T-M-SF	□	40													11.5	4				

Confirm the total weight of the cutter and the arbor is within the machine's acceptable range.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MFAH (Steel Body)

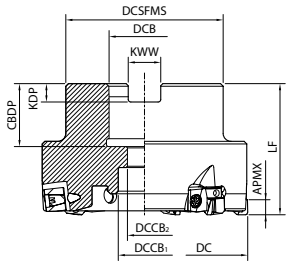


Fig. 1

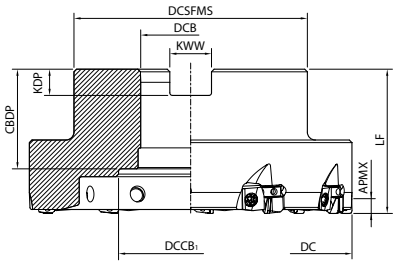
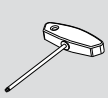
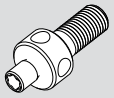
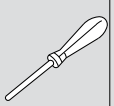
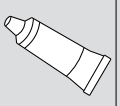


Fig. 2

Toolholder Dimensions

Unit		Part Number	Std. Item	No. of Inserts	Dimensions									Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts	Applicable Inserts ➡ M205
			R		DC	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX					Arbor Bolt (Included if Listed)	
mm	Inch Bore Dia.	MFAH 080RS-6T-SF	●	6	80	50	1.000"	20	13	50	1.063"	0.236"	0.375"	4.6	No	14,600	1.02	1	HH12X35	ENET0905PAER-G ENET0905PAER-C ENET0905PAER-R
		080RS-10T-SF	●	10													0.98	1		
		100RS-8T-SF	●	8	100	70	1.250"	45	-		1.339"	0.315"	0.500"			13,000	1.59	2	-	
		100RS-12T-SF	●	12													1.55	2		
		125RS-10T-SF	●	10	125	89	1.500"	55		55	1.496"	0.394"	0.625"			11,400	2.63	2		
		125RS-16T-SF	●	16													2.56	2		
	Metric	MFAH 050RS-4T-M-SF	●	4	50	48	16	13.6	9	40	19	5.6	8.4	4.6	No	19,200	0.44	1	HH8X25	
		050RS-5T-M-SF	●	5													0.43	1		
		063RS-5T-M-SF	●		63	61	22	23	11		21	6.3	10.4			16,800	0.69	1	HH10X30	
		063RS-6T-M-SF	●	6													0.68	1		
		080RS-6T-M-SF	●	6	80	60	27	20	13	50	24	7	12.4			14,600	1.16	1	HH12X35	
		080RS-10T-M-SF	●	10													1.11	1		
		100RS-8T-M-SF	●	8	100	70	32	45	-		30	8	14.4			13,000	1.56	2	-	
		100RS-12T-M-SF	●	12													1.51	2		
		125RS-10T-M-SF	●	10	125	89	40	55		55	33	9	16.4			11,400	2.6	2		
		125RS-16T-M-SF	●	16													2.5	2		

Spare Parts

Part Number		Wedge	Wedge Screw	Wrench	Adjustment Screw	Wrench	Anti-Seize Compound	Applicable Inserts
								
Light-Weight Hybrid Body	MFAH080RA- … ~ MFAH315RA- …	C08R	W5X13L	TTW-15	AJ-4170	DTPM-8	P-37	ENET0905…
Steel Body	MFAH050RS- … ~ MFAH125RS- …							

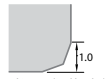
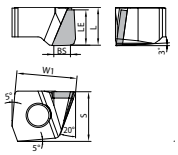
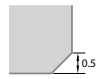
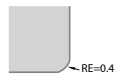
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

ENET

Usage Classification

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

Carbon steel / Alloy steel		P
Mold and die steel		
Austenitic stainless steel		M
Martensitic stainless steel		
Precipitation hardened stainless steel		
Gray cast iron		K
Nodular cast iron		
Non-ferrous metals	■	N
Heat-resistant alloy		S
Titanium alloy		
Hard materials		H

Insert			Part Number	Dimensions (mm) S	L	LE	W1	BS	PCD -	PCD KPD001	Applicable Toolholder
	 1.0 General Purpose (Double-Edge)		ENET 0905PAER-G	7.9	6.02	5.6	9.61	2.6		●	MFAH...RA...-SF MFAH...RS...-SF
	 0.5 Low Cutting Force		ENET 0905PAER-C	7.9	6.02	5.6	9.61	3		●	MFAH...RA...-SF MFAH...RS...-SF
	 RE=0.4 Tough Edge		ENET 0905PAER-R	7.9	6.02	5.6	9.61	3.1		●	MFAH...RA...-SF MFAH...RS...-SF

Applicable Toolholder ➡ M202~M204

Recommended Cutting Conditions ➡ M206

ENET PCD Inserts are sold in 1 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Workpiece material	Property	Vc (sfm)	fz (ipt)	Recommended Insert Grades
Aluminum Alloys	Si Ratio ≤ 12.5%	3,280~**8,200**~9,840	0.002~**0.004**~0.008	KPD001
	Si Ratio ≥ 12.5%	1,310~**1,970**~2,630	0.002~**0.004**~0.008	

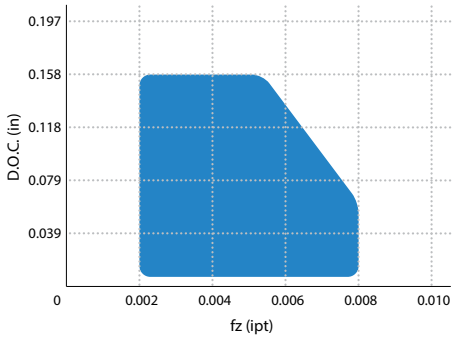
Recommended Cutting Conditions are reference values.

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

BT50 M/C (Machine Power 30kw)



Cutting Conditions: Vc = 8,200 sfm, ae = 2.165", Wet, Cutting Dia. Ø80mm
MFAH080RS-10T-SF, ENET0905PAER-G KPD001, Workpiece: 383.0 Aluminum

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

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 quality grade (ISO 1940-1) G2.5

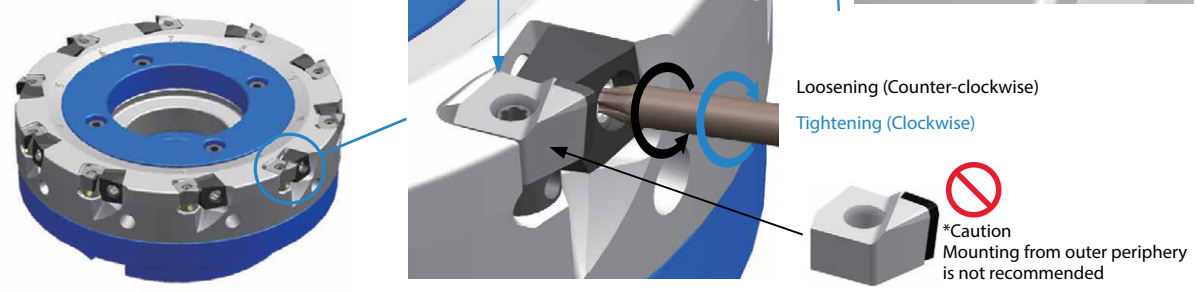
Do not adjust the balance screw
➡ This could lead to improper dynamic balance
Do not completely remove clamp and clamp screw from cutter
➡ This requires additional balance adjustment

Balance adjustment screw is mounted at the necessary point

* Do not operate

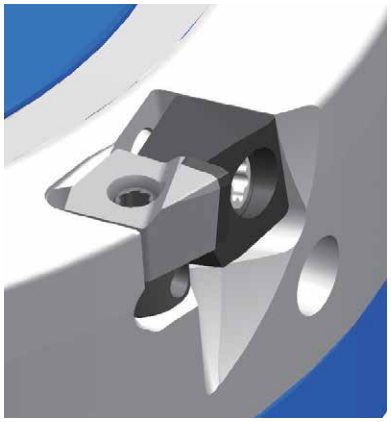
How to Mount Inserts

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



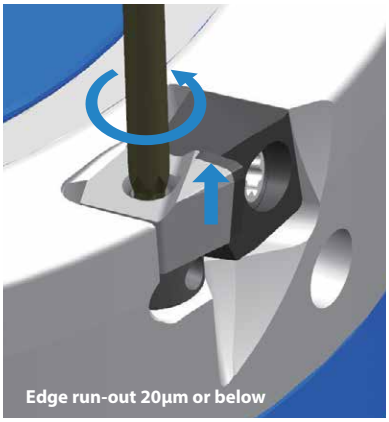
How to Adjust Blade Runout

1 Install an insert



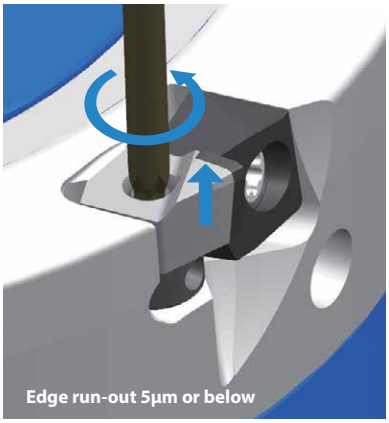
2 Partially tighten

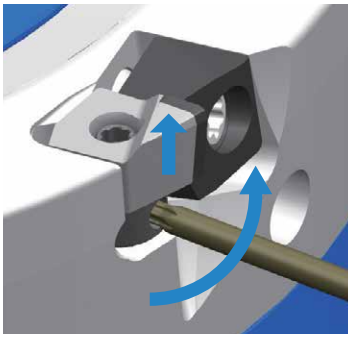
3 Adjustable blade runout



4 Fully tighten

5 Adjustable blade runout





Adjustment edge run-out from outer periphery is possible

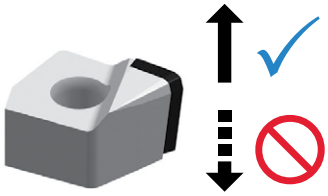
1 Install inserts into all pockets

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

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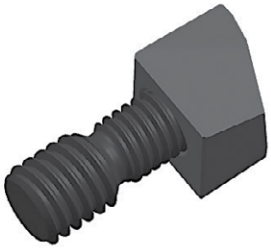
Replacing the Insert Clamp

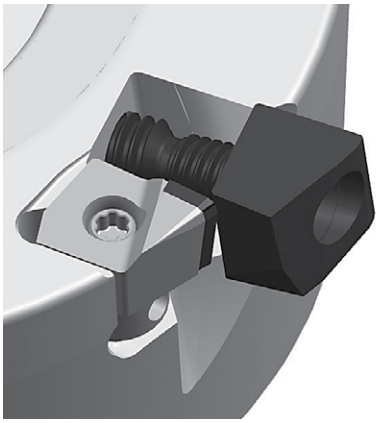
Corrrect Mounting Procedure for Clamp and Clamp Screw

1 Attach clamp screw into clamp first



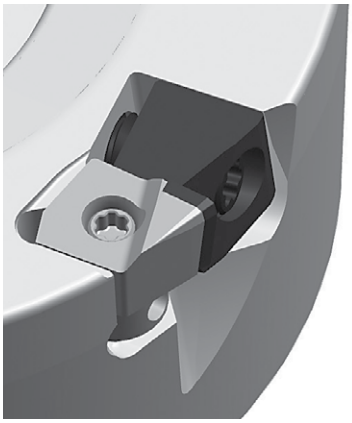
Attaching clamp screw into clamp
(about 1 revolution)

2 Mounting



Mount it to the holder

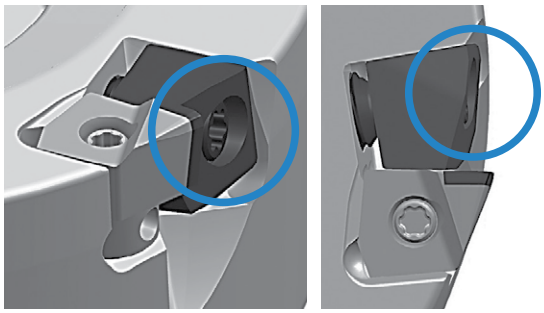
3 Fastening



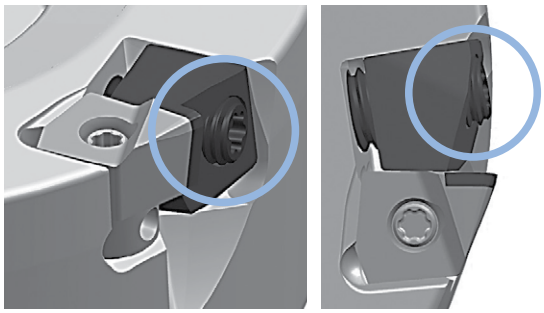
Fasten with recommended torque
(Completed)

Mount position of clamp screw

Right position
(Screw head does not come out)



Wrong position
(Screw head comes out)



After tightening the clamp screw with the recommended torque, please check the protrusion of the clamp screw.
If it is protruding outside the clamp, please reinstall

When clamp screws need to be replaced and completely removed, a balance adjustment is necessary after installation

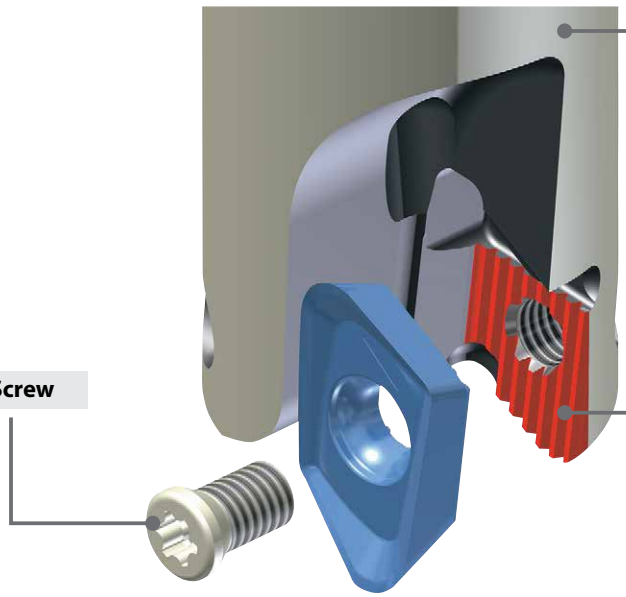
High Efficiency Milling Cutters for Aluminum Machining

MEAS

Excellent scatter prevention to ensure stable, high speed aluminum machining
Large ramping angle delivers a wide range of machining applications

1 Reliable High Efficiency Machining

Grooved connection between the insert and holder
Provides high speed aluminum machining (ø1.25" / ø32mm: Recommended max. cutting speed Vc = 9,840 sfm)



ISO balance quality grade G6.3

Prevents vibration during high speed machining (ISO1940/1)

M4 Clamp Screw

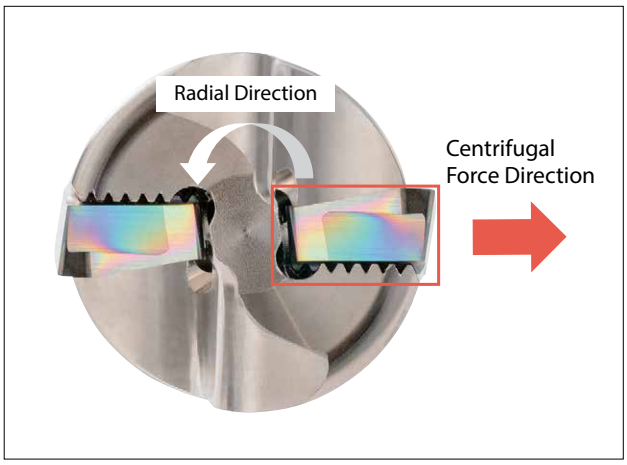
Unique Grooved Contact Surface

Prevents insert screw breakage and ensures greater safety

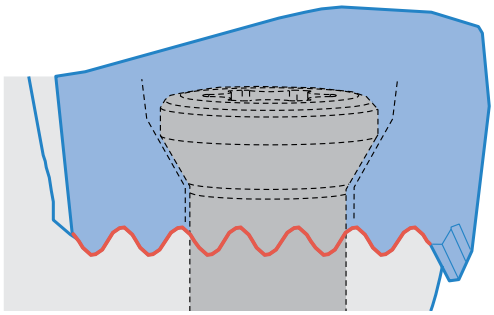
Back of the Insert

Grooved Insert Pocket

Centrifugal force is applied across the grooved surface to reduce pressure on the insert screw
Prevents insert screw breakage and safely secures the insert during high-speed revolutions



Grooved Contact Surface



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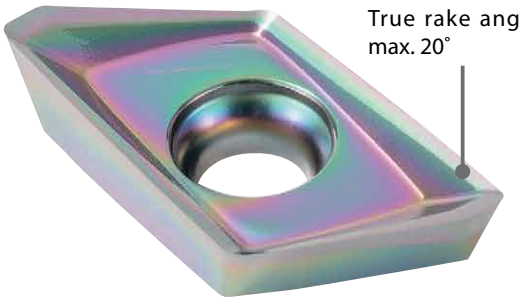
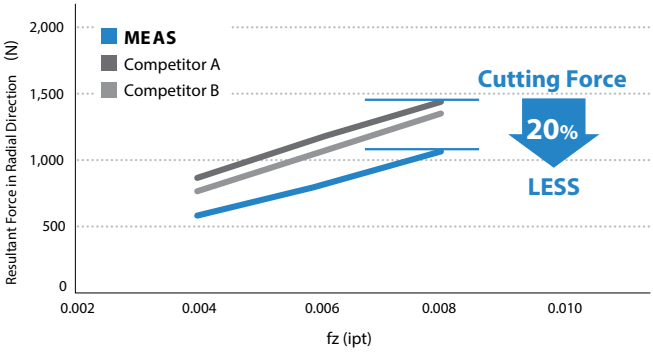
2 Low Cutting Force with Sharp Cutting Edge

True rake angle max. 20°
Low cutting force and excellent chattering resistance



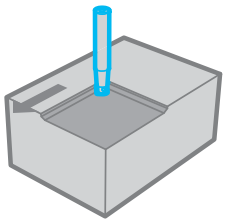
Cutting Force Comparison (Internal Evaluation)

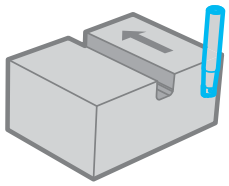


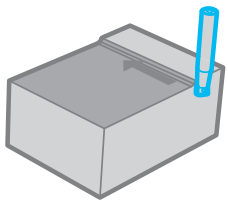
Cutting conditions: Vc = 390 m/min, ap × ae = 8 × 5mm, Dry
Cutter dia. ø25mm (2 Flutes) Workpiece material: A7075

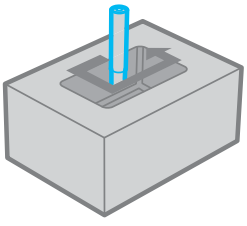
3 Machining for a Wide Variety of Applications

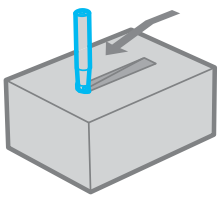
Max. ramping angle 20° (ø1.00" / ø25mm)
The MEAS can be used for shouldering, slotting, ramping, and helical milling applications

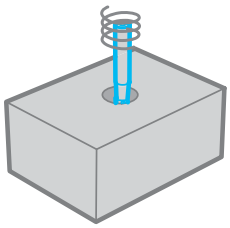

Facing, Shouldering

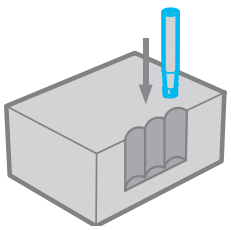

Slotting


Contouring


Pocketing


Ramping


Helical Milling


Plunging

MEAS (End Mill for Aluminum)

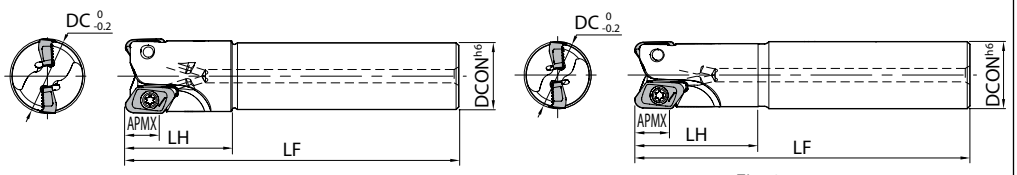


Fig. 1

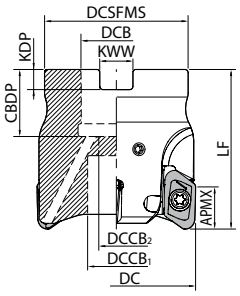
Fig. 2

Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions DC	DCON	LF	LH	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts: Anti-Seize Compound	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts ➡ M213
Inch	Cylindrical	Standard Shank	MEAS 1000-S1000-13-2T	●	2	1.000	1.000	5.000	2.000	0.472	+10	14	Yes	59,000	0.4	2	P-37	SB-4075TRP	DTPM-15	KCGT1305... KCGT1305...
			1250-S1250-13-2T	●	2	1.250	1.250	6.000	2.750			13		49,000	0.8	2		SB-4090TRP		
			1500-S1250-13-3T	●	3	1.500			2.000			12		42,000	0.9	1				
		Long Shank	MEAS 1000S1000132T675	●	2	1.000	1.000	6.750	3.550	0.472	+10	14	Yes	49,000	0.6	2	P-37	SB-4075TRP	DTPM-15	KCGT1305... KCGT1305...
			1250S1250132T800	●	2	1.250	1.250	8.000	4.800			13		39,000	1.1	2		SB-4090TRP		
mm	Cylindrical	Standard Shank	MEAS 25-S25-13-2T	●	2	25	25	125	49	12	+10	-14	Yes	59,000	0.4	2	P-37	SB-4075TRP	DTPM-15	KCGT1305... KCGT1305...
			28-S25-13-2T	●		28			40			-13		54,000	0.4	1		SB-4090TRP		
			32-S32-13-2T	●		32	32	150	69					49,000	0.8	2				
			35-S32-13-2T	●		35			50					46,000	0.9	1				
			40-S32-13-3T	●	3	40	32	150	50			-12		42,000	0.9	1				
		Long Shank	MEAS 25-S25-13-2T-170	●	2	25	25	170	89	12	+10	-14	Yes	49,000	0.5	2	P-37	SB-4075TRP	DTPM-15	KCGT1305...
			32-S32-13-2T-200	●		32	32	200	119			-13		39,000	1.1	2		SB-4090TRP		

When using inserts with a corner-R(RE) of 1/8" (3.2mm) or larger, additional modifications (R0.138" (3.5mm) or larger) on the corner of cutter body is necessary.
Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.
Recommended tightening torque for insert clamp : 3.5N·m

MEAS (Face Mill for Aluminum)



Toolholder Dimensions

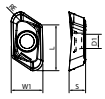
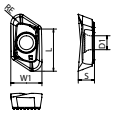
Unit	Part Number	Std. Item R	No. of Inserts	Dimensions DC	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Spare Parts: Anti-Seize Compound	Spare Parts: Arbor Bolt	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts ➡ M213
Inch	MEAS 2000R-13-4T	●	4	2.000	1.750	0.750	0.669	0.433	1.969	0.750	0.187	0.313	0.472	+10	-10	Yes	36,000	0.4	P-37	HH10X30H	SB-4090TRP	DTPM-15	KCGT1305...
mm	MEAS 050R-13-4T-M	●	4	50	45	22	18	11	50	21	6.3	10.4	12	+10	-11	Yes	36,000	0.4	P-37	HH10X30H	SB-4090TRP	DTPM-15	KCGT1305...

When using inserts with a corner-R(RE) of 1/8" (3.2mm) or larger, additional modifications (R0.138" (3.5mm) or larger) on the corner of cutter body is necessary.
Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.
Recommended tightening torque for insert clamp : 3.5N·m

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

KCGT

Usage Classification		
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel	P
	Mold and die steel	
	Austenitic stainless steel	M
	Martensitic stainless steel	
	Precipitation hardened stainless steel	
	Gray cast iron	K
	Nodular cast iron	
	Non-ferrous metals ★	N
	Heat-resistant alloy	S
	Titanium alloy	
	Hard materials	H

Insert		Part Number	No. of Edges	Dimensions (mm) S	D1	RE	L	W1	Carbide DLC PDL025	Applicable Toolholder ⇨ M212
	 Non-Ferrous Metals	KCGT 130504FR-AL	2	5.1	4.4	0.4	14.1	9.9	●	MEAS...
		130508FR-AL				0.8	13.9		●	
		130512FR-AL				1.2	13.8		●	
		130516FR-AL				1.6	13.3		●	
		130520FR-AL				2	13.3		●	
		130524FR-AL				2.4	13.3		●	
		130530FR-AL				3	13.3		●	
		130532FR-AL				3.2	12.8		●	
		130540FR-AL				4	12.8		●	
		130550FR-AL				5	12.8		●	
	 Tough Edge	KCGT 130504ER-AM	2	5.1	4.4	0.4	13.7	9.9	●	MEAS...
		130508ER-AM				0.8	13.7		●	
		130516ER-AM				1.6	13.3		●	
		130525ER-AM				2.5	13.3		●	
		130530ER-AM				3	13.3		●	
		130540ER-AM				4	12.8		●	

KCGT Inserts are sold in 10 piece boxes

Right-hand Insert Shown

Recommended Cutting Conditions

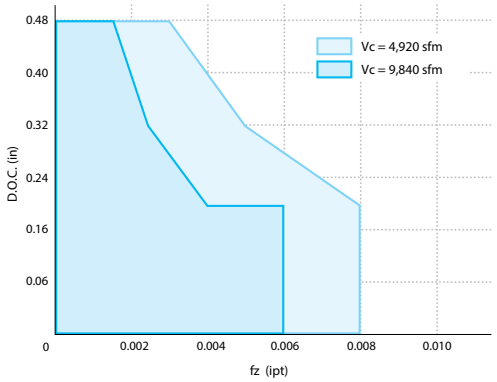
Workpiece Material		Chipbreaker	Vc (sfm)	ae	fz (ipt) D.O.C. = 0.197" (Reference Value)	
				DC	Cutting Dia. ≤ ø1.000" / ø28mm	Cutting Dia. ≥ ø1.250" / ø32mm
Aluminum Alloys	Si Ratio ≤ 12.5%	AL	660~3,280~9,840	≤ 0.5DC	0.002~0.006~0.010	
				0.5DC <		
		AM	660~3,280~16,400	≤ 0.5DC	0.002~0.006~0.012	0.002~0.008~0.014
				0.5DC <	0.002~0.006~0.010	0.002~0.006~0.012
	Si Ratio ≥ 12.5%	AL	660~980~1,310	≤ 0.5DC	0.002~0.004~0.008	
				0.5DC <		
		AM	660~980~2,620	≤ 0.5DC	0.002~0.006~0.012	0.002~0.008~0.014
				0.5DC <	0.002~0.006~0.010	0.002~0.006~0.012

- 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 (See page **M167**)
- Regularly changing the insert clamp screw is recommended
  Use appropriate safety covers to protect from tool breakage and chip scattering
- When using at a higher revolution (10,000min^{-1} or over), refer to the table below to adjust the balance of the MEAS and arbor

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

MEAS Cutting Performance

ø50mm (4 flutes) Shouldering ae = 0.984" Workpiece Material: 7175



Reduce the feed rate when machining at high speeds

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
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Ramping Reference Data

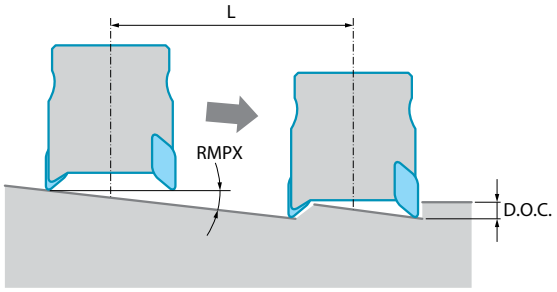
Cutter Dia. DC	1.000"	1.250"	1.500"	2.000"	25mm	28mm	32mm	35mm	40mm	50mm
Max. ramping angle RMPX	20°	12.5°	8.5°	6°	20°	16°	12.5°	11°	8.5°	6°
tan RMPX	0.363	0.221	0.149	0.105	0.363	0.287	0.221	0.194	0.149	0.105

Ramping Guide

Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
Reduce recommended feed rate by 50%

Formula for max. cutting length "L" at Max. ramping angle

$$L = \frac{D.O.C.}{\tan RMPX}$$



Plunging Guide

* When plunging, reduce feed rate to fz = ≤ 0.004 ipt.

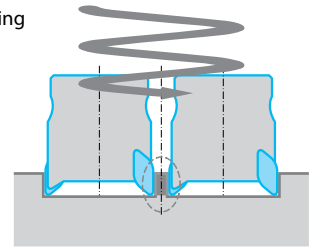
Insert Description	Max. Width of Cut (ae)
KCGT13 type	0.315"

Helical Milling Guide

For helical milling, use between min. cutting dia. and max. cutting dia.

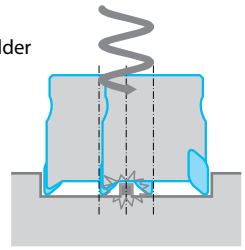
Over max. Cutting Dia.

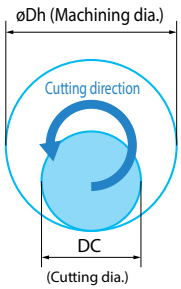
Center core part remains after machining



Under min. Cutting Dia.

Center core part interferes with toolholder





Cutter	Min. Cutting Dia.	Max. Cutting Dia.	Maximum Ramping Depth per Cycle
MEAS...13...	2 × DC - 0.630"	2 × DC - 0.118"	0.138"

Unit: inch

- Climb milling is recommended (refer to the figure above)
- Feed rate should be under 50% of the recommended cutting conditions
- Use caution to eliminate incidences caused by producing long chips

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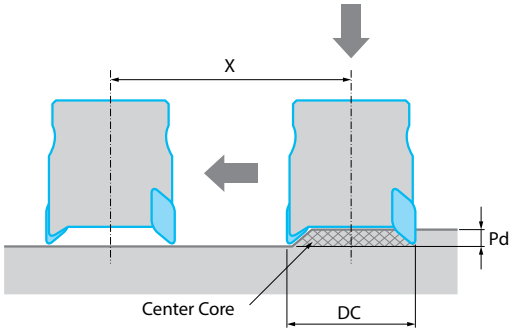
Drilling Guide



Drilling Depth

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

Traversing after Drilling

1. It is recommended to reduce feed by fz = 0.006 ipt or less until the center core is removed.
2. When drilling, reduce feed rate per revolution to f = 0.004 ipr or under.

Description	Max. Cutting Depth Pd	Min. Cutting Length X for Flat Bottom Surface
MEAS…-13-…	0.138	DC - 0.630"

Unit: inch

How to Mount Inserts

1. Be sure to remove dust and chips from the insert mounting pocket.

2. Insert screw

- Coat anti-seize compound thinly on portion of taper and thread.
- Attach screw to the magnetized wrench tip and tighten while gently pressing the outside edge of the insert toward the insert pocket surface (grooved surface)

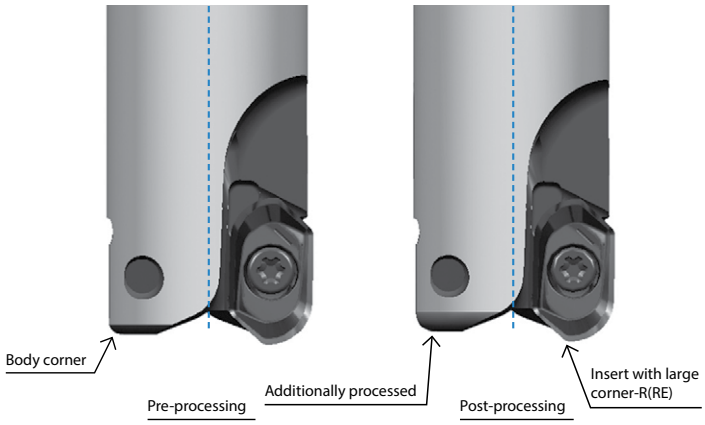
See the picture on the right. Recommended Torque 3.5N•m

When Using Inserts with a Corner-R(RE) of 3.2mm or larger

When using inserts with corner-R(RE) 3.2mm 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.
(If corner-R is 3.0mm or smaller, additional modifications are not needed)

Insert Corner-R(RE)	Additional Processing Dimension to Body Corner
1/8" (3.2mm)	R0.079" (2.0mm)
0.157" (4mm)	R0.098" (2.5mm)
0.197" (5mm)	R0.118" (3.0mm)

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



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
Do not use the end mill at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Please do not use under the following conditions :
When cutter is not fully loaded with inserts
If the body is damaged

Please wear protective equipment such as protective glove when changing inserts
Injury can occur when touching the cutting edge

Dynamic Balance

Balance adjustment on the cutter is completed before shipping

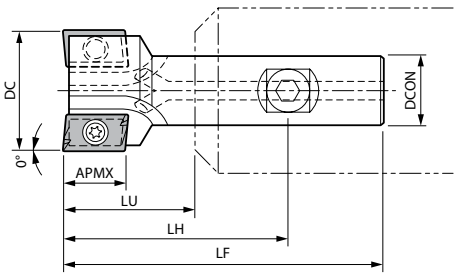
Balance adjustment to be ISO balance quality grade (ISO 1940-1) G6.3
When using at a higher revolution (10,000rpm or over), refer to the table below to adjust the balance of MEAS and arbor

Do not operate the balance adjustment screw on the outer periphery of the cutter. This could lead to improper dynamic balance

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

EM-AL (Fixed Pocket End Mill for Aluminum)

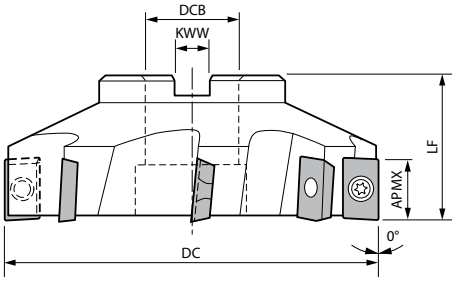
For CM-AL chamfering end mills for aluminum ➔ M298



Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions DC	DCON	LF	LH	LU	APMX	A.R. (°)	R.R. (°)	Coolant Hole	Max. Ramping Angle (°)	Insert Screw	Wrench	Applicable Inserts ➔ M217
Inch	EM 1000-AL	●	2	1	3/4	3.380	2.365	1.360	0.64	+5	-10	Yes	8	SCR-02	T15	APET1604...
	1250-AL	●		1-1/4							-7					
	1500-AL	●		1-1/2	1	4.000	2.864	1.740			-5					
	2000-AL	●	3	2		4.250	3.110	1.990			-2					
	EM 1000-2.75-AL	●	2	1	3/4	4.780	3.780	2.750	0.64	+5	-10	Yes	8	SCR-02	T15	APET1604...
	1000-3.75-AL	●			1	6.015	4.875	3.750								
	1250-2.125-AL	●		1-1/4		4.433	3.293	2.125			-7					

FM-AL (Fixed Pocket Face Mill for Aluminum)



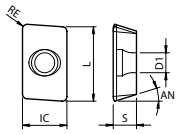
Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions DC	DCB	LF	KWW	APMX	A.R. (°)	R.R. (°)	Coolant Hole	Max. Ramping Angle (°)	Insert Screw	Wrench	Applicable Inserts ➔ M217
Inch	FM AL-2500-90-3	●	3	2-1/2	3/4	1.570	5/16	0.64	+5	-3	No	8	SCR-02	T15	APET1604...
	3000-90-AL	●	6	3	1		3/8		+5	+0					
	4000-90-AL	●	8	4											
	4000-90-AL-125	●			1-1/4		1/2								
	AL-4000-90-5	●	5		1		3/8								

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

APET

Usage Classification			
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel		P
	Mold and die steel		
	Stainless steel		M
	Gray cast iron		K
	Nodular cast iron		
	Non-ferrous metals	★	N
	Heat-resistant alloy		S
	Titanium alloy		
	Hard materials		H

Insert		Part Number	No. of Edges	Dimensions (in)					Angle (°)		Carbide	Applicable Toolholder ⇨ M216 M298
				IC	S	D1	RE	INSL	AN	AS	- / KW10	
		APET 1604PDFR	2	3/8	0.188	0.157	0.039	0.630	11	-	●	EM...-AL FMAL-... FM...-90-AL CM...-AL
		160416					0.062				●	
		160431					0.125				●	

Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade (Vc sfm)
		Uncoated Carbide
		KW10
Non-ferrous Metals	0.005~0.007	2,000~4,000

APET Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
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High-Precision Cutter for Finishing Applications

MFF

Cutter body design provides excellent reliability
Molded wiper inserts increase machining efficiency

1 Innovative Solutions for Finish Machining

Designed with a unique insert combination of semi-finishing and finishing, the MFF drastically improves productivity by reducing finish quality issues.

SOLUTION

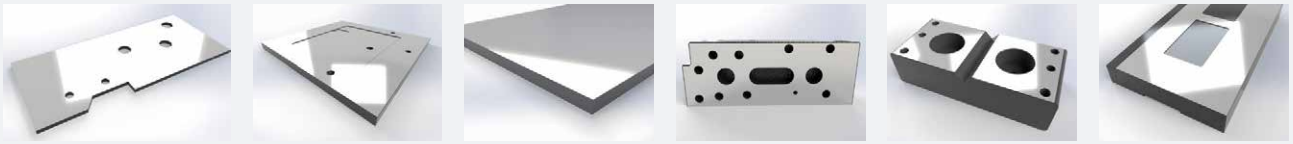
Increase feed to f = 0.197 ipt
Achieved 0.8 µm Ra surface finish
No grinding required
Achieved 5 µm flatness

The above is the result of a field test. Actual results will depend on machining environment, workpiece rigidity, machine, etc.

MFF
Machining solutions

Can be used on a wide variety or parts and workpieces

Parts	Workpiece Material	Industry
Plate / Frame / Case Cylinder pump / Rail Turbine housing Casing / Mold base	Rolled Steel for general structure / Gray cast iron / Spheroidal graphite cast iron Ni-resist cast iron Mold steel Carburized and hardened steel (60 HRC)	Industrial machining / Machine tools Shipbuilding / Automotive Construction machinery / Molds



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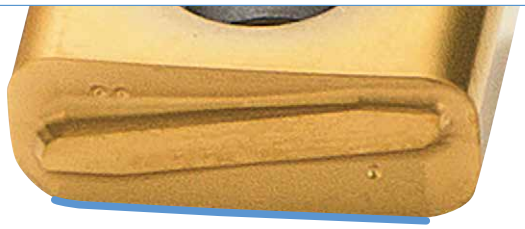
2 Molded Wiper Insert for High-Quality Surface Finish

Kyocera's unique molded insert technology for high feed rates and excellent surface finish



Low cutting force with special edge preparation

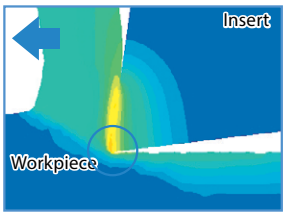
Micro-honing
Good sharpness

Wiper Edge

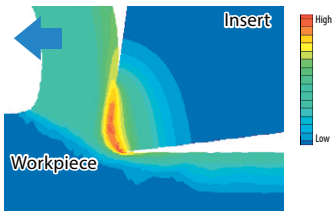
Large S-curve shape developed for higher feed rates

Edge Temperature Simulation Comparison (Internal Evaluation)

MFF



Conventional Tool After 2 sec machining



MEGACOAT NANO Cermet PV60M

For high-speed machining
Recommended Vc = ~ 1,150 sfm

High-quality surface finish

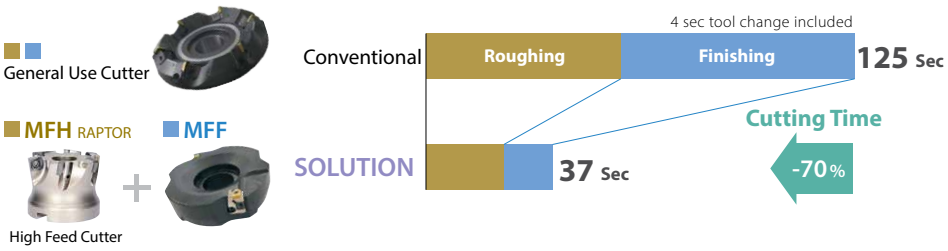
Molded TT Chipbreaker

Reduces chip clogging
High feed machining

Comprehensive Machining Solutions

From roughing to finish machining improvements (Internal Evaluation)

Combine with Kyocera's MFH high feed cutter to improve quality and efficiency



Cutting Conditions
Conventional Ø200mm (6 flute)
Vc = 660 sfm
Roughing : Vf = 11.26 ipm (fz = 0.006 ipt), D.O.C. = 0.047"
Finishing : Vf = 9.06 ipm (fz = 0.005 ipt), D.O.C. = 0.012"

SOLUTION
Roughing: MFH-RAPTOR Ø63mm (6 flute)
Vc = 660 sfm
Vf = 287.40 ipm (fz = 0.047 ipt), D.O.C. = 0.028"
Finishing: MFF Ø200mm (2 flute)
Vc = 980 sfm
Vf = 94.49 ipm (f = 0.197 ipt), D.O.C. = 0.004"

Surface finish quality after machining

The MFF SOLUTION

Excellent Surface Finish (0.27 µm Ra)

Conventional Machining

Cloudy Surface Finish (1.01 µm Ra)

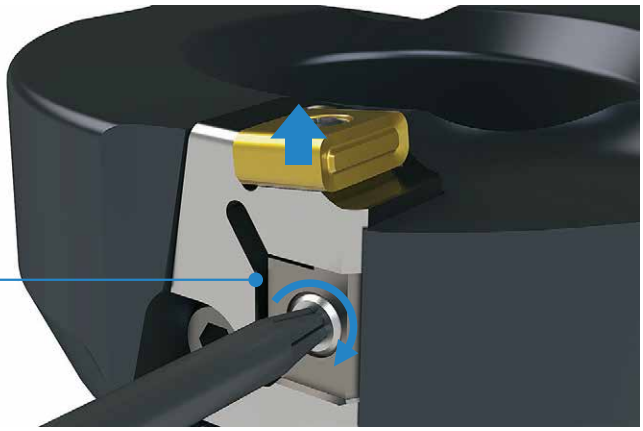
3 Adjustable Cutting Edge Height for Increased Usability

Cartridge height comes pre-adjusted and should not be necessary.

Adjustment is not required after replacing insert.

Easy-to-Adjust Cutting Edge

Cutting edge height can be adjusted easily with one screw

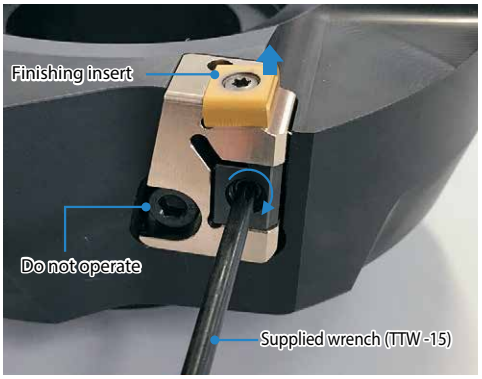


Included adjustment wrench

Edge Adjustment

If D.O.C. is 0.004"~0.008" (0.1mm ~ 0.2mm), no adjustment is necessary (Pre-adjusted before holder is shipped).
Cutting edge adjustment is NOT required when replacing inserts.

If D.O.C. is less than 0.1 mm or if you prefer a different edge height, use the following method:



Adjusting the cutting edge

Use the supplied TTW-15 wrench to rotate the screw and easily adjust the cutting edge position.

Procedure

To adjust, start with the screw turned counterclockwise about two rotations (lowering the cutting edge).
Tighten the screw clockwise (raising the cutting edge) to adjust the amount of protrusion.
*Use a dial gauge to measure protrusion amount.

Precautions

Make sure to lower the cutting edge below the desired height first (turning screw counterclockwise) and then raise the edge up to the final height (turning screw clockwise).
If cutting edge is simply lowered to the final edge height, chattering or loosening of the screw may occur due to backlash.
Make sure the measurement position of the cutting edge is the same machining diameter.

Standard Cutting Edge Height

D.O.C. = 0.0020" → protrusion against rough edge : 0.0012"
D.O.C. = 0.0039" ~ → protrusion against rough edge : 0.0024" *Pre-adjusted before shipment

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MFF

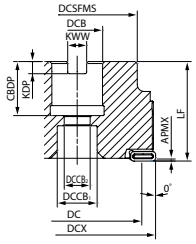


Fig. 1

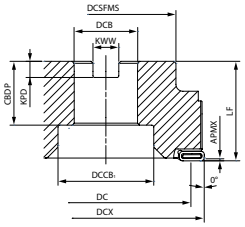


Fig. 2

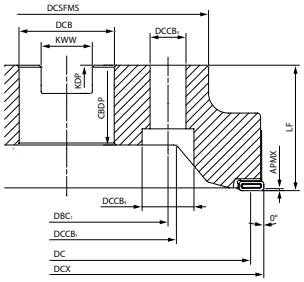


Fig. 3

Toolholder Dimensions

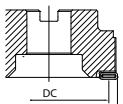
Unit	Part Number		Std. Item R	No. of Inserts	Dimensions DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	DCCB3	DCCB4	DBC1	LF	CBDP	KDP	KWW	APMX	A.R. (°)	R.R. (°) (Medium-Finishing Insert)	R.R. (°) (Finishing Insert)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Applicable Inserts M222 M42
mm	Inch Bore Dia.	MFF 080R-SF	●	2	67.3	80	60	1.000"	20	13	-	-	-	50	1.063"	0.236"	0.375"	0.3	-8	-9	-20	No	2,000	1.3	1	LNGX120916R-TT LNGX120916
		100R-SF	●		87.3	100	70	1.250"	48						1.260"	0.315"	0.500"						1,600	1.8	2	
		125R-SF	●		112.3	125	87	1.500"	58					63	1.496"	0.394"	0.625"						1,300	3.5	2	
		160R-SF	●		147.3	160	102	2.000"	72	-						0.433"	0.750"						1,000	5.9	2	
		200R-SF	●		187.3	200	142	1.875"	110		18	26	4.000"		1.575"	0.551"	1.000"						800	8.1	3	
		250R-SF	●		237.3	250																		10.8	3	
	Metric Bore Dia.	MFF 080R-M-SF	●	2	67.3	80	60	27	20	13	-	-	-	50	24	7	12.4	0.3	-8	-9	-20	No	2,000	1.3	1	LNGX120916R-TT LNGX120916
		100R-M-SF	●		87.3	100	70	32	48						32	8	14.4						1,600	1.8	2	
		125R-M-SF	●		112.3	125	87	40	55					63	33	9	16.4						1,300	3.5	2	
		160R-M-SF	●		147.3	160	102		72	-													1,000	5.9	2	
		200R-M-SF	●		187.3	200	142	60	110		18	26	101.6		40	14	25.7						800	7.7	3	
		250R-M-SF	●		237.3	250																		10.5	3	

*ø250mm sizes have holes for lighter weight.

Max. Revolution

Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page **M225**.
Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Surface Finish
The surface will be finished flat within the range of DC shown on the right.

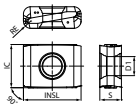
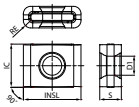


Spare Parts

Spare Parts							
Insert Screw	Wrench	Wedge	Cartridge	Cartridge Clamp Screw	Wrench	Adjustment Screw	Anti-seize Compound
SB-3592TR	DTM-10	AD-MFF	CR-MFF	HH5X15L	TTW-15	W6X18N	P-37
Recommended tightening torque for insert screw 1.2N•m							

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

LNGX

Insert		Part Number	No. of Edges	Dimensions (mm)					Cermet	Carbide		Applicable Toolholder ➡ M221 M40
				IC	S	D1	RE	INSL	PVD	PVD		
									PV60M	PR1525	PR1825	
	 Low Cutting Force	LNGX 120916R-TT	4	9.525	4.76	4.2	1.6	12.7	●	●	●	MFF...-SF MFSE45...-W MFSE45...-W-M
		LNGX 120916	4	9.525	4.76	4.2	1.6	12.7	●	●	●	MFF...-SF MFSE45...-W MFSE45...-W-M

Recommended Cutting Conditions ➡ **M223**

LNGX Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Chipbreaker	Workpiece Material	f (ipr)	D.O.C. (in)	Recommended Insert Grades (Vc : sfm)	
				PV60M	PR1825 (PR1525)
TT	Structural steel	0.059~**0.158**~0.197	0.001~**0.004**~0.012	★ 750~**920**~1,150	☆ 750~**920**~1,150
	Carbon steel	0.039~**0.158**~0.197		★ 660~**820**~1,150	☆ 660~**820**~1,150
	Alloy steel	0.039~**0.158**~0.197		★ 660~**820**~1,150	☆ 660~**820**~1,150
	Mold steel	0.039~**0.079**~0.158	0.001~**0.004**~0.008	☆ 390~**660**~820	★ 390~**660**~820
	Mold steel (50HRC～)	0.024~**0.039**~0.047	0.001~**0.002**~0.004	-	★ 160~**230**~260
	Austenitic stainless steel*	0.039~**0.079**~0.158	0.001~**0.004**~0.008	☆ 390~**660**~820	★ 390~**660**~820
	Martensitic stainless steel *	0.039~**0.118**~0.158		☆ 490~**660**~980	★ 490~**660**~980
Standard	Gray cast iron	0.039~**0.079**~0.158	0.001~**0.004**~0.012	☆ 660~**820**~1,150	★ 660~**820**~1,150
	Nodular cast iron	0.059~**0.079**~0.158		☆ 490~**820**~980	★ 490~**820**~980

*These cutters are 1-flute effective (recommended feed rates are in inches per rev)
*Machining with coolant is recommended for stainless steel
The number in bold is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

★: 1st Recommendation ☆: 2nd Recommendation

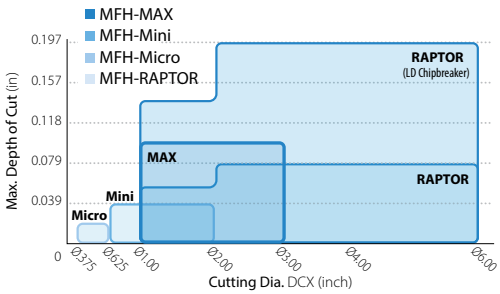
High-Feed Milling Series

(Cutter Dia. Ø1.000" ~ Ø6.000")
(Cutter Dia. Ø25mm ~ Ø160mm)

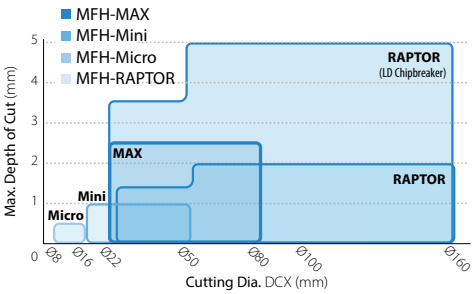
MFH-RAPTOR

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

MFH-Series Inch Diameter Range

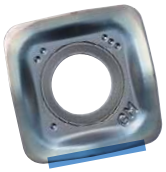


MFH-Series Metric Diameter Range



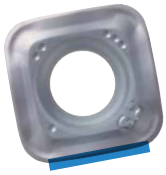
1 4 Different Insert Designs Offer a Variety of Machining Options

GM (General Milling)



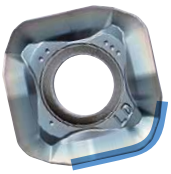
1st Choice for General Purpose
Multiple Metalworking Processes

GH (Tough Edge)



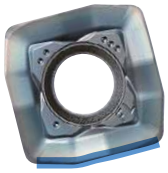
Tough Edge
Excellent Fracture Resistance

LD (Large D.O.C.)



1st Choice for Large D.O.C.
Available for Scale Removal
Max. D.O.C. = 0.197" (5mm)

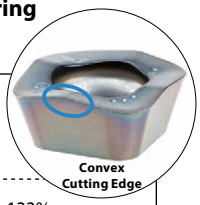
FL (Wiper Edge)



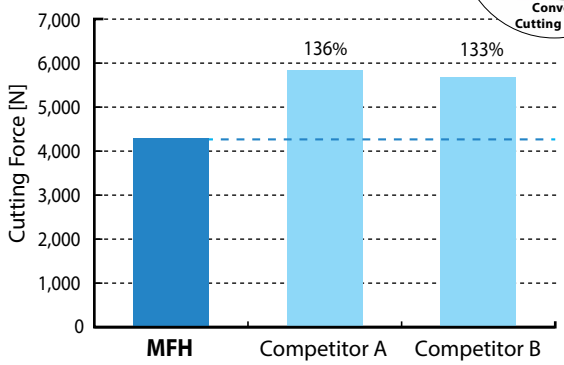
Wiper Edge
Roughing and Finishing Even in Low Horsepower Machining Centers

2 Molded Convex Cutting Edge Reduces Initial Shock when Entering Workpiece

Cutting Force (Shock) Comparison when Entering Workpiece (Internal Evaluation)



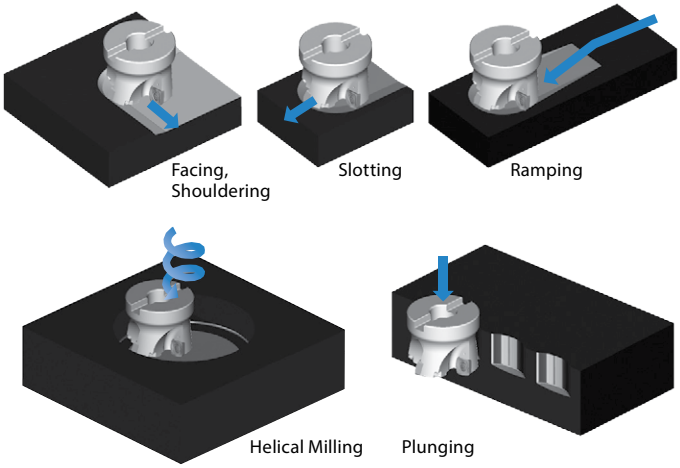
Width of cut ae is half of cutter diameter when cutting forces at initial contact are greatest



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

Resultant Force Shown

3 Multi-Functional Applications



* GM insert is applicable to all the above applications

* LD insert and FL insert are not applicable for helical milling, plunging, and contouring of rising wall (Please refer to **M184**)

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MFH-RAPTOR (Face Mill)

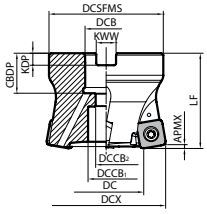


Fig. 1

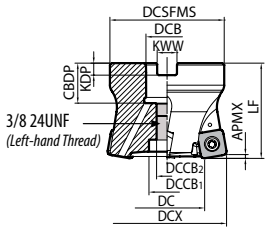


Fig. 2

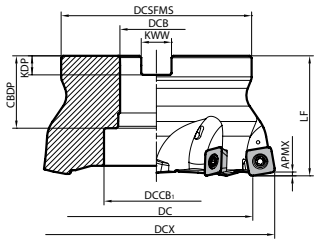


Fig. 3

Toolholder Dimensions (SOMT10 Inserts)

Unit	Part Number	Std. Item R	No. of Inserts	Dimensions DCX	DC (GM/GH)	DC (LD)	DC (FL)	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX	APMX2	A.R. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Applicable Inserts M233
Inch	MFH 2000R-10-4T	●	4	2.000	1.331	1.510	1.469	1.750	0.750	0.669	0.433	1.969	0.947	0.187	0.313	0.059 (0.138)	0.047	+10	-5	Yes	10,000	0.4	1	SOMT1004...
	2000R-10-5T	●	5																					
	2500R-10-5T	●	5	2.500	1.831	2.010	1.969	2.250					0.75						-4		8,800	0.7		
	2500R-10-6T	●	6																					
	3000R-10-7T	●	7	3.000	2.331	2.510	2.469	2.750	1.000	0.866	0.551	2.48	1.063	0.236	0.382						7,600	1.3		

Toolholder Dimensions (SOMT14 Inserts)

Unit	Part Number	Std. Item R	No. of Inserts	Dimensions DCX	DC (GM/GH)	DC (LD)	DC (FL)	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX	APMX2	A.R. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Applicable Inserts M233
Inch	MFH 2000R-14-4T	●	4	2.000	1.094	1.330	1.291	1.750	0.750	0.500	3/8 24UNF	1.969	0.827	0.187	0.313	0.079 (0.197)	0.079	+10	-10	Yes	8,800	0.4	2	SOMT1405...
	2000R-14-5T	●	5																				2	
	2500R-14-4T	●	4	2.500	1.594	1.830	1.791	2.250	0.750	0.669	0.433	1.969	0.750	0.187	0.313						7,400	0.6	1	
	2500R-14-5T	●	5																				1	
	2500R-14-5T-1000	●	5						1.000	0.866	0.551	2.480	1.063	0.236	0.382						7,400	0.7	1	
	3000R-14-5T	●	5	3.000	2.094	2.330	2.291	2.750	1.000	0.866	0.551	2.480	1.063	0.236	0.382				-9		6,400	1.2	1	
	3000R-14-6T	●	6																				1	
	3000R-14-6T-1250	●	6						1.250	1.000	0.657	2.480	1.063	0.280	0.504						6,400	1.3	1	
	4000R-14-6T	●	6	4.000	3.094	3.330	3.291	3.750	1.500	1.299	0.866	2.480	1.181	0.394	0.626				-7		5,600	2.3	1	
	4000R-14-7T	●	7																				1	
	5000R-14-7T	●	7	5.000	4.094	4.330	4.291		1.500	2.047	-	2.480	1.496	0.394	0.626						4,800	2.9	3	
	6000R-14-8T	●	8	6.000	5.094	5.330	5.291	4.880	2.000	2.835	-			0.433	0.752				-6	No	4,200	4.5	3	

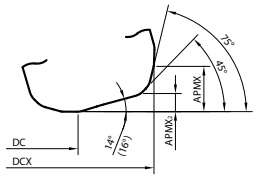
For APMX2, refer to the figure on **M226**
For SOMT10...-LD inserts (APMX = 0.138") and (APMX2 = 0.047").
For SOMT14...-LD inserts (APMX = 0.197") and (APMX2 = 0.079").
Max. Revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-Seize Compound thinly on portion of taper and thread prior to installation.

Spare Parts (MFH-RAPTOR - Inch Face Mills)

Part Number		Spare Parts						Applicable Inserts ➡ M233
		Insert Screw	Wrench		Anti-Seize Compound	Arbor Bolt	Mounting Screw	
			DTPM	TTP				
MFH	2000R-10-4T	SB-4090TRPN	DTPM-15 Recommended tightening torque for insert screw 3.5N•m		P-37	HH3/8-1.25(H)	–	SOMT100420ER-GM SOMT100420ER-LD SOMT100420ER-FL SOMT100420ER-GH
	2000R-10-5T							
	2500R-10-5T							
	2500R-10-6T							
	3000R-10-7T					HH1/2-1.25(H)	–	
MFH	2000R-14-4T	SB-50120TRP				-	XNS610*	
	2000R-14-5T	SB-5090TRP						
	2500R-14-4T	SB-50120TRP	TTP-20 Recommended tightening torque for insert screw 4.5N•m		P-37	HH3/8-1.25(H)	-	SOMT140520ER-GM SOMT140520ER-LD SOMT140514ER-FL SOMT140520ER-GH
	2500R-14-5T							
	2500R-14-5T-1000					HH1/2-1.25(H)	-	
	3000R-14-5T							
	3000R-14-6T							
	3000R-14-6T-1250					HH5/8-1.50(H)	-	
	4000R-14-6T					HH3/4-2.3H	-	
	4000R-14-7T							
	5000R-14-7T					-	-	
	6000R-14-8T							

(H) Optional coolant-through bolt available.

LD Chipbreaker Cutting Edge Dimensions



Angle in ( ) is for SOMT14 type

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

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

*Differential Screw (3/8-24UNF)

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MFH-RAPTOR (Face Mill)

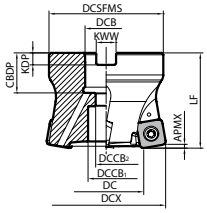


Fig. 1

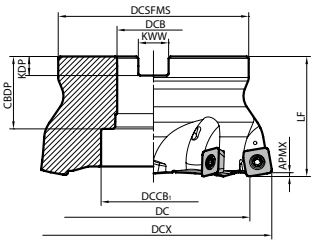


Fig. 2

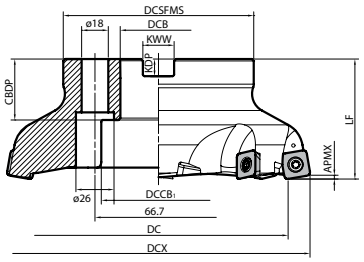


Fig. 3

Toolholder Dimensions (SOMT10 Inserts)

Unit		Part Number	Std. Item R	No. of Inserts	Dimensions DCX	DC (GM/GH)	DC (LD)	DC (FL)	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX	APMX2	A.R. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Applicable Inserts M233
mm	Inch Bore Dia.	MFH 050R-10-4T	●	4	50	33	37.5	36.5	47	0.875"	19	11	50	0.748"	0.197"	0.331"	1.5 (3.5)	1.2	+10	-5	Yes	10,000	0.4	1	SOMT1004...
		050R-10-5T	●	5																					
		063R-10-5T	●	5	63	46	50.5	49.5	60											-4		8,800	0.7		
		063R-10-6T	●	6																					
		080R-10-7T	●	7	80	63	67.5	66.5	76	1.250"	26	17	63	1.260"	0.315"	0.500"						7,600	1.3		
	Metric Bore Dia.	MFH 050R-10-4T-M	●	4	50	33	37.5	36.5	47	22	19	11	50	21	6.3	10.4	1.5 (3.5)	1.2	+10	-5	Yes	10,000	0.4	1	SOMT1004...
		050R-10-5T-M	●	5																					
		063R-10-5T-22M	●	5	63	46	50.5	49.5	60											-4		8,800	0.7		
		063R-10-5T-27M	●	5						27	20	13		24	7	12.4									
		063R-10-6T-22M	●	6						22	19	11		21	6.3	10.4									
		063R-10-6T-27M	●	6						27	20	13		24	7	12.4									
		080R-10-7T-M	●	7	80	63	67.5	66.5	76				63									7,600	1.6		

Toolholder Dimensions (SOMT14 Inserts)

Unit		Part Number	Std. Item R	No. of Inserts	Dimensions DCX	DC (GM/GH)	DC (LD)	DC (FL)	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX	APMX2	A.R. (°)		Coolant Hole	Max RPM	Weight (kg)	Fig.	Applicable Inserts M233
mm	Inch Bore Dia.	MFH 050R-14-4T	●	4	50	27	33	32	47	0.875"	12	-	50	0.748"	0.197"	0.331"	2 (5)	2	+10	-10	Yes	8,800	0.4	1	SOMT1405...
		063R-14-4T	●	4	63	40	46	45	60		19	11										7,400	0.6	1	
		063R-14-5T	●	5																				1	
		080R-14-5T	●	5	80	57	63	62	76	1.250"	26	17	63	1.260"	0.315"	0.500"				-8		6,400	1.3	1	
		080R-14-6T	●	6																				1	
		100R-14-6T	●	6	100	77	83	82	96											-7		5,600	2.4	1	
		100R-14-7T	●	7																				1	
		125R-14-7T	●	7	125	102	108	107	100	1.500"	55	-		1.496"	0.394"	0.625"						4,800	2.9	2	
		160R-14-8T	●	8	160	137	143	142		2.000"	72				0.433"	0.750"				-6	No	4,200	3.9	2	
	Metric Bore Dia.	MFH 050R-14-4T-M	●	4	50	27	33	32	47	22	12	-	50	21	6.3	10.4	2 (5)	2	+10	-10	Yes	8,800	0.4	1	SOMT1405...
		063R-14-4T-22M	●	4	63	40	46	45	60		19	11										7,400	0.6	1	
		063R-14-4T-27M	●	4						27	20	13		24	7	12.4								1	
		063R-14-5T-22M	●	5						22	19	11		21	6.3	10.4								1	
		063R-14-5T-27M	●	5						27	20	13		24	7	12.4								1	
		080R-14-5T-M	●	5	80	57	63	62	76	27	20	13	63	24	7	12.4				-8		6,400	1.4	1	
		080R-14-6T-M	●	6																				1	
		100R-14-6T-M	●	6	100	77	83	82	96	32	26	17		28	8	14.4				-7		5,600	2.4	2	
		100R-14-7T-M	●	7																				2	
		125R-14-7T-M	●	7	125	102	108	107	100	40	55	-		33	9	16.4						4,800	2.8	2	
		160R-14-8T-M	●	8	160	137	143	142			68			32						-6	No	4,200	3.7	3	

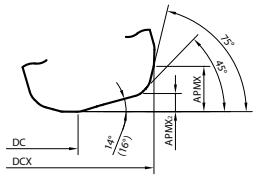
For APMX2, refer to the figure on **M228**
For SOMT10...-LD (APMX = 3.5mm) and (APMX2 = 1.2mm).
For SOMT14...-LD (APMX = 5mm) and (APMX2 = 2mm).
Max. Revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-Seize Compound thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Spare Parts (MFH-RAPTOR - Metric Face Mills)

Part Number		Spare Parts						Applicable Inserts ➡ M233
		Insert Screw	Wrench		Anti-Seize Compound	Arbor Bolt	Mounting Screw	
			DTPM	TTP				
MFH	050R-10-...	SB-4090TRPN	DTPM-15 Recommended tightening torque for insert screw 3.5N•m		P-37	HH10X30	-	SOMT100420ER-GM SOMT100420ER-LD SOMT100420ER-FL SOMT100420ER-GH
	050R-10-...-M							
	063R-10-...							
	063R-10-...-22M							
	063R-10-...-27M					HH12X35	-	
	080R-10-...					HH16X40	-	
	080R-10-...-M					HH12X35	-	
MFH	050R-14-...	SB-50120TRP	TTP-20 Recommended tightening torque for insert screw 4.5N•m		P-37	-	W10X31	SOMT140520ER-GM SOMT140520ER-LD SOMT140514ER-FL SOMT140520ER-GH
	050R-14-...-M							
	063R-14-...					HH10X30	-	
	063R-14-...-22M							
	063R-14-...-27M					HH12X35	-	
	080R-14-...					HH16X40	-	
	080R-14-...-M					HH12X35	-	
	100R-14-...					HH16X40	-	
	100R-14-...-M					-	-	
	125R-14-...					-	-	
	125R-14-...-M					-	-	
	160R-14-...					-	-	
	160R-14-...-M					-	-	

LD Chipbreaker Cutting Edge Dimensions



Angle in ( ) is for SOMT14 type

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

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

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MFH-RAPTOR (End Mill)

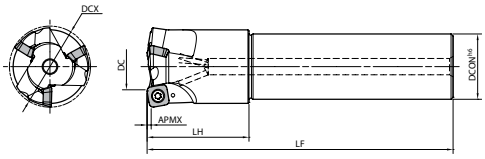


Fig. 1

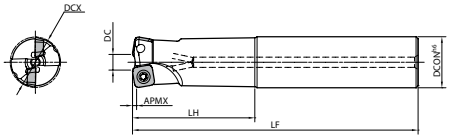


Fig. 2

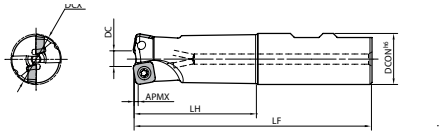


Fig. 3

Toolholder Dimensions (SOMT10 Inserts)

Unit			Part Number	Std. Item	No. of Inserts	Dimensions									A.R. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts			Applicable Inserts M233
						DCX	DCON	DC (GM/GH)	DC (LD)	DC (FL)	LF	LH	APMX	$APMX_2$							Anti-Seize Compound	Insert Screw	Wrench	
Inch	Standard Shank	Weldon	MFH 1000-W100-10-2T	●	2	1.000	1.000	0.331	0.508	0.469	5.500	3.173	0.059 (0.138)	0.047	+10	-5	Yes	17,000	0.4	3	P-37	SB-4075TRP	DTPM-15	SOMT1004...
			1250-W125-10-2T	●	2	1.250	1.250	0.581	0.758	0.719	6.000	2.750						14,000	0.8	3				
			1250-W125-10-3T	●	3															3	Recommended tightening torque for insert screw 3.5N•m			
			1500-W150-10-3T	●	3	1.500	1.500	0.831	1.008	0.969		2.000						11,500		3				
			1500-W150-10-4T	●	4															3				
	Long Shank	Cylindrical	MFH 1000-S100-10-2T-8	●	2	1.000	1.000	0.331	0.508	0.469	8.000	4.750	0.059 (0.138)	0.047	+10	-5	Yes	17,000	0.8	2	P-37	SB-4075TRP	DTPM-15	SOMT1004...
			1250-S125-10-2T-8	●	2	1.250	1.250	0.581	0.758	0.719								14,000		2	Recommended tightening torque for insert screw 3.5N•m			
			1500-S125-10-4T10	●	4	1.500	1.250	0.831	1.008	0.969	10.000	2.000						11,500		1				

For $APMX_2$, refer to the figure on **M226**
For SOMT10...-LD inserts (APMX = 0.138") and ($APMX_2$ = 0.047").
Max. Revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-Seize Compound thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MFH-RAPTOR (End Mill)

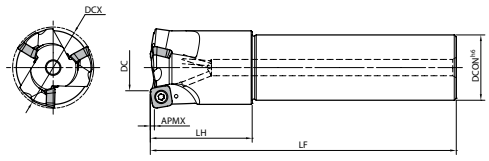


Fig. 1

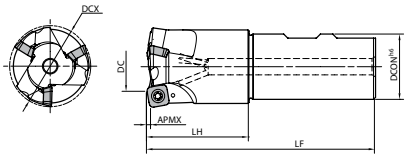


Fig. 2

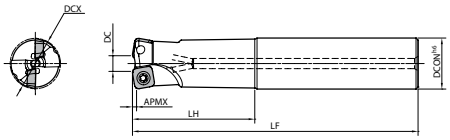


Fig. 3

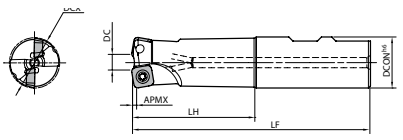


Fig. 4

Toolholder Dimensions (SOMT10 Inserts)

Unit			Part Number	Std. Item	No. of Inserts	Dimensions DCX	DCON	DC (GM/GH)	DC (LD)	DC (FL)	LF	LH	APMX	APMX2	A.R. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts: Anti-Seize Compound	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts M233
mm	Standard Shank	Cylindrical	MFH 25-S25-10-2T	●	2	25	25	8	12.5	11.5	140	60	1.5 (3.5)	1.2	+10	-5	Yes	17,000	0.4	3	P-37	SB-4075TRP	DTPM-15	SOMT1004...
			28-S25-10-2T	●	2	28		11	15.5	14.5		40						15,500	0.5	1				
			32-S32-10-2T	●	2	32	32	15	19.5	18.5	150	70						14,000	0.8	3				
			32-S32-10-3T	●	3															3				
			35-S32-10-2T	●	2	35		18	22.5	21.5		50						13,000		1				
			35-S32-10-3T	●	3															1				
			40-S32-10-3T	●	3	40		23	27.5	26.5								11,500	0.9	1				
			40-S32-10-4T	●	4															1				
		Weldon	MFH 25-W25-10-2T	●	2	25	25	8	12.5	11.5	117	60	1.5 (3.5)	1.2	+10	-5	Yes	17,000	0.4	4	P-37	SB-4075TRP	DTPM-15	SOMT1004...
			32-W32-10-3T	●	3	32	32	15	19.5	18.5	131	70						14,000	0.7	4				
			40-W32-10-3T	●	3	40		23	27.5	26.5	112	50						11,500		2				
			40-W32-10-4T	●	4															2				
	Long Shank	Cylindrical	MFH 25-S25-10-2T-200	●	2	25	25	8	12.5	11.5	200	120	1.5 (3.5)	1.2	+10	-5	Yes	17,000	0.6	3	P-37	SB-4075TRP	DTPM-15	SOMT1004...
			28-S25-10-2T-200	●	2	28		11	15.5	14.5		40						15,500	0.7	1				
			32-S32-10-2T-200	●	2	32	32	15	19.5	18.5		120						14,000	1	3				
			35-S32-10-2T-200	●	2	35		18	22.5	21.5		50						13,000	1.4	1				
			40-S32-10-4T-250	●	4	40		23	27.5	26.5	250							11,500	1.5	1				
	Extra Long Shank	Cylindrical	MFH 25-S25-10-2T-300	●	2	25	25	8	12.5	11.5	300	180	1.5 (3.5)	1.2	+10	-5	Yes	17,000	1	3	P-37	SB-4075TRP	DTPM-15	SOMT1004...
			28-S25-10-2T-300	●	2	28		11	15.5	14.5		40						15,500	1.1	1				
			32-S32-10-2T-300	●	2	32	32	15	19.5	18.5		180						14,000	1.6	3				
			35-S32-10-2T-300	●	2	35		18	22.5	21.5		50						13,000	1.7	1				
			40-S32-10-4T-300	●	4	40		23	27.5	26.5								11,500	1.8	1				

Recommended tightening torque for insert screw 3.5N•m

For APMX2, refer to the figure on **M228**
For SOMT10...-LD (APMX = 3.5mm) and (APMX2 = 1.2mm).
Max. Revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-Seize Compound thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MFH-RAPTOR (End Mill)

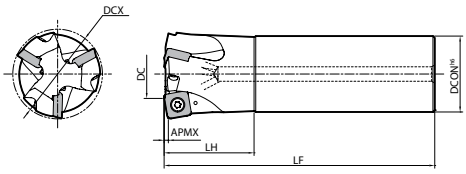


Fig. 1

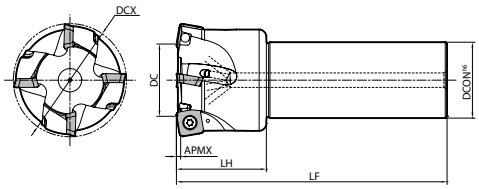


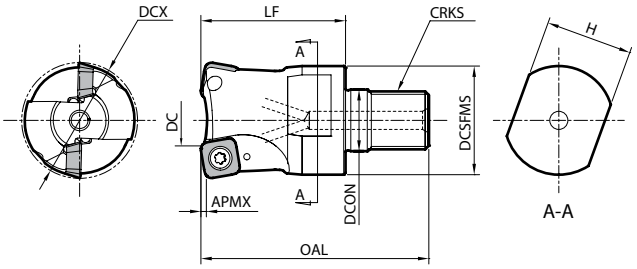
Fig. 2

Toolholder Dimensions (SOMT14 Inserts)

Unit		Part Number	Std. Item	No. of Inserts	Dimensions									A.R. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts			Applicable Inserts ➡ M233
					DCX	DCON	DC (GM/GH)	DC (LD)	DC (FL)	LF	LH	APMX	APMX₂							Anti-Seize Compound	Insert Screw	Wrench	
mm	Cylindrical	MFH 50-S42-14-3T	●	3	50	42	27	33	32	150	50	2 (5)	2	+10	-10	Yes	8,800	1.4	1	P-37	SB-50120TRP	TTP-20	SOMT1405...
		63-S42-14-4T	●	4	63		40	46	45						-10		7,400	1.7	2	Recommended tightening torque for insert screw 3.5N•m			
		80-S42-14-5T	●	5	80		57	63	62						-8		6,400	2.3	2				

For APMX₂, refer to the figure on **M228**
For SOMT14...-LD (APMX = 5mm) and (APMX₂ = 2mm).
Max. Revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-Seize Compound thinly on portion of taper and thread prior to installation.

MFH-RAPTOR (Modular Head)



Toolholder Dimensions (SOMT10 Inserts)

Unit	Part Number	Std. Item	No. of Inserts	Dimensions												A.R. (°)	R.R. (°)	Coolant Hole	Max RPM	Spare Parts			Applicable Inserts ➡ M233
				DCX	DCON	DC (GM/GH)	DC (LD)	DC (FL)	DCSFMS	OAL	LF	APMX	APMX₂	CRKS	H					Anti-Seize Compound	Screw	Wrench	
mm	MFH 25-M12-10-2T	●	2	25	12.5	8	12.5	11.5	23	57	35	1.5 (3.5)	1.2	M12×P1.75	19	+10	-5	Yes	17,000	P-37	SB-4075TRP	DTPM-15	SOMT1004...
	28-M12-10-2T	●	2	28		11	15.5	14.5											15,500				
	32-M16-10-2T	●	2	32	17	15	19.5	18.5	30	62	40			M16×P2.0	24				14,000				
	32-M16-10-3T	●	3																				
	35-M16-10-2T	●	2	35		18	22.5	21.5											13,000				
	35-M16-10-3T	●	3																				
	40-M16-10-3T	●	3	40		23	27.5	26.5											11,500				
	40-M16-10-4T	●	4																				

Recommended tightening torque for insert clamp 3.5N•m

For $APMX_2$, refer to the figure in **M228**
For SOMT10...-LD ($APMX = 3.5mm$) and ($APMX_2 = 1.2mm$).
Max. Revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-Seize Compound thinly on portion of taper and thread prior to installation.
See page **M324** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

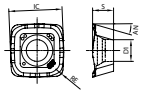
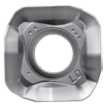
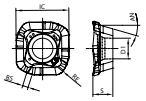
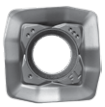
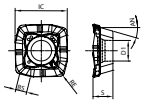
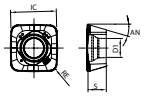
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

SOMT

Usage Classification

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

Carbon steel / Alloy steel				☆			★	☆	P
Mold and die steel				☆			★	☆	P
Austenitic stainless steel					☆		☆	★	M
Martensitic stainless steel	★							☆	M
Precipitation hardened stainless steel					☆			★	M
Gray cast iron			☆			★			K
Nodular cast iron			☆			★			K
Non-ferrous metals									N
Heat-resistant alloy	★							☆	S
Titanium alloy					☆			★	S
Hard materials (≤ 60 HRC)		★							H

Insert		Part Number	No. of Edges	Dimensions (mm) IC	S	D1	RE	BS	Angle (°) AN	Carbide CVD CA6535	PVD PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	Applicable Toolholder ➡ M225~M232
	 General Purpose	SOMT 100420ER-GM	4	10.3	4.58	4.6	2	-	16	●		△	●	●	●	●	●	MFH...-10-..
		SOMT 140520ER-GM	4	14.14	5.56	5.8	2	-	16	●		△	●	●	●	●	●	MFH...-14-..
	 Large D.O.C.	SOMT 100420ER-LD	4	10.45	4.58	4.6	2	0.9	16	●		△	●	●	●	●	●	MFH...-10-..
		SOMT 140520ER-LD	4	14.76	5.56	5.8	2	1.6	16	●		△	●	●	●	●	●	MFH...-14-..
	 With Wiper Edge	SOMT 100420ER-FL	4	10.44	4.58	4.6	2	1.4	16	●		△	●	●	●	●	●	MFH...-10-..
		SOMT 140514ER-FL	4	14.57	5.56	5.8	1.4	3.1	16	●		△	●	●	●	●	●	MFH...-14-..
	 Tough Edge	SOMT 100420ER-GH	4	10.43	4.57	4.55	2	-	16		●	△	●	●	●	●	●	MFH...-10-..
		SOMT 140520ER-GH	4	14.17	5.56	5.8	2	-	16		●	△	●	●	●	●	●	MFH...-14-..

Right-hand Insert Shown

Recommended Cutting Conditions ➡ M234~M235

SOMT Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Chipbreaker	Workpiece	Holder Part Number and Feed Rate (fz: ipt)					Recommended Insert Grade (Vc: sfm)				
		End Mill Feed Rates			Face Mill Feed Rates		MEGACOAT NANO EX (MEGACOAT NANO)			MEGACOAT HARD	CVD
		MFH1000 MFH25-	MFH1250 MFH32-	MFH1500 MFH40-	MFH…R-10	MFH…-14	PR1810 (PR1510)	PR1825 (PR1525)	PR1835 (PR1535)	PR015S	CA6535
GM GH	Carbon Steel	① 0.020~**0.032**~0.039 ② 0.008~**0.016**~0.020	① 0.020~**0.039**~0.059 ② 0.012~**0.028**~0.039	① 0.020~**0.047**~0.071 ② 0.016~**0.039**~0.059	0.020~**0.059**~0.079		-	★ 390~**590**~820	☆ 390~**590**~820	-	-
	Alloy Steel	① 0.020~**0.032**~0.039 ② 0.008~**0.016**~0.020	① 0.020~**0.039**~0.059 ② 0.012~**0.028**~0.039	① 0.020~**0.047**~0.071 ② 0.016~**0.039**~0.059	0.020~**0.059**~0.079		-	★ 330~**520**~720	☆ 330~**520**~720	-	-
	Mold Steel (~40 HRc)	① 0.020~**0.028**~0.032 ② 0.008~**0.012**~0.016	① 0.020~**0.032**~0.047 ② 0.012~**0.024**~0.032	① 0.020~**0.039**~0.063 ② 0.016~**0.032**~0.047	0.020~**0.047**~0.071		-	☆ 260~**460**~590	☆ 260~**460**~590	**GH** ★ 260-**460**-590	-
	Mold Steel (40~50 HRc)	① 0.006~**0.012**~0.020 ② 0.006~**0.008**~0.010	① 0.008~**0.020**~0.032 ② 0.008~**0.012**~0.018	① 0.008~**0.024**~0.035 ② 0.008~**0.020**~0.028	0.008~**0.028**~0.039		-	☆ 200~**330**~430	-	**GH** ★ 200-**330**-430	-
	Mold Steel (50~55 HRc)	① 0.006~**0.010**~0.016	① 0.006~**0.014**~0.024	① 0.006~**0.010**~0.028	0.008~**0.020**~0.031		-	☆ 160~230~330	-	**GH** ★ 160-**230**-330	-
	Mold Steel (55~60 HRc)	① 0.0004-**0.0024**-0.0039 (Recommended only with GH chipbreaker)					-	-	-	**GH** ☆ 160-**200**-230	-
	Austenitic Stainless Steel	① 0.020~**0.028**~0.032 ② 0.008~**0.012**~0.016	① 0.020~**0.032**~0.047 ② 0.012~**0.024**~0.032	① 0.020~**0.039**~0.063 ② 0.016~**0.032**~0.047	0.020~**0.047**~0.071		-	**GM** ☆ 330~**520**~660	**GM** ☆ 330~**520**~660	-	-
	Martensitic Stainless Steel	① 0.020~**0.028**~0.032 ② 0.008~**0.012**~0.016	① 0.020~**0.032**~0.047 ② 0.012~**0.024**~0.032	① 0.020~**0.039**~0.063 ② 0.016~**0.032**~0.047	0.020~**0.047**~0.071		-	-	☆ 490~**660**~820	-	★ 590~**790**~980
	Precipitation Hardened Stainless Steel	① 0.020~**0.028**~0.032 ② 0.008~**0.012**~0.016	① 0.020~**0.032**~0.047 ② 0.012~**0.024**~0.032	① 0.020~**0.039**~0.063 ② 0.016~**0.032**~0.047	0.020~**0.047**~0.071		-	-	★ 300~390~490	-	-
	Gray Cast Iron	① 0.020~**0.032**~0.039 ② 0.008~**0.016**~0.020	① 0.020~**0.039**~0.059 ② 0.012~**0.028**~0.039	① 0.020~**0.047**~0.071 ② 0.016~**0.039**~0.059	0.020~**0.059**~0.079		★ 390~**590**~820	-	-	-	-
	Nodular Cast Iron	① 0.020~**0.028**~0.032 ② 0.008~**0.012**~0.016	① 0.020~**0.032**~0.047 ② 0.012~**0.024**~0.032	① 0.020~**0.039**~0.063 ② 0.016~**0.032**~0.047	0.020~**0.047**~0.071		★ 330~**490**~660	-	-	-	-
	Ni-base Heat Resistant Alloy	① 0.008~**0.016**~0.024 ② 0.006~**0.008**~0.012	① 0.008~**0.020**~0.035 ② 0.008~**0.016**~0.024	① 0.008~**0.024**~0.039 ② 0.008~**0.020**~0.032	0.008~**0.032**~0.047		-	-	☆ 70~**100**~160	-	★ 70~**100**~160
	Titanium Alloy	① 0.008~**0.016**~0.024 ② 0.006~**0.008**~0.012	① 0.008~**0.020**~0.035 ② 0.008~**0.016**~0.024	① 0.008~**0.024**~0.039 ② 0.008~**0.020**~0.032	0.008~**0.032**~0.047		**GM** ☆ 100~**160**~230	-	**GM** ★ 130~**200**~260	-	-
LD	Carbon Steel	① 0.020~**0.032**~0.039 ③ 0.002~**0.004**~0.008	① 0.020~**0.039**~0.059 ③ 0.002~**0.006**~0.012	① 0.020~**0.047**~0.071 ③ 0.002~**0.008**~0.012	① 0.020~**0.059**~0.079 ③ 0.002~**0.008**~0.012	④ 0.020~**0.059**~0.079 ⑤ 0.002~**0.008**~0.016	-	★ 390~**590**~820	☆ 390~**590**~820	-	-
	Alloy Steel	① 0.020~**0.032**~0.039 ③ 0.002~**0.004**~0.008	① 0.020~**0.039**~0.059 ③ 0.002~**0.006**~0.012	① 0.020~**0.047**~0.071 ③ 0.002~**0.008**~0.012	① 0.020~**0.059**~0.079 ③ 0.002~**0.008**~0.012	④ 0.020~**0.059**~0.079 ⑤ 0.002~**0.008**~0.016	-	★ 330~**520**~720	☆ 330~**520**~720	-	-
	Mold Steel (~40 HRc)	① 0.020~**0.028**~0.032 ③ 0.002~**0.003**~0.006	① 0.020~**0.032**~0.047 ③ 0.002~**0.004**~0.008	① 0.020~**0.039**~0.063 ③ 0.002~**0.006**~0.008	① 0.020~**0.047**~0.071 ③ 0.002~**0.006**~0.008	④ 0.020~**0.047**~0.071 ⑤ 0.002~**0.006**~0.012	-	★ 260~**460**~590	☆ 260~**460**~590	-	-
	Mold Steel (40~50 HRc)	① 0.008~**0.012**~0.020 ③ 0.001~**0.002**~0.004	① 0.008~**0.020**~0.032 ③ 0.001~**0.003**~0.006	① 0.008~**0.024**~0.035 ③ 0.001~**0.004**~0.006	① 0.008~**0.028**~0.039 ③ 0.001~**0.004**~0.006	④ 0.008~**0.028**~0.039 ⑤ 0.001~**0.004**~0.008	-	★ 200~**330**~430	☆ 200~**330**~430	-	-
	Austenitic Stainless Steel	① 0.020~**0.028**~0.032 ③ 0.002~**0.003**~0.006	① 0.020~**0.032**~0.047 ③ 0.002~**0.004**~0.008	① 0.020~**0.039**~0.063 ③ 0.002~**0.006**~0.008	① 0.020~**0.047**~0.071 ③ 0.002~**0.006**~0.008	④ 0.020~**0.047**~0.071 ⑤ 0.002~**0.006**~0.012	-	☆ 330~**520**~660	★ 330~**520**~660	-	-
	Martensitic Stainless Steel	① 0.020~**0.028**~0.032 ③ 0.002~**0.003**~0.006	① 0.020~**0.032**~0.047 ③ 0.002~**0.004**~0.008	① 0.020~**0.039**~0.063 ③ 0.002~**0.006**~0.008	① 0.020~**0.047**~0.071 ③ 0.002~**0.006**~0.008	④ 0.020~**0.047**~0.071 ⑤ 0.002~**0.006**~0.012	-	-	☆ 490~**660**~820	-	★ 590~**790**~980
	Precipitation Hardened Stainless Steel	① 0.020~**0.028**~0.032 ③ 0.002~**0.003**~0.006	① 0.020~**0.032**~0.047 ③ 0.002~**0.004**~0.008	① 0.020~**0.039**~0.063 ③ 0.002~**0.006**~0.008	① 0.020~**0.047**~0.071 ③ 0.002~**0.006**~0.008	④ 0.020~**0.047**~0.071 ⑤ 0.002~**0.006**~0.012	-	-	★ 300~**390**~490	-	-
	Gray Cast Iron	① 0.020~**0.032**~0.039 ③ 0.002~**0.004**~0.008	① 0.020~**0.039**~0.059 ③ 0.002~**0.006**~0.012	① 0.020~**0.047**~0.071 ③ 0.002~**0.008**~0.012	① 0.020~**0.059**~0.079 ③ 0.002~**0.008**~0.012	④ 0.020~**0.059**~0.079 ⑤ 0.002~**0.008**~0.016	★ 390~**590**~820	-	-	-	-
	Nodular Cast Iron	① 0.020~**0.028**~0.032 ③ 0.002~**0.003**~0.006	① 0.020~**0.032**~0.047 ③ 0.002~**0.004**~0.008	① 0.020~**0.039**~0.063 ③ 0.002~**0.006**~0.008	① 0.020~**0.047**~0.071 ③ 0.002~**0.006**~0.008	④ 0.020~**0.047**~0.071 ⑤ 0.002~**0.006**~0.012	★ 330~**490**~660	-	-	-	-
	Ni-base Heat Resistant Alloy	① 0.008~**0.016**~0.024 ③ 0.001~**0.002**~0.004	① 0.008~**0.020**~0.035 ③ 0.001~**0.003**~0.006	① 0.008~**0.024**~0.039 ③ 0.001~**0.004**~0.006	① 0.008~**0.032**~0.047 ③ 0.001~**0.004**~0.006	④ 0.008~**0.032**~0.047 ⑤ 0.001~**0.004**~0.008	-	-	☆ 70~**100**~160	-	★ 70~**100**~160
	Titanium Alloy	① 0.008~**0.016**~0.024 ③ 0.001~**0.002**~0.004	① 0.008~**0.020**~0.035 ③ 0.001~**0.003**~0.006	① 0.008~**0.024**~0.039 ③ 0.001~**0.004**~0.006	① 0.008~**0.032**~0.047 ③ 0.001~**0.004**~0.006	④ 0.008~**0.032**~0.047 ⑤ 0.001~**0.004**~0.008	☆ 100~**160**~230	-	★ 130~**200**~260	-	-

★: 1st Recommendation ☆: 2nd Recommendation

① **For D.O.C. ≤ 0.039"**
② **For D.O.C. 0.040 - 0.059"**
③ **For D.O.C. 0.040 - 0.138"**
④ **For D.O.C. ≤ 0.079"**
⑤ **For D.O.C. 0.080 - 0.197"**

- Machining with coolant is recommended for Ni-base Heat Resistant Alloy and Titanium Alloy
- The figure in bold font is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
- Machining with CAT30 or equivalent, feed rate should be reduced to 25% of recommended cutting conditions
- Internal coolant is recommended for slotting applications
- For finishing, maximum recommended feed is f = 0.059 ipt for **SOMT14-LD** type, f = 0.035 ipt for **SOMT10-LD** type, f = 0.118 ipt for **SOMT14-FL** type, f = 0.055 ipt for **SOMT10-FL** type

Recommended Cutting Conditions

Chipbreaker	Workpiece	Holder Part Number and Feed Rate (fz: ipt)					Recommended Insert Grade (Vc: sfm)				
		End Mill Feed Rates			Face Mill Feed Rates		MEGACOAT NANO EX (MEGACOAT NANO)			MEGACOAT HARD	CVD
		MFH1000 MFH25-	MFH1250 MFH32-	MFH1500 MFH40-	MFH...R-10	MFH...R-14	PR1810 (PR1510)	PR1825 (PR1525)	PR1835 (PR1535)	PR015S	CA6535
FL	Carbon Steel	① 0.020~**0.032**~0.039 ② 0.008~**0.016**~0.020	① 0.020~**0.039**~0.059 ② 0.012~**0.028**~0.039	① 0.020~**0.047**~0.071 ② 0.016~**0.039**~0.059	0.020~**0.059**~0.079		-	★ 390~**590**~820	☆ 390~**590**~820	-	-
	Alloy Steel	① 0.020~**0.032**~0.039 ② 0.008~**0.016**~0.020	① 0.020~**0.039**~0.059 ② 0.012~**0.028**~0.039	① 0.020~**0.047**~0.071 ② 0.016~**0.039**~0.059	0.020~**0.059**~0.079		-	★ 330~**520**~720	☆ 330~**520**~720	-	-
	Mold Steel (~40 HRc)	① 0.020~**0.028**~0.032 ② 0.008~**0.012**~0.016	① 0.020~**0.032**~0.047 ② 0.012~**0.024**~0.032	① 0.020~**0.039**~0.063 ② 0.016~**0.032**~0.047	0.020~**0.047**~0.071		-	★ 260~**460**~590	☆ 260~**460**~590	-	-
	Mold Steel (40~50 HRc)	① 0.006~**0.012**~0.020 ② 0.006~**0.008**~0.010	① 0.008~**0.020**~0.032 ② 0.008~**0.012**~0.018	① 0.008~**0.024**~0.035 ② 0.008~**0.020**~0.028	0.008~**0.028**~0.039		-	★ 200~**330**~430	☆ 200~**330**~430	-	-
	Austenitic Stainless Steel	① 0.020~**0.028**~0.032 ② 0.008~**0.012**~0.016	① 0.020~**0.032**~0.047 ② 0.012~**0.024**~0.032	① 0.020~**0.039**~0.063 ② 0.016~**0.032**~0.047	0.020~**0.047**~0.071		-	☆ 330~**520**~660	★ 330~**520**~660	-	-
	Martensitic Stainless Steel	① 0.020~**0.028**~0.032 ② 0.008~**0.012**~0.016	① 0.020~**0.032**~0.047 ② 0.012~**0.024**~0.032	① 0.020~**0.039**~0.063 ② 0.016~**0.032**~0.047	0.020~**0.047**~0.071		-	-	☆ 490~**660**~820	-	★ 590~**790**~980
	Precipitation Hardened Stainless Steel	① 0.020~**0.028**~0.032 ② 0.008~**0.012**~0.016	① 0.020~**0.032**~0.047 ② 0.012~**0.024**~0.032	① 0.020~**0.039**~0.063 ② 0.016~**0.032**~0.047	0.020~**0.047**~0.071		-	-	★ 300~**390**~490	-	-
	Gray Cast Iron	① 0.020~**0.032**~0.039 ② 0.008~**0.016**~0.020	① 0.020~**0.039**~0.059 ② 0.012~**0.028**~0.039	① 0.020~**0.047**~0.071 ② 0.016~**0.039**~0.059	0.020~**0.059**~0.079		★ 390~**590**~820	-	-	-	-
	Nodular Cast Iron	① 0.020~**0.028**~0.032 ② 0.008~**0.012**~0.016	① 0.020~**0.032**~0.047 ② 0.012~**0.024**~0.032	① 0.020~**0.039**~0.063 ② 0.016~**0.032**~0.047	0.020~**0.047**~0.071		★ 330~**490**~660	-	-	-	-
	Ni-base Heat Resistant Alloy	① 0.008~**0.016**~0.024 ② 0.006~**0.008**~0.012	① 0.008~**0.020**~0.035 ② 0.008~**0.016**~0.024	① 0.008~**0.024**~0.039 ② 0.008~**0.020**~0.032	0.008~**0.032**~0.047		-	-	☆ 70~**100**~160	-	★ 70~**100**~160
	Titanium Alloy	① 0.008~**0.016**~0.024 ② 0.006~**0.008**~0.012	① 0.008~**0.020**~0.035 ② 0.008~**0.016**~0.024	① 0.008~**0.024**~0.039 ② 0.008~**0.020**~0.032	0.008~**0.032**~0.047		☆ 100~**160**~230	-	★ 130~**200**~260	-	-

★: 1st Recommendation ☆: 2nd Recommendation

① **For D.O.C. ≤ 0.039"**
② **For D.O.C. 0.040 - 0.059"**
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- Machining with coolant is recommended for Ni-base Heat Resistant Alloy and Titanium Alloy
- The figure in bold font is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
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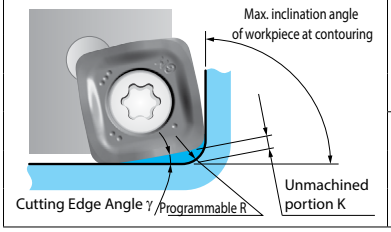
Approximate Programming Radius Adjustment

Shape	Holder	Chipbreaker	Cutting Edge Angle γ	Programmable R (in) Recommended	Max. Non-machined Portion K (in)	Side Wall Max. Inclination Angle (°)
	MFH…-10-…	GM / GH	10°	0.118	0.034	90°
		LD	14°	0.148	0.027	65°
		FL	14°	0.118	0.035	80°
	MFH…-14-…	GM / GH	10°	0.148	0.054	90°
		LD	16°	0.197	0.042	65°
		FL	13°	0.118	0.054	80°

Ramping Reference Data

MFH…-10-…

Cutter Dia. DCX (in)	1.00"	-	1.25"	-	1.50"	2.00"	2.50"	3.00"
Cutter Dia. DCX (mm)	25mm	28mm	32mm	35mm	40mm	50mm	63mm	80mm
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-…

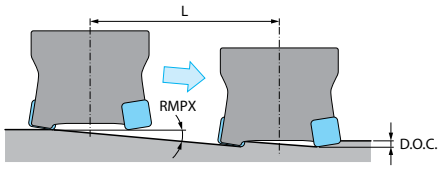
Cutter Dia. DCX (in)	2.00"	2.50"	3.00"	4.00"	5.00"	6.00"
Cutter Dia. DCX (mm)	50mm	63mm	80mm	100mm	125mm	160mm
Max. Ramping Angle RMPX (°)	2°	1.8°	1°	0.5°	0.4°	0.2°
tan RMPX	0.035	0.031	0.017	0.009	0.007	0.003

Ramping Guide

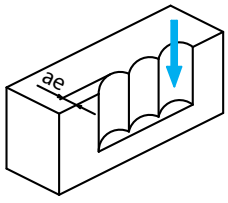
- Ramping angle RPMX (maximum ramping angle) should be under above cutting conditions
- Reduce recommended feed rate in cutting conditions above by 70%

Formula for Max. Cutting Length (L) at Max. Ramping Angle

$$L = \frac{D.O.C.}{\tan RMPX}$$



Plunging



Insert Description	Maximum Width of Cut (ae)
SOMT10 Type	0.315"
SOMT14 Type	0.453"

- LD and FL chipbreakers are not available for plunging
- Reduce feed rate to fz = 0.008ipt when plunging

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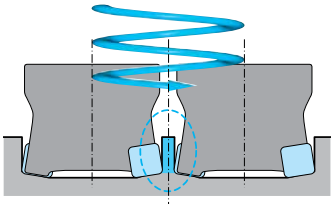
Helical Milling

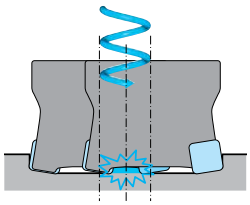
For Helical milling, use between Min. Drilling Dia. and Max. Drilling Dia.

⃠ Exceeding Max. Machining Dia.



Center Core Remains

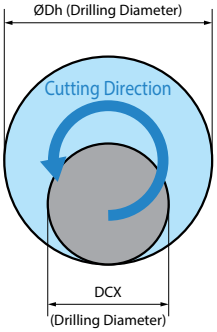
⃠ Under Min. Machining Dia.



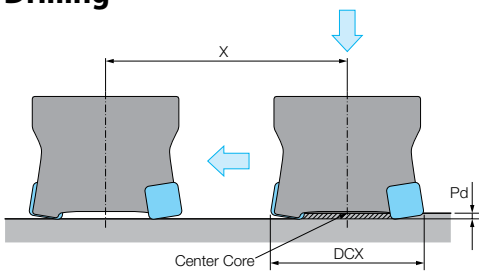
Center Core Hits Holder Body

Holder	Min. Drilling Dia. ØDh1	Max. Drilling Dia. ØDh2	Max. Ramping Depth per Cycle
MFH…-10-…	2×DCX–0.709"	2×DCX–0.079"	GM = 0.059"
MFH…-14-…	2×DCX–0.984"	2×DCX–0.079"	GM = 0.079"

- Keep machine depth per rotation less than max D.O.C. (APMX) in the cutter dimensions chart
- Use climb milling. (Refer to detail on right)
- Feed rates should be reduced to 50% of recommended cutting conditions
- Use caution to eliminate incidences caused by producing long chips



Drilling



3D Machining

Chipbreaker	Ramping	Contouring (Rising Wall Angle)	Plunging	Helical Milling	Pocketing
GM / GH	✓	✓ (90°)	✓	✓	✓
LD	✓	Limit (65°)	X	X	X
FL	✓	Limit (80°)	X	X	X

- Some applications are not available depending on chipbreaker.
- For FL and LD type, there is a limit of rising wall angle during contouring.

Holder	GM / GH		LD		FL	
	Max. Drilling Depth (Pd)	Min. Cutting Length (X) for Flat Bottom Surface	Max. Drilling Depth (Pd)	Min. Cutting Length (X) for Flat Bottom Surface	Max. Drilling Depth (Pd)	Min. Cutting Length (X) for Flat Bottom Surface
MFH…-10-…	0.059"	DCX–0.709"	0.059"	DCX–0.551"	0.059"	DCX–0.591"
MFH…-14-…	0.079"	DCX–0.945"	0.079"	DCX–0.709"	0.079"	DCX–0.748"

[Drilling Depth]
See Max. Drilling Depth (Pd) in the above cutting conditions
Traversing after Drilling
1. It is recommended to reduce feed by 25% of recommended cutting conditions until Center Core is removed
2. Axial feed rate recommendation per revolution is 0.008 ipr while drilling

High-Feed Small Diameter / Large D.O.C. Milling

(Cutter Dia. Ø1.000" ~ Ø3.000")
(Cutter Dia. Ø22mm ~ Ø80mm)

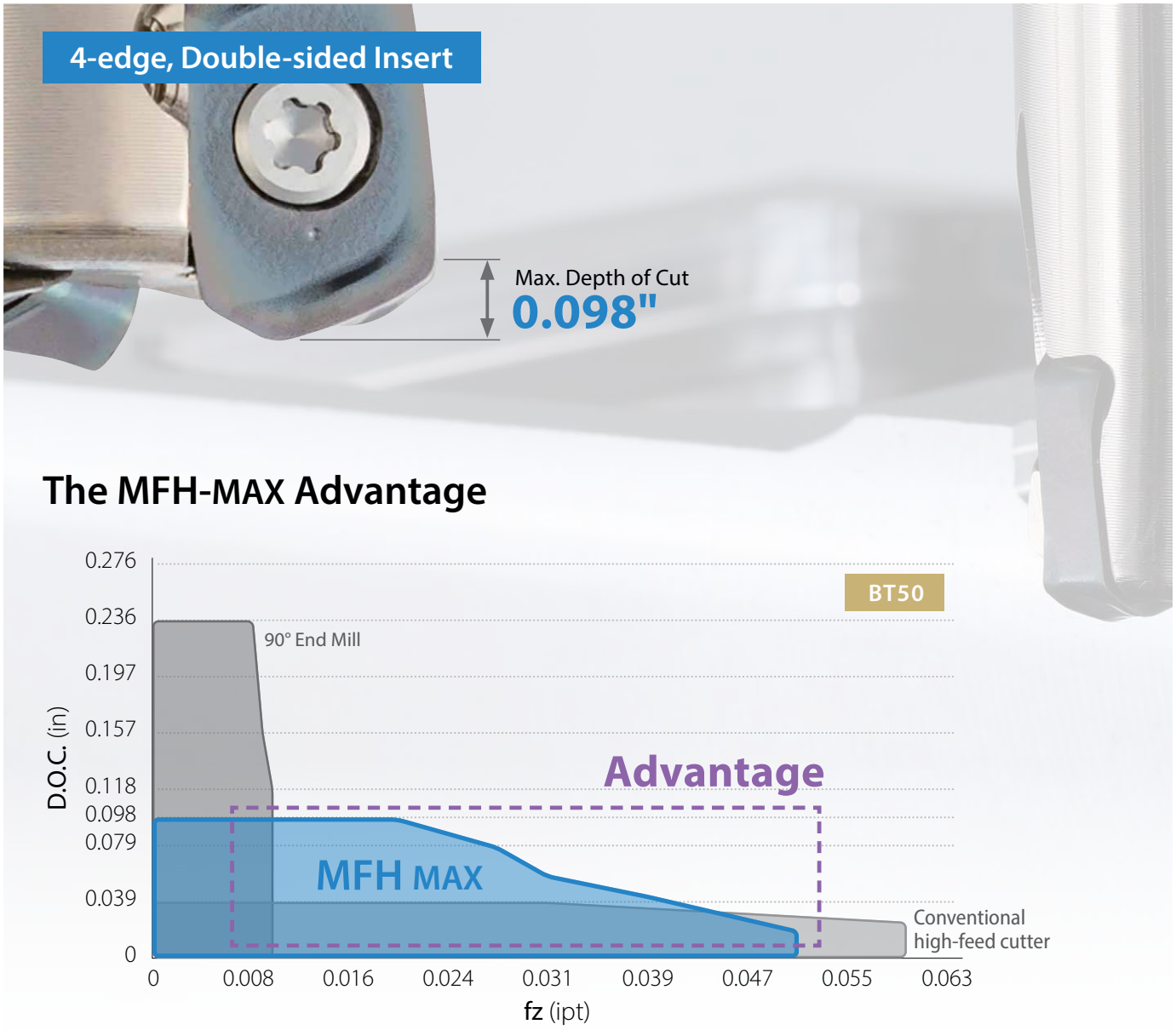
MFH-MAX

Excellent Performance in Various Applications, including Automotive Parts, Difficult-to-cut Materials, and Mold Machining

1 Small Diameter High Feed Milling with Large Depth of Cut Capabilities

A small 4-edge, double-sided insert supports depths of cut up to 0.098" (2.5mm) with cutting diameters available from Ø1.000" and Ø22mm.

Achieves high efficiency machining in various shouldering, slotting, helical milling, and ramping applications.



Vc = 490 sfm, ae = 0.492" (ae/DCX = 50%), 1049 Dry Ø1.000" Overhang length 2.362" BT50

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2 The MFH-MAX can cover a Large Variety of Machining Applications and Environments

1 A Better Alternative to 90° End Mills (Rough to Medium-Finish Machining)

High Feed Rates Dramatically Improve Machining Efficiency

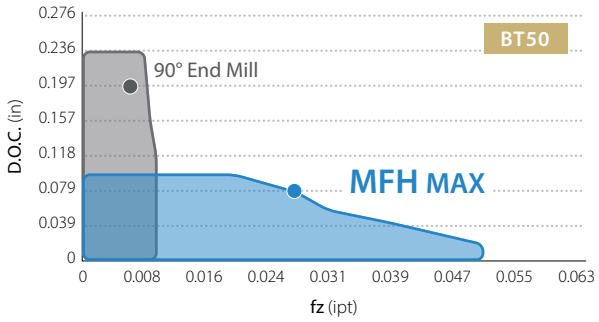
Machining Efficiency Simulation Example

Pocketing: Vc = 490 sfm, ae = 0.492"

MFH MAX Ø1.000" (3 Flute): **100 cc/min**
D.O.C. = **0.079"**, fz = **0.028** ipt

Machining Efficiency x 1.8

Conventional 90° End Mill Ø1.000" (3 Flute): **54 cc/min**
D.O.C. = **0.197"**, fz = **0.006** ipt



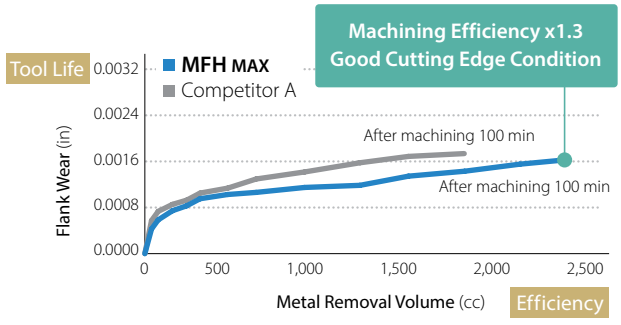
High Efficiency and Good Tool Life

Machining Efficiency and Cutting Edge Condition Comparison (Internal Evaluation)

Cutting edge condition after machining 100 min

MFH-MAX
D.O.C = 0.063", fz = 0.024 ipt

Competitor A 90° End Mill
D.O.C. = 0.197", fz = **0.006** ipt



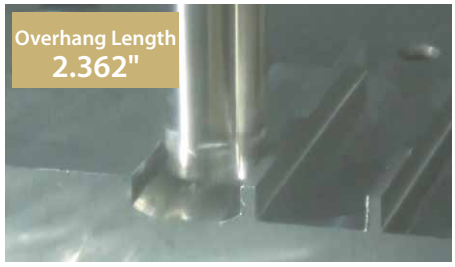
Vc = 490 sfm, ae = 0.492", Dry 4140Ⓗ Ø1.000" BT50

Higher Stability in Unstable Machining Environment

Chatter Resistance Comparison (Internal evaluation)

Slotting
Ø1.000" (3 Flute)
External air
1049
BT50

Video



Machining Efficiency

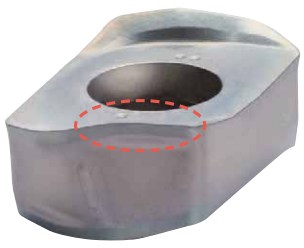
MFH MAX: **103 cc/min**
Vc = 390 sfm, D.O.C. = 0.059", fz = **0.024** ipt

Machining Efficiency x 4.5

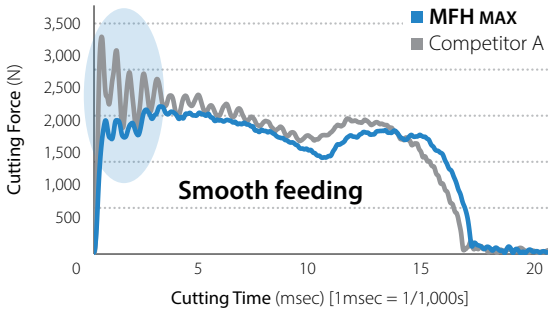
Competitor A 90 ° End Mill:
31 cc/min **Chattering (Machining was impossible)**
Vc = 260 sfm, D.O.C. = 0.079", fz = 0.008 ipt
23 cc/min
Vc = 260 sfm, D.O.C. = 0.079", fz = 0.006 ipt

Innovative Insert Design

Convex cutting edge design reduces impact when entering workpiece



Cutting Force when Entering Workpiece (Internal Evaluation)



Vc = 490 sfm, D.O.C. = 0.079", ae = 1.000", fz = 0.028 ipt, Dry 1049 Ø2.000" BT50

2 When Compared to Conventional High Feed Cutters

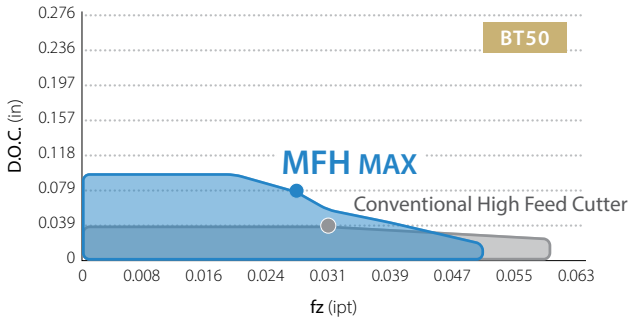
A Larger D.O.C. Dramatically Improves Machining Efficiency

Machining Efficiency Simulation Example

Multistage Machining (Depth 1.181"): Vc = 490 sfm, ae = 0.492"

MFH MAX Ø1.000" (3 Flute): **100 cc/min** (Machining Efficiency x 1.3)
D.O.C. = 0.079", fz = **0.028** ipt

Conventional High Feed Cutter Ø1.000" (3 Flute): **76 cc/min**
D.O.C. = **0.039"**, fz = **0.031** ipt



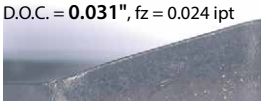
High Efficiency and Good Tool Life

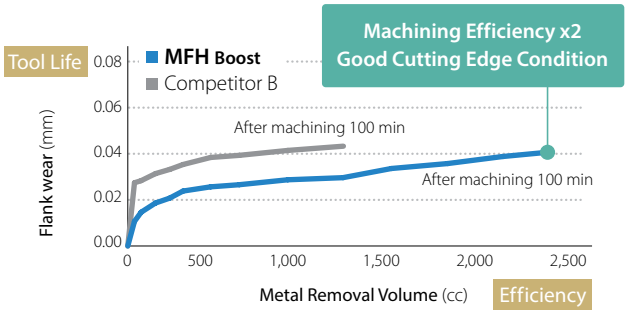
Machining Efficiency and Cutting Edge Condition Comparison
(Internal Evaluation)

Cutting Edge Condition after 100 min machining

MFH-MAX
D.O.C. = 0.063", fz = 0.024 ipt

Competitor B High Feed Type
D.O.C. = **0.031"**, fz = 0.024 ipt





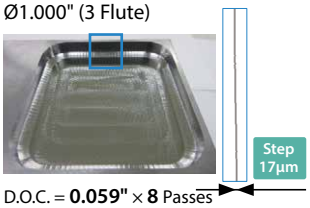
Vc = 490 sfm, ae = 0.492", Dry 4140 Ø1.000" BT50

Excellent Wall Accuracy

Machining Efficiency and Wall Comparisons
(Internal Evaluation)

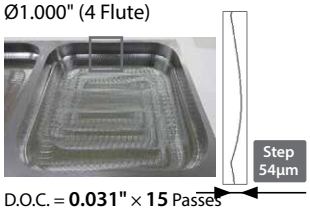
Pocketing (Depth 0.472")

MFH-MAX
Ø1.000" (3 Flute)



D.O.C. = **0.059"** × **8** Passes
Q = 115 cc/min

Competitor B High Feed Type
Ø1.000" (4 Flute)



D.O.C. = **0.031"** × **15** Passes
Q = **81** cc/min

Cutting Conditions: Vc = 660 sfm, ae = 0.492", fz = 0.031 ipt, Dry 1049 BT50

Superior Wall Accuracy

Wiper on outer periphery

Reduction of wall level variation in multi-pass machining

3 A Powerful Tool for Difficult-to-cut Materials

The MFH-MAX gained dramatic improvements in efficiency when machining titanium alloy, stainless steel, etc.

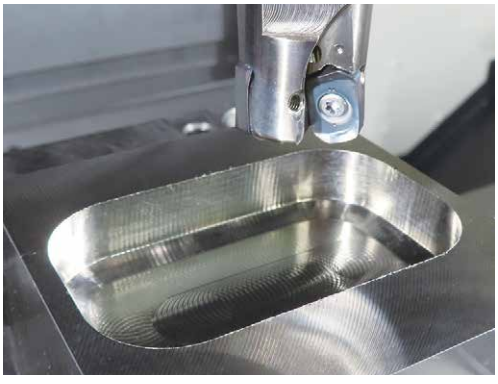
Machining Efficiency Comparison (Internal Evaluation)

Titanium Alloy Pocketing (Depth 0.236")

MFH MAX: **Approx. 1' 30"** (Machining Efficiency x 1.8)
D.O.C. = **0.059"** × **4** Passes (fz = ~0.014 ipt)

Competitor C High Feed Type: **Approx. 2' 50"**
D.O.C. = **0.024"** × **10** Passes (fz = ~0.016 ipt)

Vc = 160 sfm, ae = 0.492" (ae/DCX = 50%), Ramping Angle 3° Ti-6Al-4V Wet Ø1.000" (3 Flute) BT50



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MFH-MAX (End Mill)

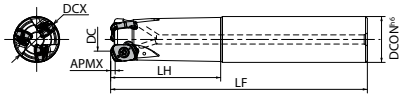


Fig. 1

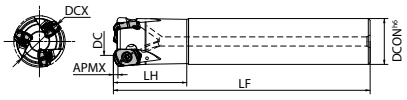


Fig. 2

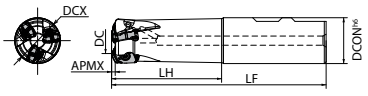


Fig. 3

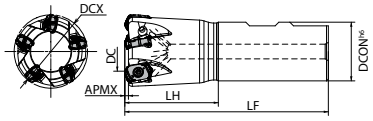


Fig. 4

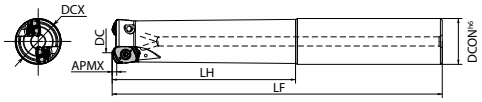


Fig. 5

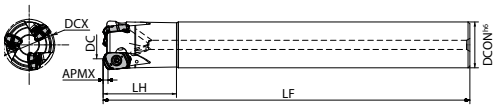


Fig. 6

Toolholder Dimensions

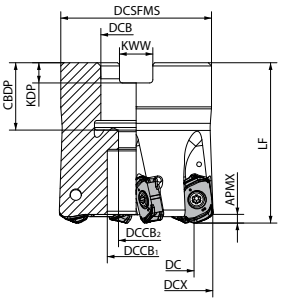
Unit			Part Number		Std. Item	No. of Inserts	Dimensions						A.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts			Applicable Inserts ➡ M244
							DCX	DC	DCON	LF	LH	APMX						Anti-Seize Compound	Insert Screw	Wrench	
Inch	Cylindrical	Standard Shank	MFH	1000-S100-04-3T	●	3	1.000	0.567	1.000	2.500	5.500	0.098	-10	Yes	12,500	0.4	1	P-37	SB-3575TRP	DTPM-10	LOMU040410ER-GM
				1250-S125-04-5T	●	5	1.250	0.817	1.250	2.750	6.000				11,000	0.7	1				
		Long Shank	MFH	1000-S100-04-3T-7	●	3	1.000	0.567	1.000	4.000	7.000	0.098	-10	Yes	12,500	0.7	5				
				1250-S125-04-4T-8	●	4	1.250	0.817	1.250	4.750	8.000				11,000	1.1	5				
	Weldon	Standard Shank	MFH	1000-W100-04-3T	●	3	1.000	0.567	1.000	2.000	4.600	0.098	-10	Yes	12,500	0.4	3				
				1250-W125-04-5T	●	5	1.250	0.817	1.250	2.750	5.150				11,000	0.7	3				
mm	Cylindrical	Standard Shank	MFH	22-S20-04-2T	●	2	22	11	20	130	30	2.5	-10	Yes	13,600	0.3	2	P-37	SB-3575TRP	DTPM-10	LOMU040410ER-GM
				25-S25-04-2T	●	2	25	14	25	140	60				12,700	0.5	1				
				25-S25-04-3T	●	3											1				
				28-S25-04-3T	●	3	28	17			40				12,000	0.5	2				
				28-S25-04-4T	●	4											2				
				32-S32-04-4T	●	4	32	21	32	150	70				11,200	0.8	1				
				32-S32-04-5T	●	5											1				
				35-S32-04-4T	●	4	35	24			50				10,700	0.8	2				
				35-S32-04-5T	●	5											2				
				40-S32-04-5T	●	5	40	29							10,000	0.9	2				
				40-S32-04-6T	●	6											2				
		Long Shank	MFH	25-S25-04-2T-180	●	2	25	14	25	180	100	2.5	-10	Yes	12,700	0.6	5	P-37	SB-3575TRP	DTPM-10	LOMU040410ER-GM
				25-S25-04-3T-180	●	3											5				
				28-S25-04-3T-200	●	3	28	17		200	40				12,000	0.7	6				
				32-S32-04-4T-200	●	4	32	21	32		120				11,200	1.1	5				
				35-S32-04-4T-200	●	4	35	24			50				10,700		6				
				40-S32-04-5T-250	●	5	40	29		250					10,000	1.5	6				
	Weldon	Standard Shank	MFH	25-W25-04-2T	●	2	25	14	25	117	60	2.5	-10	Yes	12,700	0.4	3	P-37	SB-3575TRP	DTPM-10	LOMU040410ER-GM
				25-W25-04-3T	●	3											3				
				32-W32-04-4T	●	4	32	21	32	131	70				11,200	0.7	3				
				32-W32-04-5T	●	5											3				
				40-W32-04-5T	●	5	40	29		111	50				10,000		4				
				40-W32-04-6T	●	6											4				

Spare Parts: Recommended tightening torque for insert screw 2.0N•m

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-Seize Compound thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MFH-MAX (Face Mill)



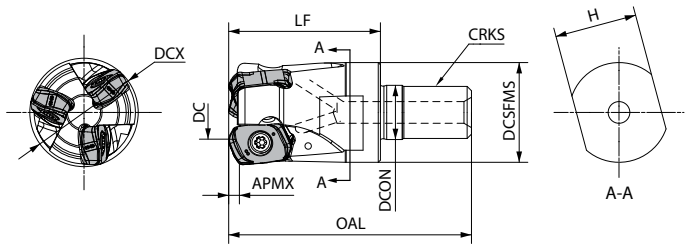
Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions											A.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Spare Parts				Applicable Inserts M244
		R		DCX	DC	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX					Anti-Seize Compound	Insert Screw	Wrench	Arbor Bolt	
Inch	Inch Bore Dia. MFH 1500R-04-6T	●	6	1.500	1.067	1.400	0.500	0.433	0.276	1.575	0.709	0.156	0.250	0.098	-10	Yes	10,200	0.2	P-37	SB-3575TRP	DTPM-10	HH1/4-0.75(H)	LOMU 040410ER-GM
	2000R-04-7T	●	7	2.000	1.567	1.750	0.750	0.669	0.433	1.969	0.947	0.188	0.313				8,600	0.5				HH3/8-1.25(H)	
	2500R-04-9T	●	9	2.500	2.067	2.250					0.750						8,000	0.7	Recommended tightening torque for insert screw 2.0N•m				
	3000R-04-10T	●	10	3.000	2.567	2.750	1.000	0.866	0.551	2.480	1.063	0.236	0.375				7,500	1.3				HH1/2-1.25(H)	
mm	Inch Bore Dia. MFH 080R-04-8T	●	8	80	69	76	1.250"	26	17	63	1.260"	0.315"	0.500"	2.5	-10	Yes	7,100	1.6	P-37	SB-3575TRP	DTPM-10	HH16X40(H)	LOMU 040410ER-GM
	080R-04-10T	●	10																Recommended tightening torque for insert screw 2.0N•m			HH16X40(H)	
	Metric Bore Dia. MFH 040R-04-5T-M	●	5	40	29	38	16	15	9	40	19	5.6	8.4	2.5	-10	Yes	10,000	0.2	P-37	SB-3575TRP	DTPM-10	HH8X25(H)	LOMU 040410ER-GM
	040R-04-6T-M	●	6																				
	050R-04-6T-M	●	6	50	39	47	22	18	11	50	21	6.3	10.4				9,000	0.4				HH10X30(H)	
	050R-04-7T-M	●	7																				
	052R-04-6T-M	●	6	52	41												8,800	0.5				HH10X30(H)	
	052R-04-7T-M	●	7															0.4					
	063R-04-7T-M	●	7	63	52	60	22	18	11								8,000	0.8				HH10X30(H)	
	063R-04-7T-27M	●	7				27	20	13		24	7	12.4										
	063R-04-9T-M	●	9				22	18	11		21	6.3	10.4										
	063R-04-9T-27M	●	9				27	20	13		24	7	12.4					0.7					
	080R-04-8T-M	●	8	80	69	76				63							7,100	1.8				HH12X35(H)	
	080R-04-10T-M	●	10															1.7					

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-Seize Compound thinly on portion of taper and thread prior to installation.
(H) Optional coolant-through arbor bolt available

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MFH-MAX (Modular Head)



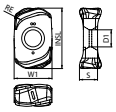
Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions DCX	DC	DCON	DCSFMS	OAL	LF	APMX	CRKS	H	A.R. (°)	Coolant Hole	Max RPM	Spare Parts: Anti-Seize Compound	Insert Screw	Wrench	Applicable Inserts M244
Inch	MFH 1000-M12-04-3T	●	3	1.000	0.567	0.492	0.900	2.205	1.380	0.098	M12×P1.75	0.748	-10	Yes	12,500	P-37	SB-3575TRP	DTPM-10	LOMU040410ER-GM
	1250-M16-04-5T	●	5	1.250	0.817	0.669	1.180	2.441	1.580		M16×P2.0	0.945			11,000	Recommended tightening torque for insert screw 2.0N•m			
mm	MFH 22-M10-04-2T	●	2	22	11	10.5	18.7	48	30	2.5	M10×P1.5	15	-10	Yes	13,600	P-37	SB-3575TRP	DTPM-10	LOMU040410ER-GM
	25-M12-04-2T	●	2	25	14	12.5	23	56	35		M12×P1.75	19			12,700				
	25-M12-04-3T	●	3																
	28-M12-04-3T	●	3	28	17										12,000				
	28-M12-04-4T	●	4																
	32-M16-04-4T	●	4	32	21	17	30	62	40		M16×P2.0	24			11,200				
	32-M16-04-5T	●	5																
	35-M16-04-4T	●	4	35	24										10,700				
	35-M16-04-5T	●	5																
	40-M16-04-5T	●	5	40	29										10,000				
	40-M16-04-6T	●	6																
	42-M16-04-5T	●	5	42	31										9,800				
	42-M16-04-6T	●	6																

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-Seize Compound thinly on portion of taper and thread prior to installation.
See page **M324** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

LOMU

Usage Classification									
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or under)	Carbon steel / Alloy steel			☆			★	☆	P
	Mold and die steel			☆			★	☆	
	Austenitic stainless steel				☆		☆	★	M
	Martensitic stainless steel	★						☆	
	Precipitation hardened stainless steel				☆			★	
	Gray cast iron		☆			★			K
	Nodular cast iron		☆			★			
	Non-ferrous metals								N
	Heat-resistant alloy	★						☆	S
	Titanium alloy				☆			★	
	Hard materials								H

Insert		Part Number	No. of Edges	Dimensions (mm)					Carbide						Applicable Toolholder
				S	D1	RE	W1	INSL	CVD	PVD					
									CA6535	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	➡ M241~M243
	 General Purpose	LOMU 040410ER-GM	4	4.4	4.1	1	9.1	14.5	●	△	●	●	●	●	●	MFH...-04-..

Right-hand Insert Shown

Recommended Cutting Conditions ➡ M245

LOMU Inserts are sold in 10 piece boxes

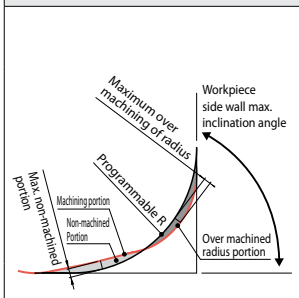
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Chipbreaker	Workpiece Material		Holder Part Number and Feed Rate (fz: ipt)		Recommended Insert Grade (Vc: sfm)			
			D.O.C. (in)	MFH…04…	MEGACOAT NANO EX (MEGACOAT NANO)			CVD Coating
					PR1810 (PR1510)	PR1825 (PR1525)	PR1835 (PR1535)	CA6535
GM	Carbon Steel Alloy Steel	(~ 280HB)	≤ 0.020	0.008~**0.032**~0.051	–	★ 390~**520**~720	☆ 390~**520**~720	–
			≤ 0.039	0.008~**0.028**~0.043				
			≤ 0.059	0.008~**0.024**~0.032				
			≤ 0.079	0.008~**0.016**~0.028				
			≤ 0.098	0.008~**0.012**~0.020				
		(~ 350HB)	≤ 0.020	0.008~**0.030**~0.047	–	★ 330~**490**~660 (Dry Machining Recommended)	☆ 330~**490**~660 (Dry Machining Recommended)	–
			≤ 0.039	0.008~**0.026**~0.039				
			≤ 0.059	0.008~**0.022**~0.028				
			≤ 0.079	0.008~**0.016**~0.022				
			≤ 0.098	0.008~**0.010**~0.014				
	Mold Steel	(~ 40HRC)	≤ 0.020	0.008~**0.024**~0.043	–	★ 260~**390**~520 (Dry Machining Recommended)	☆ 260~**390**~520 (Dry Machining Recommended)	–
			≤ 0.039	0.008~**0.020**~0.035				
			≤ 0.059	0.008~**0.016**~0.026				
			≤ 0.079	0.008~**0.012**~0.022				
			≤ 0.098	0.008~**0.010**~0.014				
		(40 ~ 50HRC)	≤ 0.020	0.004~**0.012**~0.020	–	★ 200~**330**~430 (Dry Machining Recommended)	–	–
			≤ 0.039	0.004~**0.010**~0.016				
			≤ 0.059	0.004~**0.008**~0.012				
			≤ 0.079	–				
			≤ 0.098					
		(50 ~ 55HRC)	≤ 0.020	0.004~**0.008**~0.016	–	★ 160~**230**~330 (Dry Machining Recommended)	–	–
			≤ 0.039	0.004~**0.006**~0.010				
			≤ 0.059	–				
			≤ 0.079					
			≤ 0.098					
	Austenitic Stainless Steel		≤ 0.020	0.008~**0.02**4~0.039	–	☆ 330~**460**~590	★ 330~**460**~590	–
			≤ 0.039	0.008~**0.020**~0.035				
			≤ 0.059	0.008~**0.018**~0.024				
			≤ 0.079	0.008~**0.012**~0.020				
			≤ 0.098	0.008~**0.010**~0.016				
	Martensitic Stainless Steel		≤ 0.020	0.008~**0.024**~0.039	–	–	☆ 330~**490**~660	★ 490~**660**~980
			≤ 0.039	0.008~**0.020**~0.035				
			≤ 0.059	0.008~**0.018**~0.024				
			≤ 0.079	0.008~**0.012**~0.020				
			≤ 0.098	0.008~**0.010**~0.016				
	Precipitation Hardened Stainless Steel		≤ 0.020	0.004~**0.012**~0.020	–	–	★ 300~**390**~490	–
			≤ 0.039	0.004~**0.010**~0.018				
			≤ 0.059	0.004~**0.006**~0.010				
			≤ 0.079	–				
			≤ 0.098					
	Gray Cast Iron		≤ 0.020	0.008~**0.032**~0.051	★ 390~**520**~720	–	–	–
			≤ 0.039	0.008~**0.028**~0.043				
			≤ 0.059	0.008~**0.024**~0.032				
			≤ 0.079	0.008~**0.016**~0.028				
			≤ 0.098	0.008~**0.012**~0.020				
	Nodular Cast Iron		≤ 0.020	0.008~**0.024**~0.039	★ 330~**490**~660	–	–	–
			≤ 0.039	0.008~**0.020**~0.035				
			≤ 0.059	0.008~**0.016**~0.028				
			≤ 0.079	0.008~**0.012**~0.024				
			≤ 0.098	0.008~**0.010**~0.016				
	Ni-base Heat-Resistant Alloy		≤ 0.020	0.004~**0.012**~0.018	–	–	☆ 70~**100**~160	★ 70~**100**~160
			≤ 0.039	0.004~**0.010**~0.016				
			≤ 0.059	0.004~**0.006**~0.008				
			≤ 0.079	–				
			≤ 0.098					
	Titanium Alloy		≤ 0.020	0.004~**0.012**~0.020	–	–	★ 130~**200**~260	–
			≤ 0.039	0.004~**0.010**~0.018				
			≤ 0.059	0.004~**0.006**~0.010				
			≤ 0.079	–				
			≤ 0.098					

- The number in **bold** font is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation. ★: 1st Recommendation ☆: 2nd Recommendation
- Machining with coolant is recommended for Precipitation Hardened Stainless Steel, Ni-base Heat-Resistant Alloy, and Titanium Alloy.
- Machining with coolant may have a lower tool life than dry machining. Set the cutting speed, feed rate and D.O.C. lower than recommended conditions.
- Machining with CAT30 or equivalent, feed rate should be reduced to 25% of recommended cutting conditions. Slotting is not recommended in this situation.
- Center through air is recommended for slotting.
- Slotting or pocketing are not recommended for face mill types.
- For face milling, it is recommended that width of cut should be set to 75% or less of the cutting diameter.
- For long shank end mills, 75% or less of the recommended conditions is recommended for both D.O.C. and feed rate.

Approximate Programming Radius Adjustment

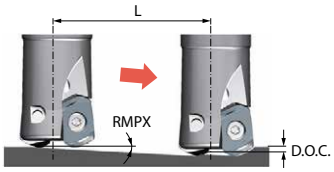
Shape	Programmable R (in)	Maximum Over Machining of Radius (in)	Maximum Non-machined Portion (in)
	R0.059	0	0.0559
	R0.079	0	0.0488
	R0.118 (Recommended)	0	0.0343
	0.138	0.0024	0.0272

Ramping Guide

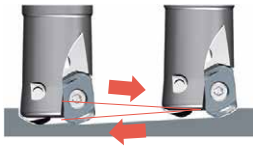
- Ramping angle should be under RMPX (maximum ramping angle) in table below
- Reduce recommended feed rate in recommended cutting conditions by 70%

Formula for max. cutting Length (L) at max. ramping angle

$$L = \frac{D.O.C.}{\tan RMPX}$$



- When ramping from both the front and outer periphery, set the maximum ramping angle RMPX to 50%.



Ramping Reference Data

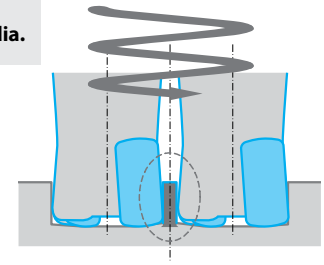
	Cutter Dia. DCX (in)	-	1.000"	-	1.250"	-	1.500"	-	2.000"	-	2.500"	3.000"
Description	Cutter Dia. DCX (mm)	22	25	28	32	35	40	42	50	52	63	80
MFH… -04- …	Max. Ramping Angle RMPX	3.9°	3.0°	2.4°	2.0°	1.7°	1.4°	1.3°	1.0°	1.0°	0.8°	0.6°
	tan RMPX	0.068	0.052	0.042	0.035	0.029	0.024	0.022	0.018	0.017	0.013	0.010

Helical Milling

For Helical milling, use between Min. Drilling Dia. and Max. Drilling Dia.

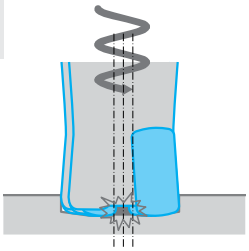
⃠ Exceeding max. cutting dia.

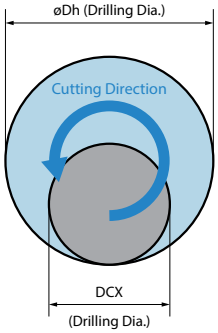
Center core part remains after machining



⃠ Under min. cutting dia.

Center core part interferes with toolholder

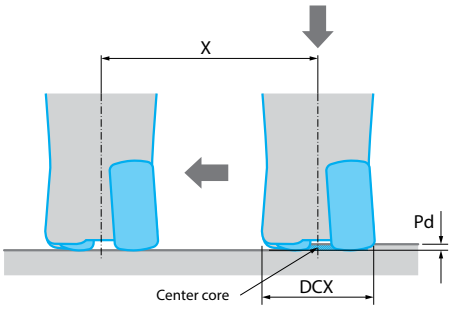




Description	Min. Drilling dia. (in)	Max. Drilling dia. (in)
MFH… -04- …	2 × DCX - 0.433"	2 × DCX - 0.079"

- Maximum ramping depth per cycle to be under maximum D.O.C. Max D.O.C. (0.098")
- Use climb milling. (Refer to the above figure)
- Feed rates should be reduced to 50% of recommended cutting conditions
- Use caution to eliminate incidences caused by producing long chips

Drilling

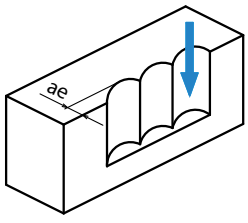


Description	GM type	
	Max. Drilling Depth Pd (in)	Min. Cutting Length X for Flat Bottom Surface (in)
MFH… -04- …	0.024"	DCX - 0.472"

It is recommended to reduce feed by 25% of recommendation until the center core is removed
Axial feed rate recommendation per revolution is f ≤ 0.008 ipr while drilling

Plunging

Plunging



Insert Description	Maximum Width of Cut (ae)
LOMU04 Type	0.197"

Reduce feed rate to fz ≤ 0.008 ipt when plunging

High-Feed Small Diameter Milling

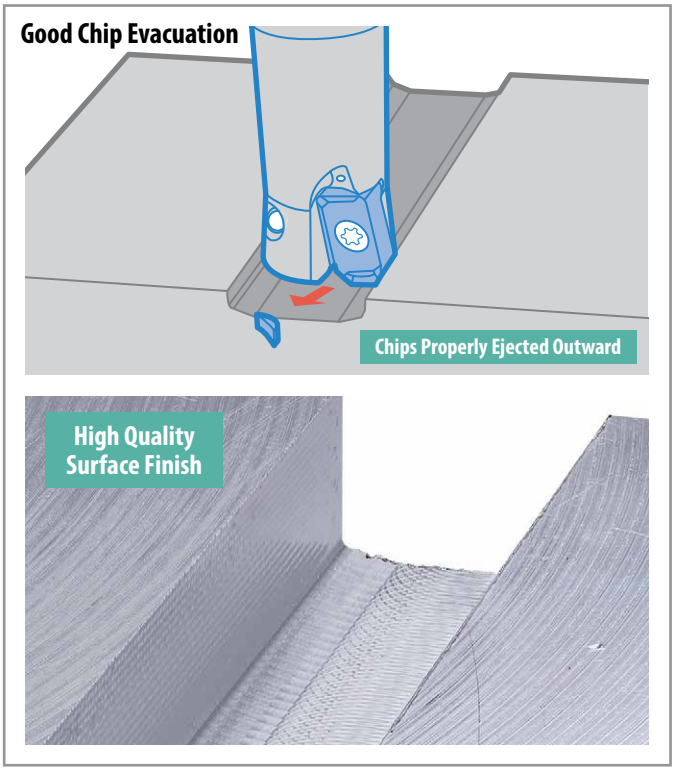
MFH-Mini

(Cutter Dia. Ø0.625" ~ Ø2.000")
(Cutter Dia. Ø16mm ~ Ø50mm)

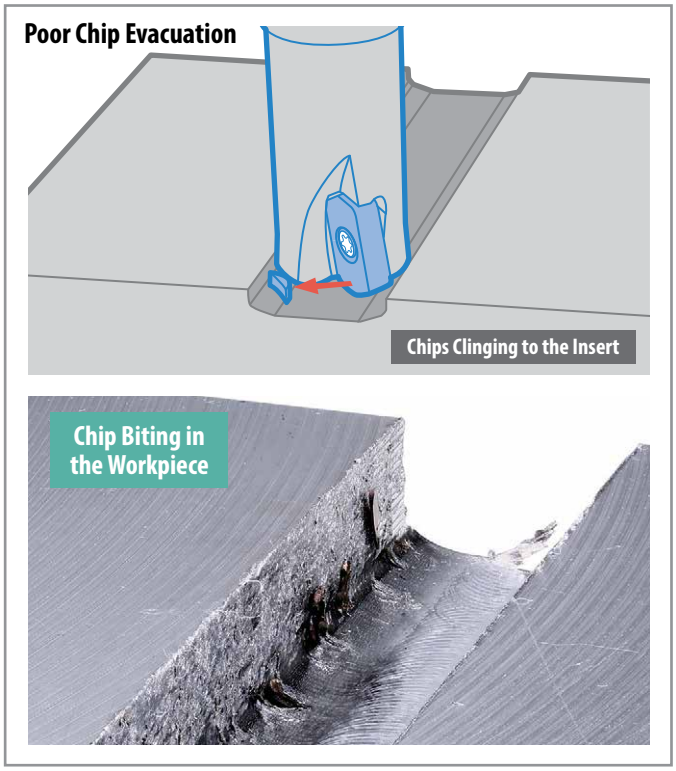
Excellent Performance in Various Applications, including Automotive Parts, Difficult-to-cut Materials, and Mold Machining

1 Excellent Chip Evacuation

MFH-Mini



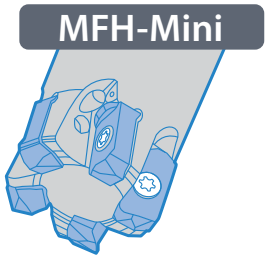
Competitor High Feed Cutter



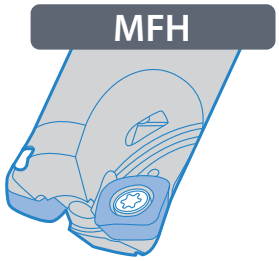
Cutting Conditions: Cutter Dia. DCX = Ø0.625" , Vc = 490 sfm, fz = 0.024 ipt, D.O.C. = 0.020" (20 Passes): Total 0.394" × 0.630", Dry Workpiece: Stainless Steel

2 Fine Pitch for Efficient Machining

Cutter Dia. 1.000" Type



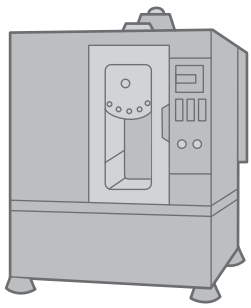
5 Inserts
MFH1000-W100-03-5T47



2 Inserts
MFH1000-W100-10-2T

3 Suitable for Roughing of Molds

High Feed Machining in Small Machining Centers



MFH-Mini (End Mill)

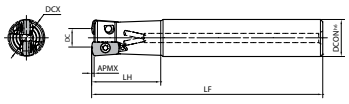


Fig. 1

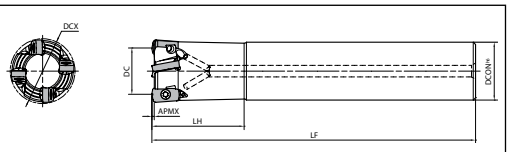


Fig. 2

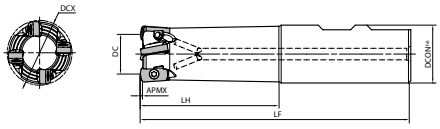


Fig. 3

Toolholder Dimensions

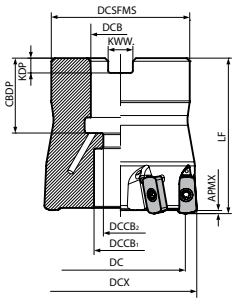
Unit			Part Number	Std. Item	No. of Inserts	Dimensions DCX	DC	DCON	LF	LH	APMX	A.R. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts: Anti-Seize Compound	Insert Screw	Wrench	Applicable Inserts ➡ M251
Inch	Weldon	Standard Shank	MFH 0625-W625-03-2T-3	●	2	0.625	0.310	0.625	3.196	1.250	0.039	-10	-15	Yes	18,800	0.1	3	P-37	SB-3065TRP	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH
			0750-W750-03-3T-4	●	3	0.750	0.435	0.750	4.070	2.000					15,700	0.2	3				
			1000-W100-03-4T47	●	4	1.000	0.685	1.000	4.820	2.500					13,400	0.4	3				
			1000-W100-03-5T47	●	5												3				
			1250-W125-03-5T-5	●	5	1.250	0.935	1.250	5.070	2.750					11,400	0.7	3				
			1250-W125-03-6T-5	●	6												3				
	Cylindrical	Long Shank	MFH 0625-S625-03-2T-6	●	2	0.625	0.310	0.625	6.000	2.000	0.039	-10	-15	Yes	18,800	0.2	1	P-37	SB-3065TRP	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH
			0750-S750-03-3T55	●	3	0.750	0.435	0.750	5.500	2.000					15,700	0.3	1				
			0750-S750-03-3T65	●	3				6.500	3.000							1				
			0875-S750-03-3T55	●	3	0.875	0.560		5.500	2.000					14,700	0.3	1				
			1000-S100-03-4T55	●	4	1.000	0.685	1.000	5.500	2.500					13,400	0.5	1				
			1000-S100-03-4T-7	●	4				7.000	4.000						0.6	1				
			1250-S125-03-5T62	●	5	1.250	0.935	1.250	6.250	3.000					11,400	0.8	1				
			1250-S125-03-5T-8	●	5				8.000	4.750						1.1	1				
mm	Cylindrical	Standard Shank	MFH 16-S16-03-2T	●	2	16	8	16	100	30	1	-10	-15	Yes	18,800	0.1	1	P-37	SB-3065TRP	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH
			17-S16-03-2T	●	2	17	9			20					17,900		2				
			18-S16-03-2T	●	2	18	10								17,000		2				
			20-S20-03-3T	●	3	20	12	20	130	50					15,700	0.3	1				
			20-S20-03-4T	●	4												1				
			22-S20-03-3T	●	3	22	14			30					14,700		2				
			22-S20-03-4T	●	4												2				
			25-S25-03-4T	●	4	25	17	25	140	60					13,400	0.5	1				
			25-S25-03-5T	●	5												1				
			28-S25-03-4T	●	4	28	20			40					12,400		2				
			28-S25-03-5T	●	5												2				
			32-S32-03-5T	●	5	32	24	32	150	70					11,400	0.8	1				
			32-S32-03-6T	●	6												1				
		Long Shank	MFH 16-S16-03-2T-150	●	2	16	8	16	150	50	1	-10	-15	Yes	18,800	0.2	1	P-37	SB-3065TRP	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH
			20-S20-03-3T-160	●	3	20	12	20	160	80					15,700	0.3	1				
			25-S25-03-4T-180	●	4	25	17	25	180	100					13,400	0.6	1				
			32-S32-03-5T-200	●	5	32	24	32	200	120					11,400	1.1	1				
	Weldon	Standard Shank	MFH 16-W16-03-2T	●	2	16	8	16	79	30	1	-10	-15	Yes	18,800	0.1	3	P-37	SB-3065TRP	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH
			20-W20-03-3T	●	3	20	12	20	101	50					15,700	0.2	3				
			20-W20-03-4T	●	4												3				
			25-W25-03-4T	●		25	17	25	117	60					13,400	0.4	3				
			25-W25-03-5T	●	5												3				
			32-W32-03-5T	●		32	24	32	131	70					11,400	0.7	3				
			32-W32-03-6T	●	6												3				

Recommended tightening torque for insert screw 1.2N•m

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-Seize Compound thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MFH-Mini (Face Mill)

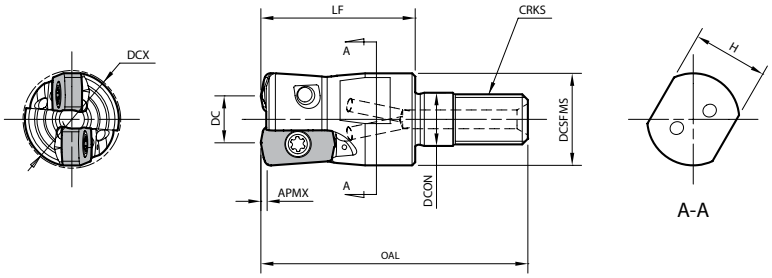


Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions											A.R. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Spare Parts				Applicable Inserts ➡ M251
		R		DCX	DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX						Anti-Seize Compound	Insert Screw	Wrench	Arbor Bolt	
Inch	MFH 1500R-03-5T	●	5	1.500	1.185	1.400	0.500	0.433	0.276	1.575	0.709	0.156	0.250	0.039	-10	-15	Yes	10,200	0.2	P-37	SB-3065TRP	DTPM-8	HH1/4-0.75(H)	LOGU030310ER-GM LOGU030310ER-GH
	1500R-03-6T	●	6																					
	2000R-03-8T	●	8	2.000	1.685	1.750	0.750	0.669	0.433	1.968	0.947	0.188	0.312	0.039				8,600	0.5	Recommended tightening torque for insert screw 1.2N•m			HH3/8-1.25(H)	
	2000R-03-9T	●	9																					
mm	MFH 040R-03-5T-M	●	5	40	32	38	16	15	9	40	19	5.6	8.4	1	-10	-15	Yes	9,900	0.2	P-37	SB-3065TRP	DTPM-8	HH8X25(H)	LOGU030310ER-GM LOGU030310ER-GH
	040R-03-6T-M	●	6																					
	050R-03-8T-M	●	8	50	42	47	22	19	11	50	21	6.3	10.4					8,600	0.5	Recommended tightening torque for insert screw 1.2N•m			HH10X30(H)	

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Multiple step slot milling is NOT recommended for MFH-Mini face mill diameters above Ø1.300" due to a danger of re-cutting chips.
Coat Anti-Seize Compound thinly on portion of taper and thread prior to installation.
(H) Optional coolant-through arbor bolt available.

MFH-Mini (Modular Head)



Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions								A.R. (°)	R.R. (°)	Coolant Hole	Max RPM	Spare Parts			Applicable Inserts ➡ M251
				DCX	DC	DCON	DCSFMS	OAL	LF	APMX	CRKS	H					Anti-Seize Compound	Insert Screw	Wrench	
Inch	MFH 0625-M08-03-2T	●	2	0.625	0.310	0.335	0.579	1.693	0.984	0.039	M8×P1.25	0.472	-10	-15	Yes	18,800	P-37	SB-3065TRP	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH
	MFH 0750-M10-03-3T	●	3	0.750	0.435	0.413	0.728	1.929	1.181	0.039	M10×P1.5	0.591	-10	-15	Yes	15,700				
	MFH 1000-M12-03-4T	●	4	1.000	0.685	0.492	0.906	2.244	1.378	0.039	M12×P1.75	0.748	-10	-15	Yes	13,400				
	1000-M12-03-5T	●	5																	
	MFH 1250-M16-03-5T	●	5	1.250	0.935	0.669	1.181	2.480	1.575	0.039	M16×P2	0.945	-10	-15	Yes	11,400				
	1250-M16-03-6T	●	6																	
	1500-M16-03-6T	●	6	1.500	1.185											10,200				
mm	MFH 16-M08-03-2T	●	2	16	8	8.5	14.7	42	25	1	M8×P1.25	12	-10		Yes	18,880	P-37	SB-3065TRP	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH
	17-M08-03-2T	●	2	17	9											17,900				
	18-M08-03-2T	●	2	18	10											17,000				
	MFH 20-M10-03-3T	●	3	20	12	10.5	18.7	48	30	1	M10×P1.5	15	-10		Yes	15,700				
	20-M10-03-4T	●	4																	
	22-M10-03-3T	●	3	22	14											14,700				
	22-M10-03-4T	●	4																	
	MFH 25-M12-03-4T	●	4	25	17	12.5	23	56	35	1	M12×P1.75	19	-10		Yes	13,400				
	25-M12-03-5T	●	5																	
	28-M12-03-4T	●	4	28	20											12,400				
	28-M12-03-5T	●	5																	
	MFH 32-M16-03-5T	●	5	32	24	17	30	62	40	1	M16×P2	24	-10		Yes	11,400				
	32-M16-03-6T	●	6																	

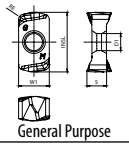
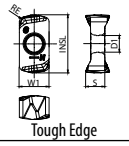
Recommended tightening torque for insert screw 1.2N•m

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-Seize Compound thinly on portion of taper and thread prior to installation.
See page **M324** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

LOGU

Usage Classification										
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or under)	Carbon steel / Alloy steel				☆			★	☆	P
	Mold and die steel				☆			★	☆	
	Austenitic stainless steel					☆		☆	★	M
	Martensitic stainless steel	★							☆	
	Precipitation hardened stainless steel					☆			★	
	Gray cast iron			☆			★			K
	Nodular cast iron			☆			★			
	Non-ferrous metals									N
	Heat-resistant alloy	★							☆	S
	Titanium alloy					☆			★	
	Hard materials (≤ 60 HRC)		★							H

Insert		Part Number	No. of Edges	Dimensions (mm)					Carbide							Applicable Toolholder
				S	D1	RE	INSL	W1	CVD	PVD							
									CA6535	PR0155	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	
	 General Purpose	LOGU 030310ER-GM	4	3.96	3.45	1	11.9	6.2	●		△	●	●	●	●	●	MFH...-03-..
	 Tough Edge	LOGU 030310ER-GH	4	3.96	3.45	1	11.9	6.2		●	△	●	●	●	●	●	MFH...-03-..

Right-hand Insert Shown

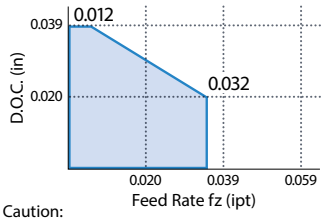
Recommended Cutting Conditions ➡ M252

LOGU Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

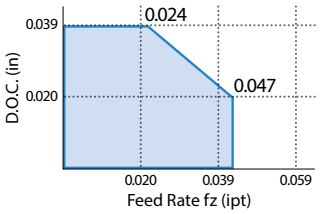
Cutting Performance

Fine Pitch End Mill



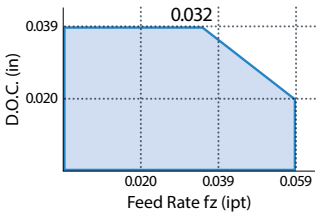
Standard Pitch End Mill

Cutting Dia. Ø0.625" - Ø0.750"
Cutting Dia. Ø16mm - Ø22mm



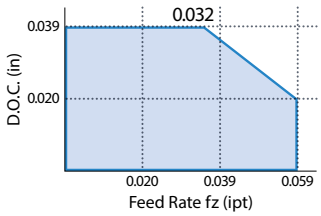
Standard Pitch End Mill

Cutting Dia. 1.000" - 1.250"
Cutting Dia. Ø25mm - Ø32mm



MFH Mini Face Mill

Cutting Dia. 1.500" - 2.000"
Cutting Dia. Ø40mm - Ø50mm



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

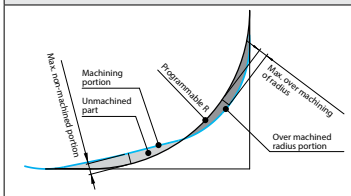
Recommended Cutting Conditions

Chipbreaker	Workpiece Material	Holder Part Number and Feed Rate (fz: ipt) *Recommended D.O.C. = 0.020" Reference Value								Recommended Insert Grade (Vc: sfm)				
										MEGACOAT NANO EX (MEGACOAT NANO)			MEGACOAT HARD	CVD
		MFH0625...2T (MFH16...2T)	MFH0750...3T (MFH20...3T)	(MFH20...4T)	MFH1000...4T (MFH25...4T)	MFH1000...5T (MFH25...5T)	MFH1250...5T (MFH32...5T)	MFH1250...6T (MFH32...6T)	MFH1500...5T/6T MFH2000...8T	PR1810 (PR1510)	PR1825 (PR1525)	PR1835 (PR1835)	PR015S	CA6535
GM GH	Carbon Steel	0.008-**0.028**-0.047		0.008-**0.020**-0.031	0.008-**0.031**-0.059	0.008-**0.020**-0.031	0.008-**0.031**-0.059	0.008-**0.020**-0.031	0.008-**0.031**-0.059	-	★ 390-**590**-820	☆ 390-**590**-820	-	-
	Alloy Steel									-	★ 330-**520**-720	☆ 330-**520**-720	-	-
	Mold Steel ~40 HRc	0.008-**0.020**-0.035		0.008-**0.016**-0.024	0.008-**0.024**-0.047	0.008-**0.016**-0.024	0.008-**0.024**-0.047	0.008-**0.016**-0.024	0.008-**0.024**-0.047	-	☆ 260-**460**-590	☆ 260-**460**-590	**GH** ★ 260-**460**-590	-
	Mold Steel 40~50 HRc	0.008-**0.012**-0.020		0.008-**0.010**-0.012	0.008-**0.012**-0.024	0.008-**0.010**-0.012	0.009-**0.012**-0.024	0.008-**0.010**-0.012	0.008-**0.012**-0.024	-	☆ 200-**330**-430	-	**GH** ★ 200-**330**-430	-
	Mold Steel 50~55 HRc	0.004-**0.012**-0.020		0.004-**0.008**-0.012	0.004-**0.012**-0.020	0.004-**0.008**-0.012	0.004-**0.012**-0.020	0.004-**0.008**-0.012	0.004-**0.008**-0.012	-	☆ 160-**230**-330	-	**GH** ★ 160-**230**-330	-
	Mold Steel 55~60 HRc	0.0004-**0.0024**-0.0039 (Recommended only with GH chipbreaker)								-	-	-	**GH** ☆ 160-**200**-230	-
	Austenitic Stainless Steel	0.008-**0.020**-0.035		0.008-**0.016**-0.024	0.008-**0.024**-0.047	0.008-**0.016**-0.024	0.008-**0.024**-0.047	0.008-**0.016**-0.024	0.008-**0.024**-0.047	-	**GM** ☆ 330-**520**-660	**GM** ★ 330-**520**-660	-	-
	Martensitic Stainless Steel									-	-	☆ 490-**660**-820	-	★ 590-**790**-980
	Precipitation Hardened Stainless Steel									-	-	★ 300-**390**-490	-	-
	Gray Cast Iron	0.008-**0.028**-0.047		0.008-**0.020**-0.031	0.008-**0.031**-0.059	0.008-**0.020**-0.031	0.008-**0.031**-0.059	0.008-**0.020**-0.031	0.008-**0.031**-0.059	★ 390-**590**-820	-	-	-	-
	Nodular Cast Iron	0.008-**0.020**-0.035		0.008-**0.016**-0.024	0.008-**0.024**-0.047	0.008-**0.016**-0.024	0.008-**0.024**-0.047	0.008-**0.016**-0.024	0.008-**0.024**-0.047	★ 330-**490**-660	-	-	-	-
	Ni-base Heat-Resistant Alloy	0.008-**0.012**-0.024		0.008-**0.010**-0.016	0.008-**0.016**-0.031	0.008-**0.010**-0.016	0.008-**0.016**-0.031	0.008-**0.010**-0.016	0.008-**0.016**-0.031	-	-	☆ 70-**100**-160	-	★ 70-**100**-160
	Titanium Alloy									**GM** ☆ 100-**160**-230	-	**GM** ★ 130-**200**-260	-	-

Standard Pitch End Mills | Fine Pitch End Mills | MFH Mini Face Mills

Machining with coolant is recommended for Ni-base Heat Resistant Alloy and Titanium Alloy
The number in bold font is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
★: 1st Recommendation ☆: 2nd Recommendation
Machining with CAT30 or equivalent, feed rate should be reduced to 25% of recommended cutting conditions
Internal coolant is recommended for slotting applications
Slotting and pocketing are not recommended for face mill types

Approximate Programming Radius Adjustment

Shape	Programmable R (in)	Maximum Over Machining of Radius (in)	Maximum Non-machined Portion (in)
	R0.063 (Recommended)	0	0.0154
	R0.079	0.0035	0.0138
	R0.098	0.0102	0.0102
	R0.118	0.0181	0.0067

Cutting edge angle: 12°

800.823.7284
www.kyoceraprecisiontools.com

Ramping Reference Data

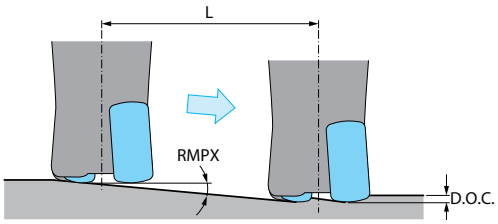
Description	Cutter Dia. DCX (in)	0.625"	-	-	0.750"	-	0.875"	1.000"	-	1.250"	1.500"	2.000"
	Cutter Dia. DCX (mm)	16mm	17mm	18mm	20mm	22mm	-	25mm	28mm	32mm	40mm	50mm
MFH ...-03-...	Max. Ramping Angle RMPX (°)	2.8°	2.5°	2.1°	1.7°	1.4°	1.3°	1.2°	1°	0.8°	0.5°	0.4°
	tan RMPX	0.049	0.042	0.037	0.030	0.024	0.023	0.021	0.017	0.014	0.009	0.007

Ramping Guide

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

Multiple step slot milling is NOT recommended for MFH-Mini face mill diameters above Ø1.3" due to a danger of re-cutting chips

Formula of the cutting length "L" at max. ramping angle $L = \frac{D.O.C.}{\tan RMPX}$

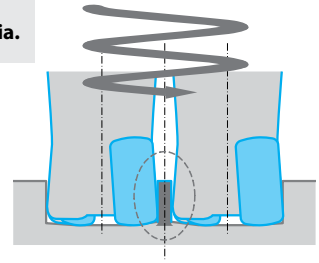


Helical Milling

For Helical milling, use between Min. Drilling Dia. and Max. Drilling Dia.

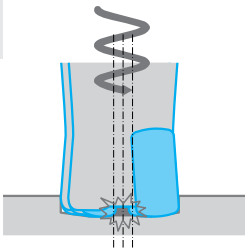
Exceeding max. cutting dia.

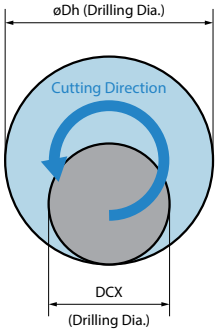
Center core part remains after machining



Under min. cutting dia.

Center core part interferes with toolholder

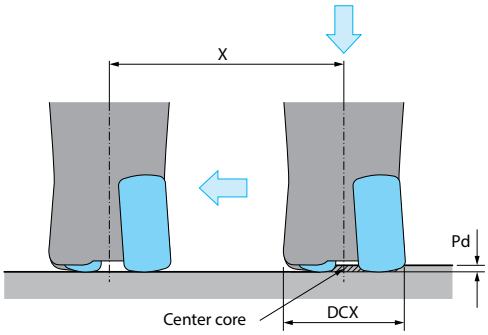




Description	Min. Drilling dia. (in)	Max. Drilling dia. (in)
MFH… -03- …	2 × DCX - 0.315"	2 × DCX - 0.079"

- Maximum ramping depth per cycle to be under maximum D.O.C. Max D.O.C. (0.039")
- Use climb milling. (Refer to the above figure)
- Feed rates should be reduced to 50% of recommended cutting conditions
- Use caution to eliminate incidences caused by producing long chips

Drilling Guide



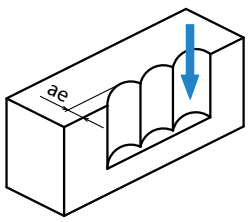
Description	GM type / GH type	
	Max. Drilling Depth Pd (in)	Min. Cutting Length X for Flat Bottom Surface (in)
MFH...-03-...	0.039"	DCX-0.354"

Unit: in

It is recommended to reduce feed by 25% of recommendation until the center core is removed
Axial feed rate recommendation per revolution is f ≤ 0.008 ipr while drilling

Plunging Guide

Plunging



Insert Description	Max. Width of Cut
LOGU03 type	0.138"

Reduce feed rate to fz ≤ 0.008 ipt when plunging

High-Feed Small Diameter Milling

(Cutter Dia. Ø0.375" ~ Ø0.625")
(Cutter Dia. Ø8mm ~ Ø16mm)

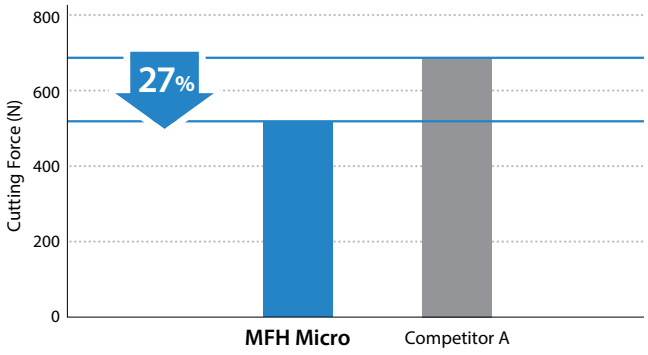
MFH-Micro

Low Resistance and Durable Design Aids in Chatter Resistant Machining Maximum D.O.C. 0.020" and Stable High Feed Machining on a Wide Range of Applications

1 Stable Machining with Chattering Resistance

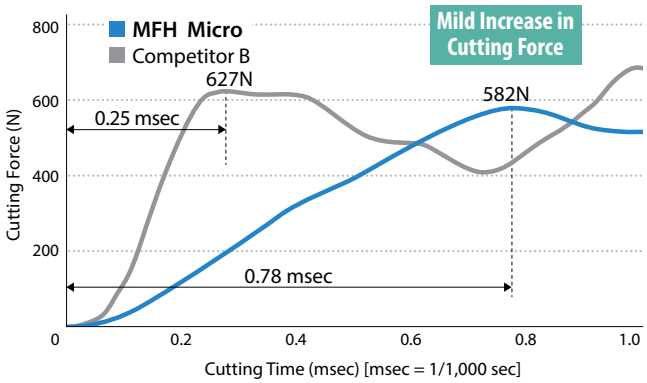
Molded Convex Cutting Edge Controls Initial Impact when Entering the Workpiece

Cutting Force Comparison (In-house Evaluation)



Cutting Conditions: Vc = 390 sfm, fz = 0.024 ipt, D.O.C. = 0.016"
Cutter Dia. Ø0.375", Slotting, Dry Workpiece: 1049

Increase in Cutting Force when Entering Work Piece
(In-house Evaluation)



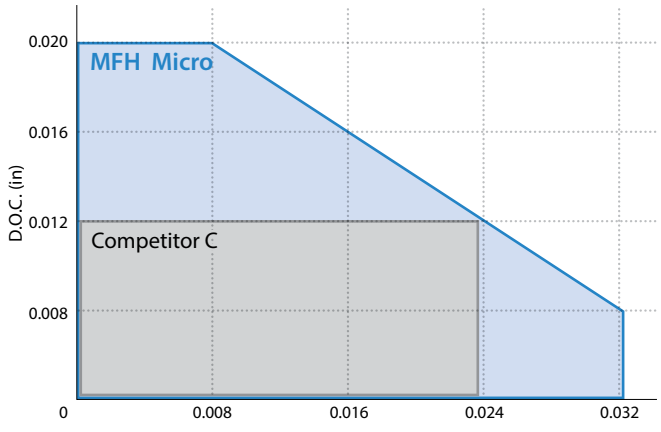
Cutting Conditions: Vc = 390 sfm, fz = 0.024 ipt, D.O.C. × ae = 0.016" × 0.197"
Cutter Dia. Ø0.375", Dry Workpiece: 1049

2 Wide Range of Machining Applications

Wide Range of Machining Applications at a Maximum Depth of Cut of 0.020"

Stable Machining Even with Small Machining Centers

Cutting Performance Map (Cutter Dia. Ø0.375")



(Internal Evaluation)

3 Can Replace Solid End Mills to Reduce Machining Costs

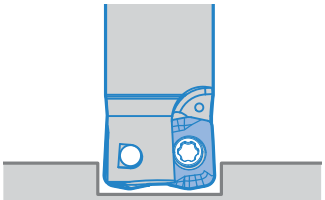
Suppresses Chattering and Increases Milling Efficiency

MFH-Micro Compared to Solid End Mills (Mechanical Parts Slotting 1049)

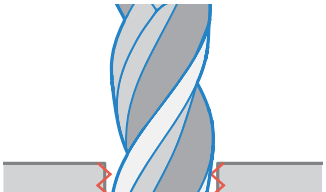
MFH-Micro Q = 15.3 cc/min
Vc = 490 sfm, fz = 0.016 ipt
D.O.C. × ae = 0.016" × 0.394", Dry
MFH10-S10-01-2T (2 Flutes)
LPGT010210ER-GM (PR1525)

1.2x Machining Efficiency

Solid End Mill Q = 12.2 cc/min
Vc = 260 sfm, fz = 0.002 ipt
D.O.C. × ae = 0.012" × 0.394", Dry
Ø10mm (4 Flute)



Resists Chattering at High Feed Rates (fz = 0.016 ipt)



Subject to Chattering and Feed per Tooth Cannot Be Increased

MFH-Micro (End Mill)

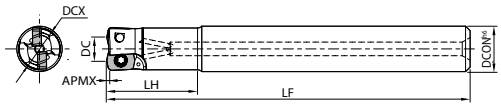


Fig. 1

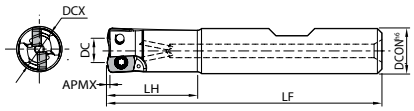


Fig. 2

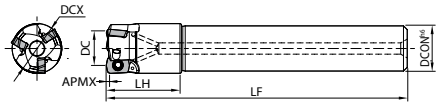


Fig. 3

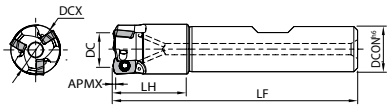


Fig. 4

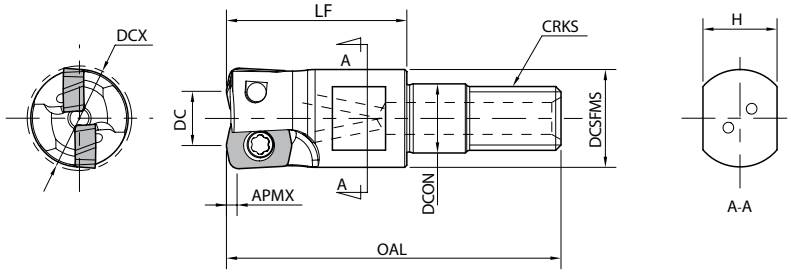
Toolholder Dimensions

Unit		Part Number	Std. Item	No. of Inserts	Dimensions						A.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Spare Parts			Applicable Inserts ▶ M257
					DCX	DC	DCON	LF	LH	APMX						Anti-Seize Compound	Insert Screw	Wrench	
Inch	Cylindrical	MFH 0375-S375-01-1T-3	●	1	0.375	0.225	0.375	3.000	0.750	0.020	+5	Yes	16,200	0.04	1	P-37	SB-1840TRP	FTP-6	LPGT010210ER-GM
		0394-S375-01-2T-3	●	2	10mm	0.244							16,200	0.04	1				
		0500-S500-01-3T-3	●	3	0.500	0.350	0.500						14,000	0.07	1				
		0500-S500-01-3T-5	●	3				5.000					14,000	0.11	1				
		0625-S625-01-4T35	●	4	0.625	0.475	0.625	3.500	1.000				11,400	0.12	1				
mm	Cylindrical	MFH 08-S10-01-1T	●	1	8	4.2	10	75	16	0.5	+5	Yes	20,000	0.04	1	P-37	SB-1840TRP	FTP-6	LPGT010210ER-GM
		10-S10-01-2T	●	2	10	6.2		80	20				16,200	0.04	1				
		12-S12-01-3T	●	3	12	8.2	12						14,000	0.06	1				
		14-S12-01-3T	●	3	14	10.2							12,500	0.07	3				
		16-S16-01-4T	●	4	16	12.2	16	90	25				11,400	0.12	1				
	Weldon	MFH 08-W10-01-1T	●	1	8	4.2	10	58	16	0.5	+5	Yes	20,000	0.03	2	P-37	SB-1840TRP	FTP-6	LPGT010210ER-GM
		10-W10-01-2T	●	2	10	6.2		60	20				16,200	0.03	2				
		12-W12-01-3T	●	3	12	8.2	12	65					14,000	0.05	2				
		14-W12-01-3T	●	3	14	10.2							12,500	0.05	4				
		16-W16-01-4T	●	4	16	12.2	16	73	25				11,400	0.1	2				

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-Seize Compound thinly on portion of taper and thread prior to installation.
Recommended tightening torque for insert screw : 0.5N·m

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MFH-Micro (Modular Head)

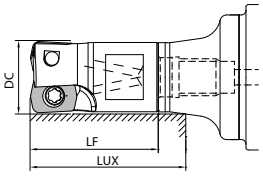


Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions									A.R. (°)	Coolant Hole	Max RPM	Spare Parts			Applicable Inserts M257
				DCX	DC	DCON	DCSFMS	OAL	LF	APMX	CRKS	H				Anti-Seize Compound	Insert Screw	Wrench	
Inch	MFH 0500-M06-01-3T	●	3	0.500	0.350	0.256	0.441	1.240	0.669	0.020	M6xP1.0	0.276	+5	Yes	14,000	P-37	SB-1840TRP	FTP-6	LPGT010210ER-GM
	0625-M08-01-4T	●	4	0.625	0.475	0.335	0.579	1.575	0.866		M8xP1.25	0.472			11,400				
mm	MFH 08-M06-01-1T	●	1	8	4.2	6.5	9.2	30.5	17	0.5	M6xP1.0	7	+5	Yes	20,000	P-37	SB-1840TRP	FTP-6	LPGT010210ER-GM
	10-M06-01-2T	●	2	10	6.2										16,200				
	12-M06-01-3T	●	3	12	8.2		11.2								14,000				
	14-M06-01-3T	●	3	14	10.2										12,500				
	16-M08-01-4T	●	4	16	12.2	8.5	14.7	39	22	0.5	M8xP1.25	12	+5	Yes	11,400				

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-Seize Compound thinly on portion of taper and thread prior to installation.
Industry standard threads for adapting to common toolholders (For Ø8mm - Ø14mm screw size: M6 x P1.0).
Check screw specifications for the shank in use.
Recommended tightening torque for insert screw : 0.5N·m

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



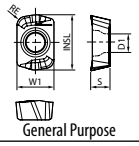
BT Arbor Part Number	Applicable End Mill (Head)			Actual End Mill Depth (mm)
	Part Number	Cutting Dia. (mm)	Dimensions (mm)	LUX
		DC	LF	
BT30K-M08-45	MFH16-M08-01...	16	22	28.8
BT40K-M08-55	MFH16-M08-01...	16	22	28.7

See page **M324** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

LPGT

Usage Classification								
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or under)	Carbon steel / Alloy steel		☆		★	☆	P
	Mold and die steel		☆		★	☆	
	Austenitic stainless steel			☆	☆	★	M
	Martensitic stainless steel	★				☆	
	Precipitation hardened stainless steel			☆		★	
	Gray cast iron						K
	Nodular cast iron						
	Non-ferrous metals						N
	Heat-resistant alloy	★				☆	S
	Titanium alloy			☆		★	
	Hard materials (≤ 60 HRC)						H

Insert		Part Number	No. of Edges	Dimensions (mm)					Carbide					Applicable Toolholder ➡ M255 M256
				S	D1	RE	W1	INSL	CVD	PVD				
									CA6535	PR1525	PR1535	PR1825	PR1835	
	 General Purpose	LPGT 010210ER-GM	2	2.19	2.1	1	4.19	6.26	●	●	●	●	●	MFH...-01-..

Right-hand Insert Shown

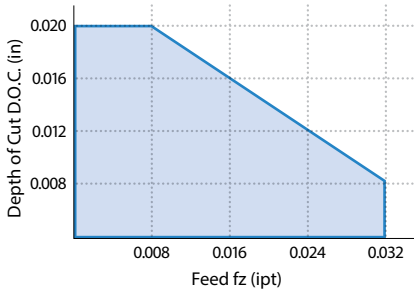
Recommended Cutting Conditions ➡ M258

LPGT Inserts are sold in 10 piece boxes

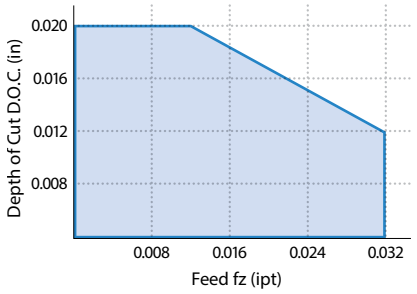
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Cutting Performance

Cutter Dia: Ø0.375" ~ Ø0.500"
Cutter Dia: Ø8mm ~ Ø12mm



Cutter Dia: Ø0.625"
Cutter Dia: Ø14mm ~ Ø16mm



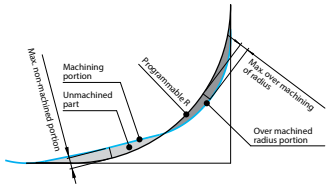
Recommended Cutting Conditions

Chipbreaker	Workpiece Material	Cutter Part Number and Feed Rate (fz: ipt) *Recommended D.O.C. = 0.012" Reference Value					Recommended Insert Grade (Vc: sfm)		
		MFH08-…-1T	MFH0375…-1T-3 MFH0394…-2T-3 MFH10-…-2T	MFH0500-…-3T-.. MFH12-…-3T	MFH14-…-3T	MFH0625-…-4T(35) MFH16-…-4T	MEGACOAT NANO EX (MEGACOAT NANO)		CVD
							PR1825 (PR1525)	PR1835 (PR1535)	CA6535
GM	Carbon Steel	0.008~**0.016**~0.024			0.008~**0.020**~0.031		★ 390~**590**~820	☆ 390~**590**~820	-
	Alloy Steel						★ 330~**520**~720	☆ 330~**520**~720	-
	Mold Steel (~40 HRc)	0.008~**0.012**~0.020			0.008~**0.016**~0.024		★ 260~**460**~590	☆ 260~**460**~590	-
	Mold Steel (40~50 HRc)	0.008~**0.010**~0.012			0.008~**0.010**~0.016		★ 200~**330**~430	☆ 200~**330**~430	-
	Austenitic Stainless Steel	0.008~**0.012**~0.020			0.008~**0.016**~0.024		☆ 330~**520**~660	★ 330~**520**~660	-
	Martensitic Stainless Steel						-	☆ 490~**660**~820	★ 590~**790**~980
	Precipitation Hardened Stainless Steel						-	★ 300~**390**~490	-
	Gray Cast Iron	0.008~**0.016**~0.024			0.008~**0.020**~0.031		★ 390~**590**~820	-	-
	Nodular Cast Iron	0.008~**0.012**~0.020			0.008~**0.016**~0.024		★ 330~**490**~660	-	-
	Ni-base Heat-Resistant Alloy	0.008~**0.010**~0.012			0.008~**0.010**~0.016		-	☆ 70~**100**~160	★ 70~**100**~160
	Titanium Alloy						-	★ 130~**200**~260	-

Machining with coolant is recommended for Ni-base Heat Resistant Alloy and Titanium Alloy
The number in **bold** font is recommended starting conditions.
Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
Internal coolant is recommended for slotting applications

★: 1st Recommendation ☆: 2nd Recommendation

Approximate Programming Radius Adjustment

Shape	Programmable R (in)	Maximum Over Machining of Radius (in)	Maximum Non-machined Portion (in)
	R0.039	0	0.0083
	R0.047 (Recommended)	0	0.0067
	R0.059	0.0032	0.0039
	R0.079	0.0110	0.0004

Cutting edge angle: 12°

Ramping Reference Data

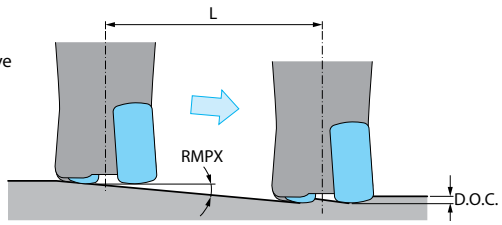
Description	Cutter Dia. DCX (in)	-	0.375"	0.500"	-	0.625"
	Cutter Dia. DCX (mm)	8mm	10mm	12mm	14mm	16mm
MFH ...-01-...	Max. Ramping Angle RMPX (°)	4.0°	3.0°	2.0°	1.5°	1.2°
	tan RMPX	0.070	0.052	0.035	0.026	0.021

Ramping Guide

Decrease Ramping Angle if Chips Become Excessively Long
Ramping angle should be under RMPX (maximum ramping angle) in the cutting conditions above
Reduce recommended feed rate in recommended cutting conditions by 70%

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

$$L = \frac{D.O.C.}{\tan RMPX}$$

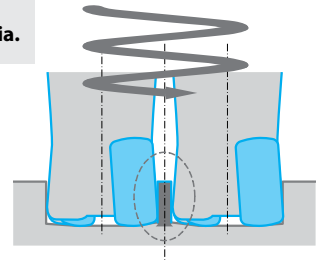


Helical Milling

For Helical milling, use between Min. Drilling Dia. and Max. Drilling Dia.

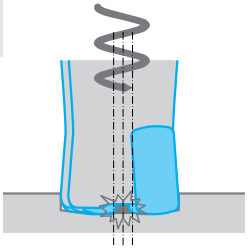
Exceeding max. cutting dia.

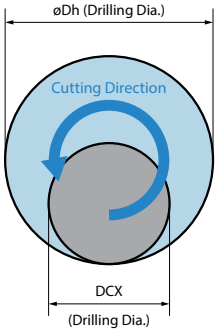
Center core part remains after machining



Under min. cutting dia.

Center core part interferes with toolholder

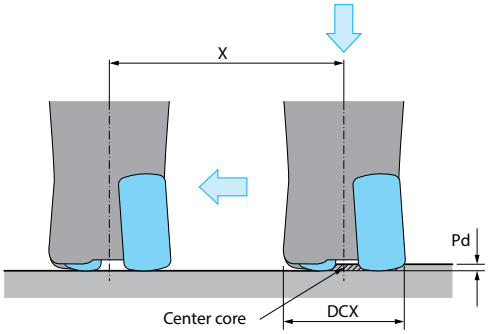




Description	Min. Drilling dia. (in)	Max. Drilling dia. (in)
MFH... -01- ...	2 × DCX - 0.138"	2 × DCX - 0.079"

- Maximum ramping depth per cycle to be under maximum D.O.C. Max D.O.C. (0.020")
- Use climb milling. (Refer to the above figure)
- Feed rates should be reduced to 50% of recommended cutting conditions
- Use caution to eliminate incidences caused by producing long chips

Drilling Guide



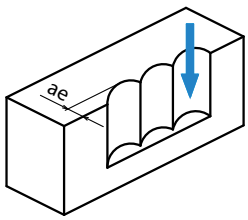
Description	GM type / GH type	
	Max. Drilling Depth Pd (in)	Min. Cutting Length X for Flat Bottom Surface (in)
MFH...-01-...	0.020"	DCX-0.138"

Unit: in

It is recommended to reduce feed by 25% of recommendation until the center core is removed
Axial feed rate recommendation per revolution is f ≤ 0.008 ipr while drilling

Plunging Guide

Plunging



Insert Description	Max. Width of Cut
LPGT01 type	0.067"

Reduce feed rate to fz ≤ 0.008 ipt when plunging

MEY

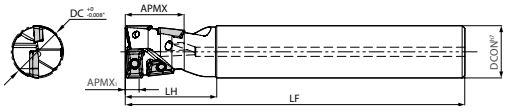


Fig. 1

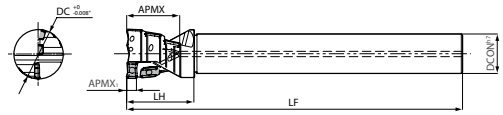


Fig. 2

Toolholder Dimensions

Unit		Part Number	Std. Item	No. of Inserts	No. of Flutes	Dimensions DC	DCON	LF	LH	APMX	APMX1	A.R. (°)	R.R. (°)	Coolant Hole	Fig.	Spare Parts: Anti-seize Compound	Insert Screw	Wrench	Applicable Inserts ➡ M262
Inch	Standard Shank	MEY 0625-S625-HG	●	4	2	0.630	0.625	4.699	1.195	0.748	0.177	+11	-11	Yes	1	P-37	SB-2040TRG	DTM-6	Center Edge : GOMT08T208ER-D Side Edge : JOMT08T208ER-D
		0750-S750-HG	●			0.787	0.750	5.091	1.350	0.866	0.236		-9				SB-2555TRG	DT-8	Center Edge : GOMT100308ER-D Side Edge : JOMT100308ER-D
		1000-S100-HG	●			1.000	1.000	5.486	1.549	1.102	0.295		-11				SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
		1250-S125-HG	●			1.250	1.250	5.858	1.921	1.417	0.374	+13	-9				SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D
		1500-S125-HG	●	7		1.500	1.250	6.260	2.126	1.654	0.295		-11		2		SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
		2000-S150-HG	●			1.984	1.500	6.649	2.712	2.126	0.374		-9				SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D

APMX1 shows the edge length of the complete 2-insert part.
Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.

Applicable Inserts

Part Number		Applicable Inserts ➡ M262 Side Edge	No. of Inserts	Center Edge	No. of Inserts
MEY	0625-S625-HG	JOMT08T208ER-D	3	GOMT08T208ER-D	1
	0750-S750-HG	JOMT100308ER-D		GOMT100308ER-D	
	1000-S100-HG	JOMT13T308ER-D		GOMT13T308ER-D	
	1250-S125-HG	JOMT160408ER-D		GOMT160408ER-D	
	1500-S125-HG	JOMT13T308ER-D	6	GOMT13T308ER-D	
	2000-S150-HG	JOMT160408ER-D		GOMT160408ER-D	
MEY	16-S16(-...)	JOMT08T208ER-D	3	GOMT08T208ER-D	1
	17-S16(-...)				
	20-S20(-...)	JOMT100308ER-D		GOMT100308ER-D	
	21-S20(-...)				
	25-S25(-...)	JOMT13T308ER-D		GOMT13T308ER-D	
	26-S25(-...)				
	32-S32(-...)	JOMT160408ER-D		GOMT160408ER-D	
	33-S32(-...)				
	40-S32(-...)	JOMT13T308ER-D	6	GOMT13T308ER-D	
	50-S42(-...)	JOMT160408ER-D		GOMT160408ER-D	

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MEY

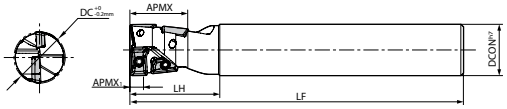


Fig. 1

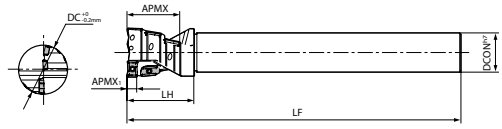


Fig. 2

Toolholder Dimensions

Unit		Part Number	Std. Item	No. of Inserts	No. of Flutes	Dimensions DC	DCON	LF	LH	APMX	APMX1	A.R. (°)	R.R. (°)	Coolant Hole	Fig.	Spare Parts: Anti-seize Compound	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts ➡ M262
mm	Standard Shank	MEY 16-S16	●	4	2	16	16	120	31	19	4.5	+11	-11	No	1	P-37	SB-2040TRG	DTM-6	Center Edge : GOMT08T208ER-D Side Edge : JOMT08T208ER-D
		17-S16	●			17									1				
		20-S20	●			20	20	130	35	22	6		-9		1		SB-2555TRG	DT-8	Center Edge : GOMT100308ER-D Side Edge : JOMT100308ER-D
		21-S20	●			21									1				
		25-S25	●			25	25	140	40	28	7.5		-11		1		SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
		26-S25	●			26									1				
		32-S32	●			32	32	150	50	36	9.5	+13	-9		1		SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D
		33-S32	●			33									1				
		40-S32	●	7		40		160	55	42	7.5		-11		2		SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
		50-S42	●			50	42	170	70	54	9.5		-9		2		SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D
	Long Head	MEY 16-S16-140H	●	4	2	16	16	140	51	19	4.5	+11	-11	No	1	P-37	SB-2040TRG	DTM-6	Center Edge : GOMT08T208ER-D Side Edge : JOMT08T208ER-D
		20-S20-150H	●			20	20	150	53	22	6		-9		1		SB-2555TRG	DT-8	Center Edge : GOMT100308ER-D Side Edge : JOMT100308ER-D
		25-S25-170H	●			25	25	170	70	28	7.5	+13	-11		1		SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
		32-S32-180H	●			32	32	180	80	36	9.5		-9		1		SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D
	Long Shank	MEY 16-S16-190	●	4	2	16	16	190	61	19	4.5	+11	-11	No	1	P-37	SB-2040TRG	DTM-6	Center Edge : GOMT08T208ER-D Side Edge : JOMT08T208ER-D
		17-S16-190	●			17			31						1				
		20-S20-200	●			20	20	200	63	22	6		-9		1		SB-2555TRG	DT-8	Center Edge : GOMT100308ER-D Side Edge : JOMT100308ER-D
		21-S20-200	●			21			35						1				
		25-S25-220	●			25	25	220	80	28	7.5		-11		1		SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
		26-S25-220	●			26			40						1				
		32-S32-230	●			32	32	230	90	36	9.5	+13	-9		1		SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D
		33-S32-230	●			33			50						1				
		40-S32-240	●	7		40		240	55	42	7.5		-11		2		SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
		50-S42-250	●			50	42	250	70	54	9.5		-9		2		SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D

APMX1 shows the edge length of the complete 2-insert part.
Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.

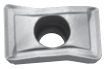
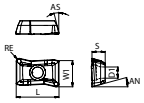
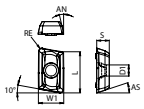
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

GOMT/JOMT

Usage Classification

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

Carbon steel / Alloy steel		★	P
Mold and die steel		★	P
Austenitic stainless steel		☆	M
Martensitic stainless steel			M
Precipitation hardened stainless steel			M
Gray cast iron	★		K
Nodular cast iron	★		K
Non-ferrous metals			N
Heat-resistant alloy			S
Titanium alloy			S
Hard materials			H

Insert		Part Number	No. of Edges	Dimensions (mm)					Angle (°)		Carbide		Applicable Toolholder ➡ M260 M261
				S	D1	RE	L	W1	AN	AS	PVD		
											PR1810	PR1825	
		GOMT 08T208ER-D	2	2.78	2.3	0.8	8.7	5.21	17	13	●	●	MEY0625-S625-HG MEY16-S16(-...) MEY17-S16(-...)
		GOMT 100308ER-D	2	3.3	2.8	0.8	10.7	6.56	17	13	●	●	MEY0750-S750-HG MEY20-S20(-...) MEY21-S20(-...)
		GOMT 13T308ER-D	2	3.85	3.4	0.8	13.2	8.36	17	13	●	●	MEY1000-S100-HG MEY1500-S125-HG MEY25-S25(-...) MEY26-S25(-...) MEY40-S32(-...)
		GOMT 160408ER-D	2	4.76	4.4	0.8	16.7	10.03	17	13	●	●	MEY1250-S125-HG MEY2000-S150-HG MEY32-S32(-...) MEY33-S32(-...) MEY50-S42(-...)
		JOMT 08T208ER-D	2	2.78	2.3	0.8	8.5	5.14	13	17	●	●	MEY0625-S625-HG MEY16-S16(-...) MEY17-S16(-...)
		JOMT 100308ER-D	2	3.18	2.8	0.8	10.2	6.41	13	17	●	●	MEY0750-S750-HG MEY20-S20(-...) MEY21-S20(-...)
		JOMT 13T308ER-D	2	3.7	3.4	0.8	13.2	8.07	13	17	●	●	MEY1000-S100-HG MEY1500-S125-HG MEY25-S25(-...) MEY26-S25(-...) MEY40-S32(-...)
		JOMT 160408ER-D	2	4.5	4.4	0.8	16.7	9.72	13	17	●	●	MEY1250-S125-HG MEY2000-S150-HG MEY32-S32(-...) MEY33-S32(-...) MEY50-S42(-...)

Right-hand Insert Shown

Recommended Cutting Conditions ➡ M263

GOMT / JOMT Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Workpiece Material	fz (ipt)		Recommended Insert Grades (Vc: sfm)	
			MEGACOAT NANO EX	
	Drilling	Shouldering, Slotting	PR1810	PR1825
Carbon Steel	0.003~0.006	0.002~0.010	-	★ 390~820
Alloy Steel	0.003~0.006	0.002~0.010	-	★ 330~720
Mold Steel	0.003~0.005	0.002~0.006	-	★ 260~590
Stainless Steel	0.003~0.005	0.002~0.006	-	★ 390~720
Cast Iron	0.002~0.008	0.002~0.010	★ 330~720	-

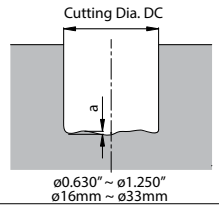
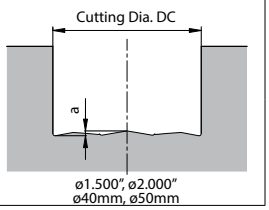
★: 1st Recommendation ☆: 2nd Recommendation

Drilling Precautions

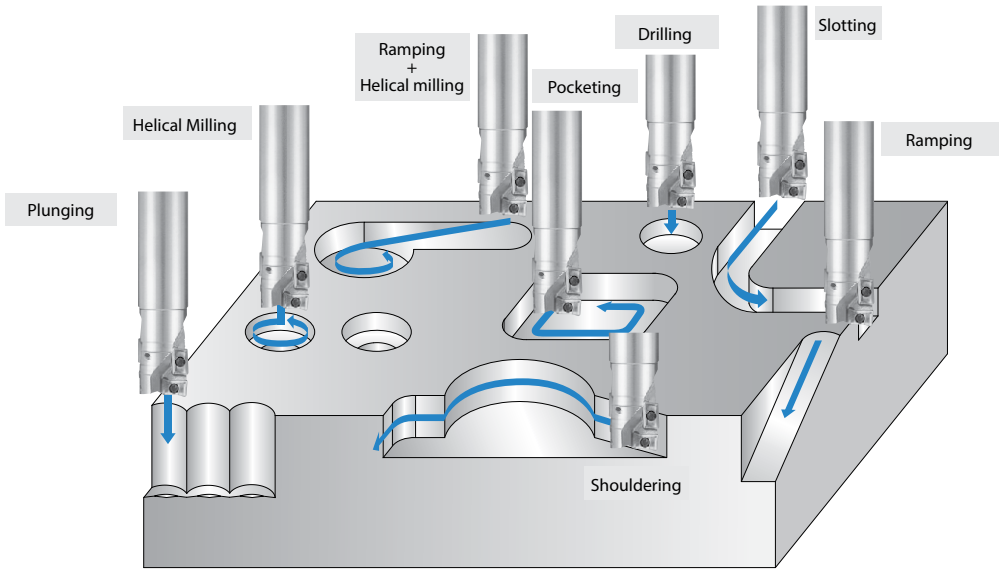
1. Drilling conditions should be calculated as one flute effective.
2. Use compressed air during drilling.
3. Carbon steel other than low carbon steel can be drilled to a depth of 0.5D without step feeding. For soft steel or sticky material such as stainless steel, Step feed drilling (0.020" ~ 0.039") is recommended.
4. For stainless steel drilling, coolant is recommended.
5. Please refer to right list for maximum hole depth.

Cutting Dia. (DC)	Max. Hole Depth
ø0.630" / ø16mm	0.512" / 13mm
ø17mm	0.512" / 13mm
ø0.787" / ø20mm	0.669" / 17mm
ø21mm	0.669" / 17mm
ø1.000" / ø25mm	0.866" / 22mm
ø26mm	0.866" / 22mm
ø1.250" / ø32mm	1.142" / 29mm
ø33mm	1.142" / 29mm
ø1.500" / ø40mm	1.417" / 36mm
ø2.000" / ø50mm	1.575" / 40mm

Drilled Hole Bottom Shape

Cutting Dia.	a	Shape of the Bottom
ø0.630" ø16mm, ø17mm	0.020" 0.50mm	
ø0.787" ø20,mm ø21mm	0.025" 0.64mm	
ø1.000" ø25mm, ø26mm	0.033" 0.85mm	
ø1.250" ø32mm, ø33mm	0.044" 1.12mm	
ø1.500" ø40mm	0.061" 1.54mm	
ø2.000" ø50mm	0.065" 1.65mm	

Examples of MEY multi-function machining



MEY Cutting Performance

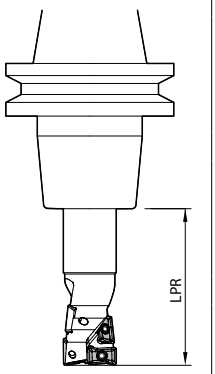
Workpiece Material: 1049

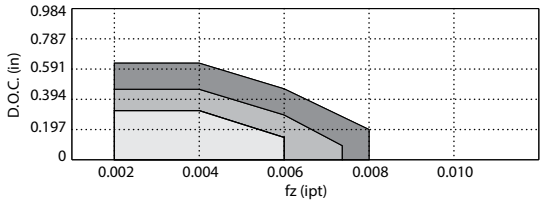
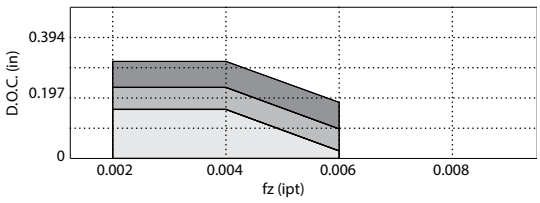
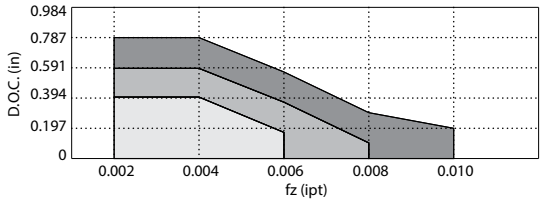
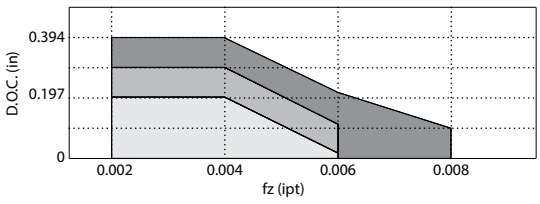
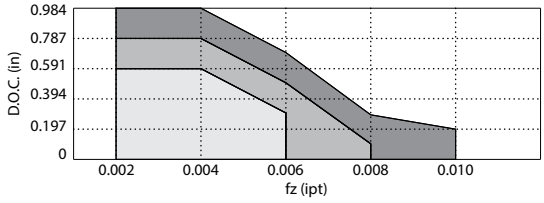
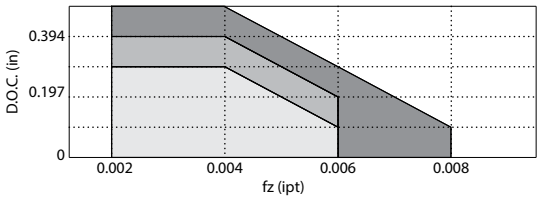
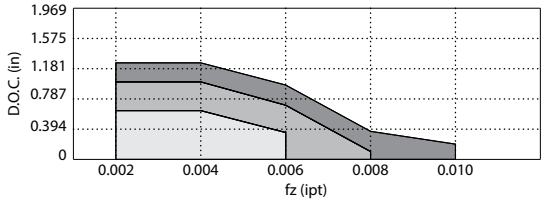
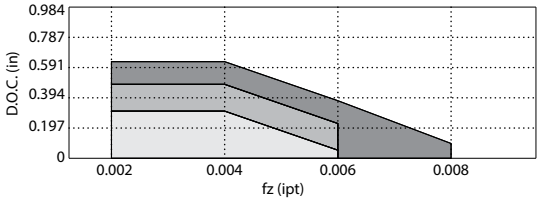
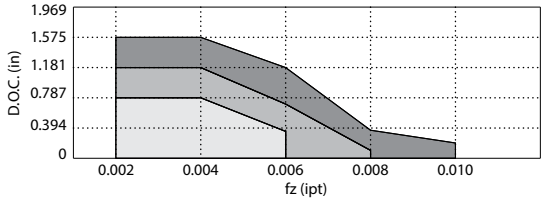
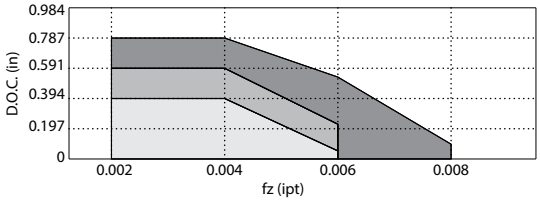
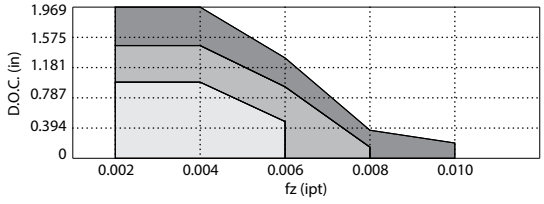
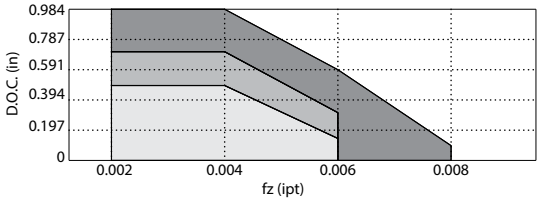
Cutting Dia.	Description	Overhang Length LPR (in)		
ø0.630″ ø16mm	MEY16-S16	1.220″	[~2.402″]	(Not Recommended)
	MEY16-S16-140H	-	~2.402″	[~3.583″]
	MEY16-S16-190	-	2.402″	~3.583″
ø17mm	MEY17-S16	1.220″	[~2.402″]	(Not Recommended)
	MEY17-S16-190	1.220″	~2.402″	~3.583″
ø0.750″ ø20mm	MEY20-S20	1.378″	[~2.559″]	(Not Recommended)
	MEY20-S20-150H	-	~2.559″	[~3.740″]
	MEY20-S20-200	-	2.559″	~3.740″
ø21mm	MEY21-S20	1.378″	[~2.559″]	(Not Recommended)
	MEY21-S20-200	1.378″	~2.559″	~3.740″

When using in [ ] dimension, be careful the chucking length to the shank does not get too short.

Cutting Dia.	Description	Overhang length LPR (in)		
ø1.000″ ø25mm	MEY25-S25	1.575″	[~2.756″]	(Not Recommended)
	MEY25-S25-170H	-	2.756″	[~3.937″]
	MEY25-S25-220	-	~3.150″	~3.937″
ø26mm	MEY26-S25	1.575″	[~2.756″]	(Not Recommended)
	MEY26-S25-220	1.575″	~2.756″	~3.937″
ø1.250″ ø32mm	MEY32-S32	1.969″	[~3.150″]	(Not Recommended)
	MEY32-S32-180H	-	~3.150″	[~4.331″]
	MEY32-S32-230	-	3.543″	~4.331″
ø33mm	MEY33-S32	1.969″	[~3.150″]	(Not Recommended)
	MEY33-S32-230	1.969″	~3.150″	~4.331″
ø1.500″ ø40mm	MEY40-S32	2.165″	[~3.346″]	[~4.528″]
	MEY40-S32-240	2.165″	~3.346″	~4.528″
ø2.000″ ø50mm	MEY50-S42	2.756″	[~3.937″]	[~5.118″]
	MEY50-S42-250	2.756″	~3.937″	~5.118″

Shape



Description	• Shouldering (Cutting Width ae = DC/2) Note: Part ae = DC/4	• Slotting, Ramping, and Helical Milling
MEY0625-S625 MEY16-S16 MEY17-S16		
MEY0750-S750 MEY20-S20 MEY21-S20		
MEY1000-S100 MEY25-S25 MEY26-S25		
MEY1250-S125 MEY32-S32 MEY33-S32		
MEY1500-S125 MEY40-S32		
MEY2000-S125 MEY50-S42		

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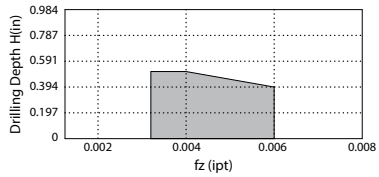
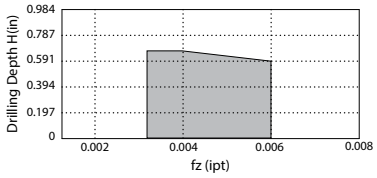
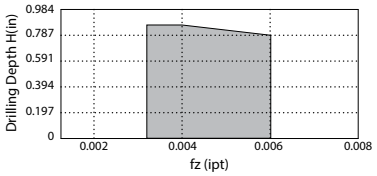
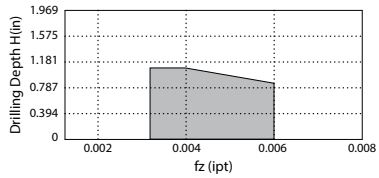
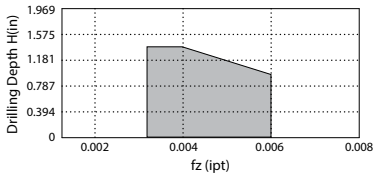
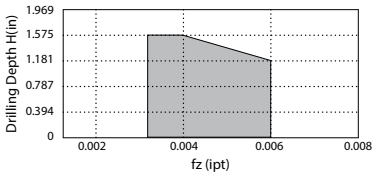
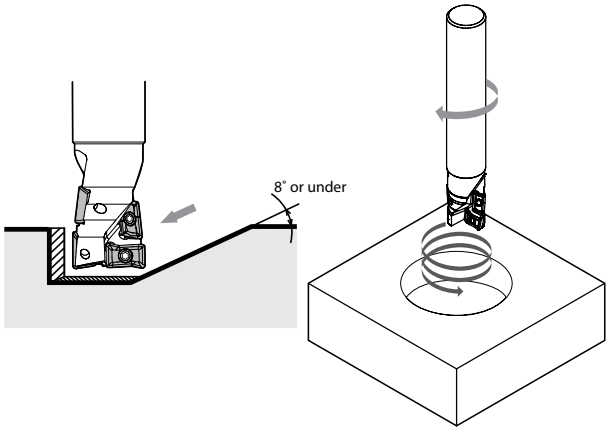
Drilling (Standard/Long Head/Long Shank: 1049)

MEY0625-S625	MEY16-S16 MEY17-S16	MEY0750-S750	MEY20-S20 MEY21-S20	MEY1000-S100	MEY25-S25 MEY26-S25
					
MEY1250-S125	MEY32-S32 MEY33-S32	MEY1500-S125	MEY40-S32	MEY2000-S125	MEY50-S42
					

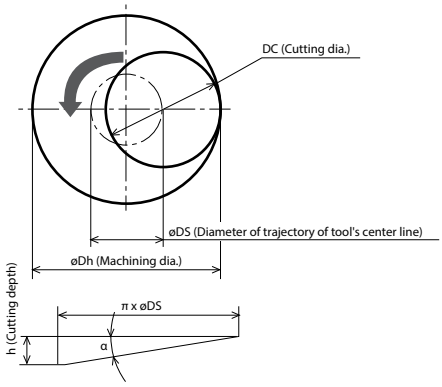
How to use MEY effectively

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



øDS (How to find diameter of trajectory of tool's center line)

øDS = øDh - DC

h How to find "h"

h = π X ø DS X tan α

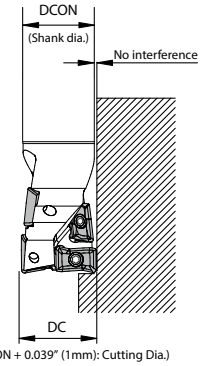
(α should be 8˚ or under)

Shouldering

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

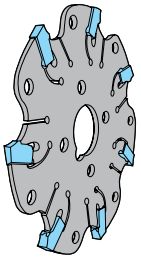
(mm)

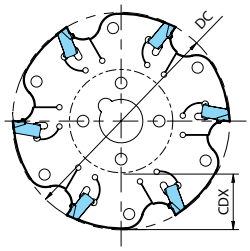
Description	DC	DCON
MEY17-S16	17	16
MEY21-S20	21	20
MEY26-S25	26	25
MEY33-S32	33	32
MEY17-S16-190	17	16
MEY21-S20-200	21	20
MEY26-S25-220	26	25
MEY33-S32-230	33	32

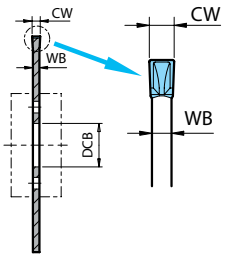


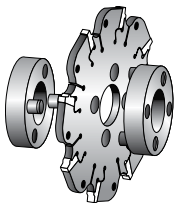
(DCON + 0.039" (1mm): Cutting Dia.)

MSTA









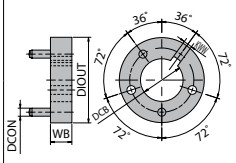
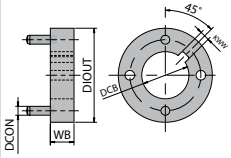
Drive Ring (Sold Separately)
Assembly Example

Toolholder Dimensions (Inch)

Unit	Part Number	Std. Item N	No. of Inserts	Dimensions DC	DCB	CDX	CW	WB	Coolant Hole	RPM	Weight (kg)	Applicable Inserts M268
Inch	MSTA 02N063-5T	●	5	2.500	0.625	0.625	0.063 (1.6mm)	0.051	No	5,100	0.03	SLT..-..SKB SLT..-..SKD
	03N063-7T	●	7	3.000		0.875				4,000	0.04	
	04N063-9T	●	9	4.000	1.000	1.063				3,200	0.07	
	05N063-11T	●	11	5.000	1.250	1.375				2,600	0.1	
	MSTA 03N089-7T	●	7	3.000	0.625	0.875	0.089 (2.2mm) (2.5mm)	0.071	No	4,000	0.05	SLT..-..SKB SLT..-..SKD
	04N089-9T	●	9	4.000	1.000	1.063				3,200	0.08	
	06N089-14T	●	14	6.000	1.250	1.438				2,000	0.3	
	MSTA 02N126-4T	●	4	2.500	0.625	0.625	0.120 (3.05mm)	0.095	No	5,100	0.05	SLT..-..SKB SLT..-..SKD
	03N126-6T	●	6	3.000		0.875				4,000	0.08	
	04N126-9T	●	9	4.000	1.000	1.063				3,200	0.13	
	05N126-11T	●	11	5.000	1.250	1.375				2,600	0.2	
	06N126-14T	●	14	6.000		1.438				2,000	0.35	
	MSTA 03N164-6T	●	6	3.000	0.625	0.875	0.160 (4.05mm)	0.134	No	4,000	0.1	SLT..-..SKB SLT..-..SKD
	04N164-9T	●	9	4.000	1.000	1.063				3,200	0.15	
	05N164-11T	●	11	5.000	1.250	1.375				2,600	0.25	

Attach the drive ring (sold separately) to MSTA slot mill to use. Drive ring is sold in 1 piece packs.
Please purchase two drive rings per one MSTA slot mill.
Do not exceed the max. revolution.
Do not operate cutting on reverse revolution.
Wrench (MS-FRW1) is not included. Please purchase it separately.

Drive Ring (for Inch Holders)

Shape	Part Number	Std. Item	Dimensions (in) DCB	DIOUT	WB	KWW	DCON	Drawing	Applicable Toolholders
 Fig. 1  Fig. 2	DR1000-1875	●	1.000	1.875	0.394	0.256	0.200	Fig. 2	MSTA 04N○○○-○T
	DR1250-2250	●	1.250	2.250		0.319	0.240		MSTA 05N○○○-○T
	DR1250-3125	●	1.250	3.125	0.472	0.319	0.472		MSTA 06N○○○-○T

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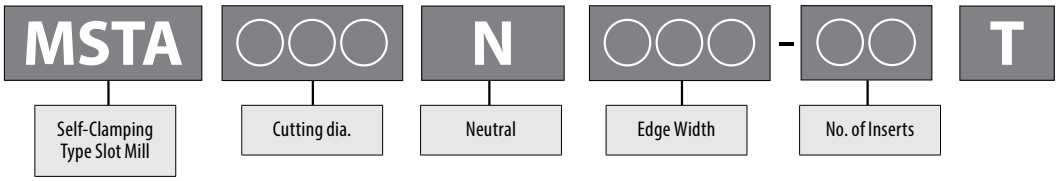
MSTA Toolholder Identification System

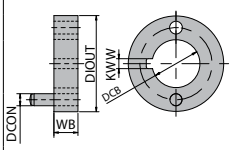
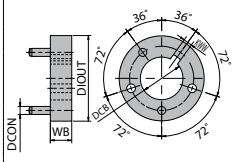
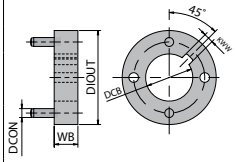


Toolholder Dimensions (Metric)

Unit	Part Number	Std. Item N	No. of Inserts	Dimensions DC	DCB	CDX	WB	CW	Coolant Hole	RPM	Weight (kg)	Applicable Inserts ➡ M268
mm	MSTA 63N16-5T	●	5	63	16	15	1.3	1.6	No	5,100	0.03	SLT..-..SKB SLT..-..SKD
	80N16-7T	●	7	80		21				4,000	0.04	
	100N16-9T	●	9	100	22	27				3,200	0.07	
	125N16-11T	●	11	125	32	35				2,600	0.1	
	MSTA 63N22-5T	●	5	63	16	15	1.8	2.2 (2.25)	No	5,100	0.03	SLT..-..SKB SLT..-..SKD
	80N22-7T	●	7	80		21				4,000	0.05	
	100N22-9T	●	9	100	22	27				3,200	0.08	
	125N22-11T	●	11	125	32	35				2,600	0.12	
	160N22-14T	●	14	160	40	40				2,000	0.3	
	MSTA 63N30-4T	●	4	63	16	15	2.4	3.05	No	5,100	0.05	SLT..-..SKB SLT..-..SKD
	80N30-6T	●	6	80		21				4,000	0.08	
	100N30-9T	●	9	100	22	27				3,200	0.13	
	125N30-11T	●	11	125	32	35				2,600	0.2	
	160N30-14T	●	14	160	40	40				2,000	0.35	
	MSTA 63N40-4T	●	4	63	16	15	3.4	4.05	No	5,100	0.06	SLT..-..SKB SLT..-..SKD
	80N40-6T	●	6	80		21				4,000	0.1	
	100N40-9T	●	9	100	22	27				3,200	0.15	
	125N40-11T	●	11	125	32	35				2,600	0.25	
	160N40-14T	●	14	160	40	40				2,000	0.4	

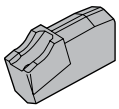
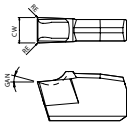
Attach the drive ring (sold separately) to MSTA slot mill to use. Drive ring is sold in 1 piece packs.
Please purchase two drive rings per one MSTA slot mill.
Do not exceed the max. revolution.
Do not operate cutting on reverse revolution.
Wrench (MS-FRW1) is not included. Please purchase it separately.

Drive Ring (for Metric Holders)

Shape	Part Number	Std. Item	Dimensions (mm) DCB	DIOUT	WB	KWW	DCON	Drawing	Applicable Toolholders
 Fig. 1	DR16-32A	●	16	32	8	4.1	3	Fig. 2	MSTA 63N16-5T 63N22-5T
 Fig. 2	DR16-32B	●					4	Fig. 1	MSTA 63N30-4T 63N40-4T
 Fig. 3	DR16-38	●		38				Fig. 3	MSTA 80N○○-○T
	DR22-46	●	22	46	10	6.1	5		MSTA 100N○○-○T
	DR32-55	●	32	55		8.1	6		MSTA 125N○○-○○T
	DR40-80	●	40	80	12	10.1	12		MSTA 160N○○-○○T

SLT Inserts

Usage Classification		P	M	K	N	S	H
● : 1st Choice	Carbon steel / Alloy steel	●	○				
○ : 2nd Choice	Mold and die steel						
	Stainless steel	○	●				
	Gray cast iron	○					
	Nodular cast iron	○					
	Non-ferrous metals						
	Heat-resistant alloy		●				
	Titanium alloy						
	Hard materials						

Insert	Part Number	Dimensions (mm) CW Inch	CW mm	RE	Angle (°) GAN	Tolerance (mm) CW min.	CW max.	Carbide CVD CA0835	Carbide PVD PR0735	Applicable Toolholder
 	SLT 16-15SKB	0.063	1.60	0.15	5	- 0.1	0	●	●	MSTA...
	SLT 22-20SKB	0.087	2.20	0.2	5	- 0.05	+ 0.08	●	●	
	SLT 30-20SKB	0.120	3.05	0.2	5	0	+ 0.15	●	●	
	SLT 40-20SKB	0.159	4.05	0.2	5	0	+ 0.15	●	●	
Low Cutting Force	SLT 16-15SKD	0.063	1.60	0.15	15	- 0.1	0	●	●	
	SLT 22-20SKD	0.089	2.25	0.2	15	0	+ 0.15	●	●	
	SLT 30-20SKD	0.120	3.05	0.2	15	0	+ 0.15	●	●	
	SLT 40-20SKD	0.159	4.05	0.2	15	0	+ 0.15	●	●	

Recommended Cutting Conditions ➡ M269

Inserts Identification System

Edge width	
Symbol	Edge Width
16	1.6mm
22	2.2(2.25)mm
30	3.05mm
40	4.05mm

Chipbreaker Symbol	
Symbol	Rake Angle
KB	5°
KD	15°

SLT **16** – **15** **S** **KB**

- SLT: Insert Symbol
- 16 – 15: Corner-R (RE)

Corner-R (RE)	
Symbol	Corner-R (RE)
15	0.15mm
20	0.2mm

- S: Edge Preparation

Edge Preparation	
Symbol	Cutting Edge Spec.
S	Chamfered + R-honed

Selection of chipbreaker

KB chipbreaker ··· general purpose chipbreaker for steel and cast iron
KD chipbreaker ··· low cutting force chipbreaker for stainless steel

Insert Grades Features

CA0835

- TiN+TiCN+Al_2O_3 based CVD Coated carbide
- For carbon steel, alloy steel, stainless steel and cast iron
- For middle to high speed machining

PR0735

- TiN base PVD Coated carbide
- For stainless steel, heat-resistant alloys, etc.
- For low to middle speed machining

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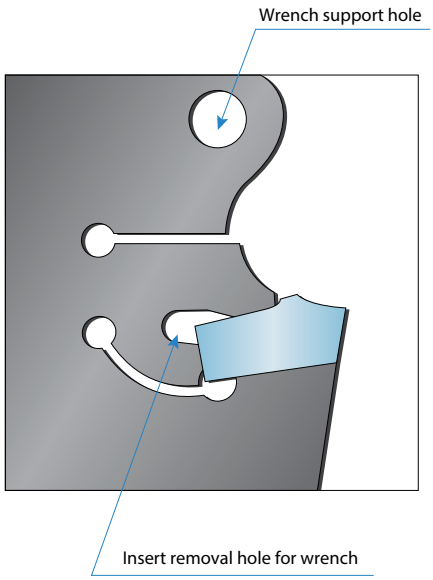
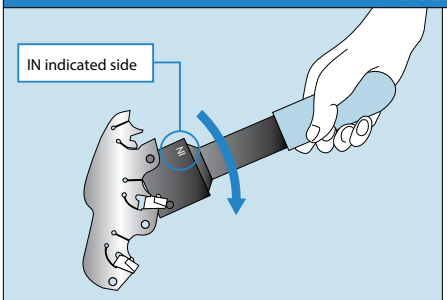
Setup

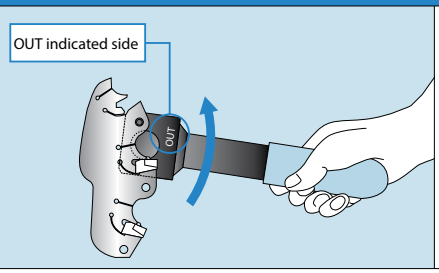


How to attach inserts



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



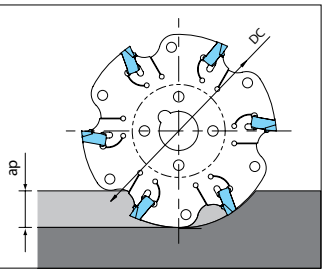
1. Insert one of the pins on the wrench (on OUT indicated side) into the wrench support hole, and insert other pin into the insert releasing hole.
2. Insert can be uninstalled by rotating the wrench counterclockwise. (A magnet is installed on OUT indicated side.)

Note: Use appropriate wrench for set up.

Recommended Cutting Conditions

Workpiece Material		Hardness (HRC)	Recommended Insert Grades (Vc: sfm)		fz (ipt)				Notes
			CVD Coated Carbide	PVD Coated Carbide	Edge Width				
			CA0835	PR0735	0.063" 1.60mm	0.087" (0.089") 2.20mm (2.25mm)	0.118" 3.00mm	0.157" 4.00mm	
Low Carbon Steel	1010~1025	20	820~1020	660~820	0.001~0.005	0.002~0.006	0.002~0.007	0.003~0.008	Coolant
Carbon Steel	1030~1059, 1060 Annealed	29	520~620	430~520	0.001~0.005	0.002~0.006	0.002~0.007	0.003~0.008	
	1030~1059, 1060 Heat Treated	37	460~590	360~490	0.001~0.005	0.002~0.006	0.002~0.007	0.003~0.008	
Alloy Steel	Annealed	28	460~590	360~490	0.001~0.005	0.002~0.006	0.002~0.007	0.003~0.008	
	Heat Treated	41	390~520	330~430	0.001~0.004	0.002~0.005	0.002~0.006	0.003~0.007	
High Carbon Alloy	D2, H13, etc.	42	330~460	260~390	0.001~0.004	0.002~0.005	0.002~0.006	0.003~0.007	
Stainless Steel	304, 316, etc. Austenitic	33	490~620	260~390	0.001~0.004	0.002~0.005	0.002~0.006	0.003~0.007	
	403, 410, etc. Martensitic	45	460~590	200~260	0.001~0.004	0.002~0.005	0.002~0.006	0.003~0.007	
Gray Cast Iron	NO.45~NO.60	38	520~660	-	0.001~0.005	0.002~0.006	0.002~0.007	0.003~0.008	Dry
Nodular Cast Iron	60-40-18~70-50-05	25	430~520	-	0.001~0.005	0.002~0.006	0.002~0.007	0.003~0.008	
	80-60-03~120-90-02	37	360~460	-	0.001~0.005	0.002~0.006	0.002~0.007	0.003~0.008	

Note: 1. Use down-cut machining.
2. If ap is 1/10 or under of cutter dia.(DC), it is possible to increase feed per tooth (fz) by 40%.



MRF

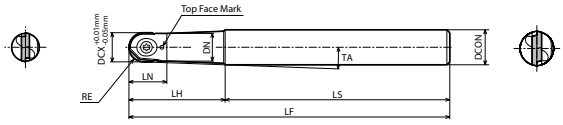


Fig. 1

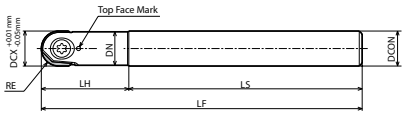


Fig. 2

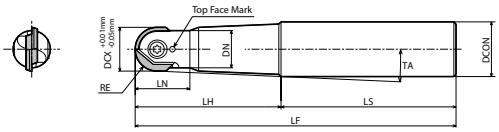


Fig. 3

Top Face Shown

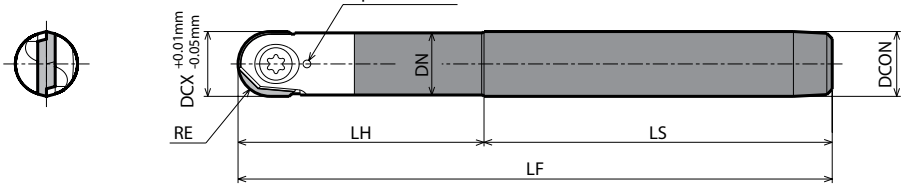
Toolholder Dimensions

Unit		Part Number	Std. Item	No. of Inserts	Dimensions RE	DCX	DCON	LF	LH	DN	LN	LS	TA	Coolant Hole	Fig.	Spare Parts: Anti-seize Compound	Insert Screw	Wrench	Wrench	Applicable Inserts ➡ M272
mm	Standard Neck	MRF 08-S12	●	1	4	8	12	100	22	7.5	10	78	6°20′	No	1	P-37	SC-30067	DT-8	-	RDFG08FR
		10-S12	●		5	10			25	9.5	13	75	3°00′		1		SC-35085	DT-10		RDFG10FR
		12-S12	●		6	12		110	30	11.5	-	80	-		2		SC-40100	DT-15		RDFG12FR
		16-S20	●		8	16	20	130	50	14	20		2°50′		1		SC-50130	DT-20		RDFG16FR
		20-S25	●		10	20	25	140	60	17	25		3°00′		3		SC-60160	-	TT-25	RDFG20FR
		25-S32	●		12.5	25	32	150	70	22	31		3°30′		3		SC-60210		TT-30	RDFG25FR
	Long Neck	MRF 08-S12-130	●	1	4	8	12	130	50	7.5	10	80	2°30′	No	1	P-37	SC-30067	DT-8	-	RDFG08FR
		10-S16-150	●		5	10	16	150		9.5	15	100	3°50′		1		SC-35085	DT-10		RDFG10FR
		12-S16-160	●		6	12		160	60	11.5	16		2°10′		1		SC-40100	DT-15		RDFG12FR
		16-S20-160	●		8	16	20		65	14	20	95	2°00′		1		SC-50130	DT-20		RDFG16FR
		20-S25-180	●		10	20	25	180	80	17	25	100	2°10′		3		SC-60160	-	TT-25	RDFG20FR
		25-S32-200	●		12.5	25	32	200	90	22	31	110	2°40′		3		SC-60210		TT-30	RDFG25FR

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 prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MRFW (Carbide Shank)



Top Face Shown

Toolholder Dimensions

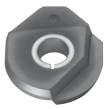
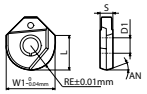
Unit		Part Number	Std. Item	No. of Inserts	Dimensions							Coolant Hole	Spare Parts			Applicable Inserts ➡ M272
					RE	DCX	DCON	LF	LH	DN	LS		Anti-seize Compound	Insert Screw	Wrench	
mm	Carbide Standard	MRFW 08-S08	●	1	4	8	8	100	30	7.4	70	No	P-37	SC-30067	DT-8	RDFG08FR
		10-S10	●		5	10	10		35	9.5	65			SC-35085	DT-10	RDFG10FR
		12-S12	●		6	12	12	110	45	11.5				SC-40100	DT-15	RDFG12FR
	Carbide Long Neck	MRFW 08-S08-130	●	1	4	8	8	130	65	7.4	65	No	P-37	SC-30067	DT-8	RDFG08FR
		10-S10-140	●		5	10	10	140	75	9.5				SC-35085	DT-10	RDFG10FR
		12-S12-150	●		6	12	12	150	85	11.5				SC-40100	DT-15	RDFG12FR

Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

RDFG

Usage Classification ● : 1st Choice ○ : 2nd Choice			
Carbon steel / Alloy steel	●	P
Mold and die steel	●	P
Stainless steel	○	M
Gray cast iron	○	K
Nodular cast iron	○	K
Non-ferrous metals		N
Heat-resistant alloy		S
Titanium alloy		S
Hard materials		H

Insert		Part Number	Dimensions (mm) S	D1	RE	L	W1	AN	Angle (°) Carbide	PVD PR915	Applicable Toolholder ➡ M270 M271
		RDFG 08FR	2.1	3.1	4	6.6	8	15	●		MRF(W)08...
		10FR	2.7	3.6	5	8	10	15	●		MRF(W)10...
		12FR	3.2	4.1	6	9.4	12	15	●		MRF(W)12...
		16FR	4.2	5.1	8	11.3	16	10	●		MRF16...
		20FR	5.2	6.1	10	14.1	20	10	●		MRF20...
		25FR	6.2	6.1	12.5	15.5	25	10	●		MRF25...

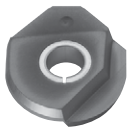
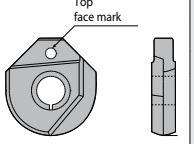
Right-hand Insert Shown

Recommended Cutting Conditions ➡ M273

RDFG Inserts are sold in 2 piece boxes

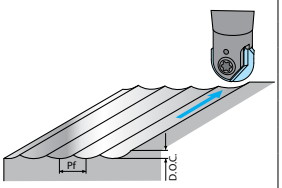
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Applicable Inserts

Insert		Description	
	 Top face shown	RDFG	08FR 10FR 12FR 16FR 20FR 25FR

Align 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	0.008 (Max 0.012)	0.031	
	MRF10-S12	0.008	0.039	
	MRF12-S12	0.020	0.047	
	MRF16-S20	0.020	0.063	
	MRF20-S25	0.039	0.079	
	MRF25-S32	0.039	0.098	
Long Neck	MRF08-S12-130	0.008 (Max 0.012)	0.031	
	MRF10-S12-150	0.008	0.039	
	MRF12-S12-160	0.020	0.047	
	MRF16-S20-160	0.020	0.063	
	MRF20-S25-180	0.039	0.079	
	MRF25-S32-200	0.039	0.098	
Carbide Standard Neck	MRFW08-S08	0.008 (Max 0.012)	0.031	
	MRFW10-S10	0.008	0.039	
	MRFW12-S12	0.020	0.047	
Carbide Long Neck	MRFW08-S08-130	0.008 (Max 0.012)	0.031	
	MRFW10-S10-140	0.008	0.039	
	MRFW12-S12-150	0.020	0.047	

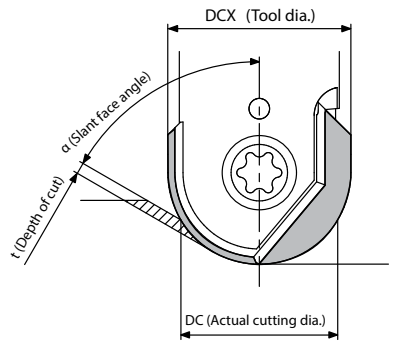
For Ø8mm, Holder may be broken because of overload if D.O.C. exceeds 0.012".

Recommended Cutting Conditions (At Cutting Dia. DCX)

Workpiece Material	Insert Grade	Vc (sfm)	fz (ipt)	ø8mm		ø10mm		ø12mm	
				Vc (sfm) (RPM)	fz (ipt) Vf (ipm)	Vc (sfm) (RPM)	fz (ipt) Vf (ipm)	Vc (sfm) (RPM)	fz (ipt) Vf (ipm)
Carbon steel	PR915	330~660	0.004~0.012	490 (5,970)	0.008 (94.095)	490 (4,770)	0.008 (75.197)	490 (3,980)	0.008 (62.598)
Alloy steel	PR915	260~590	0.004~0.012	430 (5,170)	0.008 (81.496)	430 (4,140)	0.008 (65.354)	430 (3,450)	0.008 (54.331)
Mold steel	PR915	160~490	0.004~0.008	330 (3,980)	0.006 (46.850)	330 (3,180)	0.006 (37.402)	330 (2,650)	0.006 (31.496)
Stainless steel	PR915	160~490	0.004~0.008	330 (3,980)	0.006 (46.850)	330 (3,180)	0.006 (37.402)	330 (2,650)	0.006 (31.496)
Cast iron	PR915	330~660	0.008~0.016	490 (5,970)	0.012 (140.945)	490 (4,770)	0.012 (112.598)	490 (3,980)	0.012 (94.095)
Workpiece Material	Insert Grade	Vc (sfm)	fz (ipt)	ø16mm		ø20mm		ø25mm	
				Vc (sfm) (RPM)	fz (ipt) Vf (ipm)	Vc (sfm) (RPM)	fz (ipt) Vf (ipm)	Vc (sfm) (RPM)	fz (ipt) Vf (ipm)
Carbon steel	PR915	330~660	0.004~0.012	490 (2,980)	0.008 (46.850)	490 (2,390)	0.008 (37.402)	490 (1,910)	0.008 (29.921)
Alloy steel	PR915	260~590	0.004~0.012	430 (2,590)	0.008 (40.551)	430 (2,070)	0.008 (32.677)	430 (1,660)	0.008 (25.984)
Mold steel	PR915	160~490	0.004~0.008	330 (1,990)	0.006 (23.622)	330 (1,590)	0.006 (18.898)	330 (1,270)	0.006 (14.961)
Stainless steel	PR915	160~490	0.004~0.008	330 (1,990)	0.006 (23.622)	330 (1,590)	0.006 (18.898)	330 (1,270)	0.006 (14.961)
Cast iron	PR915	330~660	0.008~0.016	490 (2,980)	0.012 (70.472)	490 (2,390)	0.012 (56.299)	490 (1,910)	0.012 (45.276)

Actual Cutting Speed (Vd) Conversion Coefficient Table

- Vd varies depending on D.O.C. and slant face angle.
- Vd can be obtained by dividing the conversion coefficient into the recommended cutting speed.

Model	Tool Dia. (DCX)		ø8mm		ø10mm		ø12mm	
	Depth of Cut (t:in)		0.004	0.008	0.004	0.008	0.008	0.020
	Slant face angle (α)	15°	1.00	1.00	1.00	1.00	1.00	1.00
		30°	1.05	1.02	1.05	1.03	1.04	1.01
		45°	1.18	1.12	1.20	1.14	1.16	1.07
		60°	1.47	1.34	1.51	1.38	1.42	1.24
		75°	2.15	1.82	2.24	1.92	2.02	1.60
		90°(Horizontal plane)	4.48	3.22	5.06	3.57	3.92	2.50
	Tool Dia. (DCX)		ø16mm		ø20mm		ø25mm	
	Depth of Cut (t:in)		0.008	0.020	0.020	0.039	0.020	0.039
	Slant face angle (α)	15°	1.00	1.00	1.00	1.02	1.00	1.01
		30°	1.05	1.01	1.02	1.00	1.03	1.00
		45°	1.18	1.10	1.12	1.06	1.14	1.08
		60°	1.47	1.30	1.34	1.21	1.38	1.25
		75°	2.14	1.73	1.83	1.53	1.93	1.62
		90°(Horizontal plane)	4.48	2.87	3.20	2.29	3.57	2.55

e.g.) Suppose tool dia. 8mm, D.O.C. = 0.039", slant face angle 90°: The actual cutting speed Vd for carbon steel machining, when Vc is 490sfm at the full cutter diameter, Vd can be obtained by calculating: Vd = 490 ÷ 4.48 = 109.4sfm

High Efficiency Radius Cutter

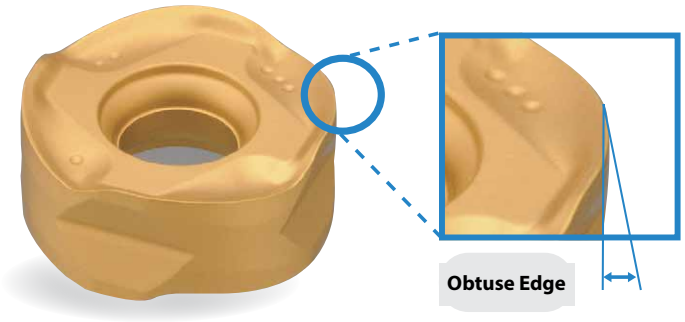
RAD-8 (MRW)

Economical and high efficiency radius cutter with double-sided insert for various types of workpieces

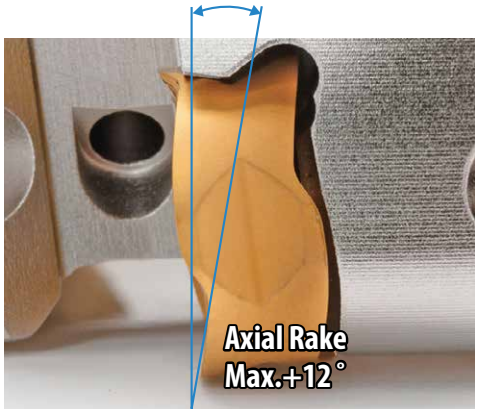
Economical double-sided 8-edge insert
Combine sharpness and cutting edge strength

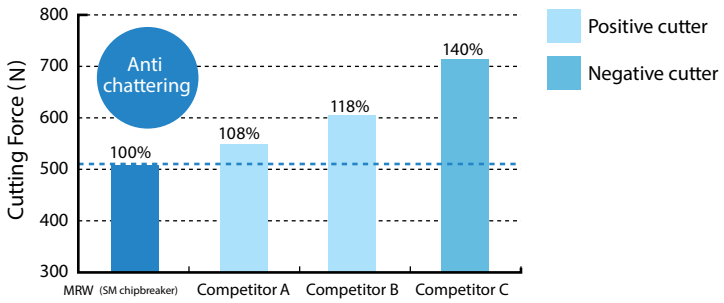
Obtuse edge increases cutting edge toughness

Helical cutting edge design with maximum axial rake 12˚ reduces cutting force, equivalent to positive inserts.



Low Cutting Force Chipbreaker

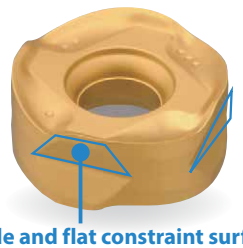




< Cutting Condition >
Vc = 390 sfm, D.O.C. × ae = 0.039" × 1.575", fz = 0.008 ipt
304 Stainless Steel, Cutter Ø2.000"

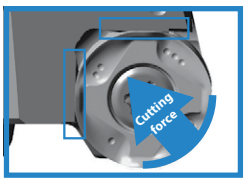
1 Flat Lock Structure Creates a Firm Hold on the Inserts

Prevents insert rotation for stable machining



Flat lock structure

Wide flat constraint surface
- Receives even cutting forces
- Controls insert rotation



800.823.7284
www.kyoceraprecisiontools.com

Longer tool life with a variety of grades and 3 chipbreakers available for various applications

Available for Steel, Stainless Steels, Cast Iron, and Heat-Resistant Alloys

Workpiece Material		Applicable Insert Grades	Applicable Chipbreaker
P Carbon Steel / Alloy Steel/Mold Steel		PR1825 PR1525	GM/SM/GH chipbreaker
K Cast Iron		PR1810 PR1510	GH/GM chipbreaker
S Ni-base Heat-Resistant Alloys	M Martensitic Stainless Steel	PR1835 CA6535	SM/GM chipbreaker
S Ni-base Heat-Resistant Alloys S Titanium alloys	M Austenitic Stainless Steel M Precipitation Hardened Stainless Steel	PR1835 PR1535	SM/GM chipbreaker

2 Insert Grades for Difficult-to-cut Material

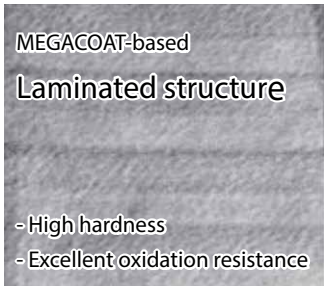
Controls sudden fracture for stable machining
Suitable for high efficiency machining

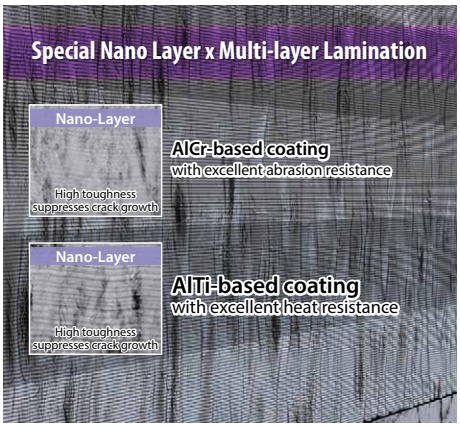
CA6535

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

PR1835

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 EX

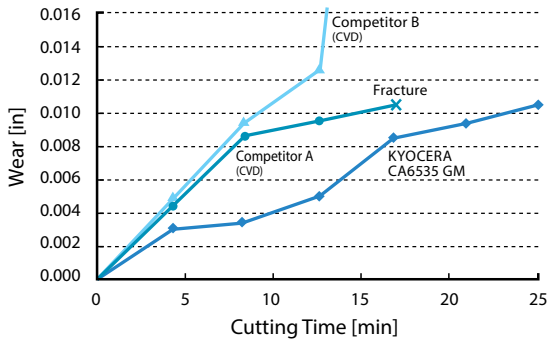




Multi-layering of high-performance nano layers

Tool Life Comparison

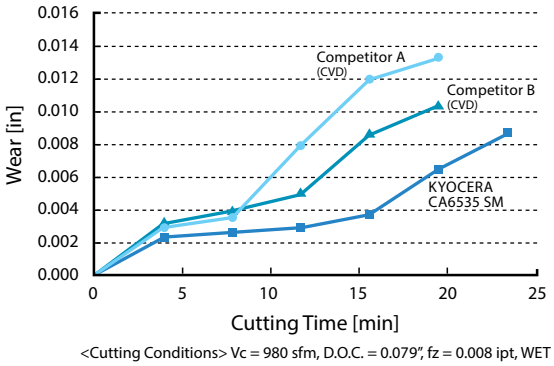
Ni-base Heat Resistant Alloy



<Cutting Conditions> Vc = 160 sfm, D.O.C. = 0.039", fz = 0.006 ipt, WET

1st recommendation GM Chipbreaker

Martensitic Stainless Steel



<Cutting Conditions> Vc = 980 sfm, D.O.C. = 0.079", fz = 0.008 ipt, WET

1st recommendation SM Chipbreaker

MRW (Face Mill)

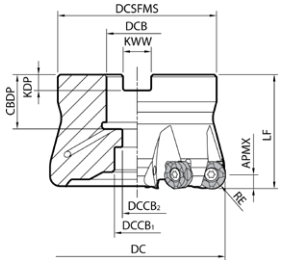


Fig. 1

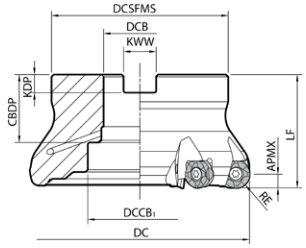


Fig. 2

Toolholder Dimensions

Unit	Part Number	Std. Item R	No. of Inserts	Dimensions RE	DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	A.R. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Applicable Inserts ➡ M281
Inch	Inch Bore Dia. MRW 2000R-12-5T	●	5	0.236 (6mm)	2.00	1.75	0.75	0.748	0.433	1.575	0.750	0.187	0.312	0.236 (6mm)	+12	-15.5	Yes	16,000	0.3	1	ROMU1204M0ER-..
	2000R-12-6T	●	6																0.3	1	
	2500R-12-6T	●	6		2.50	1.75	0.75	0.748	0.433	1.575	0.750	0.187	0.312					14,000	0.6	1	
	2500R-12-7T	●	7																0.6	1	
	3000R-12-6T	●	6		3.00	2.25	1.00	0.866	0.551	1.969	1.063	0.236	0.381					12,000	1.1	1	
	3000R-12-8T	●	8																1.1	1	
	4000R-12-7T	●	7		4.00	3.54	1.50	2.047	-	1.969	1.142	0.393	0.625					10,600	1.5	2	
	4000R-12-9T	●	9																1.4	2	
	MRW 2500R-16-5T	●	5	0.315 (8mm)	2.50	1.75	0.75	0.748	0.433	1.575	0.750	0.187	0.312	0.315 (8mm)	+11	-16.5	Yes	12,800	0.5	1	ROMU1605M0ER-..
	2500R-16-6T	●	6																0.5	1	
	3000R-16-7T	●	7		3.00	2.25	1.00	0.866	0.551	1.969	1.063	0.236	0.381					11,000	1.0	1	
	4000R-16-8T	●	8		4.00	3.54	1.50	2.047	-	1.969	1.142	0.393	0.625					9,600	1.3	2	
	5000R-16-8T	●	8		5.00	3.54	1.50	2.047	-	2.480	1.496	0.393	0.625					8,560	2.6	2	
	5000R-16-10T	●	10																2.5	2	

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.
APMX is Maximum D.O.C. For more details, see page **M282**.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MRW (Face Mill)

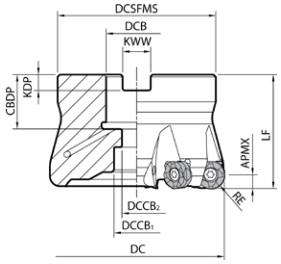


Fig. 1

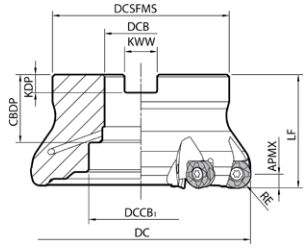


Fig. 2

Toolholder Dimensions

Unit		Part Number	Std. Item R	No. of Inserts	Dimensions RE	DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	A.R. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Applicable Inserts ➡ M281
mm	Inch Bore Dia.	MRW 080R-12-6T	●	6	6	80	70	1.000"	20	13	50	1.063"	0.236"	0.375"	6	+12	-15.5	Yes	12,000	1.2	1	ROMU1204M0ER-..
		080R-12-8T	●	8																1.1	1	
		100R-12-7T	●	7		100	78	1.250"	46	-		1.339"	0.315"	0.500"					10,600	1.5	2	
		100R-12-9T	●	9																1.4	2	
		MRW 080R-16-6T	●	6	8	80	70	1.000"	20	13	50	1.063"	0.236"	0.375"	8	+11	-16.5	Yes	11,000	1.1	1	ROMU1605M0ER-..
		080R-16-7T	●	7																	1	
		100R-16-6T	●	6		100	78	1.250"	46	-		1.339"	0.315"	0.500"					9,600	1.4	2	
		100R-16-8T	●	8																	2	
		125R-16-8T	●	8		125	89	1.500"	55		63	1.496"	0.394"	0.625"					8,560	2.6	2	
		125R-16-10T	●	10																	2	
	Metric Bore Dia.	MRW 050R-12-5T-M	●	5	6	50	48	22	18	11	40	21	6.3	10.4	6	+12	-15.5	Yes	16,000	0.3	1	ROMU1204M0ER-..
		050R-12-6T-M	●	6																	1	
		063R-12-6T-M	●	6		63	60		19										14,000	0.6	1	
		063R-12-7T-M	●	7																	1	
		080R-12-6T-M	●	6		80	70	27	20	13	50	24	7	12.4					12,000	1.1	1	
		080R-12-8T-M	●	8																	1	
		100R-12-7T-M	●	7		100	78	32	46	-		30	8	14.4					10,600	1.5	2	
		100R-12-9T-M	●	9																1.4	2	
		MRW 063R-16-5T-M	●	5	8	63	60	22	19	11	40	21	6.3	10.4	8	+11	-16.5	Yes	12,800	0.5	1	ROMU1605M0ER-..
		063R-16-6T-M	●	6																	1	
		080R-16-6T-M	●	6		80	70	27	20	13	50	24	7	12.4					11,000	1.1	1	
		080R-16-7T-M	●	7																1	1	
		100R-16-6T-M	●	6		100	78	32	46	-		30	8	14.4					9,600	1.4	2	
		100R-16-8T-M	●	8																1.3	2	
		125R-16-8T-M	●	8		125	89	40	55		63	33	9	16.4					8,500	2.6	2	
		125R-16-10T-M	●	10																2.5	2	

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.
APMX is Maximum D.O.C. For more details, see page **M282**.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Spare Parts and Applicable Inserts (Inch Face Mills)

Part Number	Spare Parts					Applicable Inserts ➡ M281		
	Insert Screw	Wrench		Anti-seize Compound	Arbor Bolt	General Purpose	Low Cutting Force	Tough Edge (For Heavy Milling)
		DTPM-15	TTP-20					
MRW 2000R-12...	SB-4085TRP	DTPM-15		P-37	HH3/8-1.25 (HH3/8-1.25H)	ROMU1204M0ER-GM	ROMU1204M0ER-SM	ROMU1204M0ER-GH
MRW 2500R-12...		Recommended tightening torque for insert screw 3.5N•m			HH1/2-1.25 (HH1/2-1.25H)			
MRW 3000R-12...					-			
MRW 4000R-12...								
MRW 2500R-16...	SB-50140TRP	TTP-20		P-37	HH3/8-1.25 (HH3/8-1.25H)	ROMU1605M0ER-GM	ROMU1605M0ER-SM	ROMU1605M0ER-GH
MRW 3000R-16...		Recommended tightening torque for insert screw 4.5N•m			HH1/2-1.25 (HH1/2-1.25H)			
MRW 4000R-16...					-			
MRW 5000R-16...								

Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.
( ) Optional coolant-through bolt available

Spare Parts and Applicable Inserts (Metric Face Mills)

Part Number	Spare Parts					Applicable Inserts ➡ M281		
	Insert Screw	Wrench		Anti-seize Compound	Arbor Bolt	General Purpose	Low Cutting Force	Tough Edge (For Heavy Milling)
		DTPM-15	TTP-20					
MRW 050R-12...	SB-4085TRP	DTPM-15		P-37	HH10X30	ROMU1204M0ER-GM	ROMU1204M0ER-SM	ROMU1204M0ER-GH
MRW 063R-12...		Recommended tightening torque for insert screw 3.5N•m			HH12X35			
MRW 080R-12...					-			
MRW 100R-12...								
MRW 063R-16...	SB-50140TRP	TTP-20		P-37	HH10X30	ROMU1605M0ER-GM	ROMU1605M0ER-SM	ROMU1605M0ER-GH
MRW 080R-16...		Recommended tightening torque for insert screw 4.5N•m			HH12X35			
MRW 100R-16...					-			
MRW 125R-16...								

Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.

MRW (End Mill)

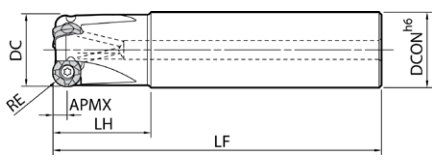


Fig. 1

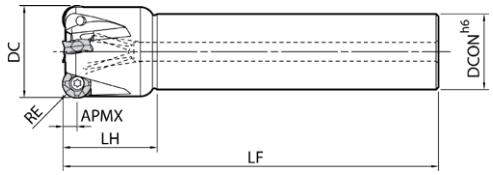


Fig. 2

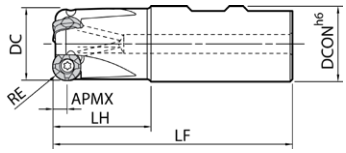


Fig. 3

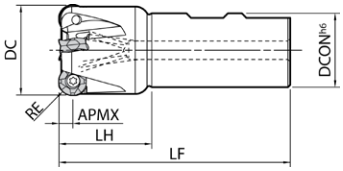


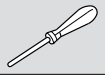
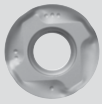
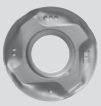
Fig. 4

Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions RE	DC	DCON	LF	LH	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Fig.	Applicable Inserts ➡ M281
Inch	Weldon	Standard Shank	MRW 1250-W125-12-3T	●	3	0.236 (6mm)	1.25	1.25	3.921	1.575	0.236 (6mm)	+12	-20	Yes	22,000	3	ROMU1204M0ER-..
			1500-W125-12-4T	●	4		1.50		3.856				-16.5		18,800	4	
			2000-W150-12-5T	●	5		2.00	1.50	4.266				-15.5		16,000	4	
			MRW 1500-W125-16-2T	●	2	0.315 (8mm)	1.50	1.25	3.856	1.575	0.315 (8mm)	+11	-18	Yes	17,200	4	ROMU1605M0ER-..
			2000-W150-16-4T	●	4		2.00	1.50	4.262				-16.5		14,800	4	
			2500-W150-16-5T	●	5		2.50								12,800	4	
	Cylindrical	Long Shank	MRW 2000-S150-12-4T-12	●	4	0.236 (6mm)	2.00	1.50	12.000	1.969	0.236 (6mm)	+12	-15.5	Yes	16,000	2	ROMU1204M0ER-..
			MRW 2000-S150-16-3T-8	●	3	0.315 (8mm)	2.00	1.50	8.000	1.575	0.315 (8mm)	+11	-16.5	Yes	14,800	2	ROMU1605M0ER-..
			2500-S150-16-4T-12	●	4		2.50		12.000	1.969					12,800	2	

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.
APMX is Maximum D.O.C. For more details, see page **M282**.

Spare Parts and Applicable Inserts (Inch End Mills)

Part Number	Spare Parts: Insert Screw	Spare Parts: Wrench	Spare Parts: Anti-seize Compound	Applicable Inserts ➡ M281: General Purpose	Low Cutting Force	Tough Edge (For Heavy Milling)
		DTPM-15  TTP-20				
MRW ...-12-...	SB-4085TRP	DTPM-15	P-37	ROMU1204M0ER-GM	ROMU1204M0ER-SM	ROMU1204M0ER-GH
	Recommended tightening torque for insert screw 3.5N•m					
MRW ...-16-...	SB-50140TRP	TTP-20	P-37	ROMU1605M0ER-GM	ROMU1605M0ER-SM	ROMU1605M0ER-GH
	Recommended tightening torque for insert screw 4.5N•m					

Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MRW (End Mill)

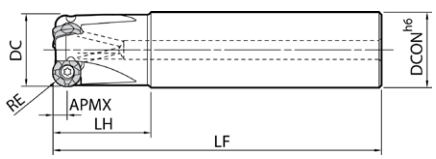


Fig. 1

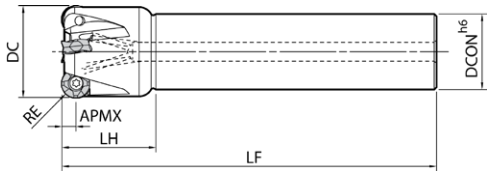


Fig. 2

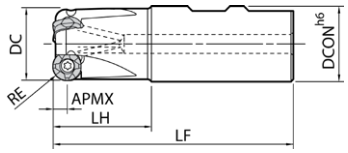


Fig. 3

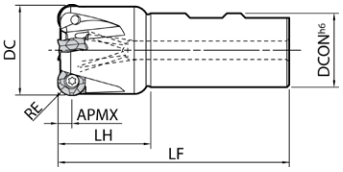


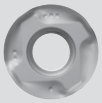
Fig. 4

Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions RE	DC	DCON	LF	LH	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Fig.	Applicable Inserts ➡ M281
mm	Cylindrical	Standard Shank	MRW 32-S32-12-3T	●	3	6	32	32	140	40	6	+12	-20	Yes	22,000	1	ROMU1204M0ER-..
			40-S32-12-4T	●	4		40		160				-16.5		18,800	2	
			50-S42-12-5T	●	5		50	42	170				-15.5		16,000	2	
			MRW 40-S32-16-3T	●	3	8	40	32	160	40	8	+11	-18	Yes	17,200	2	ROMU1605M0ER-..
			50-S42-16-4T	●	4		50	42	170				-16.5		14,800	2	
			63-S42-16-5T	●	5		63			50					12,800	2	
		Long Shank	MRW 32-S32-12-2T-200	●	2	6	32	32	200	40	6	+12	-20	Yes	22,000	1	ROMU1204M0ER-..
			40-S32-12-3T-200	●	3		40						-16.5		18,800	2	
			50-S42-12-4T-300	●	4		50	42	300				-15.5		16,000	2	
			MRW 40-S32-16-2T-200	●	2	8	40	32	200	40	8	+11	-18	Yes	17,200	2	ROMU1605M0ER-..
			50-S42-16-3T-300	●	3		50	42	300				-16.5		14,800	2	
			63-S42-16-4T-300	●	4		63			50					12,800	2	
	Weldon	Standard Shank	MRW 32-W32-12-3T	●	3	6	32	32	102	40	6	+12	-20	Yes	22,000	3	ROMU1204M0ER-..
			40-W32-12-4T	●	4		40		100				-16.5		18,800	4	
			50-W40-12-5T	●	5		50	40	110				-15.5		16,000	4	
			MRW 40-W32-16-3T	●	3	8	40	32	100	40	8	+11	-18	Yes	17,200	4	ROMU1605M0ER-..
			50-W40-16-4T	●	4		50	40	110				-16.5		14,800	4	
			63-W40-16-5T	●	5		63		120	50					12,800	4	

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.
APMX is Maximum D.O.C. For more details, see page **M282**.

Spare Parts and Applicable Inserts (Metric End Mills)

Part Number	Spare Parts: Insert Screw	Spare Parts: Wrench	Spare Parts: Anti-seize Compound	Applicable Inserts ➡ M281: General Purpose	Low Cutting Force	Tough Edge (For Heavy Milling)
		DTPM-15 TTP-20				
MRW ...-12-...	SB-4085TRP	DTPM-15	P-37	ROMU1204M0ER-GM	ROMU1204M0ER-SM	ROMU1204M0ER-GH
	Recommended tightening torque for insert screw 3.5N•m					
MRW ...-16-...	SB-50140TRP	TTP-20	P-37	ROMU1605M0ER-GM	ROMU1605M0ER-SM	ROMU1605M0ER-GH
	Recommended tightening torque for insert screw 4.5N•m					

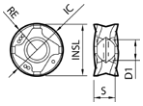
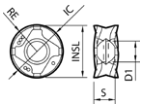
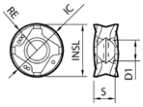
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

ROMU

Usage Classification

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

Carbon steel / Alloy steel			☆			★	☆	P
Mold and die steel			☆			★	☆	P
Austenitic stainless steel				☆		☆	★	M
Martensitic stainless steel	★						☆	M
Precipitation hardened stainless steel				☆			★	M
Gray cast iron		☆			★			K
Nodular cast iron		☆			★			K
Non-ferrous metals								N
Heat-resistant alloy	★						☆	S
Titanium alloy				☆			★	S
Hard materials								H

Insert		Part Number	Dimensions (mm)					Carbide						Applicable Toolholder ➡ M280~M280
			IC	S	D1	RE	INSL	CVD	PVD					
								CA6535	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835
	 General Purpose	ROMU 1204M0ER-GM	12	4.75	4.6	6	11.8	●	△	●	●	●	●	MRW...-12-..
		ROMU 1605M0ER-GM	16	5.48	6.2	8	15.8	●	△	●	●	●	●	MRW...-16-..
	 Low Cutting Force	ROMU 1204M0ER-SM	12	4.75	4.6	6	11.8	●		●	●		●	MRW...-12-..
		ROMU 1605M0ER-SM	16	5.48	6.2	8	15.8	●		●	●		●	MRW...-16-..
	 Tough Edge	ROMU 1204M0ER-GH	12	4.75	4.6	6	11.8	●	△	●	●	●	●	MRW...-12-..
		ROMU 1605M0ER-GH	16	5.48	6.2	8	15.8	●	△	●	●	●	●	MRW...-16-..

Right-hand Insert Shown

Recommended Cutting Conditions ➡ M282

ROMU Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Workpiece Material	Recommended Chipbreaker fz (ipt) Recommended Feed Rate (Standard Value) ROMU12 : D.O.C. = 0.118" ROMU16 : D.O.C. = 0.158"			Recommended Insert Grades (Cutting Speed Vc: sfm)			
				MEGACOAT NANO EX (MEGACOAT NANO)			CVD Coated Carbide
	GM	SM	GH	PR1810 (PR1510)	PR1825 (PR1525)	PR1835 (PR1535)	CA6535
Carbon Steel	★ 0.004~**0.008**~0.012	☆ 0.002~**0.006**~0.008	☆ 0.006~**0.012**~0.014	-	★ 390~**590**~820	☆ 390~**590**~820	-
Alloy Steel	★ 0.004~**0.008**~0.012	☆ 0.002~**0.006**~0.008	☆ 0.006~**0.012**~0.014	-	★ 330~**520**~720	☆ 330~**520**~720	-
Mold Steel	★ 0.004~**0.006**~0.010	☆ 0.002~**0.005**~0.008	☆ 0.006~**0.008**~0.012	-	★ 260~**460**~590	☆ 260~**460**~590	-
Austenitic Stainless Steel	☆ 0.004~**0.006**~0.008	★ 0.002~**0.005**~0.008	☆ 0.006~**0.008**~0.010	-	☆ 330~**520**~660	★ 330~**520**~660	-
Martensitic Stainless Steel	☆ 0.004~**0.006**~0.008	★ 0.002~**0.005**~0.008	☆ 0.006~**0.008**~0.010	-	-	☆ 490~**660**~820	★ 590~790~980
Precipitation Hardened Stainless Steel	★ 0.004~**0.006**~0.008	☆ 0.002~**0.005**~0.008	☆ 0.006~**0.008**~0.010	-	-	★ 300~**390**~490	-
Gray Cast Iron	★ 0.004~**0.008**~0.012	-	☆ 0.006~**0.012**~0.014	★ 390~**590**~820	-	-	-
Nodular Cast Iron	★ 0.004~**0.006**~0.010	-	☆ 0.006~**0.008**~0.012	★ 330~**490**~660	-	-	-
Ni-base Heat Resistant Alloy	★ 0.004~**0.005**~0.006	☆ 0.002~**0.004**~0.006	☆ 0.005~**0.006**~0.008	-	-	☆ 70~**100**~160	★ 70~**100**~160
Titanium Alloy	☆ 0.004~**0.005**~0.006	★ 0.002~**0.004**~0.006	-	☆ 100~**160**~230	-	★ 130~**200**~260	-

· Machining with coolant is recommended for Ni-base Heat Resistant Alloy and Titanium Alloy

★ : 1st Recommendation ☆ : 2nd Recommendation

· The figure in bold font is center value of the recommended cutting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

· Recommended feed rate is the reference value when D.O.C. is RE/2 (0.118" for ROMU12, 0.158" for ROMU16).
For lower feed rates than the above conditions, the conversion factor in the following table is recommended.

Conversion Factor for Feed Per Tooth by Depth of Cut (D.O.C.)

Insert	D.O.C. (Recommended)	Max. D.O.C.	Conversion Factor for Feed Per Tooth				
			D.O.C. = 0.020"	D.O.C. = 0.039"	D.O.C. = 0.079"	D.O.C. = 0.118"	D.O.C. = 0.158"
ROMU12 type	0.118" or less	0.236"	2.1	1.5	1.1	1.0 (Standard)	-
ROMU16 type	0.158" or less	0.315"	2.4	1.7	1.3	1.1	1.0 (Standard)

Calculation Example (ROMU12, Carbon Steel, GM Chipbreaker, D.O.C. = 0.039")

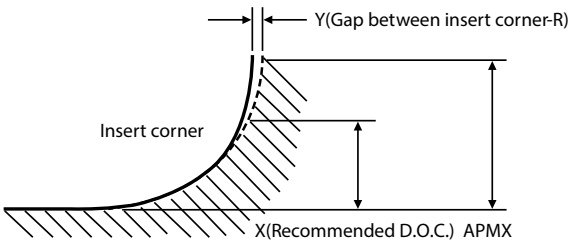
fz = 0.008 ipt (Standard value for carbon steel and GM chipbreaker)	X	**1.5** (Conversion factor for ROMU12 type, D.O.C. = 0.039")	=	**fz = 0.012 ipt** (Recommended feed rate)

* Recommended D.O.C.: 0.118" (3mm) or less for ROMU12, 0.158" (4mm) or less for ROMU16
Except the case that D.O.C. temporally surpasses the recommended D.O.C., machining under the recommended D.O.C. 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	6 mm	3 mm	0.1 mm
ROMU16 type	8 mm	4 mm	0.1 mm



* When machining with larger D.O.C. than recommended D.O.C. (X), there is a gap (Y) between the workpiece corner and Insert corner-R(RE).
* The above figure is estimation. There would be ±0.008" variation depending on the cutting conditions.

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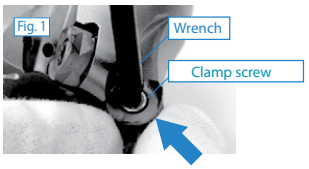
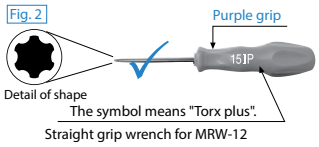
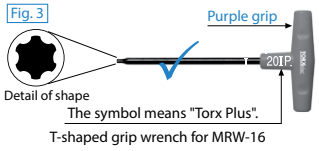
How to Mount Inserts

1. Be sure to remove dust and chips from the insert mounting pocket.
2. Clamp screw
   1. Apply anti-seize compound on portion of taper and thread of clamp screw.
   2. Attach the screw to the front end of the wrench. While lightly pressing the insert against the pocket surfaces, put the screw into the hole of the insert and tighten. (Ref. to Fig. 1)
3. Wrenches and clamp screws are "Torx Plus".
   1. Fig. 2 wrench is for MRW-12. (Straight grip)
   2. Fig. 3 wrench is for MRW-16. (T-shaped grip)
   Please use a "Torx Plus" Wrench for tightening cramp screw.
   * If a "Torx" wrench (Fig. 4) is used to tighten, the screw head might become damaged and then the screw cannot be removed.
4. When tightening the screw, make sure that the wrench is parallel to the screw.
   Recommended Tightening torque, See spare parts table.
5. After tightening the screw, make sure that there is no clearance between the insert seat surface and the pocket 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.

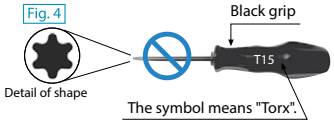




Straight grip wrench for MRW-12



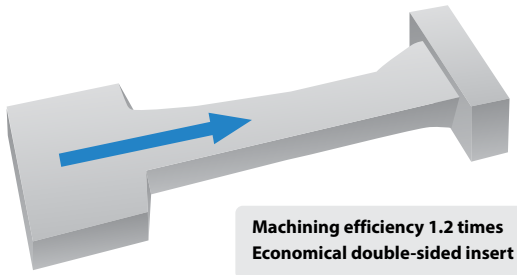
T-shaped grip wrench for MRW-16



Torx wrench (Do NOT use it for MRW)

Case Studies

410 Stainless Steel



Machining efficiency 1.2 times
Economical double-sided insert

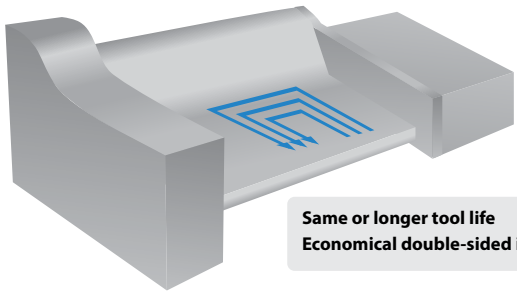
- Turbine blade • Vc = 890 sfm • fz = 0.011 ipt
- D.O.C. = 0.020~0.039" ae = Max. 1.378" • Dry
- MRW050R-12-6T-M (6 flutes) • ROMU1204M0ER-SM (CA6535)

CA6535	Stable machining
Competitor A (Positive cutter)	Unstable machining with large noise

- MRW improved machining efficiency by 1.2 times with same tool life compared with competitor A.
- MRW has cost advantage due to double-sided inserts.

(User evaluation)

410 Stainless Steel



Same or longer tool life
Economical double-sided insert

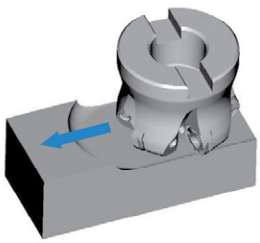
- Turbine Blade • Vc = 820 sfm • fz = 0.006 ipt
- D.O.C. = 0.079" ae = 0.197-1.181" • Wet
- MRW050R-12-5T-M (5 flutes) • ROMU1204M0ER-SM (CA6535)

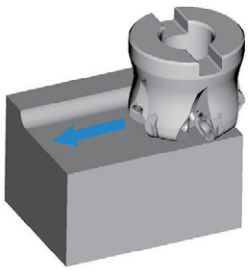
CA6535	Stable, available for further machining
Competitor B (Positive cutter)	Unstable machining with large noise

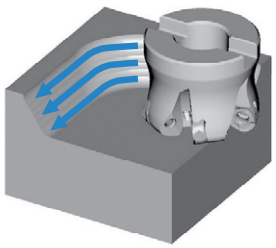
- MRW showed less damage on the cutting edge and reduced machining noise.
- MRW has equal or longer tool life and cost advantage due to double sided inserts.

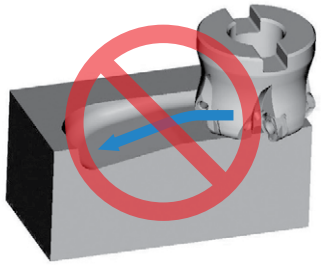
(User evaluation)

Applications


Facing


Shouldering


Contouring


Plunging/Profiling

* MRW type is not available for 3D machining such as plunging and profiling.

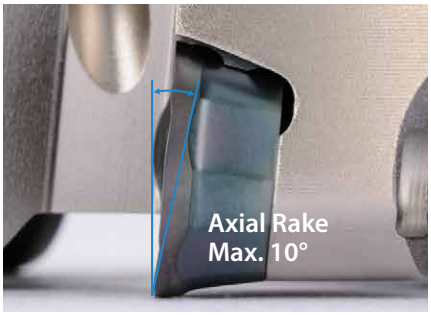
High Efficiency Radius Cutter

RAD-6 (MRX)

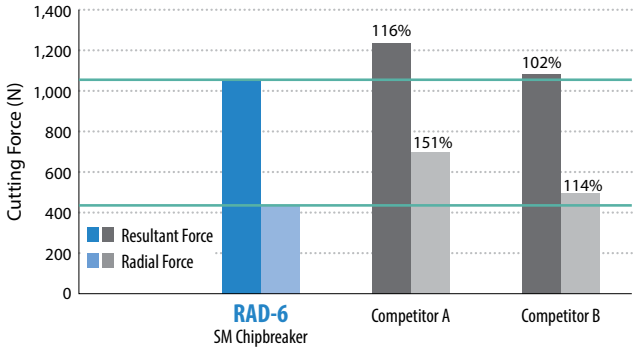
Low Cutting Forces for Longer Tool Life
Available for a Wide Range of Applications

1 Low Cutting Force Helical Cutting Edge Design

Maximum Axial Rake Angle



Cutting Force Comparison (Internal Evaluation)



Cutting Conditions: Vc = 400 sfm, D.O.C. × ae = 0.079" × 0.984" fz = 0.008 ipt,
Workpiece: 304 Steel Cutter: Ø2.000"

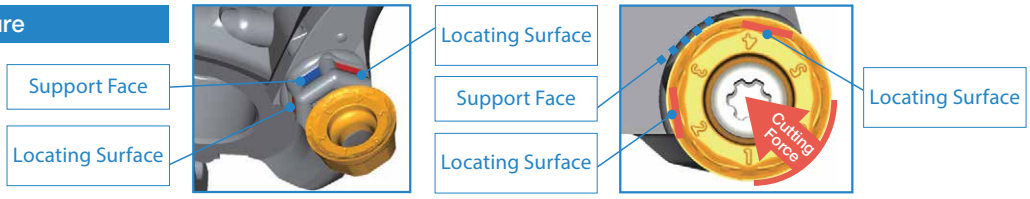
2 Flat Lock Structure Creates a Firm Hold on the Inserts

Prevents insert rotation during machining to provide stable cuttting

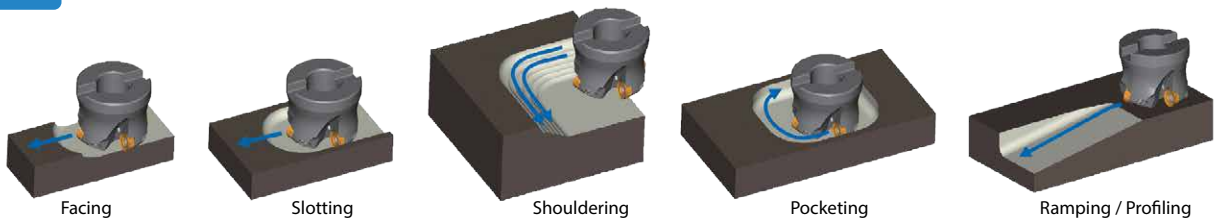
Flat Lock Structure

Wide Flat Binding Face

- Receives even cutting forces
- Prevents insert rotation



3 Available for Various Applications



4 Numerous Applications for a Large Variety of Materials

Insert grades **CA6535/PR1835** for difficult-to-cut material are available.
Long tool life with wide lineup of grades and 3 chipbreakers, available for steel, stainless steel and heat-resistant alloys.

Cost-effective M class inserts are available

MRX (Face Mill)

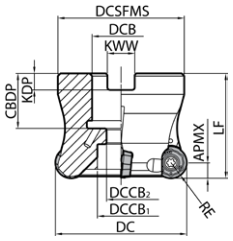


Fig. 1

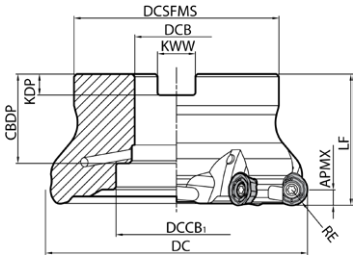


Fig. 2

Toolholder Dimensions

Unit		Part Number	Std. Item R	No. of Inserts	Dimensions RE	DC	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX	A.R. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Applicable Inserts ➡ M291
Inch	Inch Bore Dia.	MRX 1500R-10-5T	●	5	0.197 (5mm)	1.500	1.400	0.500	0.433	0.276	1.575	0.709	0.156	0.250	0.197 (5mm)	+10	-5.5	Yes	13,500	1.2	1	RPGT10T3... RPMT10T3...
		2000R-10-6T	●	6		2.000	1.750	0.750	0.669	0.433	1.575	0.750	0.187	0.313						1.1	1	
		MRX 2000R-12-5T	●	5	0.236 (6mm)	2.000	1.750	0.750	0.669	0.433	1.575	0.750	0.187	0.313	0.236 (6mm)	+10	-5.5	Yes	10,000	1.4	2	RPGT1204... RPMT1204... RPMW1204...
		3000R-12-6T	●	6		3.000	2.250	1.000	0.866	0.551	1.969	1.063	0.236	0.382					9,000	2.7	2	
		MRX 2500R-16-5T	●	5	0.315 (8mm)	2.500	1.750	0.750	0.669	0.433	1.575	0.750	0.187	0.313	0.315 (8mm)	+10	-5.5	Yes	18,000	0.3	1	RPGT1605... RPMT1605... RPMW1605...
		3000R-16-6T	●	6		3.000	2.250	1.000	0.866	0.551	1.969	1.063	0.236	0.382					15,500	0.6	1	
		4000R-16-7T	●	7		4.000	3.540	1.500	2.047	-	1.969	1.142	0.394	0.626					13,500	1.1	1	

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.

Spare Parts and Applicable Inserts (Inch Face Mills)

Part Number	Spare Parts: Insert Screw	Wrench: DTPM	Wrench: TTP	Anti-seize Compound	Arbor Bolt	Applicable Inserts ➡ M291
MRX 1500R-10...	SB-3070TRP	DTPM-10		P-37	HH1/4-0.75(H)	RPMT10T3M0ER-GM RPGT10T3M0ER-GM RPGT10T3M0ER-SM RPMT10T3M0EN-GH *1
2000R-10...	Recommended tightening torque for insert screw 2.0N•m				HH3/8-1.25(H)	
MRX 2000R-12...	SB-4090TRPN	DTPM-15		P-37	HH3/8-1.25(H)	RPMT1204M0ER-GM RPGT1204M0ER-GM RPGT1204M0ER-SM RPMT1204M0EN-GH RPMW1204M0TN *2
3000R-12...	Recommended tightening torque for insert screw 3.5N•m				HH1/2-1.25(H)	
MRX 2500R-16...	SB-50120TRP	TTP-20		P-37	HH3/8-1.25(H)	RPMT1605M0ER-GM RPGT1605M0ER-GM RPGT1605M0ER-SM RPMT1605M0EN-GH RPMW1605M0TN *3
3000R-16...	Recommended tightening torque for insert screw 4.5N•m				HH1/2-1.25(H)	
4000R-16...					-	

(H) Optional coolant-through bolt available

Max. Revolution
Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Coat anti-seize compound thinly on portion of taper and thread prior to installation.

*1··· Not compatible with conventional RPMT10T3M0 inserts (without ER-.. or EN-..)
*2··· Not compatible with conventional RPMT1204M0 and RPMT1204M0-H inserts (without ER-.. or EN-...).
*3··· Not compatible with the conventional RPMT1606M0-H inserts.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MRX (Face Mill)

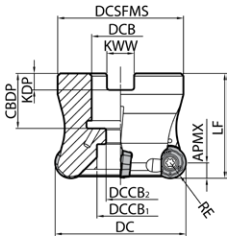


Fig. 1

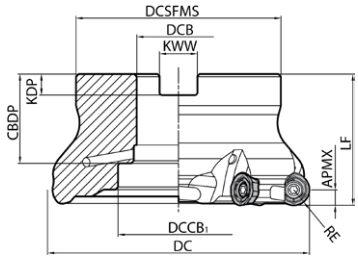


Fig. 2

Toolholder Dimensions

Unit		Part Number	Std. Item	No. of Inserts	Dimensions											A.R. (°)	R.R. (°)	Coolant Hole	Max RPM	Weight (kg)	Fig.	Applicable Inserts ➡ M291
			R		RE	DC	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX							
mm	Inch Bore Dia.	MRX 080R-12-6T	●	6	6	80	70	1.000"	20	13	50	1.063"	0.236"	0.375"	6	+10	-5.5	Yes	13,500	1.2	1	RPGT1204... RPMT1204... RPMW1204...
		080R-12-8T	●	8																1.1	1	
		100R-12-7T	●	7		100	78	1.250"	46	-		1.339"	0.315"	0.500"					12,000	1.5	2	
		100R-12-9T	●	9																	2	
		MRX 080R-16-5T	●	5	8	80	70	1.000"	20	13	50	1.063"	0.236"	0.375"	8	+10	-5.5	Yes	11,500	1.1	1	RPGT1605... RPMT1605... RPMW1605...
		080R-16-6T	●	6																	1	
		100R-16-6T	●			100	78	1.250"	46	-		1.339"	0.315"	0.500"					10,000	1.4	2	
		100R-16-7T	●	7																	2	
		125R-16-6T	●	6		125	89	1.500"	55		63	1.496"	0.394"	0.625"					9,000	2.7	2	
		125R-16-8T	●	8																	2	
	Metric Bore Dia.	MRX 040R-10-5T-M	●	5	5	40	38	16	15	9	40	19	5.6	8.4	5	+10	-5.5	Yes	20,000	0.2	1	RPGT10T3... RPMT10T3...
		050R-10-6T-M	●	6		50	48	22	18	11		21	6.3	10.4					17,500	0.3	1	
		063R-10-7T-M	●	7		63	60												15,000	0.6	1	
		MRX 040R-12-4T-M	●	4	6	40	38	16	13.5	9	40	19	5.6	8.4	6	+10	-5.5	Yes	21,000	0.2	1	RPGT1204... RPMT1204... RPMW1204...
		050R-12-4T-M	●			50	48	22	18	11		21	6.3	10.4					18,000	0.3	1	
		050R-12-5T-M	●	5																	1	
		063R-12-5T-M	●			63	60												15,500	0.6	1	
		063R-12-6T-M	●	6																	1	
		080R-12-6T-M	●			80	70	27	20	13	50	24	7	12.4					13,500	1.2	1	
		080R-12-8T-M	●	8																1.1	1	
		100R-12-7T-M	●	7		100	78	32	46	-		30	8	14.4					12,000	1.4	2	
		100R-12-9T-M	●	9																	2	
		MRX 063R-16-4T-M	●	4	8	63	60	22	18	11	40	21	6.3	10.4	8	+10	-5.5	Yes	13,500	0.5	1	RPGT1605... RPMT1605... RPMW1605...
		063R-16-5T-M	●	5																	1	
		080R-16-5T-M	●			80	70	27	20	13	50	24	7	12.4					11,500	1.1	1	
		080R-16-6T-M	●	6																	1	
		100R-16-6T-M	●			100	78	32	46	-		30	8	14.4					10,000	1.4	2	
		100R-16-7T-M	●	7																	2	
		125R-16-6T-M	●	6		125	89	40	55		63	33	9	16.4					9,000	2.6	2	
		125R-16-8T-M	●	8																	2	

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Spare Parts and Applicable Inserts (Metric Face Mills)

Part Number		Spare Parts					Applicable Inserts ➡ M291
		Insert Screw	Wrench		Anti-seize Compound	Arbor Bolt	
			DTPM	TTP			
MRX	040R-10...	SB-3070TRP	DTPM-10		P-37	HH8X25	RPMT10T3M0ER-GM RPGT10T3M0ER-GM RPGT10T3M0ER-SM RPMT10T3M0EN-GH *1
	050R-10...		Recommended tightening torque for insert screw 2.0N•m			HH10X30	
	063R-10...						
MRX	040R-12...	SB-4090TRPN	DTPM-15		P-37	HH8X25	RPMT1204M0ER-GM RPGT1204M0ER-GM RPGT1204M0ER-SM RPMT1204M0EN-GH RPMW1204M0TN *2
	050R-12...					HH10X30	
	063R-12...		Recommended tightening torque for insert screw 3.5N•m				
	080R-12...					HH12X35	
	100R-12...					-	
MRX	063R-16...	SB-50120TRP	TTP-20		P-37	HH10X30	RPMT1605M0ER-GM RPGT1605M0ER-GM RPGT1605M0ER-SM RPMT1605M0EN-GH RPMW1605M0TN *3
	080R-16...					HH12X35	
	100R-16...		Recommended tightening torque for insert screw 4.5N•m			-	
	125R-16...						

Max. Revolution
Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Coat anti-seize compound thinly on portion of taper and thread prior to installation.

*1··· Not compatible with conventional RPMT10T3M0 inserts (without ER-.. or EN-..)
*2··· Not compatible with conventional RPMT1204M0 and RPMT1204M0-H inserts (without ER-.. or EN-..).
*3··· Not compatible with the conventional RPMT1606M0-H inserts.

MRX (End Mill)

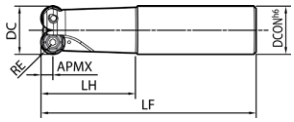


Fig. 1

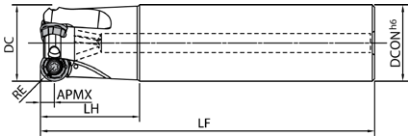


Fig. 2

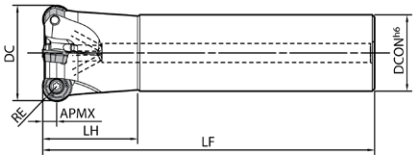


Fig. 3

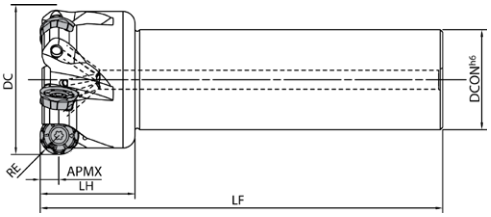


Fig. 4

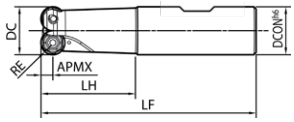


Fig. 5

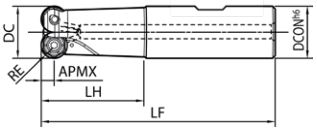


Fig. 6

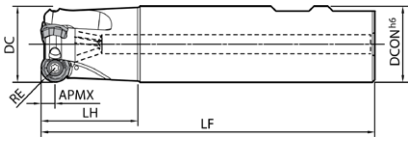


Fig. 7

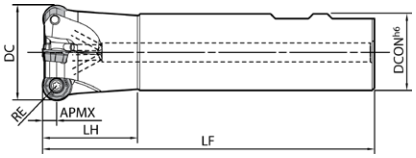


Fig. 8

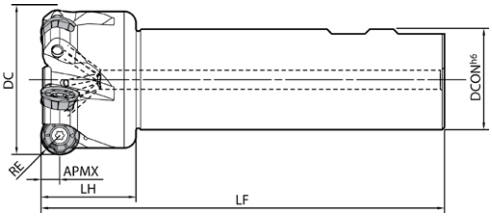


Fig. 9

Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions RE	DC	DCON	LF	LH	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Fig.	Applicable Inserts ➡ M291
Inch	Weldon	Standard Shank	MRX 0625-W625-08-2T	●	2	0.157 (4mm)	0.625	0.625	4.331	2.386	0.157 (4mm)	+3	-6.5	No	38,000	5	RDGT0803... RDMT0803...
			0750-W750-08-2T	●	2		0.750	0.750	4.724	2.654		+10	-5.5	Yes	32,000	6	
			1000-W100-08-4T	●	4		1.000	1.000	4.724	2.406					28,000	7	
			MRX 1000-W100-10-3T	●	3	0.197 (5mm)	1.000	1.000	4.724	2.409	0.197 (5mm)	+10	-5.5	Yes	28,000	7	RPGT10T3... RPMT10T3...
			1250-W125-10-4T	●	4		1.250	1.250	5.512	3.197					22,500	7	
			MRX 1250-W125-12-3T	●	3	0.236 (6mm)	1.250	1.250	5.512	3.189	0.236 (6mm)	+10	-5.5	Yes	24,500	7	RPGT1204... RPMT1204... RPMW1204...
			1500-W125-12-4T	●	4		1.500	1.250	5.512	1.575					21,000	8	
			MRX 2000-W150-16-4T	●	4	0.315 (8mm)	2.000	1.500	6.693	1.575	0.315 (8mm)	+10	-5.5	Yes	15,500	8	RPGT1605... RPMT1605... RPMW1605...

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
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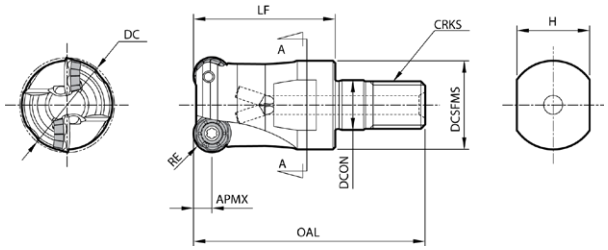
Toolholder Dimensions

Unit			Part Number	Std. Item	No. of Inserts	Dimensions RE	DC	DCON	LF	LH	APMX	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Fig.	Applicable Inserts ➡ M291
mm	Cylindrical	Standard Shank	MRX 16-S16-08-2T	●	2	4	16	16	110	40	4	+3	-5.5	No	38,000	1	RDGT0803... RDMT0803...
			20-S20-08-2T	●			20	20	120			+10		Yes	32,000	2	
			25-S25-08-4T	●	4		25	25							28,000	2	
			MRX 20-S20-10-2T	●	2	5	20	20	120	40	5	+5	-8	No	30,000	1	RPGT10T3... RPMT10T3...
			25-S25-10-3T	●	3		25	25				+10	-5.5	Yes	28,000	2	
			32-S32-10-4T	●	4		32	32	140						22,500	2	
			MRX 32-S32-12-3T	●	3	6	32	32	140	40	6	+10	-5.5	Yes	24,500	2	RPGT1204... RPMT1204... RPMW1204...
			40-S32-12-4T	●	4		40								21,000	3	
			50-S42-12-5T	●	5		50	42	170						18,000	3	
			MRX 40-S32-16-2T	●	2	8	40	32	140	40	8	+10	-5.5	Yes	18,000	3	RPGT1605... RPMT1605... RPMW1605...
			50-S42-16-4T	●	4		50	42	170						15,500	3	
			63-S42-16-5T	●	5		63								13,500	4	
	Weldon	Standard Shank	MRX 16-W16-08-2T	●	2	4	16	16	89	40	4	+3	-5.5	No	38,000	5	RDGT0803... RDMT0803...
			20-W20-08-2T	●			20	20	91			+10		Yes	32,000	6	
			25-W25-08-4T	●	4		25	25	97						28,000	7	
			MRX 20-W20-10-2T	●	2	5	20	20	91	40	5	+5	-8	No	30,000	5	RPGT10T3... RPMT10T3...
			25-W25-10-3T	●	3		25	25	97			+10	-5.5	Yes	28,000	7	
			32-W32-10-4T	●	4		32	32	101						22,500	7	
			MRX 32-W32-12-3T	●	3	6	32	32	101	40	6	+10	-5.5	Yes	24,500	7	RPGT1204... RPMT1204... RPMW1204...
			40-W32-12-4T	●	4		40								21,000	8	
			50-W40-12-5T	●	5		50	40	111						18,000	8	
			MRX 40-W32-16-2T	●	2	8	40	32	101	40	8	+10	-5.5	Yes	18,000	8	RPGT1605... RPMT1605... RPMW1605...
			50-W40-16-4T	●	4		50	40	111						15,500	8	
			63-W40-16-5T	●	5		63		112						13,500	9	
	Cylindrical	Long Shank	MRX 16-S16-08-2T-160	●	2	4	16	16	160	70	4	+3	-5.5	No	38,000	1	RDGT0803... RDMT0803...
			20-S20-08-2T-180	●			20	20	180	80		+10		Yes	32,000	2	
			25-S25-08-4T-180	●	4		25	25							28,000	2	
			MRX 20-S20-10-2T-180	●	2	5	20	20	180	80	5	+5	-8	No	30,000	1	RPGT10T3... RPMT10T3...
			25-S25-10-2T-180	●			25	25				+10	-5.5	Yes	28,000	2	
			32-S32-10-4T-200	●	4		32	32	200						22,500	2	
			MRX 32-S32-12-2T-200	●	2	6	32	32	200	80	6	+10	-5.5	Yes	24,500	2	RPGT1204... RPMT1204... RPMW1204...
			40-S32-12-4T-200	●	4		40			40					21,000	3	
			50-S42-12-4T-300	●			50	42	300						18,000	3	
			MRX 40-S32-16-2T-200	●	2	8	40	32	200	40	8	+10	-5.5	Yes	18,000	3	RPGT1605... RPMT1605... RPMW1605...
			50-S42-16-4T-300	●	4		50	42	300						15,500	3	
			63-S42-16-4T-300	●			63								13,500	4	

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MRX (Modular Head)



Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions RE	DC	DCON	DCSFMS	OAL	LF	APMX	CRKS	H	A.R. Max. (°)	R.R. (°)	Coolant Hole	Max RPM	Applicable Inserts ➡ M291
mm	MRX 16-M08-08-2T	●	2	4	16	8.5	14.7	42	25	4	M8x1.25	12	+3	-5.5	No	38,000	RDGT0803... RDMT0803...
	20-M10-08-2T	●			20	10.5	18.7	48	30		M10x1.5	15	+10		Yes	32,000	
	25-M12-08-4T	●	4		25	12.5	23	56	35		M12x1.75	19				28,000	
	MRX 20-M10-10-2T	●	2	5	20	10.5	18.7	48	30	5	M10x1.5	15	+5	-8	No	30,000	RPGT10T3... RPMT10T3...
	25-M12-10-3T	●	3		25	12.5	23	56	35		M12x1.75	19	+10	-5.5	Yes	28,000	
	32-M16-10-4T	●	4		32	17	30	62	40		M16x2.0	24				22,500	
	MRX 32-M16-12-3T	●	3	6	32	17	30	62	40	6	M16x2.0	24	+10	-5.5	Yes	24,500	RPGT1204... RPMT1204... RPMW1204...
	40-M16-12-4T	●	4		40											21,000	
	MRX 40-M16-16-2T	●	2	8	40	17	30	62	40	8	M16x2.0	24	+10	-5.5	Yes	18,000	RPGT1605... RPMT1605... RPMW1605...

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.
See page **M324** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

Spare Parts and Applicable Inserts (Inch and Metric End Mills)

Part Number	Insert Screw	Wrench DTPM	Wrench TTP	Anti-seize Compound	Applicable Inserts ➡ M291
MRX ...-08...	SB-2555TRP	DTPM-8		P-37	RDMT0803M0ER-GM RDGT0803M0ER-GM RDGT0803M0ER-SM RDMT0803M0EN-GH *1
	Recommended tightening torque for insert screw 1.2N•m				
MRX ...-10...	SB-3070TRP	DTPM-10		P-37	RPMT10T3M0ER-GM RPGT10T3M0ER-GM RPGT10T3M0ER-SM RPMT10T3M0EN-GH *2
	Recommended tightening torque for insert screw 2.0N•m				
MRX ...-12...	SB-4090TRPN	DTPM-15		P-37	RPMT1204M0ER-GM RPGT1204M0ER-GM RPGT1204M0ER-SM RPMT1204M0EN-GH RPMW1204M0TN *3
	Recommended tightening torque for insert screw 3.5N•m				
MRX ...-16...	SB-50120TRP	TTP-20		P-37	RPMT1605M0ER-GM RPGT1605M0ER-GM RPGT1605M0ER-SM RPMT1605M0EN-GH RPMW1605M0TN *4
	Recommended tightening torque for insert screw 4.5N•m				

Max. Revolution
Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Coat anti-seize compound thinly on portion of taper and thread prior to installation.

*1··· Not compatible with the conventional RDMT08T2M0-H inserts.
*2··· Not compatible with conventional RPMT10T3M0 inserts (without ER-.. or EN-..)
*3··· Not compatible with conventional RPMT1204M0 and RPMT1204M0-H inserts (without ER-.. or EN-..).
*4··· Not compatible with the conventional RPMT1606M0-H inserts.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
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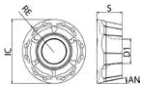
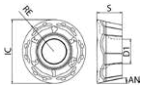
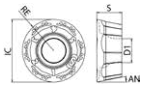
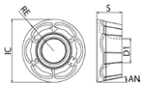
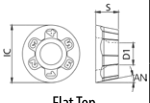
RDMT/RDGT/RPMT/RPGT/RPMW

Usage Classification

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

Carbon steel / Alloy steel			☆			★	☆	P
Mold and die steel			☆			★	☆	P
Austenitic stainless steel				☆		☆	★	M
Martensitic stainless steel	★						☆	M
Precipitation hardened stainless steel				☆			★	M
Gray cast iron		☆			★			K
Nodular cast iron		☆			★			K
Non-ferrous metals								N
Heat-resistant alloy	★						☆	S
Titanium alloy				☆			★	S
Hard materials								H

Insert		Part Number	Dimensions (mm)				Angle (°)	Carbide						Applicable Toolholder ➡ M285~M290
			IC	S	D1	RE	AN	CVD	PVD					
								CA6535	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	
	 General Purpose	RDGT 0803M0ER-GM	8	3.18	3	4	15	●	△	●	●	●	●	MRX...-08-..
		RPGT 10T3M0ER-GM	10	3.97	3.5	5	11	●	△	●	●	●	●	MRX...-10-..
		RPGT 1204M0ER-GM	12	4.76	4.6	6	11	●	△	●	●	●	●	MRX...-12-..
		RPGT 1605M0ER-GM	16	5.56	5.8	8	11	●	△	●	●	●	●	MRX...-16-..
	 General Purpose	RDMT 0803M0ER-GM	8	3.18	3	4	15	●	△	●	●	●	●	MRX...-08-..
		RPMT 10T3M0ER-GM	10	3.97	3.5	5	11	●	△	●	●	●	●	MRX...-10-..
		RPMT 1204M0ER-GM	12	4.76	4.6	6	11	●	△	●	●	●	●	MRX...-12-..
		RPMT 1605M0ER-GM	16	5.56	5.8	8	11	●	△	●	●	●	●	MRX...-16-..
	 Low Cutting Force	RDGT 0803M0ER-SM	8	3.18	3	4	15	●		●	●		●	MRX...-08-..
		RPGT 10T3M0ER-SM	10	3.97	3.5	5	11	●		●	●		●	MRX...-10-..
		RPGT 1204M0ER-SM	12	4.76	4.6	6	11	●		●	●		●	MRX...-12-..
		RPGT 1605M0ER-SM	16	5.56	5.8	8	11	●		●	●		●	MRX...-16-..
	 Tough Edge	RDMT 0803M0EN-GH	8	3.18	3	4	15	●	△	●	●	●	●	MRX...-08-..
		RPMT 10T3M0EN-GH	10	3.97	3.5	5	11	●	△	●	●	●	●	MRX...-10-..
		RPMT 1204M0EN-GH	12	4.76	4.6	6	11	●	△	●	●	●	●	MRX...-12-..
		RPMT 1605M0EN-GH	16	5.56	5.8	8	11	●	△	●	●	●	●	MRX...-16-..
	 Flat Top (Heavy Milling)	RPMW 1204M0TN	12	4.76	4.6	6	11			●	●			MRX...-12-..
		RPMW 1605M0TN	16	5.56	5.8	8	11			●	●			MRX...-16-..

Right-hand Insert Shown

Recommended Cutting Conditions ➡ M292

RDGT / RPGT / RDMT / RPMT / RPMW Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Chipbreaker / Feed Rate (fz: ipt)					Recommended Insert Grade (Vc: sfm)			
	RD..08... : D.O.C. = 0.079" RP..10... : D.O.C. = 0.098" RP..12... : D.O.C. = 0.118" RP..16... : D.O.C. = 0.158"					MEGACOAT NANO EX (MEGACOAT NANO)			CVD Coated Carbide
	RDMT-GM RPMT-GM	RDGT-GM RPGT-GM	RDGT-SM RPGT-SM	RDMT-GH RPMT-GH	RPMW	PR1810 (PR1510)	PR1825 (PR1525)	PR1835 (PR1535)	CA6535
Carbon Steel	★ 0.004~**0.008**~0.012	☆ 0.004~**0.008**~0.012	☆ 0.002~**0.006**~0.008	☆ 0.006~**0.012**~0.014	☆ 0.006~**0.012**~0.016	-	★ 390~**590**~820	☆ 390~**590**~820	-
Alloy Steel	★ 0.004~**0.008**~0.012	☆ 0.004~**0.008**~0.012	☆ 0.002~**0.006**~0.008	☆ 0.006~**0.012**~0.014	☆ 0.006~**0.012**~0.016	-	★ 330~**520**~720	☆ 330~**520**~720	-
Mold Steel	★ 0.004~**0.006**~0.010	☆ 0.004~**0.006**~0.010	☆ 0.002~**0.005**~0.008	☆ 0.006~**0.008**~0.012	☆ 0.006~**0.008**~0.012	-	★ 260~**460**~590	☆ 260~**460**~590	-
Austenitic Stainless Steel	☆ 0.004~**0.006**~0.008	☆ 0.004~**0.006**~0.008	★ 0.002~**0.005**~0.008	☆ 0.006~**0.008**~0.010	☆ 0.006~**0.008**~0.010	-	☆ 330~**520**~660	★ 330~**520**~660	-
Martensitic Stainless Steel	☆ 0.004~**0.006**~0.008	☆ 0.004~**0.006**~0.008	★ 0.002~**0.005**~0.008	☆ 0.006~**0.008**~0.010	☆ 0.006~**0.008**~0.010	-	-	☆ 490~**660**~820	★ 590~**790**~980
Precipitation Hardened Stainless Steel	☆ 0.004~**0.006**~0.008	★ 0.004~**0.006**~0.008	☆ 0.002~**0.005**~0.008	☆ 0.006~**0.008**~0.010	☆ 0.006~**0.008**~0.010	-	-	★ 300~**390**~490	-
Gray Cast Iron	★ 0.004~**0.008**~0.012	☆ 0.004~**0.008**~0.012	-	☆ 0.006~**0.012**~0.014	☆ 0.006~**0.012**~0.016	★ 390~**590**~820	-	-	-
Nodular Cast Iron	★ 0.004~**0.006**~0.010	☆ 0.004~**0.006**~0.010	-	☆ 0.006~**0.008**~0.012	☆ 0.006~**0.010**~0.014	★ 330~**490**~660	-	-	-
Ni-base Heat-Resistant Alloy	☆ 0.004~**0.005**~0.006	★ 0.004~**0.005**~0.006	☆ 0.002~**0.004**~0.006	☆ 0.005~**0.006**~0.008	☆ 0.005~**0.006**~0.008	-	-	☆ 70~**100**~160	★ 70~**100**~160
Titanium Alloy	☆ 0.004~**0.005**~0.006	☆ 0.004~**0.005**~0.006	★ 0.002~**0.004**~0.006	-	-	☆ 100~**160**~230	-	★ 130~**200**~260	-

★ : 1st Recommendation ☆ : 2nd Recommendation

- Machining with coolant is recommended for Ni-base Heat Resistant Alloy and Titanium Alloy.
- RDGT / RPGT are recommended for Stainless Steel, Ni-base Heat Resistant Alloy, and Titanium Alloy.
- The figure in bold font is the starting value of the recommended cutting conditions.
  Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
- Recommended feed rate is the reference value when D.O.C. is rε/2 (0.079" for RD..08 / 0.098" for RP..10 / 0.118" for RP..12 / 0.158" for RP..16).
  For other D.O.C., calculate the recommended feed rate based on the conversion factor below.
- For MRX16-S16-08-2T(-160), MRX16-W-08-2T, MRX20-S20-10-2T(-180), MRX20-W20-10-2T, MRX0625-W625-08-2T, MRX0625-S625-08-2T-6 set the feed rate no higher than 50% of the recommended cutting conditions.

Conversion Factor for Feed Per Tooth by Depth of Cut (D.O.C.)

Insert	D.O.C. (Max.)	Conversion Factor for Feed Per Tooth									
		D.O.C. = 0.020" (0.5mm)	D.O.C. = 0.039" (1.0mm)	D.O.C. = 0.059" (1.5mm)	D.O.C. = 0.079" (2.0mm)	D.O.C. = 0.098" (2.5mm)	D.O.C. = 0.118" (3.0mm)	D.O.C. = 0.158" (4.0mm)	D.O.C. = 0.197" (5.0mm)	D.O.C. = 0.236" (6.0mm)	D.O.C. = 0.315" (8.0mm)
RD..08... (GM/SM/GH Chipbreaker)	0.158" (4mm)	1.7	1.3	1.1	1.0 (Standard)	0.9	0.8	0.8	-	-	-
RP..10... (GM/SM/GH Chipbreaker)	0.197" (5mm)	1.9	1.4	1.2	1.0	1.0 (Standard)	0.9	0.8	0.8	-	-
RP..12... (GM/SM/GH Chipbreaker)	0.236" (6mm)	2.1	1.5	1.3	1.1	1.0	1.0 (Standard)	0.9	0.8	0.8	-
RP..16... (GM/SM/GH Chipbreaker)	0.315" (8mm)	2.4	1.7	1.4	1.3	1.1	1.1	1.0 (Standard)	0.9	0.8	0.8

Calculation Example (RPMT12..., Carbon Steel, GM Chipbreaker, D.O.C. = 0.039")

fz = 0.008 ipt (Standard value for carbon steel and GM chipbreaker) X **1.5** (Conversion factor for ROMU12 type, D.O.C. = 0.039") = **fz = 0.012 ipt** (Recommended feed rate)

Maximum Depth of Cut and Usable Edges

Usable Edges	Insert Radius			
	R4	R5	R6	R8
3 Edges	D.O.C. = 0.079"~0.158"	D.O.C. = 0.098"~0.197"	D.O.C. = 0.118"~0.236"	D.O.C. = 0.158"~0.315"
6 Edges	Less than D.O.C. = 0.079"	Less than D.O.C. = 0.098"	Less than D.O.C. = 0.118"	Less than D.O.C. = 0.158"

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Drilling Conditions

[Drilling Depth]

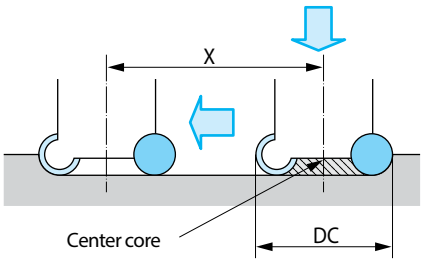
See Max. Cutting Depth (Pd) in the table below.

[Traversing After Drilling]

Caution when Traversing right after Drilling

1 . Reduce the table feed by 50% of the recommended conditions until the center core part is completely cut off. The internal cutting edge's radial rake angle is large in the negative direction.

2 . Min cutting length for flat bottom face (X) is in the table to the right.



Inch					mm				
Inch Tool Spec.		Max D.O.C.	Max. Cutting Depth (Pd)	Min. Cutting Length for Flat Bottom Face (X)	Metric Tool Spec.		Max D.O.C.	Max. Cutting Depth (Pd)	Min. Cutting Length for Flat Bottom Face (X)
Insert	Tool Dia.				Insert	Tool Dia. Metric			
RD..08	0.625	0.157	0.028	0.349	RD..08	16	4	0.7	9
	0.750	0.157	0.055	0.474		20	4	1.4	13
	1.000	0.157	0.055	0.724		25	4	1.4	18
RP..10	0.750	0.197	0.024	0.396	RP..10	20	5	0.6	11
	1.000	0.197	0.075	0.646		25	5	1.9	16
	1.250	0.197	0.075	0.896		32	5	1.9	23
	1.500	0.197	0.075	1.146		40	5	1.9	31
	2.000	0.197	0.075	1.646		50	5	1.9	41
	2.500	0.197	0.075	2.146		63	5	1.9	54
RP..12	1.250	0.236	0.094	0.817	RP..12	32	6	2.4	21
	1.500	0.236	0.094	1.067		40	6	2.4	29
	2.000	0.236	0.094	1.567		50	6	2.4	39
	2.500	0.236	0.094	2.067		63	6	2.4	52
	3.000	0.236	0.094	2.567		80	6	2.4	69
	4.000	0.236	0.094	3.567		100	6	2.4	89
RP..16	1.500	0.315	0.134	0.909	RP..16	40	8	3.4	25
	2.000	0.315	0.134	1.409		50	8	3.4	35
	2.500	0.315	0.134	1.909		63	8	3.4	48
	3.000	0.315	0.134	2.409		80	8	3.4	65
	4.000	0.315	0.134	3.409		100	8	3.4	85
	5.000	0.315	0.134	4.346		125	8	3.4	110

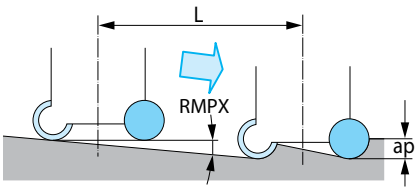
• Above value is based on the clearance of 0.039" between the tool and the workpiece.

Ramping Conditions

Ramping angle should be under RMPX (maximum ramping angle) in the table below.
Feed rate should be under 70% of the cutting conditions on page **M284**

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

$$L = \frac{D.O.C.}{\tan RMPX}$$



Inch						mm					
Inch Tool Spec.		Max D.O.C.	Max Ramping Angle RMPX	tan RMPX	Max. Cutting Length at Max. Ramping Angle (L)	Metric Tool Spec.		Max D.O.C.	Max Ramping Angle RMPX	tan RMPX	Max. Cutting Length at Max. Ramping Angle (L)
Insert	Tool Dia.					Insert	Tool Dia. Metric				
RD..08	0.625	0.157	7°	0.123	1.282	RD..08	16	4	8°	0.141	28
	0.750	0.157	9°	0.158	0.994		20	4	9°	0.158	25
	1.000	0.157	5°	0.087	1.800		25	4	5°	0.087	45
RP..10	0.750	0.197	4°	0.070	2.816	RP..10	20	5	5°	0.087	57
	1.000	0.197	9°	0.158	1.243		25	5	10°	0.176	28
	1.250	0.197	6°	0.105	1.873		32	5	6°	0.105	47
	1.500	0.197	4°	0.070	2.816		40	5	4°	0.070	71
	2.000	0.197	3°	0.052	3.757		50	5	3°	0.052	95
	2.500	0.197	2°	0.035	5.640		63	5	2°	0.035	143
RP..12	1.250	0.236	9°	0.158	1.491	RP..12	32	6	9°	0.158	37
	1.500	0.236	6°	0.105	2.248		40	6	5°	0.087	68
	2.000	0.236	4°	0.070	3.379		50	6	4°	0.070	85
	2.500	0.236	2°	0.035	6.768		63	6	2°	0.035	171
	3.000	0.236	2°	0.035	6.768		80	6	2°	0.035	171
	4.000	0.236	1°	0.017	13.498		100	6	1°	0.017	343
RP..16	1.500	0.315	12°	0.213	1.481	RP..16	40	8	11°	0.194	41
	2.000	0.315	6°	0.105	2.997		50	8	7°	0.123	65
	2.500	0.315	4°	0.070	4.506		63	8	4°	0.070	114
	3.000	0.315	3°	0.052	6.011		80	8	3°	0.052	152
	4.000	0.315	2°	0.035	9.025		100	8	2°	0.035	229
	5.000	0.315	1°	0.017	17.998		125	8	1°	0.017	458

• Above value is based on the clearance of 0.039" between the tool and the workpiece.

Helical Milling Conditions

- Sinking depth (h) when helical milling should be under Max D.O.C. in table below. Sinking angle α (with trajectory of the center line of tool) should be under RMPX (maximum ramping angle) in cutting conditions on page **M286**.
- Feed rate should be under 70% of recommended cutting conditions on page **M284**.
- Climb milling is recommended.

Formula for sinking depth (h)
$h=\pi \times øDs \times \tan \alpha$

(h should be D.O.C. or under)
(α should be RMPX or under)

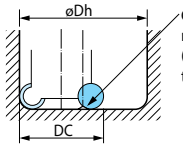
øDs (Trajectory diameter of cutter's center line)
øDs=øDh-DC

Inch						mm					
Inch Tool Spec.		Max D.O.C.	Min. Cutting Dia. (ØDh1)	Min. Cutting Dia. for Flat Bottom Facing (ØDh2)	Max. Cutting Dia. (ØDh3)	Metric Tool Spec.		Max D.O.C.	Min. Cutting Dia. (ØDh1)	Min. Cutting Dia. for Flat Bottom Facing (ØDh2)	Max. Cutting Dia. (ØDh3)
Insert	Tool Dia.					Insert	Tool Dia. Metric				
RD..08	0.625	0.157	7⁹	0.123	1.282	RD..08	16	4	8⁹	0.141	28
	0.750	0.157	9⁹	0.158	0.994		20	4	9⁹	0.158	25
	1.000	0.157	5⁹	0.087	1.800		25	4	5⁹	0.087	45
RP..10	0.750	0.197	4⁹	0.070	2.816	RP..10	20	5	5⁹	0.087	57
	1.000	0.197	9⁹	0.158	1.243		25	5	10⁹	0.176	28
	1.250	0.197	6⁹	0.105	1.873		32	5	6⁹	0.105	47
	1.500	0.197	4⁹	0.070	2.816		40	5	4⁹	0.070	71
	2.000	0.197	3⁹	0.052	3.757		50	5	3⁹	0.052	95
	2.500	0.197	2⁹	0.035	5.640		63	5	2⁹	0.035	143
RP..12	1.250	0.236	9⁹	0.158	1.491	RP..12	32	6	9⁹	0.158	37
	1.500	0.236	6⁹	0.105	2.248		40	6	5⁹	0.087	68
	2.000	0.236	4⁹	0.070	3.379		50	6	4⁹	0.070	85
	2.500	0.236	2⁹	0.035	6.768		63	6	2⁹	0.035	171
	3.000	0.236	2⁹	0.035	6.768		80	6	2⁹	0.035	171
	4.000	0.236	1⁹	0.017	13.498		100	6	1⁹	0.017	343
RP..16	1.500	0.315	12⁹	0.213	1.481	RP..16	40	8	11⁹	0.194	41
	2.000	0.315	6⁹	0.105	2.997		50	8	7⁹	0.123	65
	2.500	0.315	4⁹	0.070	4.506		63	8	4⁹	0.070	114
	3.000	0.315	3⁹	0.052	6.011		80	8	3⁹	0.052	152
	4.000	0.315	2⁹	0.035	9.025		100	8	2⁹	0.035	229
	5.000	0.315	1⁹	0.017	17.998		125	8	1⁹	0.017	458

• Above value is based on the clearance of 0.039" between the tool and the workpiece.

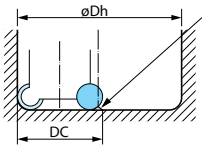
Requirements for Removing Core

[When cutting dia. øDh1≤øDh<øDh2]



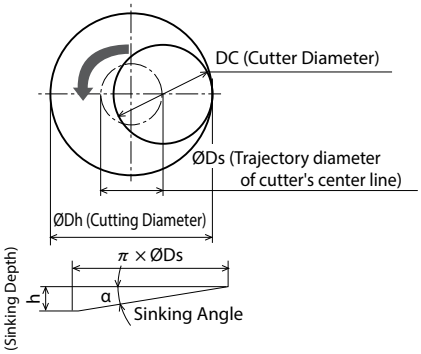
Center core part remains after machining. (Not removable with the same cutter)

[When cutting dia. øDh2≤øDh≤øDh3]



Center core part remains after machining. (Removable by traversing with the same cutter)

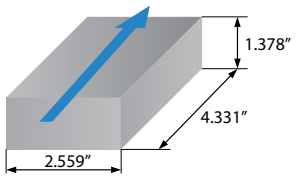
Helical Milling Factors



Case Studies

304 Stainless Steel

Vc = 375 sfm
fz = 0.006 ipt
D.O.C. × ae = 0.039" × 2.559"
Dry
MRX100R-12-9T-M (9 Flutes)
RPGT1204M0ER-SM (PR1535)



4.5 times longer tool life

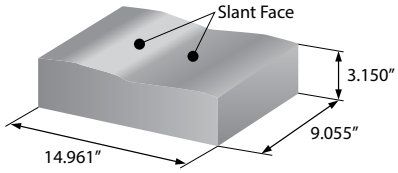
PR1535	**450 pcs/edge**
Conventional	**100 pcs/edge**

• 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)

H13 (45HRC) Alloy Tool Steel

Vc = 330 sfm
fz = 0.004 ipt
D.O.C. × ae = 0.039~0.079" × 0.394"
Dry
MRX20-S20-08-2T (2 Flutes)
RDGT0803M0ER-GM (PR1525)



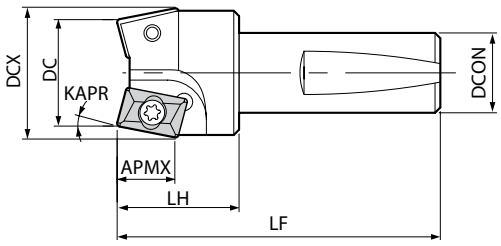
More than double tool life

PR1525	**2 pcs and more Stable tool life**
Conventional	**1 pc unstable tool life**

• Conventional tool machined only 1 pc of workpiece due to unstable tool life, but MRX doubled the tool life with stable machining.

(User evaluation)

CM (Chamfer End Mill)



Toolholder Dimensions

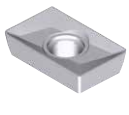
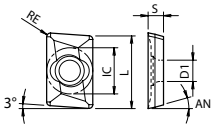
Unit	Part Number	Std. Item	No. of Inserts	Dimensions DCX	DC	DCON	LF	LH	APMX	KAPR (°)	Coolant Hole	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts ➡ M297
Inch	CM 0563-15-09	●	2	0.741	0.563	0.500	2.780	1.000	0.340	15	No	SCR-04	T7	XPMT090208
	0563-20-09	●		0.795					0.330	20				
	0563-25-09	●		0.849					0.310	25				
	0563-30-09	●		0.901	0.563	0.625	2.910	1.000	0.300	30		SCR-04		
	0563-35-09	●		0.951					0.280	35				
	0563-45-09	●		1.041					0.240	45		SCR-01		
	0563-60-09	●		1.165					0.160	60				
	0563-75-09	●		1.217					0.080	75				
	CM 1000-03	●	2	1.062	1.000	0.750	3.150	1.250	0.589	3	No	SCR-16	T10	XPMT15T3...
	1000-05	●		1.104					0.586	5				
	1000-10	●		1.206					0.577	10				
	1000-15	●		1.308					0.564	15				
	1000-20	●		1.408					0.547	20				
	1000-25	●		1.504					0.526	25				
	1000-30	●		1.596					0.501	30		SCR-30		
	1000-35	●		1.686					0.472	35				
	1000-37.5	●		1.744					0.456	37.5		SCR-30		
	1000-41	●		1.786					0.433	41				
	1000-45	●		1.800					0.400	45				
	1000-50	●		1.908					0.376	50				
	1000-55	●		2.014					0.327	55				
	1000-60	●		2.042					0.284	60				
	1000-70	●		2.094					0.193	70				
	1000-75	●		2.168					0.146	75				

Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

XPMT

Usage Classification								
★: Roughing / 1st Choice ☆: Roughing / 2nd Choice ■: Finishing / 1st Choice □: Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel				★	■	P
	Mold and die steel	★			☆	■	P
	Stainless steel				★		M
	Gray cast iron		★				K
	Nodular cast iron		★				K
	Non-ferrous metals						N
	Heat-resistant alloy	★		☆	☆		S
	Titanium alloy		☆		★		S
	Hard materials						H

Insert		Part Number	No. of Edges	Dimensions (in)					Angle (°)		Carbide				Cermet	Applicable Toolholder
				IC	S	D1	RE	INSL	AN	AS	CVD	PVD			-	
											CA6535	PR1510	PR1525	PR1535	TN100M	
		XPMT 090208	2	1/4	0.094	0.110	0.031	0.375	11	-	●	●	●	●	●	CM...-09 EM...-09(-3F)
		XPMT 15T304	2	3/8	0.156	0.157	0.016	0.607	11	-	●	●		●	●	CM1000-... EM0625 EM0688 EM0750 EM0875 EM0938 EM1000(-100S) EM1125 EM1250(-3F) EM1375 EM1500(-3F) EM...-2.5 EM...-3.5 EM...-LE FM...-90RH
		15T308					0.031				●	●		●	●	
		15T316					0.063				●	●		●		
		15T324					0.094				●	●		●		
		15T331					0.122				●	●		●		
		15T364					0.250				●	●		●		

Recommended Cutting Conditions

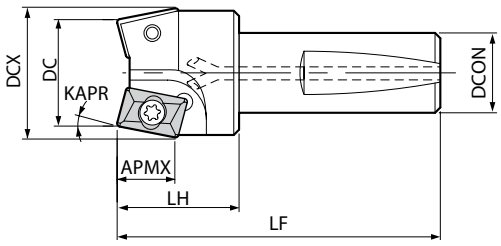
Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade (Vc sfm)				
		MEGACOAT NANO			CVD Coated Carbide	Cermet
		PR1535	PR1525	PR1510	CA6535	TN100M
Carbon Steel	0.003~0.006	★ 400~800	★ 400~800	-	-	★ 800~1400
Alloy Steel	0.003~0.006	★ 300~700	★ 300~700	-	-	★ 600~1200
Mold Steel	0.003~0.006	★ 250~600	★ 250~600	-	-	★ 400~700
Stainless Steel	0.002~0.006	★ 300~600	☆ 300~600	-	★ 550~950	☆ 300~800
Cast Iron	0.003~0.008	-	-	★ 400~800	-	☆ 400~1200
Non-ferrous Metals	0.005~0.007	-	-	-	-	☆ 1500~1800
Heat-resistant Alloy	0.002~0.005	☆ 70~160	-	-	★ 70~160	-
Titanium Alloy	0.002~0.005	☆ 130~260	-	☆ 100~230	-	-

★: 1st Recommendation ☆: 2nd Recommendation

XPMT Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

CM-AL (Chamfer End Mill, for Aluminum)



Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions DCX	DC	DCON	LF	LH	APMX	KAPR (°)	Coolant Hole	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts
Inch	CM 1000-15-AL	●	2	1.316	1.000	0.750	3.250	1.350	0.613	15.0	Yes	SCR-02	T15	APET1604...
	1000-20-AL	●		1.416					0.595	20.0				
	1000-30-AL	●		1.608					0.544	30.0				
	0800-45-AL	●		1.66	0.800				0.440	45.0				
	0800-60-AL	●		1.856					0.308	60.0				
	0690-75-AL	●		1.872	0.690				0.158	75.0				

Applicable Inserts: M302, M217

Coat Anti-seize Compound thinly on portion of taper and thread prior to installation.

APET

| Usage Classification | | | | |

MCSE

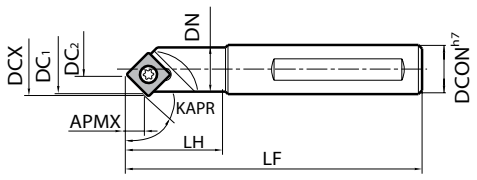


Fig. 1

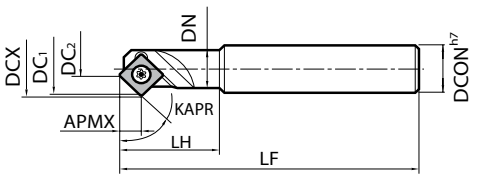


Fig. 2

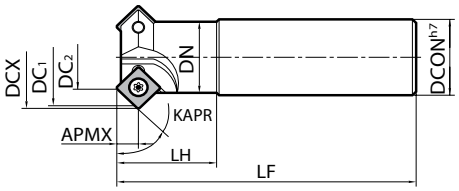


Fig. 3

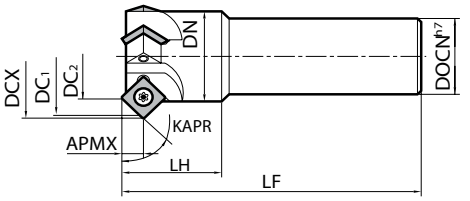


Fig. 4

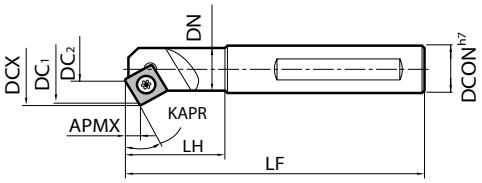


Fig. 5

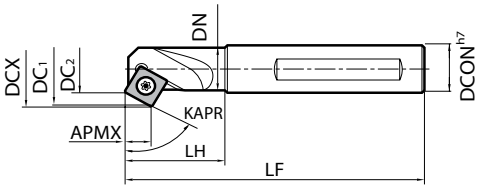


Fig. 6

Toolholder Dimensions

Unit	Part Number	Std. Item	No. of Inserts	Dimensions								Standard corner-R(RE)	KAPR (°)	A.R. (°)	R.R. (°)	Coolant Hole	Fig.	Spare Parts			Applicable Inserts ➡ M300
				DCX	DC1	DC2	DCON	LF	LH	APMX	DN							Insert Screw	Wrench	Wrench	
mm	MCSE 104	●	1	16	15	4	16	85	31	6.5	15	0.4	45	0	-4.5	No	1	SB-3060TR	DT-10	-	SDKW09T2... SDMT31.81C
	106	●	1	22	21	6	20	121	41	8.6	16	0.8	45	0	-1	No	2	SB-5090TR	-	LTW-20	SEKW42... SEMT421C
	115	●	1	31	30	15	20	121	41	8.6	18	0.8	45	0	+5	No	2	SB-5090TR	-	LTW-20	SEKW42... SEMT421C
	227	●	2	43	42	27	32	121	41	8.6	30	0.8	45	0	+8	No	3	SB-5090TR	-	LTW-20	SEKW42... SEMT421C
	336	●	3	52	51	36	32	121	41	8.6	38	0.8	45	0	+10	No	4	SB-5090TR	-	LTW-20	SEKW42... SEMT421C
	MCSE 104-30D	●	1	19	18	4	16	85	31	4.7	15	0.4	30	0	-4	No	5	SB-3060TR	DT-10	-	SDKW09T2... SDMT31.81C
	108-30D	●	1	28	27	8	20	110	41	6.3	19	0.8	30	0	-2.5	No	5	SB-5090TR	-	LTW-20	SEKW42... SEMT421C
	110-30D	●	1	30	28	10	20	120	40	6.3	18	0.8	30	0	0	No	5	SB-5090TR	-	LTW-20	SEKW42... SEMT421C
	MCSE 108-60D	●	1	19.5	19	8	20	110	41	10	19	0.8	60	0	-3.5	No	6	SB-5070TR	-	LTW-20	SEKW42... SEMT421C
	120-60D	●	1	31	30	20	20	120	40	10	18	0.8	60	0	0	No	6	SB-5090TR	-	LTW-20	SEKW42... SEMT421C

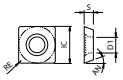
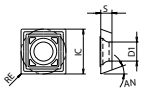
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

SDKW/SDMT/SEKW/SEMT

Usage Classification

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

Carbon steel / Alloy steel	★		■	P
Mold and die steel	★		■	P
Stainless steel	★			M
Gray cast iron		☆		K
Nodular cast iron				K
Non-ferrous metals		★		N
Heat-resistant alloy				S
Titanium alloy		☆		S
Hard materials				H

Insert		Part Number ANSI	Part Number ISO	Dimensions (in) IC	S	D1	RE	Angle (°) AN	Carbide PVD PR1825	Carbide - KW10	Cermet - TN100M	Applicable Toolholder M299
		(Use ISO Part Number)	SDKW 09T204FN	3/8	0.109	0.134	1/64	15		●		MCSE104-30D MCSE104
			SDKW 09T204TN	3/8	0.109	0.134	1/16	15	●		●	MCSE104-30D MCSE104
		SEKW 421FN 422FN	SEKW 120304FN 120308FN	1/2	1/8	0.217	1/16 1/32	20		● ●		MCSE106 , MCSE108-..D MCSE110-30D , MCSE115 MCSE120-60D , MCSE227 MCSE336
		SEKW 421TN 422TN	SEKW 120304TN 120308TN	1/2	1/8	0.217	1/64 1/32	20	● ●		● ●	
	 Low Cutting Force	SDMT 31.81C	SDMT 09T204C	3/8	0.109	0.134	1/64	15	●	●	●	MCSE104-30D MCSE104
		SEMT 421C	SEMT 120304C	1/2	1/8	0.217	1/64	20	●	●		MCSE106 , MCSE108-..D MCSE110-30D , MCSE115 MCSE120-60D , MCSE227 MCSE336

Recommended Cutting Conditions M301

SDKW / SDMT / SEKW / SEMT Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

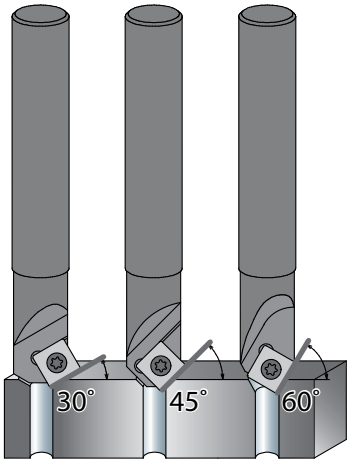
Applicable Inserts

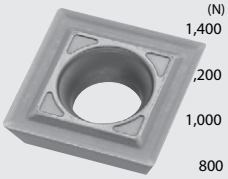
Part Number		Applicable Inserts M300		
MCSE	104 104-30D	SDKW 09T204TN	SDKW 09T204FN	SDMT 31.81C
MCSE	106 115 227 336	SEKW 421TN 422TN	SEKW 421FN 422FN	SEMT 421C
MCSE	108-30D 110-30D			
MCSE	108-60D 120-60D			

Recommended Cutting Conditions

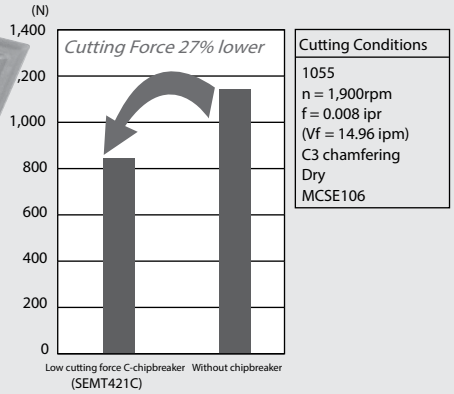
Workpiece Material	fz (ipt)		Recommended Insert Grades (Vc: sfm)		
			Cermet	MEGACOAT NANO EX	Carbide
	DC_2 (Ø4mm~Ø20mm)	DC_2 (Ø27mm~Ø36mm)	TN100M	PR1825	KW10
Carbon Steel	0.002~0.010	0.008~0.016	★ 330~590	★ 390~820	-
Alloy Steel	0.002~0.010	0.008~0.016	★ 330~590	★ 330~720	-
Mold Steel	0.002~0.010	0.008~0.016	★ 330~490	★ 260~590	-
Stainless Steel	0.002~0.008	0.004~0.012	☆ 330~590	★ 390~720	-
Cast Iron	0.004~0.012	0.012~0.020	-	-	☆ 260~490
Non-ferrous Metals	0.004~0.012	0.012~0.020	-	-	★ 330~980

★ : 1st Recommendation ☆ : 2nd Recommendation





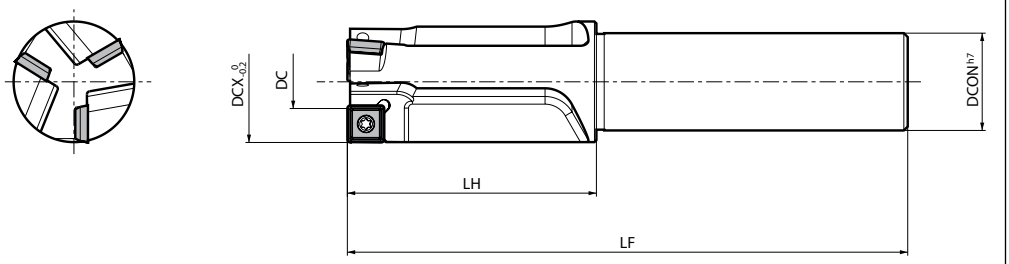
Cutting performance of low cutting force C-chipbreaker



Cutting Conditions
1055
n = 1,900rpm
f = 0.008 ipr
(Vf = 14.96 ipm)
C3 chamfering
Dry
MCSE106

Cutting force is reduced by 27% with low cutting force C-chipbreaker

MEF (Bolt Countersink End Mill)



Toolholder Dimensions

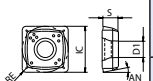
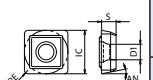
Unit	Part Number	Std. Item	No. of Inserts	Dimensions					Standard corner-R(RE)	A.R. (°)	R.R. (°)	Objective bolt size	Coolant Hole	Spare Parts		Applicable Inserts ➡ M303
				DC	DCX	DCON	LF	LH						Insert Screw	Wrench	
mm	MEF 11-S10	●	1	3	11	10	103	23	0.4	+5	-13	M6	No	SB-2250TR	DTM-7	SPMT060204EN-GM SPMT060208EN-GM SPMT060204E-Z SPMT060208E-Z
	14-S12	●		4.5	14	12	108	28				M8		SB-2260TR		
	17-S16	●	2	7.3	17.5	16	115	35				M10				
	18-S16	●		7.7	18		117	38				-				
	20-S16	●	3	9.5	20		120	40			-12	M12				
	22-S20	●		11.4	22	20	124	44				-				
	23-S20	●		12.4	23		126	46				M14				
	24-S20	●		13.4	24		128	48				-				
	25-S20	●		14.4	25		130	50				-				
	MEF 26-S25	●	3	9.8	26	25	132	52	0.8	+5	-13	M16	No	SB-3080TR	DT-10	SPMT090304EN-GM SPMT090308EN-GM SPMT090304E-Z SPMT090308E-Z
	27-S25	●		10.6	27		134	54				-				
	28-S25	●		11.5	28		136	56				-				
	29-S25	●		12.6	29		138	58				M18				
	30-S25	●		13.5	30		140	60				-				
	32-S25	●		15.5	32		144	64				M20				
	35-S32	●		18.4	35	32	150	70				M22				
	39-S32	●	4	22.5	39		158	78				M24				
	43-S32	●		26.2	43		166	86			-12	M27				
	48-S32	●		31.3	48		176	96				M30				

Although Corner-R(RE) pertains to MEF11-S10, DC = 0.118" (3.0mm).

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

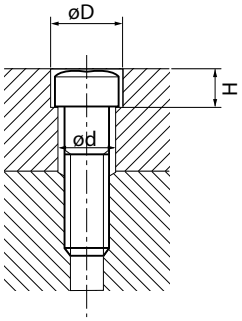
SPMT

Usage Classification		P	M	K	N	S	H
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or under)	Carbon steel / Alloy steel	★					
	Mold and die steel	☆					
	Austenitic stainless steel		☆				
	Martensitic stainless steel		★				
	Precipitation hardened stainless steel		☆				
	Gray cast iron			★			
	Nodular cast iron			☆			
	Non-ferrous metals				★		
	Heat-resistant alloy					☆	
	Titanium alloy					★	
	Hard materials					☆	

Insert		Part Number	Dimensions (in) IC	S	D1	RE	Angle (°) AN	Carbide PVD PR1810	PVD PR1825	PVD PR1835	- KW10	Applicable Toolholder ➡ M302
	 General Purpose	SPMT 060204EN-GM	1/4	0.094	2.5	1/64	11	●	●	●		MEF(11~25)-S..
		SPMT 060208EN-GM				1/32		●	●	●		
		SPMT 090304EN-GM	3/8	1/8	3.4	1/64	11	●	●	●		MEF(26~48)-S..
		SPMT 090308EN-GM				1/32		●	●	●		
	 Tough Edge	SPMT 060204E-Z	1/4	0.094	2.5	1/64	11	●	●		●	MEF(11~25)-S..
		SPMT 060208E-Z				1/32		●	●		●	
		SPMT 090304E-Z	3/8	1/8	3.4	1/64	11	●	●		●	MEF(26~48)-S..
		SPMT 090308E-Z				1/32		●	●		●	

SPMT Inserts are sold in 10 piece boxes

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

Recommended Cutting Conditions

Workpiece Material	fz (ipt)	Recommended Insert Grades (Cutting Speed Vc: sfm) MEGACOAT NANO EX PR1810	PR1825	PR1835	Carbide KW10
Carbon Steel	0.004~0.006	-	★ 390~**590**~720	☆ 390~**590**~720	-
Alloy Steel	0.004~0.006	-	★ 390~**590**~720	☆ 390~**590**~720	-
Mold Steel	0.002~0.004	-	★ 330~**490**~590	☆ 330~**490**~590	-
Stainless Steel	0.002~0.004	-	-	★ 260~**390**~590	-
Cast Iron	0.004~0.008	★ 330~**590**~720	-	-	☆ 260~**330**~390
Non-ferrous Metals	0.004~0.008	-	-	-	★ 330~**660**~980

★ : 1st Recommendation ☆ : 2nd Recommendation

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Bolt Countersinking Recommendations

1. Carbon steel
Increase the feed rate to **fz = 0.004 ~ 0.006 ipt** for preventing long chips at low feed rates.
Chip control is good when setting **(Vc = 260 sfm)** for **MEF11~MEF25**, and **(Vc = 390 sfm)** for **MEF26~MEF48**.

Toolholder Description	Vc (sfm)	fz (ipt)
MEF11~MEF25	260	0.1~0.15
MEF26~MEF48	390	0.1~0.15

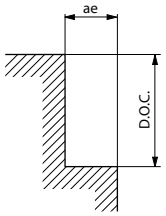
2. Sticky materials
Step feed is recommended for good chip control
Increase the feed rate to **fz = 0.004 ~ 0.006 ipt** for preventing long chips at low feed rate **(fz = 0.002 ipt)**.
Use cover to prevent accidents or injury by thick chips at higher feed rates.

Toolholder Description	Vc (sfm)	fz (ipt)	Step Feed (in)
MEF11~MEF48	260~490	0.004~0.006	0.020~0.059

3. Stainless steel
Use a lower cutting speed. High cutting speeds cause chattering.

Cutting Performance when Shouldering

MEF bolt countersink end mill is also recommended of shouldering.



Vc = 260~390 sfm
1055
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 D.O.C.. 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)

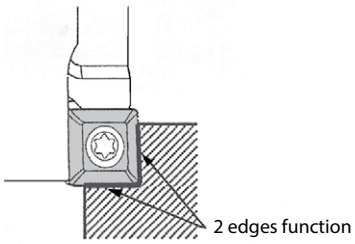


Fig. 1

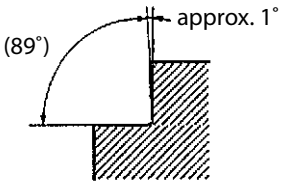
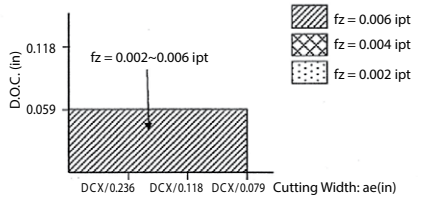
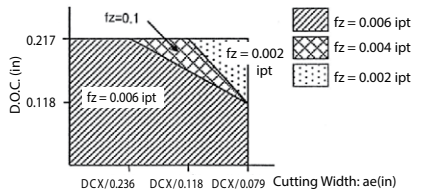
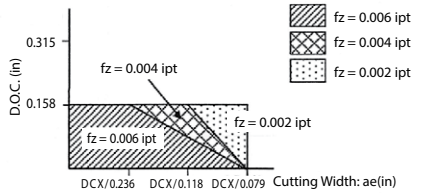
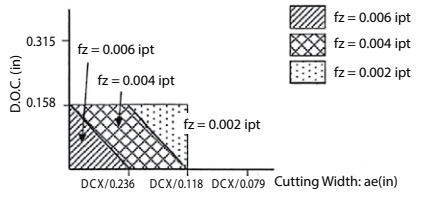


Fig. 2

Description	Cutting Range
MEF11-S12 MEF14-S12 MEF17-S16 MEF18-S16	
MEF20-S16 MEF22-S20 ~ MEF25-S20	
MEF26-S25 ~ MEF32-S25 MEF35-S32	
MEF39-S32 MEF43-S32 MEF48-S32	

800.823.7284
www.kyocera precisiontools.com

METS (T-Slot End Mill)

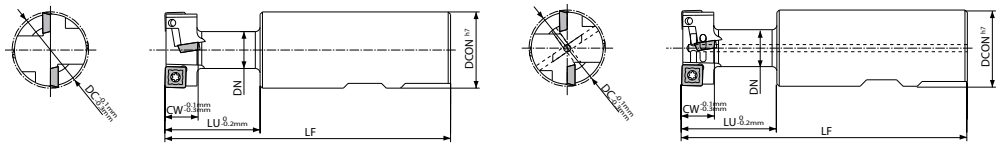


Fig. 1 Fig. 2

Toolholder Dimensions

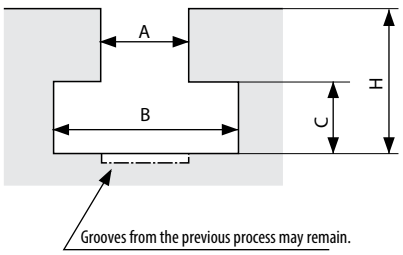
Unit	Part Number	Std. Item	No. of Inserts	No. of Flutes	Dimensions DC	DCON	LF	LU	CW	DN	A.R. (°)	R.R. (°)	Coolant Hole	Fig.	Spare Parts: Insert Screw	Spare Parts: Wrench	Applicable Inserts M306
mm	METS 21-S25	●	2	1	21	25	109	29	9	10.5	+9	-10	No	1	SB-2560TR	DT-8	SDMT221E-K
	25-S25	●	4	2	25		112	32	11	12.5				1			
	32-S32	●			32	32	120	38	14	15.5				1	SB-3060TR	DT-10	SDMT080308E-K
	40-S32	●			40		130	50	18	20.5		-12		1	SB-4085TR	DT-15	SDMT432E-K
	50-S32	●			50		140	60	22	26.5				1			
	METS 21-S25-H	●	2	1	21	25	109	29	9	10.5	+9	-10	Yes	2	SB-2560TR	DT-8	SDMT221E-K
	25-S25-H	●	4	2	25		112	32	11	12.5				2			
	32-S32-H	●			32	32	120	38	14	15.5				2	SB-3060TR	DT-10	SDMT080308E-K
	40-S32-H	●			40		130	50	18	20.5		-12		2	SB-4085TR	DT-15	SDMT432E-K
	50-S32-H	●			50		140	60	22	26.5				2			

METS...-H has air holes

JIS standard of T-slot (Extracted from B0952)

(Unit: mm)

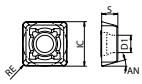
A (Nominal Size)	B	C	H Max.	H Min.
12	19 $^{+2}_{0}$	8 $^{+1}_{0}$	25	20
14	23 $^{+2}_{0}$	9 $^{+2}_{0}$	28	23
18	30 $^{+2}_{0}$	12 $^{+2}_{0}$	36	30
22	37 $^{+3}_{0}$	16 $^{+2}_{0}$	45	38
28	46 $^{+4}_{0}$	20 $^{+2}_{0}$	56	48



● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

SDMT

Usage Classification					
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel		★		P
	Mold and die steel		★		
	Austenitic stainless steel				M
	Martensitic stainless steel M				
	Precipitation hardened stainless steel				
	Gray cast iron	★		☆	K
	Nodular cast iron	★			
	Non-ferrous metals			★	N
	Heat-resistant alloy				S
	Titanium alloy				
	Hard materials				H

Insert		Part Number ANSI	Part Number ISO	Dimensions (in)				Angle (°)	Carbide			Applicable Toolholder ➡ M305
				IC	S	D1	RE	AN	PVD PR1810	PVD PR1835	- KW10	
		SDMT 221E-K	SDMT 060304E-K	1/4	1/8	0.110	1/64	15	●	●	●	METS21-S25(-H) METS25-S25(-H)
		(Use ISO Part Number)	SDMT 080308E-K	0.315	1/8	0.134	1/32	15	●	●	●	METS32-S32(-H)
		SDMT 432E-K	SDMT 120408E-K	1/2	3/16	0.173	1/32	15	●	●	●	METS40-S32(-H) METS50-S32(-H)

Recommended Cutting Conditions ➡ M307

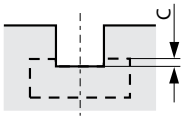
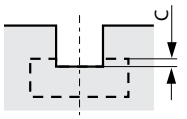
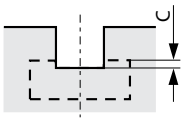
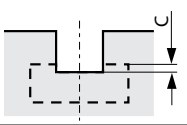
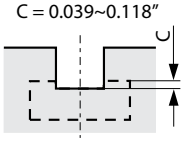
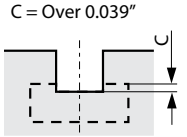
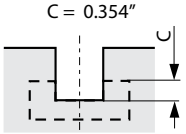
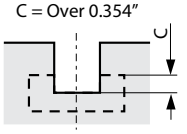
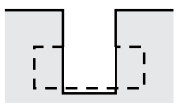
SDMT Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Workpiece Material	fz (ipt)	Recommended Insert Grades (Cutting Speed Vc: sfm)		
		MEGACOAT NANO EX		Carbide
		PR1810	PR1835	KW10
Carbon Steel	0.004~0.006	-	★ 330~660	-
Alloy Steel	0.003~0.005	-	★ 330~660	-
Mold Steel	0.002~0.004	-	★ 260~490	-
Cast Iron	0.004~0.006	★ 330~660	-	☆ 260~390
Non-ferrous Metals	0.004~0.006	-	-	★ 330~980

★ : 1st Recommendation ☆ : 2nd Recommendation

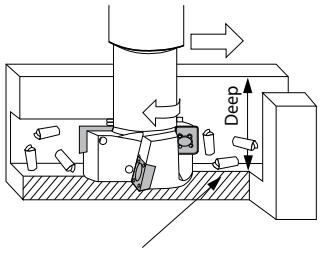
Part Number (T-Slot Nominal Size)	Steel			Cast Iron		
	Groove Shape at Pre-process	T-Slotting Conditions	Conditions to Prevent Chattering	Groove Shape at Pre-process	T-Slotting Conditions	Conditions to Prevent Chattering
METS21-S25(-H) (Nominal Size 12)	C = 0.039~0.118″ 	Vc = 390 fz = 0.004 (n = 1,820) (Vf = 7.165)	Vc = 200 fz = 0.006 (n = 920) (Vf = 5.394)	C = Over 0.039″ 	Vc = 390 fz = 0.005 (n = 1,820) (Vf = 8.583)	Vc = 260 fz = 0.006 (n = 1,210) (Vf = 7.165)
METS25-S25(-H) (Nominal Size 14)	C = 0.039~0.118″ 	Vc = 390 fz = 0.004 (n = 1,530) (Vf = 12.047)	Vc = 200 fz = 0.006 (n = 760) (Vf = 8.976)	C = Over 0.039″ 	Vc = 390 fz = 0.005 (n = 1,530) (Vf = 14.449)	Vc = 260 fz = 0.006 (n = 1,020) (Vf = 12.047)
METS32-S32(-H) (Nominal Size 18)	C = 0.039~0.118″ 	Vc = 330 fz = 0.004 (n = 1,000) (Vf = 7.874)	Vc = 200 fz = 0.006 (n = 600) (Vf = 7.087)	C = Over 0.039″ 	Vc = 390 fz = 0.005 (n = 1,190) (Vf = 11.260)	Vc = 260 fz = 0.006 (n = 800) (Vf = 9.449)
METS40-S32(-H) (Nominal Size 22)	C = 0.354″ 	Vc = 260 fz = 0.006 Chattering is likely when set to shallower than C = 0.354".	Vc = 200 fz = 0.006 (n = 480) (Vf = 5.669)	C = Over 0.354″ 	Vc = 390 fz = 0.006 (n = 960) (Vf = 8.976)	Vc = 260 fz = 0.006 (n = 640) (Vf = 7.559)
METS50-S32(-H) (Nominal Size 28)	Not recommended for steel because of chattering				Vc = 390 fz = 0.006 (n = 760) (Vf = 8.976)	Vc = 260 fz = 0.006 (n = 510) (Vf = 6.024)

- Chattering is likely when fz is less than fz = 0.004 ipt. Keep feed rate between fz = 0.004~0.006 ipt. For cast iron machining, the bigger the C-dimension becomes, the less chattering occurs.

[Cutting Speed : Vc (sfm), Spindle Revolution : n (min^{-1}), Feed Rate fz (ipt), Table Feed Vf (ipm)]

How to Prevent Damaging Chips when Steel Machining

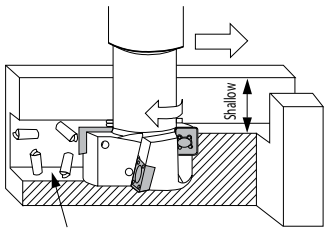
Before Improvement (Deep Groove at Pre-Process)



Chips stay in the pre-process groove.

Improvement of chip biting

After Improvement (Shallow Groove at Pre-Process)



Chips are evacuated backward and chances of damaging chips are less.

Make pre-process groove shallower to prevent the tool from becoming damaged from chips.
Use compressed air to aid in chip evacuation.

MGI (Grooving End Mill)

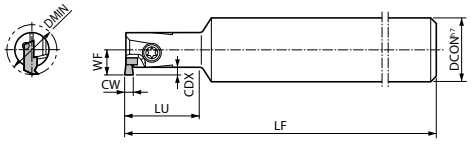


Fig. 1

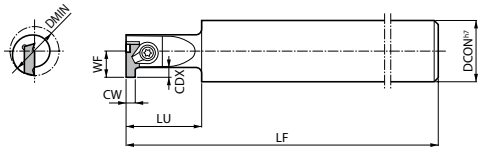
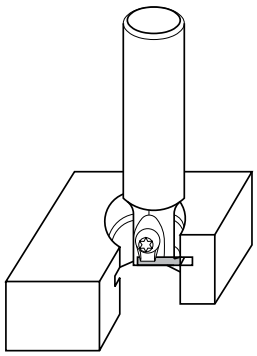
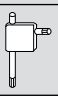


Fig. 2



Toolholder Dimensions

Unit	Part Number	Std. Item	Dimensions								Coolant Hole	Fig.	Spare Parts					Applicable Inserts ➡ M309
			DMIN	DCON	LF	LU	CDX	WF	CW min.	CW max.			Clamp Set	Clamp Set	Insert Screw	Wrench	Wrench	
																		
mm	MGI 1420-1SS	●	14	20	100	20	2.2	6.8	1	3	No	1	-	-	SB-4065TR	-	FT-15	GVR...-020SS
	MGI 1620-1S	●	16	20	110	25	2.2	7.8	1	3.4	No	1	-	-	SB-4085TR	-	FT-15	GVR...-020S
	MGI 2020-1A	●	20	20	110	30	2.2	9.8	1	3.4	No	2	CPS-5F	-	-	-	FT-15	GVR...-020A , GVR...-...AR
	MGI 2220-1B	●	22	20	110	30	2.8	11	1.45	4	No	2	CPS-5F	-	-	-	FT-15	GVR...-020B , GVR...-...BR
	MGI 3225-1C	●	32	25	120	35	5.5 (4.5)	16	2.8	4	No	2	-	CPS-6F	-	LW-3	-	GVR...-020C

CDX shows available grooving depth.
GVR280-020C, GVR300-020C inserts are available for groove depths up to 4.5mm.
GVR430 ~ 500-020C inserts can be installed into MGI3225-1C holders, but not recommended for steel machining because of toolholder's rigidity.

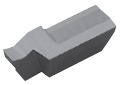
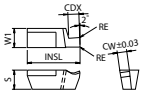
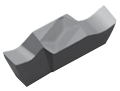
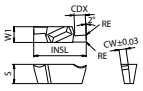
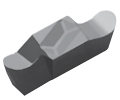
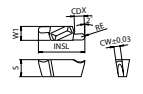
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

GVR

Usage Classification

● : Continuous ~Light interruption / 1st Choice
◔ : Continuous ~Light interruption / 2nd Choice
● : Continuous / 1st Choice
○ : Continuous / 2nd Choice

Carbon steel / Alloy steel	●	◔			P
Stainless steel	●	◔			M
Gray cast iron			●		K
Non-ferrous metals			●		N
Titanium alloy			●		S
Hard materials (~ 40HRC)	●	○			H
Hard materials (40HRC ~)					

Insert		Part Number (Use with grade PR1225)	Previous Part Number (Use with grades PR930, KW10, TC40, TC60)	No. of Edges	Dimensions (mm) CW	CDX	S	RE	INSL	W1	Tolerance (mm) CW min.	CW max.	Carbide PVD PR1225	Carbide PVD PR930	Carbide - KW10	Cermet - TC40	Applicable Toolholder ➡ M308
	 1-edge	GVR 100-020SS	GVR 100SS	1	1	2.3	3	0.2	9	3.6	-0.03	+0.03	●	●	●		MGI1420-1SS
		GVR 125-020SS	GVR 125SS		1.25								●	●	●		
		GVR 145-020SS	GVR 145SS		1.45								●	●	●		
		GVR 200-020SS	GVR 200SS		2								●	●	●		
		GVR 250-020SS	GVR 250SS		2.5								●	●	●		
		GVR 300-020SS	GVR 300SS		3								●	●	●		
		GVR 100-020S	GVR 100S	1	1	2.3	4	0.2	11	4	-0.03	+0.03	●	●	●		MGI1620-1S
		GVR 125-020S	GVR 125S		1.25								●	●	●		
		GVR 145-020S	GVR 145S		1.45								●	●	●		
		GVR 185-020S	GVR 185S		1.85								●	●	●		
		GVR 200-020S	GVR 200S		2								●	●	●		
		GVR 250-020S	GVR 250S		2.5								●	●	●		
		GVR 340-020S	GVR 340S		3.4								●	●	●		
	 2-edge	GVR 100-020A	GVR 100A	2	1	2.3	5	0.2	12	4	-0.03	+0.03	●	●	●	●	MGI2020-1A
		GVR 125-020A	GVR 125A		1.25								●	●	●		
		GVR 145-020A	GVR 145A		1.45								●	●	●	●	
		GVR 185-020A	GVR 185A		1.85								●	●	●		
		GVR 200-020A	GVR 200A		2								●	●	●		
		GVR 250-020A	GVR 250A		2.5								●	●	●		
		GVR 300-020A	GVR 300A		3								●	●	●		
		GVR 340-020A	GVR 340A		3.4								●	●	●		
		GVR 145-020B	GVR 145B	2	1.45	2.8	5.5	0.2	15	4.5	-0.03	+0.03	●	●	●		MGI2220-1B
		GVR 185-020B	GVR 185B		1.85	2.8							●	●	●		
		GVR 200-020B	GVR 200B		2	3.2							●	●	●		
		GVR 230-020B	GVR 230B		2.3	3.2							●	●	●		
		GVR 250-020B	GVR 250B		2.5	3.2							●	●	●		
		GVR 280-020B	GVR 280B		2.8	3.2							●	●	●		
		GVR 300-020B	GVR 300B		3	4.2							●	●	●		
		GVR 340-020B	GVR 340B		3.4	4.2							●	●	●		
		GVR 400-020B	GVR 400B		4	4.2							●	●	●		
		GVR 280-020C	GVR 280C	2	2.8	4.5	6.5	0.2	21	5.8	-0.03	+0.03	●	●	●		MGI3225-1C
		GVR 300-020C	GVR 300C		3	4.5							●	●	●	●	
		GVR 340-020C	GVR 340C		3.4	5.5							●	●	●		
		GVR 400-020C	GVR 400C		4	5.5							●	●	●		
		(GVR 430-020C)	(GVR 430C)		4.3	6.3							●	●	●		
		(GVR 460-020C)	(GVR 460C)		4.6	6.3							●	●	●		
		(GVR 500-020C)	(GVR 500C)		5	6.3							●	●	●		
	 2-edge / Full R / Copying	GVR 200-100AR	GVR 100AR	2	2	2.3	5	1	12	4	-0.03	+0.03	●	●	●		MGI2020-1A
		GVR 250-125AR	GVR 125AR		2.5			1.25					●	●	●		
		GVR 300-150AR	GVR 150AR		3			1.5					●	●	●		
		GVR 200-100BR	GVR 100BR	2	2	3.2	5.5	1	15	4.5	-0.03	+0.03	●	●	●		MGI2220-1B
		GVR 300-150BR	GVR 150BR		3	4.2		1.5					●	●	●		

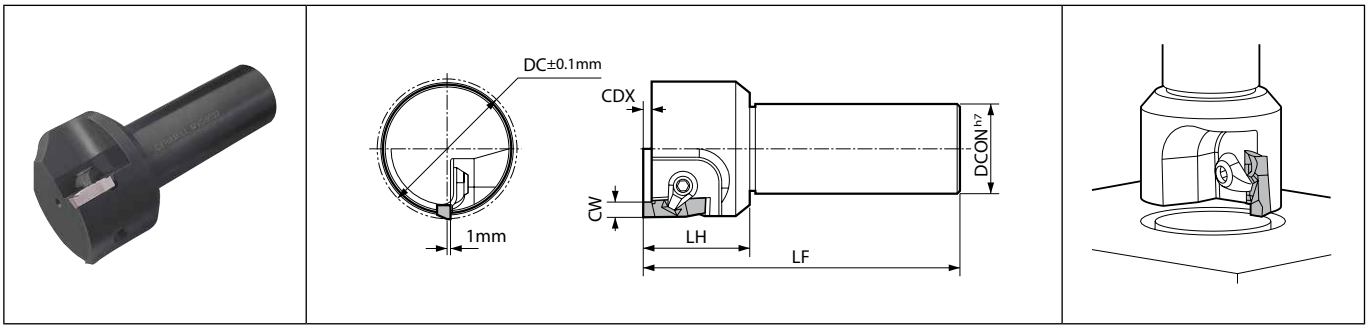
CDX shows available grooving depth.
Right-hand shown
GVR280-020C, GVR300-020C inserts are available for groove depths up to 4.5mm.
GVR430 ~ 500-020C inserts can be installed into MGI3225-1C holders, but not recommended for steel machining because of toolholder's rigidity.

Recommended Cutting Conditions ➡ M311

GVR Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MVG (Ring Grooving End Mill)



Toolholder Dimensions

Unit	Part Number	Std. Item	Dimensions							Coolant Hole	Spare Parts		Applicable Inserts
			DC	DCON	LF	LH	CDX	CW min.	CW max.		Clamp Set	Wrench	
mm	MVG 3032	●	30	32	120	40	5.2	4	4.9	No	CPS-6V	LW-3	GVFR400-020B GVFR430-020B GVFR460-020B GVFR490-020B
	3532	●	35										
	4032	●	40										
	4532	●	45										
	5032	●	50										
	5532	●	55										
	6032	●	60										

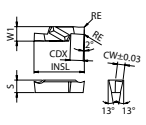
CDX shows available grooving depth.

GVFR

Usage Classification

● : Continuous ~Light interruption / 1st Choice
◔ : Continuous ~Light interruption / 2nd Choice
● : Continuous / 1st Choice
○ : Continuous / 2nd Choice

Carbon steel / Alloy steel	●	◔	P
Stainless steel	●	◔	M
Gray cast iron		●	K
Non-ferrous metals		●	N
Titanium alloy		●	S
Hard materials (~ 40HRC)	●	○	H
Hard materials (40HRC ~)			

Insert		Part Number (Use with grade PR1225)	Previous Part Number (Use with grades PR930, KW10, TC40, TC60)	No. of Edges	Dimensions (mm)						Tolerance (mm)		Carbide		Applicable Toolholder
					CW	CDX	S	RE	INSL	W1	CW min.	CW max.	PVD PR1225	PVD PR930	- KW10	
		GVFR 400-020B	GVFR 400B	2	4	5.3	5	0.2	20	5.8	-0.03	+0.03	●	●	●	MVG....
		430-020B	430B		4.3								●		●	
		460-020B	460B		4.6								●		●	
		490-020B	490B		4.9								●	●	●	

CDX shows available grooving depth.
Right-hand shown

Recommended Cutting Conditions ➔ M311

GVFR Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

MGI

Recommended Cutting Conditions

Workpiece Material	fz (ipt)	Recommended Insert Grades (Vc: sfm)				
		Cermet		MEGACOAT	PVD Coated Carbide	Carbide
		TC40	TC60	PR1225	PR930	KW10
Carbon Steel	0.002~0.006	☆ 390~660	☆ 330~590	★ 260~490	☆ 260~490	-
Alloy Steel	0.002~0.006	☆ 390~660	☆ 330~590	★ 260~490	☆ 260~490	-
Mold Steel	0.001~0.005	☆ 330~590	☆ 260~490	★ 200~430	☆ 200~430	-
Stainless Steel	0.001~0.005	☆ 330~590	★ 260~490	★ 200~430	☆ 200~430	-
Cast Iron	0.002~0.008	☆ 330~490	-	-	-	★ 260~490
Non-ferrous Metals	0.05~0.2	-	-	-	-	★ 330~980

Use down-cut machining.

★ : 1st Recommendation ☆ : 2nd Recommendation

MVG

Recommended Cutting Conditions

Workpiece Material	fz (ipt)	Recommended Insert Grades (Vc: sfm)				
		Cermet		MEGACOAT	PVD Coated Carbide	Carbide
		TC40	TC60	PR1225	PR930	KW10
Carbon Steel	0.002~0.006	★ 390~660	☆ 330~590	★ 260~560	☆ 260~490	-
Alloy Steel	0.002~0.006	★ 390~660	☆ 330~590	★ 260~560	☆ 260~490	-
Mold Steel	0.001~0.005	★ 330~590	☆ 260~490	★ 200~490	☆ 200~430	-
Stainless Steel	0.001~0.005	☆ 330~590	☆ 260~490	★ 200~490	☆ 200~430	-
Cast Iron	0.002~0.008	-	-	-	-	★ 260~490
Non-ferrous Metals	0.002~0.008	-	-	-	-	★ 330~980

★ : 1st Recommendation ☆ : 2nd Recommendation

API Ring Groover

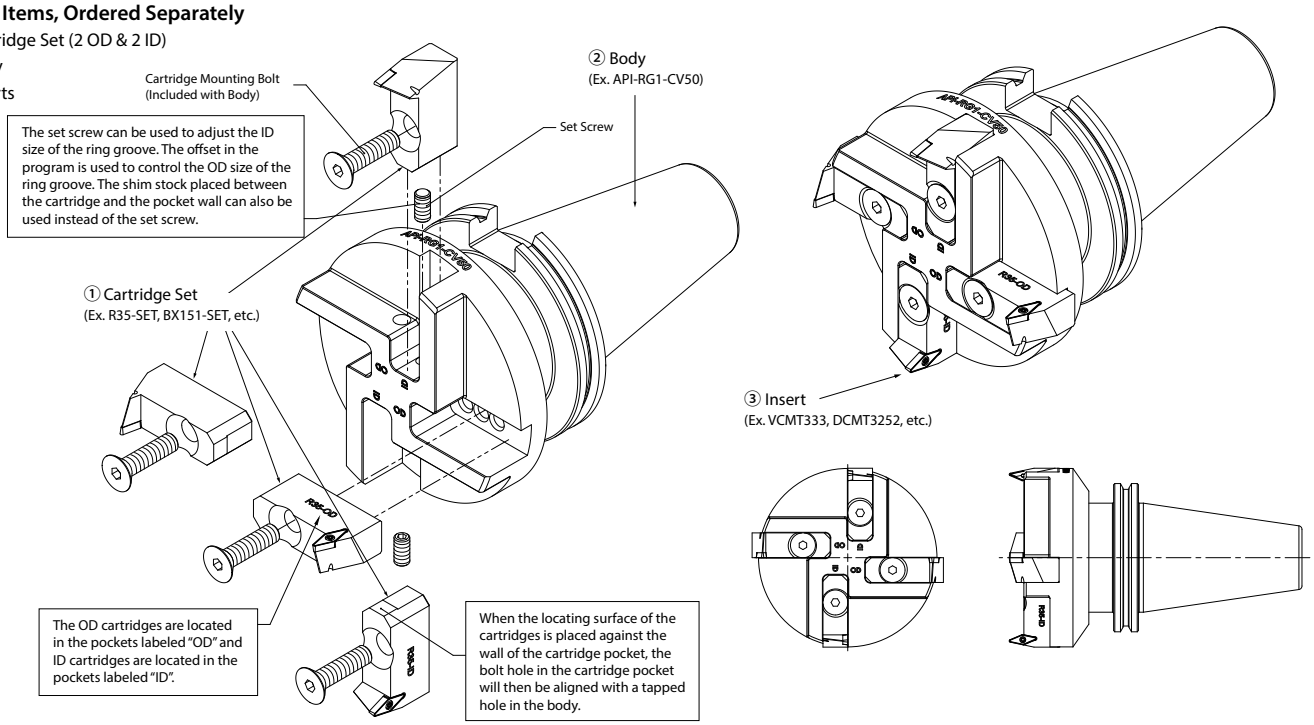
Featuring an integral shank for maximum rigidity, Kyocera's API Ring Groovers are the most versatile ring grooving tools on the market.

ADVANTAGES

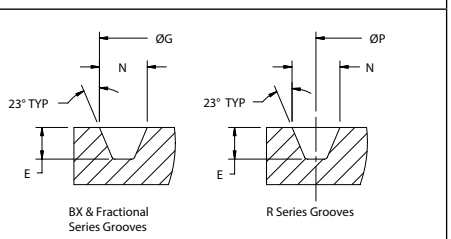
- Create ring grooves per API Spec 6A for BX, R, and RX style grooves
- Roughout and finish of inlay of API Ring Grooves
- Replaceable cartridges allow a single cutter body to produce multiple size API grooves
- Integral shank, multiple sizes and styles available

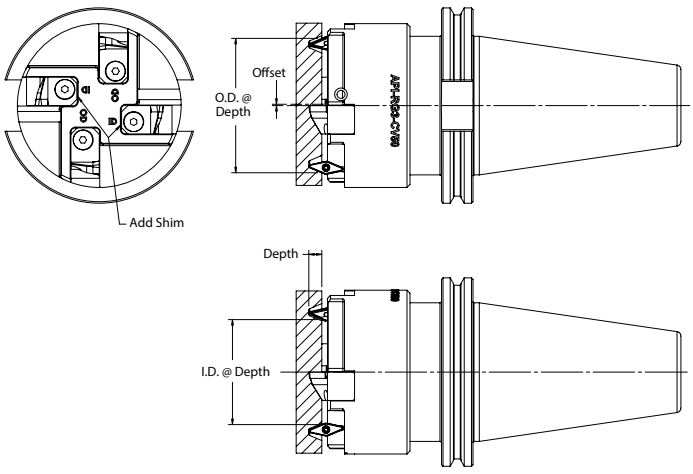
3 Line Items, Ordered Separately

① Cartridge Set (2 OD & 2 ID)
② Body
③ Inserts



API Ring Groover (Body and Cartridges)





Ring / Cartridge Set Dimensions

Ring Specification	① Cartridge Set Part Number Choose Set	Std. Item	No. of Inserts	No. of Flutes	Dimensions (in)							Roughout Cartridges	Applicable Body Part Number
					Offset	Pitch P	OD G	Width N	Depth E	OD Depth	ID Depth		
BX-150	BX150-SET	●	4	2	0.061	-	2.893	0.450	0.220	2.771	2.115	-	API-RG-3-CV40 API-RG-3-CV50 API-RG-3-BT50 API-RG-3-DIN-69871
BX-150-R	BX150-R-SET	●		1	0.097		3.341	0.841	0.485	3.147	1.853	Yes	
BX-151	BX151-SET	●	4	2	0.065	-	3.062	0.466	0.220	2.932	2.260	-	API-RG-1-CV40 API-RG-1-CV50 API-RG-1-BT50 API-RG-1-BT40 API-RG-1-DIN-69871
BX-151-R	BX151-R-SET	●	4	1	0.097	-	3.496	0.846	0.485	3.302	1.998	Yes	API-RG-3-CV40 API-RG-3-CV50 API-RG-3-BT50 API-RG-3-DIN-69871
BX-152	BX152-SET	●	4	2	0.069	-	3.395	0.498	0.230	3.257	2.537	-	API-RG-1-CV40 API-RG-1-CV50 API-RG-1-BT50 API-RG-1-BT40 API-RG-1-DIN-69871
BX-152-R	BX152-R-SET	●		1	0.091		3.826	0.876	0.505	3.644	2.256	Yes	
BX-153	BX153-SET	●		2	0.077		4.046	0.554	0.270	3.892	3.092	-	
BX-153-R	BX153-R-SET	●		1	0.110		4.486	0.936	0.535	4.266	2.834	Yes	
BX-154	BX154-SET	●		2	0.083		4.685	0.606	0.300	4.519	3.369	-	
BX-154-R	BX154-R-SET	●		1	0.112		5.116	0.971	0.570	4.892	3.398	Yes	
BX-155	BX155-SET	●	4	2	0.100	-	5.930	0.698	0.330	5.730	4.734	-	API-RG-2-CV50 API-RG-2-BT50 API-RG-2-DIN-69871
BX-155-R	BX155-R-SET	●		1	0.223		6.366	1.076	0.595	5.920	4.660	Yes	
BX-156	BX156-SET	●	4	2	0.132	-	9.521	0.921	0.440	9.257	7.943	-	API-RG-4-CV50 API-RG-4-BT50 API-RG-4-DIN-69871
BX-156-R	BX156-R-SET	●		1	0.166		9.956	1.306	0.710	9.624	7.676	Yes	
BX-169	BX169-SET	●	4	2	0.081	-	6.955	0.666	0.380	6.793	5.785	-	API-RG-2-CV50 API-RG-2-BT50 API-RG-2-DIN-69871
R-16	R16-SET	●	4	2	0.026	2.000	-	0.344	0.250	2.292	1.708	-	API-RG-3-CV40 API-RG-3-CV50 API-RG-3-BT50 API-RG-3-DIN-69871
R-18	R18-SET	●				2.375				2.667	2.083		
R-20	R20-SET	●				2.688				2.980	2.396		
R-23	R23-SET	●	4	2	0.046	3.250	-	0.469	0.310	3.627	2.873	-	API-RG-1-CV40 API-RG-1-CV50 API-RG-1-BT50 API-RG-1-BT40 API-RG-1-DIN-69871
R-23-R	R23-R-SET	●		1	0.081	3.300		0.856	0.575	3.994	2.606	Yes	
R-24	R24-SET	●		2	0.046	3.750		0.469	0.310	4.127	3.373	-	
R-24-R	R24-R-SET	●		1	0.077	3.800		0.871	0.590	4.517	3.083	Yes	
R-26	R26-SET	●		2	0.046	4.000		0.469	0.310	4.377	3.623	-	
R-27	R27-SET	●				4.250				4.627	3.873		
R-31	R31-SET	●	4	2	0.044	4.875	-	0.469	0.310	5.256	4.494	-	API-RG-2-CV50 API-RG-2-BT50 API-RG-2-DIN-69871
R-31-R	R31-R-SET	●		1	0.072	4.920		0.856	0.575	5.632	4.208	Yes	
R-35	R35-SET	●		2	0.046	5.375		0.469	0.310	5.752	4.998	-	
R-35-R	R35-R-SET	●		1	0.081	5.420		0.856	0.575	6.114	4.726	Yes	
R-37	R37-SET	●		2	0.046	5.875		0.469	0.310	6.252	5.498	-	
R-39	R39-SET	●				6.375				6.752	5.998		
R-39-R	R39-R-SET	●		1	0.081	6.420		0.856	0.575	7.114	5.726	Yes	
R-41	R41-SET	●		2	0.046	7.125		0.469	0.310	7.502	6.748	-	
R-44	R44-SET	●				7.625				8.002	7.248		
R-44-R	R44-R-SET	●		1	0.071	7.670		0.856	0.575	8.384	6.956	Yes	
R-45	R45-SET	●		2	0.046	8.313		0.469	0.310	8.690	7.936	-	
R-46	R46-SET	●			0.048			0.531	0.380	8.748	7.878		
R-46-R	R46-R-SET	●		1	0.082	8.360		0.916	0.645	9.112	7.608	Yes	
1-13/16	1-13/16-SET	●	4	2	0.034	-	4.373	0.377	0.258	4.305	3.687	-	API-RG-1-CV40 API-RG-1-CV50 API-RG-1-BT50 API-RG-1-BT40 API-RG-1-DIN-69871
2-1/16-10K	2-1/16-10K-SET	●					4.623			4.555	3.937		
2-9/16-15K	2-9/16-15K-SET	□	4	2	0.034	-	5.873	0.377	0.258	5.805	5.187	-	API-RG-2-CV50 API-RG-2-BT50 API-RG-2-DIN-69871
3-1/16-10K	3-1/16-10K-SET	●					5.748			5.680	5.062		
4-1/16-10K	4-1/16-10K-SET	●					7.123			7.055	6.437		
5-1/8-10K	5-1/8-10K-SET	●					8.748			8.680	8.062		

Applicable Body

② Body Part Number Choose Body	Std. Item	Shank	Body Spare Parts	
			Mounting Bolt	Set Screw
API-RG-1-CV40	●	CAT40	01-05	01-08
API-RG-1-CV50	●	CAT50		
API-RG-1-BT50	●	BT50		
API-RG-1-BT40	□	BT40		
API-RG-1-DIN-69871	□	DIN69871		
API-RG-2-CV50	●	CAT50	01-05	01-08
API-RG-2-BT50	●	BT50		
API-RG-2-DIN-69871	□	DIN69871		
API-RG-3-CV40	●	CAT40	01-06	01-09
API-RG-3-CV50	●	CAT50		
API-RG-3-BT50	□	BT50		
API-RG-3-DIN-69871	□	DIN69871		
API-RG-4-CV50	●	CAT50	01-07	01-10
API-RG-4-BT50	□	BT50		
API-RG-4-DIN-69871	□	DIN69871		

Note

The OD and ID dimensions are to set the cut diameter of a given cartridge set using a presetter. The dimensions are the cut diameter of the tool at the depth of the ring groove. By setting zero at the nose radius then moving the presetter to the depth of the API groove the OD and ID can be preset to the dimensions shown.

See illustration on page M312

Cartridge Set Spare Parts and Applicable Inserts M314

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Cartridge Set Spare Parts and Applicable Inserts

Ring Specification	Cartridge Set Part Number	Std. Item	Spare Parts: Clamp Screw	Spare Parts: Wrench	③ Applicable Inserts Choose Inserts
BX-150	BX150-SET	●	SCR-02	T15	DCMT3252
BX-150-R	BX150-R-SET	●			DCMT3253
BX-151	BX151-SET	●			DCMT3252
BX-151-R	BX151-R-SET	●			DCMT3253
BX-152	BX152-SET	●			DCMT3252
BX-152-R	BX152-R-SET	●			DCMT3253
BX-153	BX153-SET	●			DCMT3252
BX-153-R	BX153-R-SET	●			DCMT3253
BX-154	BX154-SET	●			DCMT3252
BX-154-R	BX154-R-SET	●			DCMT3253
BX-155	BX155-SET	●			DCMT3252
BX-155-R	BX155-R-SET	●			VCMT333
BX-156	BX156-SET	●			VCMT332
BX-156-R	BX156-R-SET	●			VCMT333
BX-169	BX169-SET	●			VCMT332
R-16	R16-SET	●	SCR-01	T7	VCMT222
R-18	R18-SET	●			
R-20	R20-SET	●			
R-23	R23-SET	●	SCR-02	T15	DCMT3252
R-23-R	R23-R-SET	●			VCMT333
R-24	R24-SET	●			DCMT3252
R-24-R	R24-R-SET	●			VCMT333

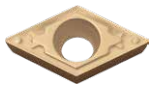
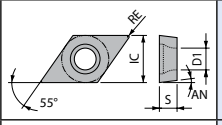
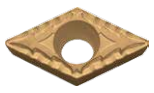
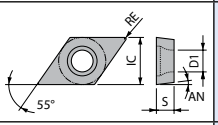
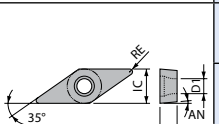
Ring Specification	Cartridge Set Part Number	Std. Item	Spare Parts: Clamp Screw	Spare Parts: Wrench	③ Applicable Inserts Choose Inserts
R-26	R26-SET	●	SCR-02	T15	DCMT3252
R-27	R27-SET	●			
R-31	R31-SET	●			
R-31-R	R31-R-SET	●			VCMT333
R-35	R35-SET	●			DCMT3252
R-35-R	R35-R-SET	●			VCMT333
R-37	R37-SET	●			DCMT3252
R-39	R39-SET	●			
R-39-R	R39-R-SET	●			VCMT333
R-41	R41-SET	●			DCMT3252
R-44	R44-SET	●			
R-44-R	R44-R-SET	●			VCMT333
R-45	R45-SET	●			DCMT3252
R-46	R46-SET	●			VCMT333
R-46-R	R46-R-SET	●			
1-13/16	1-13/16-SET	●	SCR-01	T7	VCMT222
2-1/16-10K	2-1/16-10K-SET	●			
3-1/16-10K	3-1/16-10K-SET	●			
4-1/16-10K	4-1/16-10K-SET	●			
5-1/8-10K	5-1/8-10K-SET	●			

DCMT/VCMT

Usage Classification

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

Carbon steel / Alloy steel	★			☆	★	☆	☆	P
Mold and die steel	★			☆	★	☆	☆	
Stainless steel		★		★	★			M
Gray cast iron	☆							K
Nodular cast iron	☆							
Non-ferrous metals								N
Heat-resistant alloy		★	☆	☆	☆			S
Titanium alloy				★				
Hard materials (≤ 60 HRC)								H

Insert		Part Number ANSI	Part Number ISO	Dimensions (in) IC	S	D1	RE	Angle (°) AN	Carbide: CVD CA125P	CVD CA6525	PVD PR015S	PVD PR1535	PVD PR1225	Cermet: PVD PV730	- TN60	Applicable Cartridge
		DCMT 3252HQ	DCMT 11T308HQ	3/8	5/32	0.173	1/32	7	●	●		●		●	●	(See Table Above)
		DCMT 3253CQ	DCMT 11T312CQ	3/8	5/32	0.173	3/64	7		●					●	
		VCMT 222HQ	VCMT 110308HQ	1/4	1/8	0.110	1/32	7					●			
		VCMT 332HQ	VCMT 160408HQ	3/8	3/16	0.173	1/32	7	●	●	●	●			●	
		333HQ	160412HQ				3/64						●			

DCMT / VCMT Inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grades (Cutting Speed Vc: sfm)						
		CVD Coated Carbide		MEGACOAT HARD	MEGACOAT	MEGACOAT NANO	PVD Coated Cermet	Uncoated Cermet
		CA125P	CA6525	PR015S	PR1225	PR1535	PV730	TN60
Carbon Steel	0.002~0.006	★ 330~860	-	-	★ 260~560	☆ 390~820	☆ 330~590	☆ 390~660
Alloy Steel	0.002~0.006	★ 330~860	-	-	★ 260~560	☆ 330~720	☆ 330~590	☆ 390~660
Mold Steel	0.001~0.005	★ 330~690	-	-	★ 200~490	☆ 260~590	☆ 260~490	☆ 330~590
Austenitic Stainless Steel	0.001~0.005	-	★ 390~690	-	★ 200~490	★ 330~660	-	-
Martensitic Stainless Steel	0.001~0.005	-	★ 390~890	-	★ 200~490	☆ 390~820	☆ 260~490	☆ 330~590
Precipitation Hardened Stainless Steel	0.001~0.004	-	★ 260~490	-	★ 175~330	★ 300~490	-	-
Gray Cast Iron	0.002~0.008	☆ 260~490	-	-	-	-	-	-
Nodular Cast Iron	0.002~0.006	☆ 260~390	-	-	-	-	-	-
Ni-base Heat Resistant Alloy	0.002~0.005	-	★ 130~260	☆ 130~260	☆ 130~260	☆ 70~160	-	-
Titanium Alloy	0.002~0.006	-	-	-	-	★ 130~260	-	-

- Machining with coolant is recommended for Ni-base Heat Resistant Alloy and Titanium Alloy
Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

★ : 1st Recommendation ☆ : 2nd Recommendation

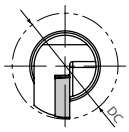
Sample CNC Program for the API Ring Groover

Sample is shown without cutter comp.
N10 (Incremental Program)
N20 G00 X (As required) Y (As required) Z.100 M03 S (As required)
N30 G01 Z0.0 F100
N40 G91 -Y (Offset) Z-.100 F (As required)
N50 G03 J (Offset) Z-.100 F (As required)
N60 G03 J (Offset) Z-.100
Continue to Depth
Last Pass
N90 G03 J (Offset) Z0.00

Use 0.03 Depth in Z for Inconel and 0.04 Depth in Z for Steel

DC (Dovetail End Mills)

Rougher / Finisher



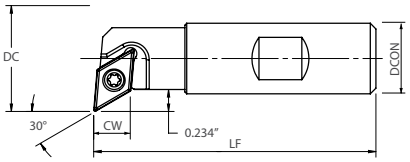
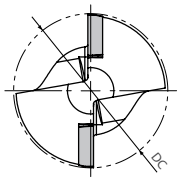


Fig. 1

Rougher / Finisher



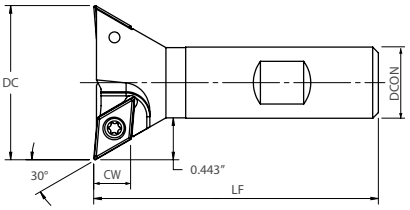
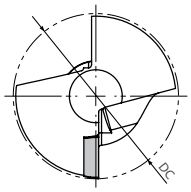


Fig. 2

Rougher



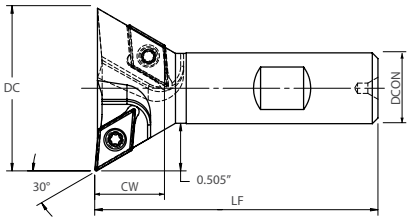


Fig. 3

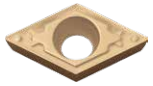
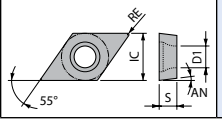
Toolholder Dimensions

Unit	Part Number		Std. Item	No. of Inserts	No. of Flutes	Dimensions				Coolant Hole	Fig.	Spare Parts		Applicable Inserts ➔ M317
						DC	DCON	LF	CW			Insert Screw	Wrench	
Inch	Weldon Shank	DC 1-1.13	●	1	1	1.125	0.750	3.000	0.388	No	1	SCR-02	T15	DCMT3251HQ
		2-1.63	●	2	2	1.625			0.388		2			
		2-1.75	●	2	1	1.750			0.739		3			

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

DCMT

Usage Classification				
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel		★	■	P
	Mold and die steel		★	■	P
	Stainless steel	☆	★		M
	Gray cast iron				K
	Nodular cast iron				K
	Non-ferrous metals				N
	Heat-resistant alloy				S
	Titanium alloy				S
	Hard materials				H

Insert		Part Number ANSI	Part Number ISO	Dimensions (in)				Angle (°)	Carbide		Cermet	Applicable Toolholder M316
				IC	S	D1	RE	AN	CVD	PVD	-	
									CA6525	PR1535	TN620	
		DCMT 3251HQ	DCMT 11T304HQ	3/8	5/32	0.173	1/64	7	●	●	●	DC...

Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grades (Cutting Speed Vc: sfm)		
		CVD Coated Carbide	MEGACOAT NANO	Uncoated Cermet
		CA6525	PR1535	TN620
Carbon Steel	0.003~0.006	-	★ 300~650	☆ 660~980
Alloy Steel	0.003~0.005	-	★ 300~650	☆ 590~820
Mold Steel	0.002~0.004	-	★ 250~500	☆ 490~720
Austenitic Stainless Steel	0.002~0.004	-	★ 300~550	-
Martensitic Stainless Steel	0.002~0.005	★ 250~500	☆ 300~650	-
Precipitation Hardened Stainless Steel	0.002~0.004	☆ 200~450	★ 200~400	-
Gray Cast Iron	0.003~0.006	-	-	-
Nodular Cast Iron	0.002~0.005	-	-	-
Ni-base Heat Resistant Alloy	0.002~0.004	★ 70~160	☆ 70~160	-
Titanium Alloy	0.002~0.004	-	★ 130~260	-

· Machining with coolant is recommended for Ni-base Heat Resistant Alloy and Titanium Alloy ★ : 1st Recommendation ☆ : 2nd Recommendation
Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

DCMT Inserts are sold in 10 piece boxes

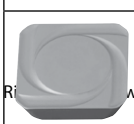
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

S-Type Inserts (Solid without Hole)

Usage Classification

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

Carbon steel / Alloy steel			☆	★		■	■	P
Mold and die steel			☆	★		■	■	P
Austenitic stainless steel			☆	★				M
Martensitic stainless steel								M
Precipitation hardened stainless steel								M
Gray cast iron	★	☆			☆			K
Nodular cast iron	★	☆						K
Non-ferrous metals					★			N
Heat-resistant alloy								S
Titanium alloy								S
Hard materials								H

Insert	Part Number ANSI	Part Number ISO	No. of Edges	Dimensions (in) IC	S	BCH	INSL	RE	BS	Angle (°) AN	AS	Carbide CVD CA420M	Carbide PVD PR1210	Carbide PVD PR1225	Carbide PVD PR1825	Carbide - KW10	Cermet - TN100M	Cermet - TN610	Applicable Toolholder
	SDKN 42AUFN	SDKN 1203AUFN	4	1/2	1/8	0.020	-	-	0.047	15	23					●			
	SDKN 42AUTN	SDKN 1203AUTN	4	1/2	1/8	0.020	-	-	0.047	15	23		●	●			●		-
	(Use ISO Part Number)	SDKN 1504AUTN	4	5/8	3/16	0.020	-	-	0.047	15	23			●					
	SDKR 42AUEN-S	SDKR 1203AUEN-S	4	1/2	1/8	0.020	-	-	0.067	15	23			●			●		-
	SDMR 42AUER-H	SDMR 1203AUER-H	4	1/2	1/8	0.020	-	0.039	0.031	15	23				●				-
	SEC 422 424	SEC 120308 120316	4	1/2	1/8	-	-	1/32 1/16	-	20	-							● ●	-
	SEEN 42AFTN	SEEN 1203AFTN	4	1/2	1/8	0.020	-	-	0.055	20	25						●		
	SEKN 42AFFN	SEKN 1203AFFN	4	1/2	1/8	0.020	-	-	0.055	20	25					●			
	SEKN 42AFTN	SEKN 1203AFTN	4	1/2	1/8	0.020	-	-	0.055	20	25		●	●			●		-
	SEKN 43AFTN	SEKN 1204AFTN	4	1/2	3/16	0.020	-	-	0.055	20	25			●					
	SEKN 53AFTN	SEKN 1504AFTN	4	5/8	3/16	0.020	-	-	0.055	20	25			●			●		
1-edge / With Wiper Edge	SEEN 42AFFR-W	SEEN 1203AFFR-W	1	1/2	1/8	-	0.573	-	0.138	20	25					●			-
	SEEN 42AFTR-W	SEEN 1203AFTR-W	1	1/2	1/8	-	0.573	-	0.138	20	25						●		
	SEKN 42EFTR	SEKN 1203EFTR	4	1/2	1/8	0.047	-	-	0.055	20	25						●		-
	SEKR 42AFEN-S	SEKR 1203AFEN-S	4	1/2	1/8	0.020	-	-	0.067	20	25			●			●		-
	SEMR 42AFER-H	SEMR 1203AFER-H	4	1/2	1/8	-	-	0.039	0.039	20	25				●				-

S-Type inserts are sold in 10 piece boxes

SEEN-W inserts are sold in 5 piece boxes

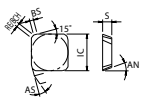
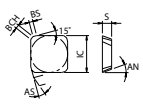
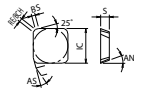
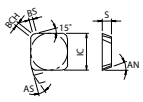
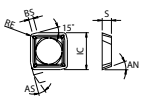
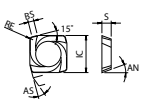
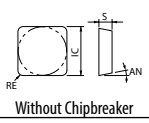
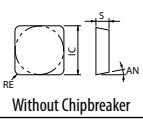
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

S-Type Inserts (Solid without Hole)

Usage Classification

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

Carbon steel / Alloy steel			☆		★		■		P
Mold and die steel			☆		★		■		P
Austenitic stainless steel			☆		★				M
Martensitic stainless steel									M
Precipitation hardened stainless steel									M
Gray cast iron	★	☆		☆		☆			K
Nodular cast iron	★	☆		☆					K
Non-ferrous metals						★			N
Heat-resistant alloy									S
Titanium alloy									S
Hard materials									H

Insert		Part Number ANSI	Part Number ISO	Dimensions (in) IC	S	BCH	RE	BS	Angle (°) AN	AS	Carbide CVD CA420M	Carbide PVD PR1210	PR1225	PR1810	PR1825	Carbide - KW10	Cermet - TN100M	TN60	Applicable Toolholder
		SPCN 42EDTR	SPCN 1203EDTR	1/2	1/8	-	0.039	0.079	11	15							●		
		SPKN 42EDER	SPKN 1203EDER	1/2	1/8	0.039	-	0.063	11	15	●								
		SPKN 42EDTR	SPKN 1203EDTR	1/2	1/8	-	0.039	0.079	11	15			●				●		-
						0.039	-					●							
		42EDTL	1203EDTL			-	0.039										●		
		SPKN 53EDFR	SPKN 1504EDFR	5/8	3/16	0.039	-	0.087	11	15						●			
		SPKN 53EDTR	SPKN 1504EDTR	5/8	3/16	0.039	-	0.087	11	15		●	●				●		
		SPEN 42EEER	SPEN 1203EEER	1/2	1/8	0.039	-	0.055	11	20	●								-
		SPEN 42EESR	SPEN 1203EESR	1/2	1/8	0.039	-	0.055	11	20				●					
		SPCN 42XPTR	SPCN 1203XPTR	1/2	1/8	-	0.039	0.079	11	11							●		
		SPKN 42XPFR	SPKN 1203XPFR	1/2	1/8	0.039	-	0.079	11	11						●			-
		SPKN 42XPTR	SPKN 1203XPTR	1/2	1/8	-	0.039	0.079	11	11							●		
		SPKN 53XETR	SPKN 1504XETR	5/8	3/16	0.039	-	0.079	11	20							●		
		SPCN 63EETR1	SPCN 1904EETR1	3/4	3/16	0.028	-	0.047	11	20							●		-
		SPKR 42EDER-S	SPKR 1203EDER-S	1/2	1/8	-	0.079	0.039	11	15			●						-
		SPMR 42EDER-H	SPMR 1203EDER-H	1/2	1/8	-	0.039	0.079	11	15					●				-
	 Without Chipbreaker	SPG 321	SPGN 090304	3/8	1/8	-	1/64	-	11	-						●			-
		322	090308				1/32									●			
		SPG 421	SPGN 120304	1/2	1/8	-	1/64	-	11	-						●			
		422	120308				1/32									●		●	
	 Without Chipbreaker	SPM 422	SPMN 120308	1/2	1/8	-	1/32	-	11							●	●	●	-
		423	120312				3/64										●	●	
		SPM 432	SPMN 120408	1/2	3/16	-	1/32	-	11		●								
		433	120412				3/64				●								

Right-hand Shown

S-Type inserts are sold in 10 piece boxes

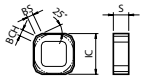
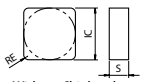
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

S-Type Inserts (Solid without Hole)

Usage Classification

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

Carbon steel / Alloy steel		■	P
Mold and die steel		■	P
Austenitic stainless steel			M
Martensitic stainless steel			M
Precipitation hardened stainless steel			M
Gray cast iron	★		K
Nodular cast iron	★		K
Non-ferrous metals			N
Heat-resistant alloy			S
Titanium alloy			S
Hard materials			H

Insert		Part Number ANSI	Part Number ISO	No. of Edges	Dimensions (in) IC	S	RE	BCH	BS	Angle (°) AN	AS	Carbide CVD CA420M	Cermet - TN100M	Applicable Toolholder
		SNCN 43XNTN	SNCN 1204XNTN	8	1/2	3/16	-	0.079	0.079	-	-		●	-
		SNKN 43XNTN	SNKN 1204XNTN	8	1/2	3/16	-	0.079	0.079	-	-		●	
		SNMF 43XNTN	SNMF 1204XNTN	8	1/2	3/16	-	0.079	0.079	-	-		●	-
	 Without Chipbreaker	SNM 433	SNMN 120412	8	1/2	3/16	3/64	-	-	-	-	●		-
		436	120424				3/32					●		

Right-hand Shown

S-Type inserts are sold in 10 piece boxes

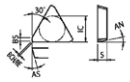
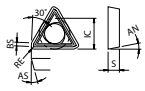
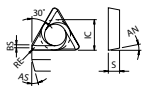
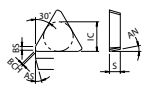
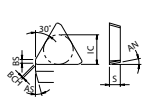
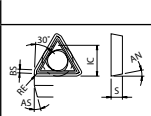
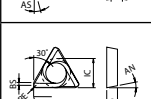
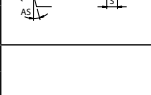
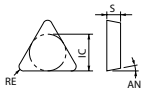
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

T-Type Inserts (Solid without Hole)

Usage Classification

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

Carbon steel / Alloy steel		☆	☆	★		■		■	P
Mold and die steel		☆	☆	★		■		■	P
Austenitic stainless steel		☆	☆	★					M
Martensitic stainless steel									M
Precipitation hardened stainless steel									M
Gray cast iron	★				☆				K
Nodular cast iron	★								K
Non-ferrous metals					★				N
Heat-resistant alloy									S
Titanium alloy									S
Hard materials									H

Insert		Part Number ANSI	Part Number ISO	No. of Edges	Dimensions (in) IC	S	BCH	RE	BS	Angle (°) AN	AS	Carbide PVD PR1210	PR1225	PR1535	PR1825	Carbide - KW10	Cermet - TN100M	TN60	TN610	Applicable Toolholder
		TEKN 32PTFR	TEKN 1603PTFR	3	3/8	1/8	0.028	-	0.055	20	22					●				-
		TEKN 32PTTR	TEKN 1603PTTR	3	3/8	1/8	0.028 -	- 1/32	0.055	20	22	●	●				●			
		TEEN 43PTTR	TEEN 2204PTTR	3	1/2	3/16	-	0.039	0.055	20	22		●				●			
		TEKN 43PTFR	TEKN 2204PTFR	3	1/2	3/16	0.028	-	0.055	20	22					●				
		TEKN 43PTTR	TEKN 2204PTTR	3	1/2	3/16	0.028 -	- 0.039	0.055	20	22	●	●				●			
		TEKR 43PTER-S	TEKR 2204PTER-S	3	1/2	3/16	-	0.039	0.055	20	22		●							-
		TEMR 32PTER-H	TEMR 1603PTER-H	3	3/8	1/8	-	1/32	0.047	20	22				●					-
		TEMR 43PTER-H	TEMR 2204PTER-H	3	1/2	3/16	-	0.039	0.055	20	22				●					
		TPC 32P4R	TPC 1603P4R	3	3/8	1/8	0.026	-	0.063	11	15								●	-
		TPK 32PDFR	TPKN 1603PDFR	3	3/8	1/8	0.028	-	0.047	11	15					●				MTP90-125-75W MTP90-150-75W MTP90-200-75W MTP90-200-R8
		TPK 32PDTR	TPKN 1603PDTR	3	3/8	1/8	0.028	-	0.047	11	15	●	●				●			
		TPK 43PDFR	TPKN 2204PDFR	3	1/2	3/16	0.028	-	0.063	11	15					●				MTP90-200-125W MTP90-250-125W
		TPK 43PDTR	TPKN 2204PDTR	3	1/2	3/16	0.028	-	0.063	11	15	●	●				●			
		TPKR 43PDER-S	TPKR 2204PDER-S	3	1/2	3/16	-	0.039	0.055	11	15		●							MTP90-200-125W MTP90-250-125W
		TPMR 32PDER-H	TPMR 1603PDER-H	3	3/8	1/8	-	1/32	0.047	11	15				●					MTP90-125-75W MTP90-150-75W MTP90-200-75W MTP90-200-R8
		TPMR 43PDER-H	TPMR 2204PDER-H	3	1/2	3/16	-	0.039	0.055	11	15				●					MTP90-200-125W MTP90-250-125W
	 Without Chipbreaker	TPG 181505 18151	TPGN 090202 090204	3	7/32	0.094	-	0.008 1/64	-	11	-					● ●		● ●	●	-
		TPG 2205 221 222	TPGN 110302 110304 110308	3	1/4	1/8	-	0.008 1/64 1/32	-	11	-					● ● ●		● ● ●	 ● ●	MTP90-075-75W MTP90-100-75W
		TPG 321 322	TPGN 160304 160308	3	3/8	1/8	-	1/64 1/32	-	11	-			●		● ●		● ●	● ●	MTP90-125-75W MTP90-150-75W MTP90-200-75W MTP90-200-R8
	 Without Chipbreaker	TPM 221 222	TPMN 110304 110308	3	1/4	1/8	-	1/64 1/32	-	11	-					● ●				MTP90-075-75W MTP90-100-75W
		TPM 321 322 323	TPMN 160304 160308 160312	3	3/8	1/8	-	1/64 1/32 3/64	-	11	-					● ●	●			MTP90-125-75W MTP90-150-75W MTP90-200-75W MTP90-200-R8
		TPM 432	TPMN 220408	3	1/2	3/16	-	1/32	-	11	-						●			-

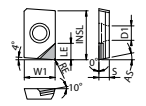
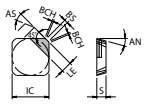
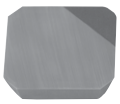
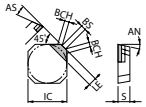
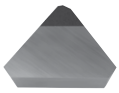
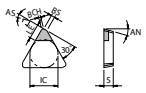
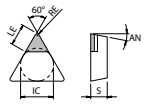
Right-hand Shown

T-Type inserts are sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

PCD Inserts

Usage Classification		
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (Hardness 45HRC or less)	Carbon steel / Alloy steel	P
	Mold and die steel	
	Austenitic stainless steel	M
	Martensitic stainless steel	
	Precipitation hardened stainless steel	
	Gray cast iron	K
	Nodular cast iron	
	Non-ferrous metals □ ■	N
	Heat-resistant alloy	S
	Titanium alloy □ ■	
	Hard materials	H

Insert		Part Number ANSI	Part Number ISO	No. of Edges	Dimensions (in)									Angle (°)		PCD			Applicable Toolholder
					IC	W1	S	D1	RE	INSL	LE	BCH	BS	AN	AS	-			
																KPD001	KPD010	KPD230	
		NDCW 3205FRX 3205FRX-NE	NDCW 150302FRX 150302FRX-NE	1	-	3/8	1/8	0.173	0.008	0.591	0.224 0.201	-	-	-	15	● ●	●	● ●	DMC...SX(...) DMC...H
		SDKN 42AUFN	SDKN 1203AUFN	1	1/2	-	1/8	-	-	-	0.142	0.020	0.047	15	23	●			-
		SEEN 42AFFN	SEEN 1203AFFN	1	1/2	-	1/8	-	-	-	0.138	0.020	0.055	20	25	●	●		-
		TEEN 32PTFR 32PTFR-NE	TEEN 1603PTFR 1603PTFR-NE	1	3/8	-	1/8	-	-	-	0.185 0.161	0.024	0.055	20	22	●	●	 ●	-
		TEKN 43PTFR 43PTFR-NE	TEKN 2204PTFR 2204PTFR-NE	1	1/2	-	3/16	-	-	-	0.189 0.165	0.028	0.071	20	22	●	●	 ●	-
		TPG 2205 221	TPGN 110302 110304	1	1/4	-	1/8	-	0.008 1/64	-	0.154 0.146	-	-	11	-	● ●	● ●	 ●	MTP90-075-75W MTP90-100-75W

Right-hand Shown

PCD Inserts are sold in 1 piece boxes

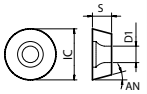
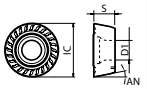
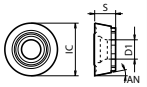
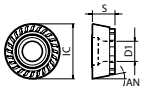
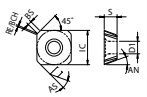
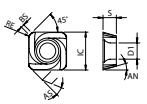
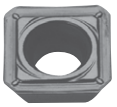
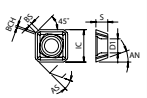
● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Additional Geometries (with Hole)

Usage Classification

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

Carbon steel / Alloy steel		☆			★	☆		■		P
Mold and die steel		☆			★	☆		■		P
Austenitic stainless steel		☆			☆	★				M
Martensitic stainless steel						☆				M
Precipitation hardened stainless steel						★				M
Gray cast iron	☆			★			☆			K
Nodular cast iron	☆			★						K
Non-ferrous metals							★			N
Heat-resistant alloy						☆				S
Titanium alloy						★				S
Hard materials										H

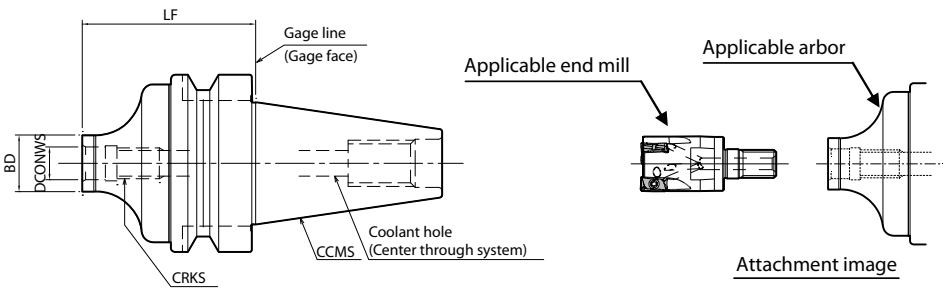
Insert		Part Number ANSI	Part Number ISO	Dimensions (in)						Angle (°)		Carbide						Cermet		Applicable Toolholder
				IC	S	D1	RE	BCH	BS	AN	AS	PVD					-	-		
												PR1210	PR1225	PR1230	PR1810	PR1825	PR1835	KW10	TN100M	
		(Use ISO Part Number)	RDHX 0702M0T	0.276	0.094	0.110	-	-	-	15	-						●			-
			RDHX 1003M0T	0.394	0.125	0.150	-	-	-	15	-						●			
			RDHX 12T3M0T	0.472	0.156	0.150	-	-	-	15	-						●			
	 Tough Edge	(Use ISO Part Number)	RDMT 08T2M0-H	0.315	0.109	0.134	-	-	-	15	-				●		●	●		-
	 Low Cutting Force	(Use ISO Part Number)	RPMT 10T3M0	0.394	0.156	0.134	-	-	-	11	-				●		●	●		-
			RPMT 1204M0	0.472	0.187	0.173	-	-	-	11	-				●		●	●		
	 Tough Edge	(Use ISO Part Number)	RPMT 1204M0-H	0.472	0.187	0.173	-	-	-	11	-				●		●	●	●	-
			RPMT 1606M0-H	0.630	0.250	0.217	-	-	-	11	-				●		●	●	●	
			RPMT 2006M0-H	0.787	0.250	0.256	-	-	-	11	-				●		●	●		
		(Use ISO Part Number)	SDKW 1204AESN	0.500	0.187	0.217	0.039	-	0.059	15	20		●							-
			SDKW 1204AETN	0.500	0.187	0.217	0.039	-	0.059	15	20	●								
		SEKW 43AFTN	SEKW 1204AFTN	0.500	0.187	0.217	-	0.020	0.067	20	25	●	●						●	
		(Use ISO Part Number)	SDMT 1204AESR-H	0.500	0.187	0.217	0.039	-	0.031	15	20					●				-
		SEKT 43AFEN-S	SEKT 1204AFEN-S	0.500	0.187	0.217	-	0.020	0.067	20	25		●						●	-

Right-hand Shown

linserts are
sold in 10 piece boxes

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

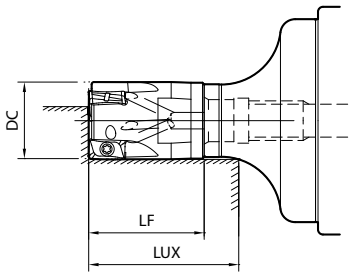
BT Arbor (for modular head / double-face clamping spindle)

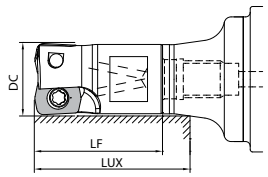


Dimensions

Unit	Part Number		Std. Item	Dimensions				Coolant Hole	Arbor (Double-Face Clamping)	Applicable Modular Head End MIII MA90, MEW, MEC, MEV, MFH-RAPTOR, MFH-MAX, MFH-Mini, MFH-Micro, MRX
				LF	BD	DCONWS	CRKS		CCMS	
mm	BT30K-	M08-45	●	45	14.7	8.5	M8×1.25	Yes	BT30	(MEW/MEC/MFH/MRX)..-M08-..
		M10-45	●		18.7	10.5	M10×1.5			(MA90/MEW/MEC/MEV/MFH/MRX)..-M10-..
		M12-45	●		23	12.5	M12×1.75			(MA90/MEW/MEC/MEV/MFH/MRX)..-M12-..
	BT40K-	M08-55	●	55	14.7	8.5	M8×1.25	Yes	BT40	(MEW/MEC/MFH/MRX)..-M08-..
		M10-60	●	60	18.7	10.5	M10×1.5			(MA90/MEW/MEC/MEV/MFH/MRX)..-M10-..
		M12-55	●	55	23	12.5	M12×1.75			(MA90/MEW/MEC/MEV/MFH/MRX)..-M12-..
		M16-65	●	65	30	17	M16×2.0			(MA90/MEW/MEC/MEV/MFH/MRX)..-M16-..

Actual End Mill Depth



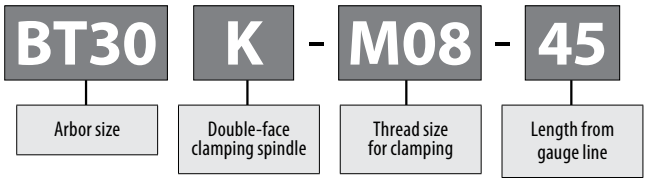


(MFH16-M08-01...)

Arbor Part Number		Unit	Applicable Modular End Mill (Head)			Actual End Mill Depth
			Part Number	Cutting Dia.	Dimensions	LUX
				DC	LF	
BT30K-	M08-45	Inch	MFH0625-M08-03... (MFH-Micro)	0.625	0.984	1.252
		mm	MFH16-M08-01... (MFH-Micro)	16	22	28.8
			...16-M08-...	16	25	31.8
			...17-M08-...	17		33.2
			...18-M08-...	18		34.2
	M10-45	Inch	...0750-M10-...	0.750	1.181	1.449
		mm	...20-M10-...	20	30	36.8
			...22-M10-...	22		39.2
	M12-45	Inch	...1000-M12-...	1.000	1.378	1.685
		mm	...25-M12-...	25	35	42.8
			...28-M12-...	28		45.5
BT40K-	M08-55	mm	MFH16-M08-01... (MFH-Micro)	16	22	28.7
			...16-M08-...	16	25	31.7
			...17-M08-...	17		33.2
			...18-M08-...	18		34.3
	M10-60		...20-M10-...	20	30	38.7
			...22-M10-...	22		44.5
	M12-55		...25-M12-...	25	35	44.6
			...28-M12-...	28		47.6
	M16-65	Inch	...1250-M16-...	1.250	1.575	2.016
		mm	...32-M16-...	32	40	51.2
			...35-M16-...	35		60.2
			...40-M16-...	40		64

● : Standard Item □ : Made to Order △ : Phaseout Item (will be removed from next catalog)
Contact your local Kyocera sales engineer to upgrade old products to new technology

Arbor Identification System



How to Attach Modular Head End Mill

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.

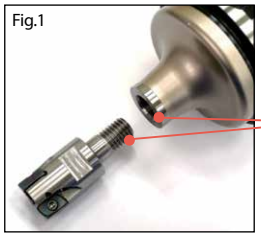
2. Attach the head on the arbor and fix it using the wrench (Fig. 2).
   See Table 1 for Recommended Torque.
   Note) The wrench is NOT included with product.

Table 1. Recommended Head Tightening Torque

Thread Dia. Tolerance	Wrench Width Across Flat (mm)	Recommended Torque (Nm)
M8	12	23
M10	15	46
M12	19	80
M16	24	90

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

Fig.1

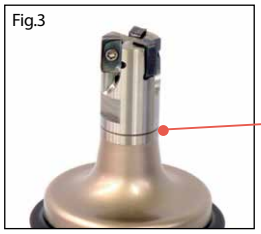


Ensure there are NO chips between the arbor and head.

Fig.2

See Table 1 for wrench size and recommended torque

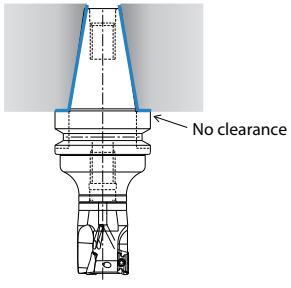
Fig.3



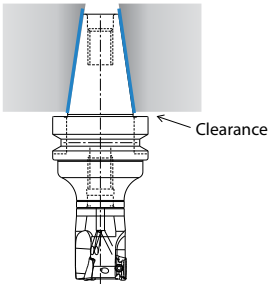
No space in between

Standard BT Spindle Mounting

The double-face clamping arbor can be mounted on a general BT spindle and used like a standard BT arbor; however, its double-face clamping advantages will not be fully realized on a general BT spindle.



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



Double-face clamping arbor mounted on general spindle