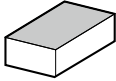
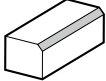
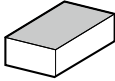
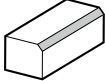


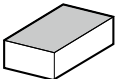
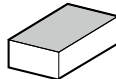
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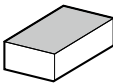
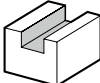
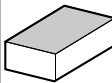
Introduction		M2
Cutting edge angle 45°/ 66°/ 70°		M12
MB45		M12
MFPN45 / MFPN66		M22
MFSE45		M36
MFLN45 / 70		M42
MFK		M48
Cutting edge angle 75°		M58
MSRS15		M58
Cutting edge angle 88°/90°		M62
MA90		M62
MEW		M74
MEC / MECX		M86
MEV		M104
MEWH		M112
MECH / MECHT		M116
MFWN / MFWN-Mini		M130
MFSN88		M144
MFLN90		M150
MSRS90		M156
MSR		M163
DMC-SX / DMC-H		M170
MFAH	High efficiency milling cutter for aluminum alloys	M174
MEAS	End mill for aluminum alloys machining, high efficiency end mill	M184
Cutter for finishing		M190
MFF		M190
High feed cutter		M196
MFH Harrier		M196
MFH Boost		M208
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Ball-nose / Radius type cutters		M258
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MCSE	Chamfering end mill	M280
MEF	Bolt countersink end mill	M283
METS	T-Slot mill	M287
MGI	Grooving end mill for M/C	M290
MVG	Ring grooving end mill for M/C	M292
Other inserts		M294

Cutting edge angle 45°/66°/75°

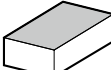
Cutting edge angle	Applications	Facing	Chamfering	Cutting edge angle	Applications	Facing	Chamfering
							
Shape				Shape			
45°	 MB45 • Economical double-sided 8-edge insert • Delivers the "low cutting force" benefits of positive inserts and the "fracture resistance" benefits of negative inserts • End mills have ø32 cylindrical shank M16~M18			45°	 MFLN45 • For heavy milling • Tough 4-edge vertical inserts • For large depths of cut and high feed rates • Max. ap 12 mm M44		
	 MFPN45 • 10-edge pentagonal inserts (double-sided) • Low cutting force with helical cutting-edge design • Dual cutting edge design (High toughness) • End mills have ø32 cylindrical shank M22~M25						
	 MFSE45 • Roughing condition (fz = 0.25 mm/t) Provides Excellent surface finish (0.8 µmRa or less) * (*Based on internal evaluation with wiper insert installed.) • Maintains long tool life with high-precision inserts • Newly developed chipbreakers for steel, stainless steel, and aluminum • Improved productivity with excellent chip control With Wiper Insert M38						

Cutting edge angle	Applications	Facing	Cutting edge angle	Applications	Facing
					
Shape			Shape		
66°	 MFPN66 • Double-sided 10-edge insert • Cutting edge angle 66° • Reduces chattering with low cutting force design • End mills have ø32 cylindrical shank M31~M33		70°	 MFLN70 • For heavy milling • Tough 4-edge vertical inserts • For large depths of cut and high feed rates • Max. ap 17 mm M45	
	 MSRS15 • For heavy milling • Max. ap 12 mm • High chip evacuation rate per unit M59			 MFK • 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) M50	
75°				 MFK-SF • For cast iron • Adjustable cutting edge height • High speed and high precision machining of cast iron by combining ceramic insert and CBN wiper insert M52	

Cutting edge angle 88°/90° (Double-sided insert)

Cutting edge angle	Applications			Cutting edge angle	Applications							
	Shape	Facing	Shouldering		Slotting	Shape	Facing	Shouldering	Slotting			
90°	MA90	• Economical double-sided 4-edge insert • Original tangential 90° end mill • Newly designed inserts high quality surface finish and excellent wall accuracy • Supports multi-functional machining such as 3D milling				MFWN	• 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 ø32 cylindrical shank					
	 ➡ M66~M68					 ➡ M131, M132, M134						
	MA90 head (Modular type)					MFWN Mini					 ➡ M139, M140	• 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 • End mills have ø25, ø32 cylindrical shank
	MEW					 ➡ M76~M78					 ➡ M145, M147	• Economical double-sided 4-edge insert • Obtuse edge increases cutting edge toughness • Smooth surface wall with low cutting force and reduced chattering • Economical double-sided 8-edge insert • Reduces chattering with low cutting force design • Contribute to cost-cutting for Shoulder Roughing • End mills have ø32, ø40 cylindrical shank
	MEW head (Modular type)	 ➡ M79										

Cutting edge angle 90°

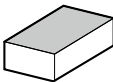
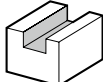
Cutting edge angle	Applications	Facing	Shouldering	Slotting	Cutting edge angle	Applications	Facing	Shouldering	Slotting
	Shape					Shape			
90°	MEC  ➡ M86~M89	• Good squareness • Low cutting force • The silver coating prevents chip wear on the tool body • With coolant hole (Over shank size $\phi 16$) • The twisted cutting edge improves cutting performance • Smooth surface of shoulder wall			90°	MEV  ➡ M106, M107	• Newly developed vertical triangle inserts • Economical 3-edge insert • The MEV can perform a wide variety of machining processes		
	MEC head (Modular type)  ➡ M90					MEV head (Modular)  ➡ M108			
	MECX  ➡ M98, M99					DMC-H  ➡ M171	• High Rake • For small milling machine and M/C		
						DMC-SX  ➡ M170	• For small milling machine and M/C		



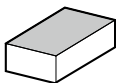
Cutting edge angle 90° (Heavy milling)

Cutting edge angle	Applications				Cutting edge angle	Applications			
	Shape	Facing	Shouldering	Slotting		Shape	Facing	Shouldering	Slotting
90°(Long cutting edge)	MEWH	• 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			90°(Long cutting edge)	MECH	• Notched insert improves higher productivity		
	MEWH shell mill	• MEWH shell mill				MECH shell mill	• MECH shell mill		
	MSRS90	• High efficiency, low cutting force and stable machining without chatter • Various expansive possibilities with combining neutral insert and custom-ordered cutter				MECH-BT50 MECH-BT50SA	• Highly rigid BT50 Arbor integrated for MECH • Head exchangeable type is available (MECH-BT50SA)		
	MSR	• Low cutting force and restrain chattering with notched insert • Chipbreaker design with specialized notches improves chip evacuation • Chipbreaker achieves stabilized machining for heavy milling				MECHT	• Excellent chattering resistance and good chip control with special design for titanium alloys • End mills have ø32, cylindrical shank		
	MSR-BT50	• Highly rigid BT50 Arbor integrated for MSR							
	MFLN90	• 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							

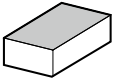
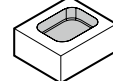
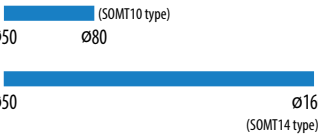
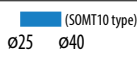
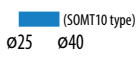
Cutting edge angle 90°
(For aluminum alloys)

Cutting edge angle	Shape	Applications		
		Facing	Shouldering	Slotting
				
90°	MFAH	• 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		
				
	➡ M176~M178			
	MEAS	• High efficiency milling cutter for finishing aluminum alloys • Excellent scatter prevention to ensure stable		
				
	➡ M186			

For finishing operations

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

High feed cutter

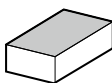
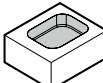
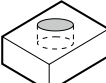
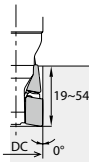
Applications Shape	Facing	Shouldering	Slotting	Pocketing	Cutting diameter DC
					
MFH Harrier (Face mill)  ➔ M198,M199	Various applications with 4 types of inserts  GM type (General purpose)  GH type (Tough edge)  LD type (Large D.O.C.) MAX. ap = 5mm  FL type (With wiper edge) Roughing and finishing				ø8 ø16 ø25 ø32 ø40 ø50 ø80 ø160  (SOMT10 type)  (SOMT14 type)
MFH Harrier (End mill)  ➔ M200,M201					 (SOMT10 type)  (SOMT14 type)
MFH Harrier (Modular type)  ➔ M202					 (SOMT10 type)
MFH Boost (Face mill)  ➔ M212	- Economical double-sided 4-edge insert - High feed milling with large depth of cut capabilities  GM type (General purpose)				
MFH Boost (End mill)  ➔ M211					
MFH Boost (Modular type)  ➔ M213					
MFH mini (Face mill)  ➔ M219	Economical double-sided 4-edge insert  GM type (General purpose)  GH type (Tough edge)				
MFH mini (End mill)  ➔ M218					
MFH mini (Modular type)  ➔ M220					
MFH micro (end mill)  ➔ M226	- Micro diameter cutter for high feed machining - High efficiency machining with low cutting force and reduced chattering 				
MFH micro (modular type)  ➔ M227					

M

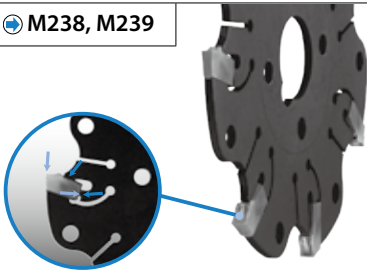
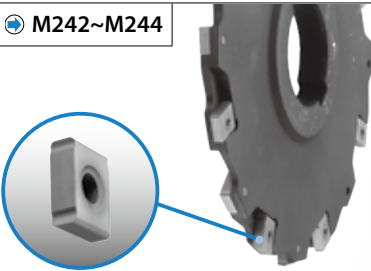
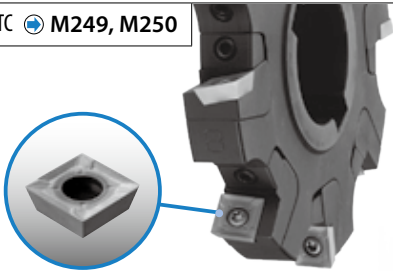


Milling

Multi-function machining end mill

Applications	Shape						Lead angle and max. ap	Cutting dia. DC				
	Facing	Shouldering	Slotting	Deep slotting	Pocketing	Drilling						
MEY							 	• 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		

Slot mill MST

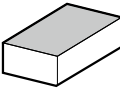
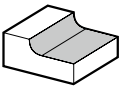
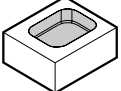
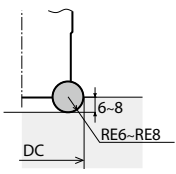
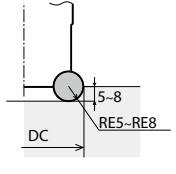
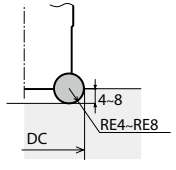
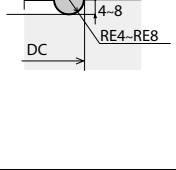
MSTA M238, M239	MSTB M242~M244	MSTC M249, M250
		
• Self-clamping type • Remove insert with appropriate wrench	• Easy screw on tangential clamped insert	• Adjustable slotting width due to unique cam adjustment structure

M

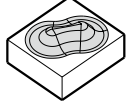
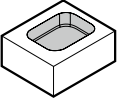
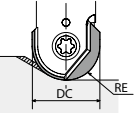
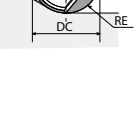


Milling

Radius

Applications Shape	Facing	Shouldering	Pocketing	Lead angle and max. ap	Cutting dia. DC
					
MRW  M264 M266	- 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				 ø32 ø125
MRX face mill  M271	- 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				 ø40 ø125
MRX end mill  M274	Wide application range from steel to heat-resistant alloys				 ø16 ø63
MRX head (Modular type)  M275					 ø16 ø40

Ball-nose end mill

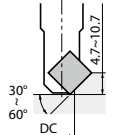
Applications Shape	Contouring/Profiling	Pocketing	Lead angle and max. ap	Cutting dia. DC
				
MRF  M258	- For high quality mold finishing - High R-accuracy (Insert's R-accuracy: ±0.01mm or under) - The bushing ensures insert installation accuracy			 ø8 ø25
MRFW  M259	- Carbide shank - For high quality 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			 ø8 ø12

M

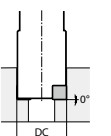


Milling

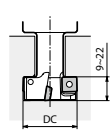
Chamfering

Applications		Chamfering	Back chamfering	V shape slotting	Countersinking	Lead angle and max. ap
Shape						
MCSE	 ➡ M280	- For 30°, 45°, 60° chamfering - Economical 4-edge insert - Available back chamfering				

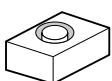
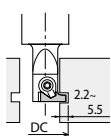
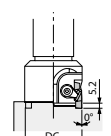
Bolt countersinking

Applications		Bolt countersinking	Facing	Shouldering	Lead angle and max. ap
Shape					
MEF	 ➡ M284	- Countersink for hexagon socket bolt (M6 ~ M30) - Economical 4-edge insert			

T-Slotting

Applications		T-Slotting	Back side milling	Lead angle and max. ap
Shape				
METS	 ➡ M287	- T-Slotting - Recommended for high feed machining with 2 flute design - Economical 4-edge insert		

Grooving

Applications		Internal grooving	Ring grooving	Lead angle and max. ap
Shape				
MGI	 ➡ M290	- Edge width 1.0 ~ 4.0mm - Grooving for M/C		
MVG	 ➡ M292		- Cutting dia. $\phi 30 \sim \phi 75$ - Edge width 4.0 ~ 4.9mm - O-Ring grooving	

M

Milling

Milling inserts identification system

Symbol	Shape
H	Hexagon
O	Octagon
P	Pentagon
S	Square
T	Triangle
C	80° Rhombic
D	55° Rhombic
E	75° Rhombic
F	50° Rhombic
M	86° Rhombic
V	35° Rhombic
W	Trigon
L	Rectangle
A	85° Parallelogram
B	82° Parallelogram
K	55° Parallelogram
R	Round
Shown angle stands for acute angle for rhombic and parallelogram inserts.	
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 (mm)			
	Corner Height	Thickness	I.C. Size	
A	±0.005	±0.025	±0.025	
F			±0.013	
C			±0.025	
H			±0.013	
E	±0.025	±0.13	±0.025	
G				
J	±0.005	±0.025	±0.05~±0.15	
K*	±0.013			
L*	±0.025			
M*	±0.08~±0.18			±0.13
N*				±0.025
U*		±0.13~±0.38		
	±0.13	±0.13		±0.08~±0.25
Insert's periphery is as fired.				
* Tolerance difference is depending on insert size.				
Tolerance				

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

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

S E K N 12 03 A F T N -

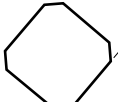
Edge length

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



A technical drawing of a trapezoidal insert. The insert has a wider top edge and a narrower bottom edge, with vertical side walls. To the right of the insert, a vertical dimension line with arrows at both ends is labeled with the letter 'S', indicating the thickness of the insert.

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



The diagram shows a hexagonal insert with a cutting edge. A horizontal line represents the workpiece surface. An arrow points to the cutting edge, and a curved arrow indicates the angle between the cutting edge and the horizontal line, labeled KAPR.

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°



The diagram shows a side view of a cutting tool. The tool has a vertical flank face on the left, a horizontal base, and a top rake face. The angle between the flank face and the top rake face is labeled AS with a curved arrow. The top rake face is a straight line sloping upwards from the base to the cutting edge.

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

Manufacturer's option
Chipbreaker, etc.

In case of indicating corner-R(RE)

Corner-R (RE) (mm)		
04	0.4	
08	0.8	
12	1.2	
16	1.6	
20	2.0	

M



Milling

New 45° General purpose milling series

MB45

Provides high quality and high performance machining solutions with long tool life
Delivers the “low cutting force” benefits of positive inserts and the “fracture resistance” benefits of negative inserts, and provides excellent surface finish

1

“Versatility” + “Quality” Large insert lineup

Supports a wide variety of machining applications

Five types of inserts for various machining applications

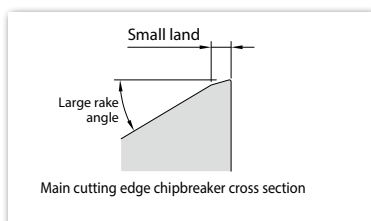
Economical inserts with 8 cutting edges

General purpose GM insert with E-Class and M-Class options based on required machining accuracy

Low cutting force **SM** (E-Class)



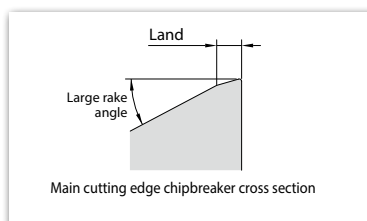
Sharpness oriented with a low cutting force design
-10% cutting resistance compared to general purpose GM insert
Recommended for small machines (BT30)



General **GM** (E-Class / M-Class)



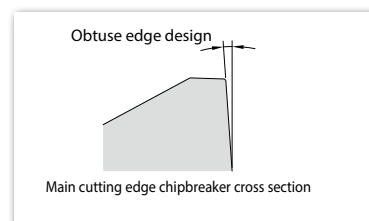
1st recommendation for steel machining
Low cutting force and fracture resistance
E-Class or M-Class selectable



Tough edge **GH** (M-Class)

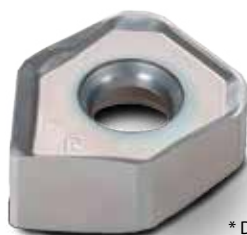


Tough cutting edge and excellent fracture resistance
Obtuse edge design is resistant to chipping
Recommended for intermittent machining



Wiper insert **W** (E-Class)

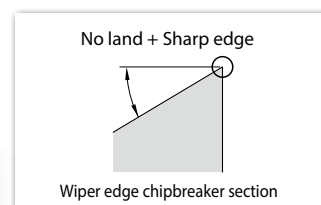
Ultra-long wiper edge (Wiper edge length approx. 8 mm)



* Double-sided
2-edge insert

for Aluminum Alloys **AM**

No land + Sharp edge specifications
Excellent sharpness



M

Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

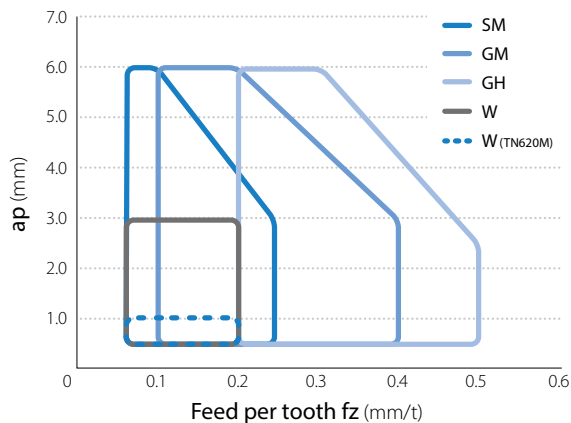
Slot Mill

Ball-nose
Radius

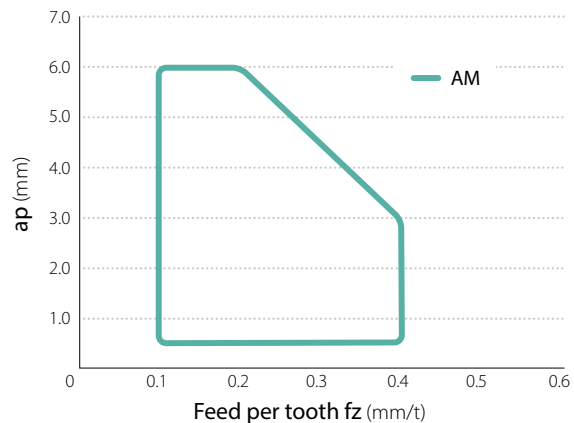
Others

Applicable insert range

Steel



Aluminum alloy



When to use GM (Class E/M)

Selection by machining application

Surface finish 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 $\pm 0.013\text{mm}$	Inscribed circle tolerance $\pm 0.005\text{mm}$	Inscribed circle tolerance $\pm 0.013\text{mm}$
Surface finish	○ Approx. $1.6\mu\text{mRa}$	△ Approx. $3.2\mu\text{mRa}$	⊙ Approx. $0.8\mu\text{mRa}$ or less
(Gloss)	(○)	(⊙)	(⊙)
Machining efficiency	○	○	⊙
Economy	○	⊙	△

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



M



Milling

Toolholder Lineup

Coarse pitch	Fine pitch	Extra fine pitch	Shank type
Recommended for workpieces or machines with low rigidity (such as sheet machining or BT30) Economical	<u>1st recommendation</u> Good balance of stability, machining accuracy and efficiency Supports a wide range of machining areas	Recommended for high rigid workpiece and machine	Compatible with milling chucks (face mill recommended basically) *Shank size: $\phi 32$
Cutting diameter $\phi 80$ to $\phi 315$ (inch spec) Cutting diameter $\phi 40$ to $\phi 315$ (metrics) * $\phi 315$: Made to order	Cutting diameter $\phi 80$ to $\phi 315$ (inch spec) Cutting diameter $\phi 40$ to $\phi 315$ (metrics) * $\phi 315$: Made to order	Cutting diameter $\phi 80$ to $\phi 250$ (inch spec) Cutting diameter $\phi 40$ to $\phi 250$ (metrics)	Cutting diameter $\phi 40$ to $\phi 80$

2

"Versatility" + "Long tool life" Large lineup of insert grades

Steel, stainless steel, cast iron, heat-resistant alloys to aluminum alloy machining

For steel, stainless steel and cast iron

PR1825/PR1835/PR1810 New development MEGACOAT NANO EX

PR1825

P

PR1835

M

PR1810

K

For Steel (Wear resistance oriented)

For Steel (Stability oriented)

For Cast iron

1st Recommendation for stainless steel

Workpiece	P Steel					M Stainless steel					K Cast iron				
ISO	01	10	20	30	40	01	10	20	30	40	01	10	20	30	40
Grade			Wear resistance oriented PR1825				1st Recommendation PR1835				1st Recommendation PR1810				
			Stability oriented PR1835												

For hardened material

For steel Surface finish oriented

PR015S MEGACOAT HARD
PVD coating

TN620M Cermet

For stainless steel and heat-resistant alloys

For aluminum machining

CA6535 CVD coating

PDL025 DLC coating

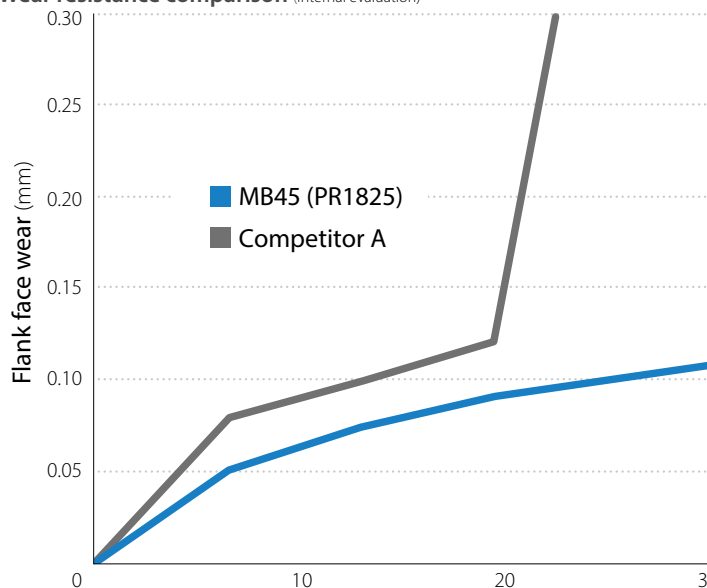
GW25 Non-coated carbide

M

Milling

PR1825 with PVD coating MEGACOAT NANO EX provides long tool life

Wear resistance comparison (Internal evaluation)



Cutting edge condition (after 20 min machining)

MB45(PR1825)



Competitor A

Cutting conditions: $V_c = 120$ m/min, $a_p = 2.0$ mm, $a_e/DC = 80\%$, $f_z = 0.20$ mm/t, Dry, Workpiece material: SKD11, $\phi 125$ BT50

3

"Versatility" + "High Performance" New design utilizes unique technology

Low cutting force and excellent fracture resistance with excellent surface finish

Low cutting force and excellent fracture resistance

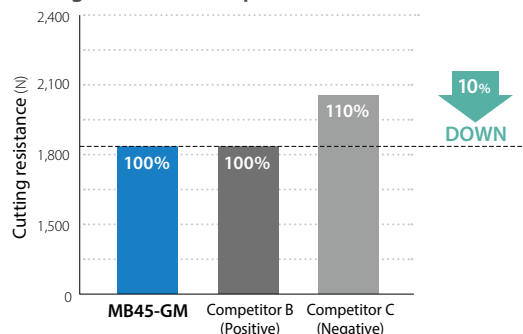
A unique helical cutting edge



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

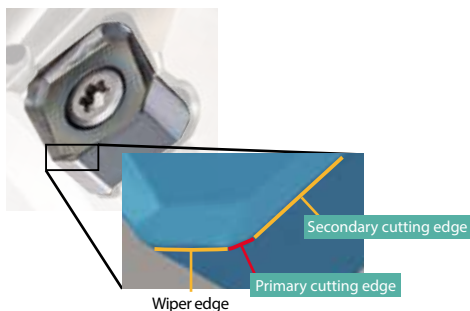
Unique helical cutting edge and double-edge structure

Cutting resistance comparison (Internal evaluation)



Cutting conditions: $V_c = 180$ m/min, $a_p = 3.0$ mm, $a_e/DC = 80\%$ Center cut, $f_z = 0.30$ mm/t, Workpiece material: S50C

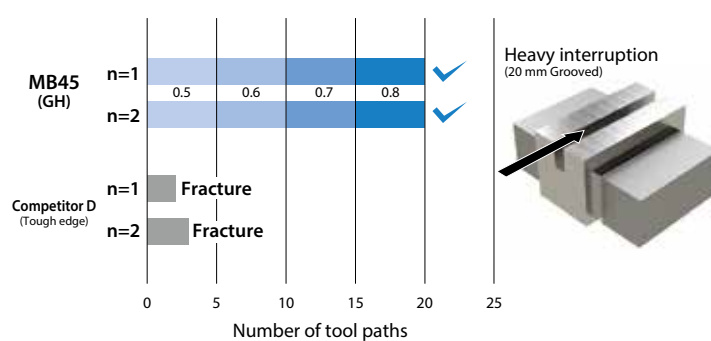
Double edge structure



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

Fracture resistance comparison (Internal evaluation)

$f_z = 0.5 \sim 0.8$ mm/t



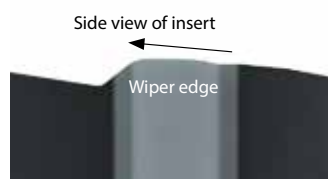
Cutting conditions: $V_c = 100$ m/min, $a_p \times a_e = 2 \times 100$ mm Center cut, BT50
Workpiece material: SCM440HT $\phi 125$ (10 inserts)

High quality

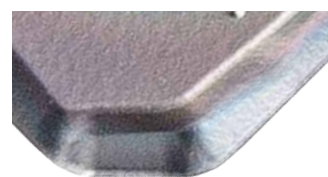
Long arc wiper edge utilizing unique technology

Unique long arc wiper edge

Reduces variation in mounting accuracy and provides superior finished surface quality

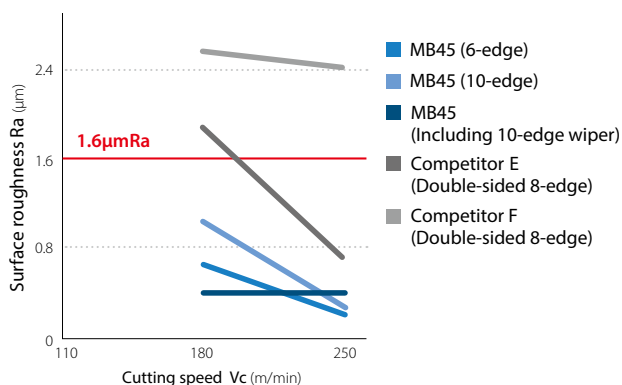


Convex curved shape with wiper edge protruding upward
*GM/SM/AM (E-Class)



Complex arc shape

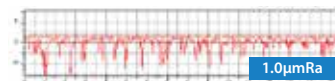
Surface roughness comparison (Internal evaluation)



Cutting conditions: $a_p \times a_e = 1 \times 100$ mm (Center cut), $f_z = 0.20$ mm/t, Dry
Workpiece material: S50C $\phi 125$ (6 inserts/10 inserts) GM (PR1825) BT50

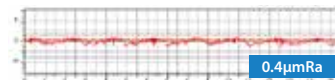
Finishing surface condition ($V_c = 180$ m/min)

MB45(10-edge)



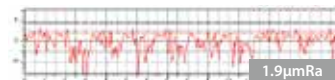
MB45

(Including 10-edge wiper)



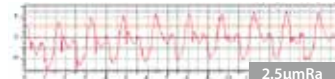
Competitor E

(Double-sided 8-edge)



Competitor F

(Double-sided 8-edge)



Proprietary long arc wiper edge provides excellent finishing surface quality

M



Milling

MB45 (Face mill)

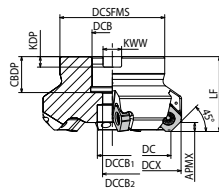


Fig. 1

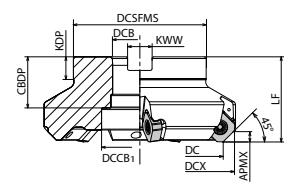


Fig. 2

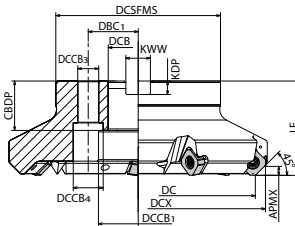


Fig. 3

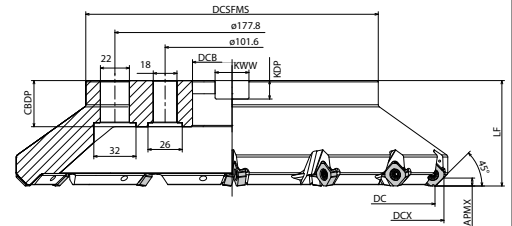


Fig. 4

Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)														A.R. max.(°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts ➡ M20					
					R	DC	DCX	DCSfMS	DCB	DCCB1	DCCB2	DCCB3	DCCB4	DBC1	LF	CBDP	KDP	KWW								APMX				
Metric	Coarse pitch	MB45- 040R-14T2C-M	●	2	40	54	38	16	13.5	9				40	19	5.6	8.4	6	+13	-12	Yes	12700	0.4	1	SN=U1406...					
		050R-14T3C-M	●	3	50	64	48	22	18	11					21	6.3	10.4					11400	0.5							
		063R-14T4C-M	●	4	63	77	50															10100	0.7							
		080R-14T5C-M	●	5	80	94	70	27	20	13	50	24	7	12.4							9000	1.4	2							
		100R-14T5C-M	●		100	114	78	32	45	30		8	14.4	8000	1.9															
		125R-14T6C-M	●	6	125	139	89	40	55					33	9	16.4	7200				3.2									
		160R-14T7-M	●	7	160	174	110				14						20				66.7	63		6300		5.1	3			
		200R-14T8-M	●	8	200	214	142	60	110	18		26	101.6										35	14		25.7		5700	7.3	
		250R-14T10-M	●	10	250	264								18	26	101.6												35	14	25.7
		315R-14T14-M	MTD	14	315	329	222	-	-		-						80				4500	19.4								
	Fine pitch	MB45- 040R-14T3C-M	●	3	40	54	38	16	13.5	9				50	19	5.6	8.4	6	+13	-12	Yes	12700	0.3	1	SN=U1406...					
		040R-14T3C-22M	●				47	12	-	21					6.3	10.4	11400					0.5								
		050R-14T4C-M	●	4	50	64	48	22	18					11			40					24	7			12.4	10100	0.6		
		063R-14T5C-M	●	5	63	77	50	-	-	-	50	30	8	14.4	9000	1.4					2									
		080R-14T6C-M	●	6	80	94	70								27	20								13			33	9	16.4	8000
		100R-14T8C-M	●	8	100	114	78								32	45	40					55	63	35		14				25.7
		125R-14T10C-M	●	10	125	139	89	40	55	14	20	66.7	63	35	14	25.7														
		160R-14T12-M	●	12	160	174	110														142						60	110	18	
		200R-14T14-M	●	14	200	214	142	60	110								18					26	101.6	35		14				25.7
		250R-14T16-M	●	16	250	264				18	26	101.6	35	14	25.7	4500					19.2						4			
	315R-14T18-M	MTD	18	315	329	222	-	-	-							80														
	Extra fine pitch	MB45- 040R-14T4C-M	●	4	40	54	38	16	13.5	9							50	19	5.6	8.4	6	+13	-12	Yes	12700	0.3	1	SN=U1406...		
		040R-14T4C-22M	●				47	22	12	-			21	6.3	10.4			11400	0.4											
		050R-14T5C-M	●	5	50	64	48	22	18	11							40	24	7	12.4					10100	0.6				
		063R-14T6C-M	●	6	63	77	50	-	-	-	50	30	8	14.4	9000	1.3								2						
		080R-14T8C-M	●	8	80	94	70								27	20									13	33	9		16.4	8000
		100R-14T10C-M	●	10	100	114	78								32	45	40	55	63	35					14					25.7
		125R-14T13C-M	●	13	125	139	89	40	55	14	20	66.7	63	35	14	25.7														
		160R-14T16-M	●	16	160	174	110																	142		60	110		18	
		200R-14T18-M	●	18	200	214	142	60	110								18	26	101.6	35					14					25.7
250R-14T20-M		●	20	250	264																									

● : Standard item MTD : Made to order

Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)																A.R. max.(°)	R.R.(°)	Coolant hole	Max.revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts ➡ M20
					R	DC	DCX	DCSFW	DCB	DCCB1	DCCB2	DCCB3	DCCB4	DBC1	LF	CBDP	KDP	KWW	APMX								
Bore dia. inch spec	Coarse pitch	MB45-	080R-14T5C	●	5	80	94	70	25.4	20	13				50	27	6	9.5	6	+13	-12	Yes	9000	1.4	1	SN-U1406...	
			100R-14T5C	●		100	114	78	31.75	45					34	8	12.7	8000					2	2			
			125R-14T6C	●	6	125	139	89	38.1	55					10	15.9	7200	3.3	3								
			160R-14T7	●	7	160	174	110	50.8	70				63	11	19.1	6300	5.1		4							
			200R-14T8	●	8	200	214			110				38			5700	7.6	3								
			250R-14T10	●	10	250	264		47.625		18	26	101.6		14	25.4	5100	10.8		4							
			315R-14T14	MT0	14	315	329	222						80			4500	20.4									
			Fine pitch	MB45-	080R-14T6C	●	6	80	94	70	25.4	20	13				50	27	6	9.5	6	+13	-12	Yes	9000		1.4
	100R-14T8C	●			8	100	114	78	31.75	45					34	8	12.7	8000	1.8	2							
	125R-14T10C	●			10	125	139	89	38.1	55					10	15.9	7200	3.1	3								
	160R-14T12	●			12	160	174	110	50.8	70				63	11	19.1	6300	4.9		4							
	200R-14T14	●			14	200	214			110				38			5700	7.4	3								
	250R-14T16	●			16	250	264		47.625		18	26	101.6		14	25.4	5100	10.5		4							
	315R-14T18	MT0			18	315	329	222						80			4500	20.2									
	Extra fine pitch	MB45-			080R-14T8C	●	8	80	94	70	25.4	20	13				50	27	6	9.5				6	+13	-12	Yes
			100R-14T10C	●	10	100	114	78	31.75	45					34	8	12.7	8000	1.8	2							
			125R-14T13C	●	13	125	139	89	38.1	55					10	15.9	7200	3	3								
			160R-14T16	●	16	160	174	110	50.8	70				63	11	19.1	6300	4.8		4							
			200R-14T18	●	18	200	214			110				38			5700	7.2	3								
			250R-14T20	●	20	250	264		47.625		18	26	101.6		14	25.4	5100	10.4									

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.

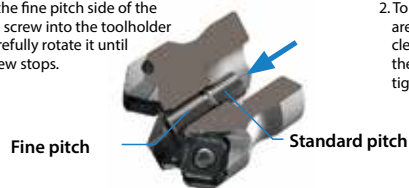
Spare parts

Description		Spare parts			
		Clamp screw	Wrench	Anti-seize compound	Mounting bolt
Face mill	MB45- 040R/050R-14T...-M				HH8X25
	040R/050R-14T...-22M				-
	063R-14T...				W10X31
	080R-14T...				HH10X30
	100R-14T...				HH12X35
	2				-
	315R-14T...				-

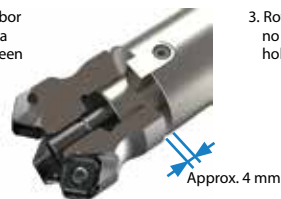
 Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

How to install double screw

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. 4 mm between the holder and arbor before tightening the screws.

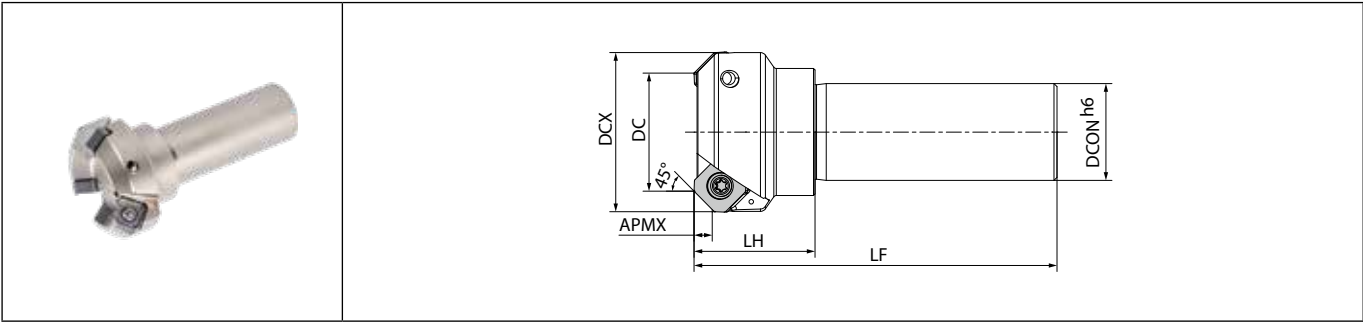


3. Rotate the screw until there is no clearance, and check the holder is attached to the arbor.



● : Standard item MT0 : Made to order

MB45 (End mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)							A.R. max.(°)		R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Spare parts			Applicable inserts ➡ M20
			DC	DCX	DCON	LF	LH	APMX	Anti-seize compound	Screw	Wrench								
MB45- 40S32-14T2C 50S32-14T3C 63S32-14T4C 80S32-14T5C	●	2	40	54	32	120	40	6	+13	-12	Yes		12700	0.9	P-37	SB-50110TRP	TTP-20	SN□U1406...	
	●	3	50	64									11400	1					
	●	4	63	77									10100	1.1					
	●	5	80	94									9000	1.5					
															Tightening torque 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 when insert is fixed.

M

Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

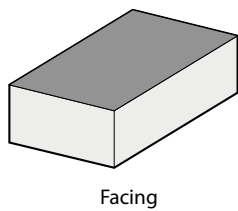
Ball-nose
Radius

Others

● : Standard item

Precautions

Applications



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.

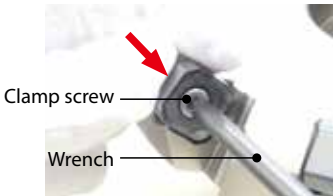
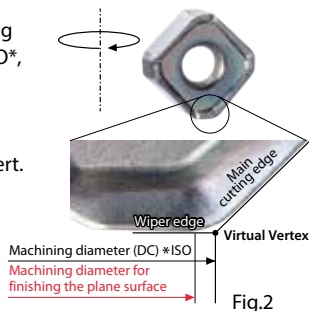


Fig.1

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.



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

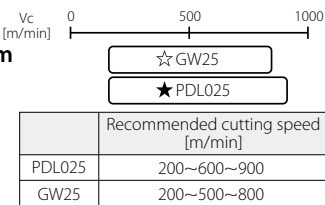
	GM	GH	SM	AM
Difference to machining diameter (DC)	-1.1	-2.0	-1.1	-1.1
Machining diameter (mm) at which the plane surface is finished *Dimensional tolerance $0_{-0.2}$	123.9	123.0	123.9	123.9

* 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

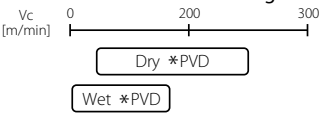
Precautions when machining aluminum

- 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.



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 [mm/rev] 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
$2.0 < f [mm/rev] \leq 4.0$	1 pc	Pocket with "Single dot" (Fig. 3)
$4.0 < f [mm/rev]$	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

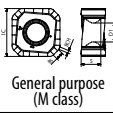
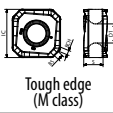
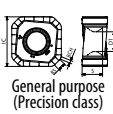
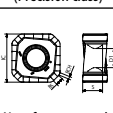
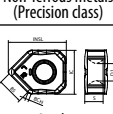
	GM chipbreaker	GH chipbreaker	SM chipbreaker	AM chipbreaker
Wiper insert	✓	Not recommended	✓	Not recommended

- 3. Install the wiper insert correctly as shown in Fig. 5.

* Fig. 6 shows the insert incorrectly attached to the holder.

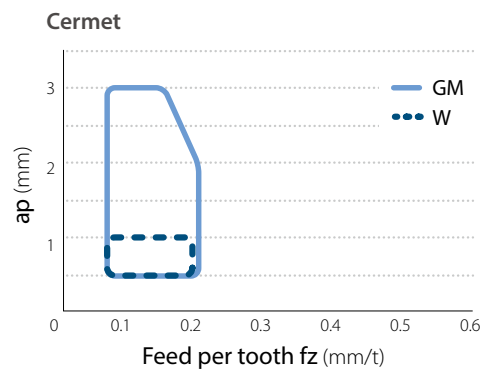
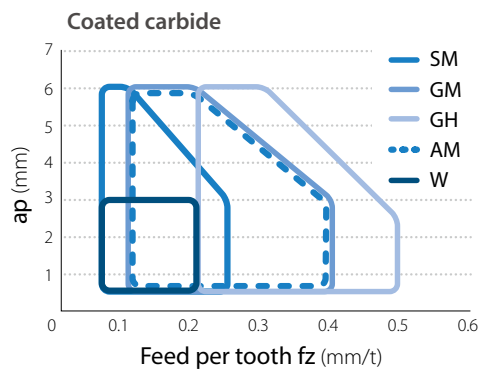


SNMU/SNEU

Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)			Carbon steel / Alloy steel									★	☆	■	P		
			Mold and die steel									★	☆	■			
			Austenitic stainless steel									☆	★		M		
			Martensitic stainless steel						★				☆				
			Precipitation hardening stainless steel										★				
			Gray cast iron									★			K		
			Nodular cast iron									★					
			Non-ferrous metals							★				☆	N		
			Heat-resistant alloy						★				☆				
			Titanium alloy										★		S		
Hard materials								★									
Insert			Description			No. of edges	Dimension (mm)					Carbide				Cermat	Applicable toolholder ➡ M16 M17 M18
							IC	S	D1	BCH	BS	CVD	DLC	PVD			
CA6535	PD1025	PR0155	PR1810	PR1825	PR1835	GW25						TN620M					
	 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 (Precision class)	SNEU	1406ANER-GM	8	14.7	6.07	5.8	0.8	2.3	●			●	●	●	●	MB45-...
	 Low cutting force (Precision class)	SNEU	1406ANER-SM	8	14.7	6.07	5.8	0.8	2.3	●				●	●		MB45-...
	 Non-ferrous metals (Precision class)	SNEU	1406ANFR-AM	8	14.7	6.07	5.8	0.8	2.3		●					●	MB45-...
	 2-edge / With wiper edge	SNEU	1406ANEN-W	2	14.7	6.15	5.8	1.1	8.8	●			●	●	●	●	MB45-...

Recommended cutting conditions ➡ M21

Applicable chipbreaker range



●: Standard item

SNEU1406ANEN-W inserts are
sold in 5 piece boxes

Recommended cutting conditions

Chipbreaker	Workpiece material	fz (mm/t) (): TN620M	Recommended insert grades (Vc: m/min)							
			MEGACOAT (PVD coated carbide)				PVD coated carbide	Cermet	DLC coated carbide	Carbide
			PR1835	PR1825	PR1810	PR015S	CA6535	TN620M	PDL025	GW15
GM	Carbon steel	0.1~ 0.2 ~0.4 (0.06~ 0.12 ~0.20)	☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-	-	★ 200~ 250 ~300	-	-
	Alloy steel	0.1~ 0.2 ~0.4 (0.06~ 0.12 ~0.20)	☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-	-	★ 180~ 220 ~250	-	-
	Mold steel	0.1~ 0.2 ~0.35 (0.06~ 0.08 ~0.15)	☆ 80~ 140 ~180	★ 80~ 140 ~180	-	-	-	★ 150~ 180 ~220	-	-
	Stainless steel (Austenitic related)	0.1~ 0.2 ~0.4	☆ 100~ 160 ~200	☆ 100~ 160 ~200	-	-	-	-	-	-
	Stainless steel (Martensitic related)	0.1~ 0.2 ~0.4	☆ 150~ 200 ~250	-	-	-	☆ 180~ 240 ~300	-	-	-
	Stainless steel (Precipitation hardening)	0.1~ 0.2 ~0.3	★ 90~ 120 ~150	-	-	-	-	-	-	-
	Gray cast iron	0.1~ 0.2 ~0.4	-	-	★ 120~ 180 ~250	-	-	-	-	-
	Nodular cast iron	0.1~ 0.2 ~0.35	-	-	★ 100~ 150 ~200	-	-	-	-	-
	Ni-base heat-resistant alloys	0.1~ 0.12 ~0.2	☆ 20~ 30 ~50	-	-	-	★ 20~ 30 ~50	-	-	-
SM	Carbon steel	0.06~ 0.12 ~0.25	☆ 120~ 180 ~250	☆ 120~ 180 ~250	-	-	-	-	-	-
	Alloy steel	0.06~ 0.12 ~0.25	☆ 100~ 160 ~220	☆ 100~ 160 ~220	-	-	-	-	-	-
	Mold steel	0.06~ 0.1 ~0.2	☆ 80~ 140 ~180	☆ 80~ 140 ~180	-	-	-	-	-	-
	Stainless steel (Austenitic related)	0.06~ 0.12 ~0.25	★ 100~ 160 ~200	☆ 100~ 160 ~200	-	-	-	-	-	-
	Stainless steel (Martensitic related)	0.06~ 0.12 ~0.25	☆ 150~ 200 ~250	-	-	-	★ 180~ 240 ~300	-	-	-
	Stainless steel (Precipitation hardening)	0.06~ 0.12 ~0.25	☆ 90~ 120 ~150	-	-	-	-	-	-	-
	Gray cast iron	0.06~ 0.12 ~0.25	-	-	☆ 120~ 180 ~250	-	-	-	-	-
	Nodular cast iron	0.06~ 0.1 ~0.2	-	-	☆ 100~ 150 ~200	-	-	-	-	-
	Ni-base heat-resistant alloys	0.06~ 0.1 ~0.15	☆ 20~ 30 ~50	-	-	-	☆ 20~ 30 ~50	-	-	-
	Titanium alloys	0.06~ 0.08 ~0.15	★ 40~ 60 ~80	-	-	-	-	-	-	-
GH	Carbon steel	0.2~ 0.3 ~0.5	☆ 120~ 180 ~250	☆ 120~ 180 ~250	-	-	-	-	-	-
	Alloy steel	0.2~ 0.3 ~0.5	☆ 100~ 160 ~220	☆ 100~ 160 ~220	-	-	-	-	-	-
	Mold steel	0.2~ 0.3 ~0.45	☆ 80~ 140 ~180	☆ 80~ 140 ~180	-	-	-	-	-	-
	Stainless steel (Austenitic related)	0.2~ 0.3 ~0.4	☆ 100~ 160 ~200	☆ 100~ 160 ~200	-	-	-	-	-	-
	Stainless steel (Martensitic related)	0.2~ 0.3 ~0.4	☆ 150~ 200 ~250	-	-	-	☆ 180~ 240 ~300	-	-	-
	Stainless steel (Precipitation hardening)	0.2~ 0.3 ~0.4	☆ 90~ 120 ~150	-	-	-	-	-	-	-
	Gray cast iron	0.2~ 0.3 ~0.5	-	-	☆ 120~ 180 ~250	-	-	-	-	-
	Nodular cast iron	0.2~ 0.3 ~0.45	-	-	☆ 100~ 150 ~200	-	-	-	-	-
	Ni-base heat-resistant alloys	0.1~ 0.2 ~0.3	☆ 20~ 30 ~50	-	-	-	☆ 20~ 30 ~50	-	-	-
	Hard materials (40HRC or less)	0.05~ 0.1 ~0.2	-	-	-	★ 50~ 80 ~100	-	-	-	-
AM	Aluminum alloys	0.1~ 0.2 ~0.4							★ 200~ 600 ~900	☆ 200~ 500 ~800

★: 1st Recommendation ☆: 2nd Recommendation

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

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

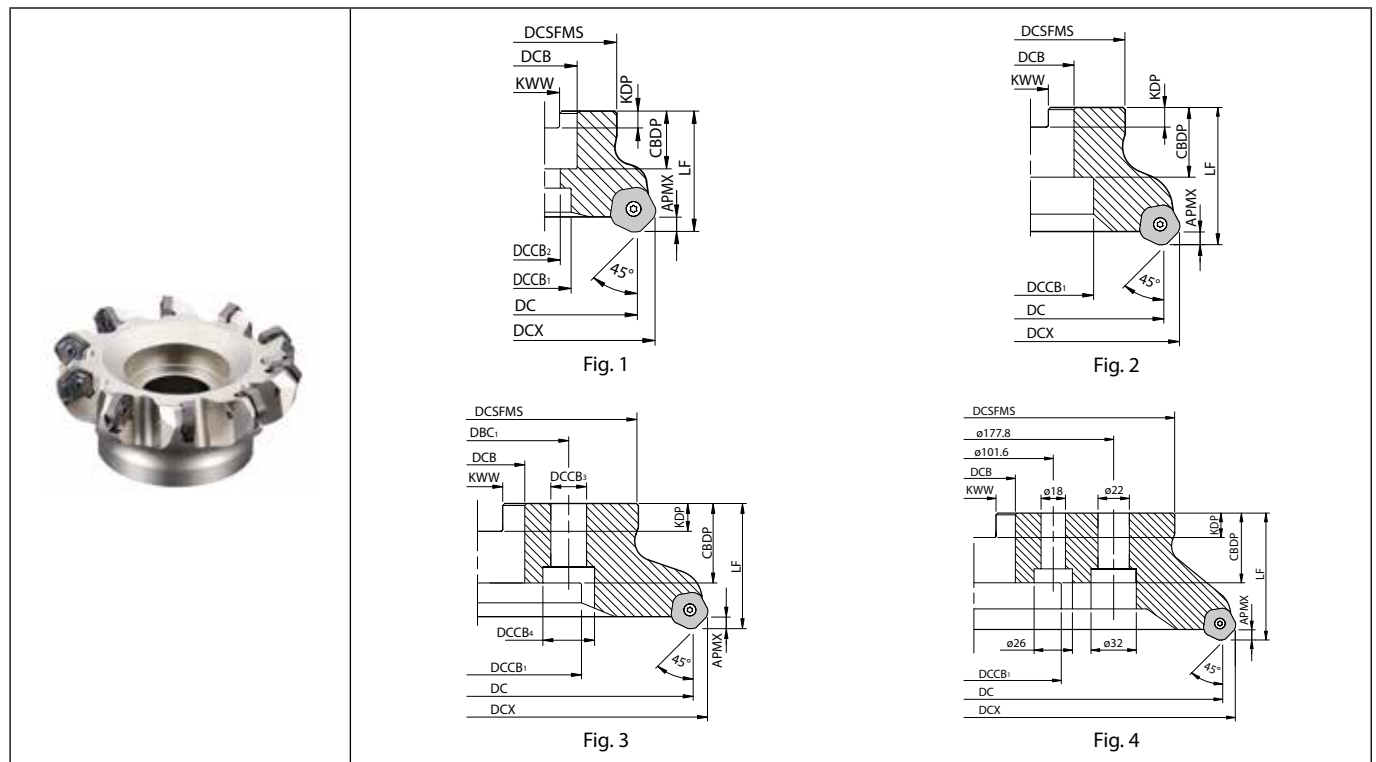
Dry machining is recommended for cermet.

M



Milling

MFPN45 (Face mill)



Toolholder dimensions

Description			Availability		Inserts	Dimension (mm)															A.R. max.(°)	R.R. (°)	Coolant hole	Weight (kg)	Fig.	Applicable inserts ➡ M26
			R	L		DC	DCX	DCSFS	DCB	DCCB ₁	DCCB ₂	DCCB ₃	DCCB ₄	DBC ₁	LF	CBDP	KDP	KWW	APMX							
Metric	Coarse pitch	MFPN	45063R-4T-M	●	4	63	76	47	22	19	11				40	21	6.3	10.4	6	+10	No	-10	0.5	1	PN□U1205ANER...	
			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		1.4				2				
			45125R-7T-M	●	7	125	138	87	40	58				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				63				6.4				3				
			45250R-12T-M	●	12	250	263				18	26	101.6		40	14	25.7	9.1				3				
			45315R-14T-M	MTD	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	No	-10	0.5	1	PN□U1205ANER...	
			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		1.4				2				
			45125R-10T-M	●	10	125	138	87	40	58				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				63				6.5				3				
			45250R-16T-M	●	16	250	263				18	26	101.6		40	14	25.7	9.1				3				
			45315R-18T-M	MTD	18	315	328	220				-	-	-	80							21.7	4			
	Extra fine pitch	MFPN	45063R-6T-M	●	6	63	76	47	22	19	11				40	21	6.3	10.4	6	+10	No	-10	0.5	1	PN□U1205ANER...	
			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		1.3				2				
			45125R-13T-M	●	13	125	138	87	40	58				63	32	9	16.4	-6				2.6	2			

APMX : 6 mm (GM, SM, GH chipbreakers), 5 mm (GL chipbreaker), 3 mm (Wiper insert)

● : Standard item MTD : Made to order

Toolholder dimensions

Description			Availability		Inserts	Dimension (mm)																A.R. max.(°)	R.R. (°)	Coolant hole	Weight (kg)	Fig.	Applicable inserts ➡ M26
			R	L		DC	DCX	DCSFS	DCB	DCCB ₁	DCCB ₂	DCCB ₃	DCCB ₄	DBC ₁	LF	CBDP	KDP	KWW	APMX								
Bore dia. inch spec	Coarse pitch	MFPN	45080°/-5T	●	●	5	80	93	60	25.4	22	13					27	6	9.5	6	+10	-8	No	1.1	1	PN□U1205ANE°/-...	
			45100°/-6T	●	●	6	100	113	70	31.75	48					50	32	8	12.7					1.4	2		
			45125°/-7T	●	●	7	125	138	87	38.1	58						36	10	15.9					2.6	2		
			45160°/-8T	●	●	8	160	173	102	50.8	72					63	38	11	19.1					4	2		
			45200R-10T	●		10	200	213	142	47.625	110						40	14	25.4					6.7	3		
			45250R-12T	●		12	250	263					18	26	101.6										9.4		3
			45315R-14T	MTD		14	315	328				220		-	-	-	80										21.2
	Fine pitch	MFPN	45080R-6T	●		6	80	93	60	25.4	22	13					27	6	9.5	6	+10	-8	No	1.1	1	PN□U1205ANER-...	
			45100R-8T	●		8	100	113	70	31.75	48					50	32	8	12.7					1.4	2		
			45125R-10T	●		10	125	138	87	38.1	58						36	10	15.9					2.7	2		
			45160R-12T	●		12	160	173	102	50.8	72					63	38	11	19.1					4	2		
			45200R-14T	●		14	200	213	142	47.625	110						40	14	25.4					6.9	3		
			45250R-16T	●		16	250	263					18	26	101.6										9.6		3
			45315R-18T	MTD		18	315	328				220		-	-	-	80										21.5
	Extra fine pitch	MFPN	45080R-8T	●		8	80	93	60	25.4	22	13					27	6	9.5	6	+10	-8	No	1.1	1	PN□U1205ANER-...	
			45100R-10T	●		10	100	113	70	31.75	48					50	32	8	12.7					1.3	2		
			45125R-13T	●		13	125	138	87	38.1	58						36	10	15.9					2.7	2		
			45160R-16T	●		16	160	173	102	50.8	72					63	38	11	19.1					4	2		
			45200R-18T	●		18	200	213	142	47.625	110						40	14	25.4					6.9	3		
			45250R-20T	●		20	250	263					18	26	101.6										9.6		3

APMX : 6 mm (GM, SM, GH chipbreakers), 5 mm (GL chipbreaker), 3 mm (Wiper insert)

● : Standard item MTD : Made to order

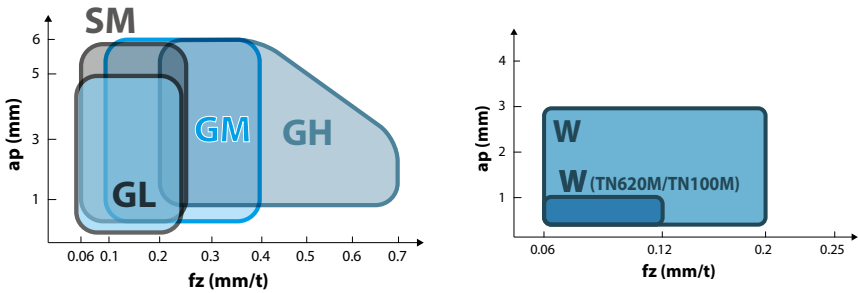


Spare parts (common to Metric / Inch spec)

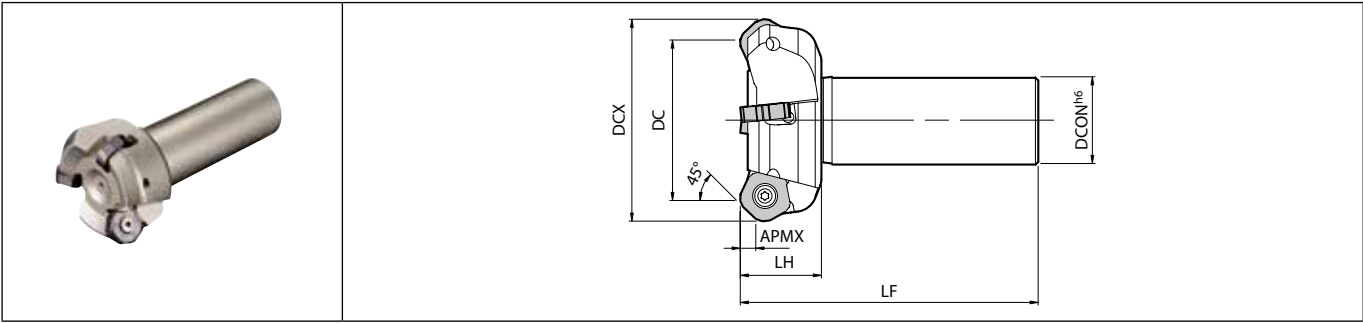
Description			Spare parts							
			Clamp screw	Wrench		Shim	Shim screw	Wrench	Anti-seize compound	Mounting bolt
				TTW	DTM					
										
Coarse pitch	MFPN	45063R-4T-M	SB-50140TR	TTW-15	-	MFPN-45	SPW-7050	LW-5	P-37	HH10X30
	MFPN	45080 ⁹ / ₁₆ -5T(-M)								HH12X35
	MFPN	45100 ⁹ / ₁₆ -6T(-M)								-
	∟	45315R-14T(-M)								
			for insert clamp tightening torque 4.2N-m			for shim clamp tightening torque 6.0N-m				-
Fine pitch	MFPN	45063R-5T-M	SB-50140TR	TTW-15	-	-	-	-	P-37	HH10X30
	MFPN	45080R-6T(-M)								HH12X35
	MFPN	45100R-8T(-M)								-
	∟	45315R-18T(-M)								
			for insert clamp tightening torque 4.2N-m							-
Extra fine pitch	MFPN	45063R-6T-M	SB-40140TRN	-	DTM-15	-	-	-	P-37	HH10X30
	MFPN	45080R-8T(-M)								HH12X35
	MFPN	45100R-10T(-M)								-
	∟	45250R-20T								
			for insert clamp tightening torque 3.5N-m							-

 Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

Applicable chipbreaker range



MFPN45 (End mill)



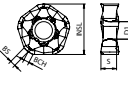
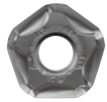
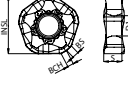
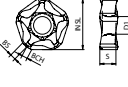
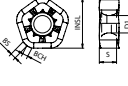
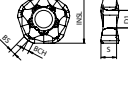
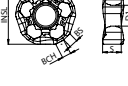
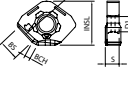
Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					A.R. max(°)	R.R. (°)	Coolant hole	Spare parts			Applicable inserts ➡ M26	
											Anti-seize compound	Screw	Wrench		
	R		DC	DCX	DCON	LF	LH								
MFPN	45050R-S32-3T	●	3	50	63					-12	No	P-37	SB-50140TR	TTW-15	PN□U1205ANER-..
	45063R-S32-4T	●	4	63	76	32	110	30	+10	-10					
	45080R-S32-5T	●	5	80	93					-8					

APMX : 6 mm (GM, SM, GH chipbreakers), 5 mm (GL chipbreaker), 3 mm (Wiper insert)
Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

● : Standard item

PNMU/PNEU

Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)			Carbon steel / Alloy steel										☆	☆	★	☆	■	P			
			Mold and die steel										☆			★	☆		■		
			Austenitic stainless steel												☆		☆		★		
			Martensitic stainless steel										★						☆		
			Precipitation hardening stainless steel													☆			★		
			Gray cast iron												☆				★		
			Nodular cast iron												☆				★		
			Non-ferrous metals																		
			Heat-resistant alloy										★							☆	
			Titanium alloy														☆			★	
Hard materials											★							H			
Insert		Description		No. of edges	Dimension (mm)					Carbide							Cermet	Applicable toolholder ➡ M22 M23 M25			
					S	D1	INSL	BCH	BS	CVD	PVD					-					
											CA6535	PR0155	PR1510	PR1525	PR1535		PR1810		PR1825	PR1835	TN100M
		PNMU	1205ANER-GM	10	5.56	6.2	17.88	2	2	●	□	○	●	●	●	●	●	MFPN45...R-..			
		PNMU	1205ANEL-GM	10	5.56	6.2	17.88	2	2	●	□	○	●	●	●	●	●	MFPN45...L-..			
		PNMU	1205ANER-SM	10	5.56	6.2	17.88	2	2	●	□	○	●	●	●	●	●	MFPN45...R-..			
		PNMU	1205ANER-GH	10	6.17	6.2	17.98	2	2	●	●	□	○	●	●	●	●	MFPN45...R-..			
		PNEU	1205ANER-GL	10	5.56	6.2	17.51	2.7	2.7	●	□	○	●	●	●	●	●	MFPN45...R-..			
		PNEU	1205ANEL-GL	10	5.56	6.2	17.51	2.7	2.7	●	□	○	●	●	●	●	●	MFPN45...L-..			
		PNEU	1205ANER-W	2	5.56	6.2	17.85	2.3	8.1	●	□	○	●	●	●	●	●	MFPN45...R-..			

Recommended cutting conditions ➡ M27

●: Standard item ○: Will be replaced with a new product □: Expected to be discontinued in September 2026

PNEU1205ANER-W inserts are
sold in 5 piece boxes

Recommended cutting conditions

Chipbreaker	Workpiece material	fz (mm/t) (): TN620M	Recommended insert grades (Vc: m/min)					
			Cermet	MEGACOAT(PVD coated carbide)				CVD coated carbide
			TN620M	PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	PR015S	CA6535
GM	Carbon steel	0.1~ 0.2 ~0.4 (0.06~ 0.12 ~0.20)	★ 200~ 250 ~300	☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-	-
	Alloy steel	0.1~ 0.2 ~0.4 (0.06~ 0.12 ~0.20)	★ 180~ 220 ~250	☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-	-
	Mold steel	0.1~ 0.2 ~0.35 (0.06~ 0.08 ~0.15)	★ 150~ 180 ~220	☆ 80~ 140 ~180	★ 80~ 140 ~180	-	-	-
	Stainless steel (Austenitic related)	0.1~ 0.2 ~0.4	-	☆ 100~ 160 ~200	☆ 100~ 160 ~200	-	-	-
	Stainless steel (Martensitic related)	0.1~ 0.2 ~0.4	-	☆ 150~ 200 ~250	-	-	-	☆ 180~ 240 ~300
	Stainless steel (Precipitation hardening)	0.1~ 0.2 ~0.3	-	★ 90~ 120 ~150	-	-	-	-
	Gray cast iron	0.1~ 0.2 ~0.4	-	-	-	★ 120~ 180 ~250	-	-
	Nodular cast iron	0.1~ 0.2 ~0.35	-	-	-	★ 100~ 150 ~200	-	-
	Ni-base heat-resistant alloys	0.1~ 0.12 ~0.2	-	☆ 20~ 30 ~50	-	-	-	★ 20~ 30 ~50
SM *1GL	Carbon steel	0.06~ 0.12 ~0.25 (0.06~ 0.10 ~0.15)	★ 200~ 250 ~300	☆ 120~ 180 ~250	☆ 120~ 180 ~250	-	-	-
	Alloy steel	0.06~ 0.12 ~0.25 (0.06~ 0.10 ~0.15)	★ 180~ 220 ~250	☆ 100~ 160 ~220	☆ 100~ 160 ~220	-	-	-
	Mold steel	0.06~ 0.1 ~0.2 (0.06~ 0.08 ~0.12)	★ 150~ 180 ~220	☆ 80~ 140 ~180	☆ 80~ 140 ~180	-	-	-
	Stainless steel (Austenitic related)	0.06~ 0.12 ~0.25	-	★ 100~ 160 ~200	☆ 100~ 160 ~200	-	-	-
	Stainless steel (Martensitic related)	0.06~ 0.12 ~0.25	-	☆ 150~ 200 ~250	-	-	-	★ 180~ 240 ~300
	Stainless steel (Precipitation hardening)	0.06~ 0.12 ~0.25	-	☆ 90~ 120 ~150	-	-	-	-
	Gray cast iron	0.06~ 0.12 ~0.25	-	-	-	☆ 120~ 180 ~250	-	-
	Nodular cast iron	0.06~ 0.1 ~0.2	-	-	-	☆ 100~ 150 ~200	-	-
	Ni-base heat-resistant alloys	0.06~ 0.1 ~0.15	-	☆ 20~ 30 ~50	-	-	-	☆ 20~ 30 ~50
	Titanium alloys	0.06~ 0.08 ~0.15	-	★ 40~ 60 ~80	-	-	-	-
*2GH	Carbon steel	0.2~ 0.4 ~0.7	-	☆ 120~ 180 ~250	☆ 120~ 180 ~250	-	-	-
	Alloy steel	0.2~ 0.4 ~0.6	-	☆ 100~ 160 ~220	☆ 100~ 160 ~220	-	-	-
	Mold steel	0.2~ 0.35 ~0.5	-	☆ 80~ 140 ~180	☆ 80~ 140 ~180	-	-	-
	Stainless steel (Austenitic related)	0.2~ 0.3 ~0.4	-	☆ 100~ 160 ~200	☆ 100~ 160 ~200	-	-	-
	Stainless steel (Martensitic related)	0.2~ 0.3 ~0.4	-	☆ 150~ 200 ~250	-	-	-	☆ 180~ 240 ~300
	Stainless steel (Precipitation hardening)	0.2~ 0.3 ~0.4	-	☆ 90~ 120 ~150	-	-	-	-
	Gray cast iron	0.2~ 0.4 ~0.7	-	-	-	☆ 120~ 180 ~250	-	-
	Nodular cast iron	0.2~ 0.35 ~0.5	-	-	-	☆ 100~ 150 ~200	-	-
	Ni-base heat-resistant alloys	0.2~ 0.3 ~0.4	-	☆ 20~ 30 ~50	-	-	-	☆ 20~ 30 ~50
	Hard materials (60HRC or less)	0.05~ 0.1 ~0.2	-	-	-	-	★ 50~ 80 ~100	-

★: 1st Recommendation ☆: 2nd Recommendation

The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

- *1. GL chipbreaker: Recommended for surface finish oriented milling.
 *2. GH chipbreaker: Fine pitch → fz≤0.4 (mm/t)
 Extra fine pitch → Not recommended



Cutter type and chipbreaker selection

Milling purpose	Cutter type			Chipbreaker				
	Coarse pitch	Fine pitch	Extra fine pitch	GM	SM	GH	GL	W
General milling for steel and alloy steel		●		●				
Steel and alloy steel (At chattering due to low rigidity machine or poor clamping power)	●				●			
Productivity oriented (Running cost decrease) ($a_p=4\text{mm}$ or over, $f_z=0.35\text{mm/t}$ or over)	●					●		
Surface finish oriented	●	●					●	
General milling of stainless steel		●			●			
Stainless steel (To prevent chattering due to low rigidity machine or poor clamping power)	●				●			
Cast iron (For processing efficiency improvement)			●	●				
Cast iron ($a_p=4\text{mm}$ or over, $f_z=0.35\text{mm/t}$ or over)	●					●		
Improved surface finish in high efficiency milling		●	●					●

How to use wiper insert

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

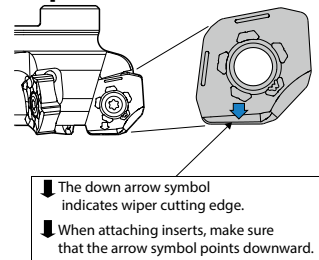
2. Combination of wiper insert with other chipbreakers

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

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

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

How to attach wiper inserts on MFPN cutter



Applicable chipbreaker

Cutter type	Chipbreaker		
	GM	SM (GL)	GH
Coarse pitch (With shim)	✓	✓	✓
Fine pitch (Without shim)	✓	✓	△ (Feed rate is recommended $f_z=0.4\text{mm/t}$ or under)
Extra fine pitch (Without shim)	✓	✓	Not recommended

M



Milling

Cutting edge angle
45°~70°Cutting edge angle
75°Cutting edge angle
88°/90°Cutter for
FinishingHigh Feed
CutterMulti-
Function

Slot Mill

Ball-nose
Radius

Others

Precautions for use (How to mount an insert)

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

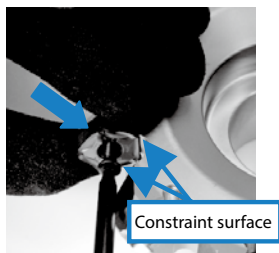


Fig. 1



Fig. 2



Fig. 3

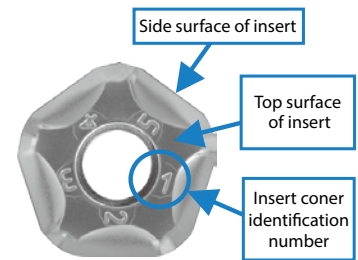


Fig. 4 (Right-hand insert)

How to replace a shim (for coarse pitch)

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

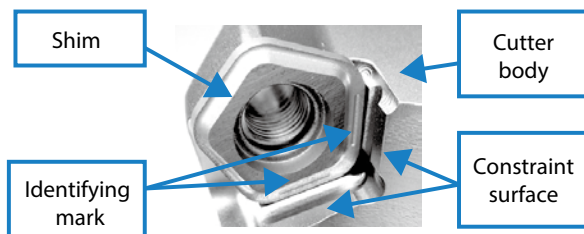


Fig. 5

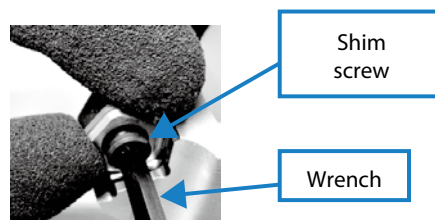


Fig. 6

Cutting edge angle 66°

MFPN66

Economical double-sided 10-edge insert reduces chattering with low cutting force design
Reduces cutting costs when machining auto parts and other general purpose machining applications

1

Economical double-sided 10-edge insert

Applicable to various machining applications with wide size range from ø32

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

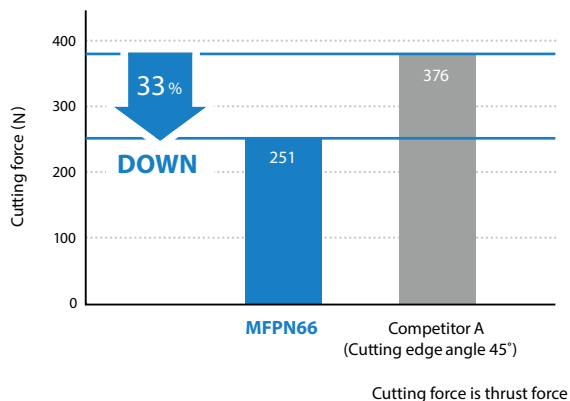
2

Reduces chattering with low cutting force design

Available for application from small ap to medium ap

Suppresses vibration for excellent surface finish with 66° cutting edge angle

Cutting force comparison (Internal evaluation)



Cutting conditions: $V_c=200$ m/min, $a_p=3$ mm, $f_z=0.15$ mm/t
 Cutter dia. ø63 Workpiece material: S50C

Surface finish (Machining with workpiece overhang length of 80mm)



Excellent surface finish with low workpiece clamping rigidity

Cutting conditions: $V_c=200$ m/min, $a_p=0.5$ mm, $f_z=0.2$ mm/t
 Cutter dia. ø63 Workpiece material: S50C

3

Extended tool life by MEGACOAT NANO technology

Insert lineup also contains cermet grade for better surface finish



General purpose
GM chipbreaker

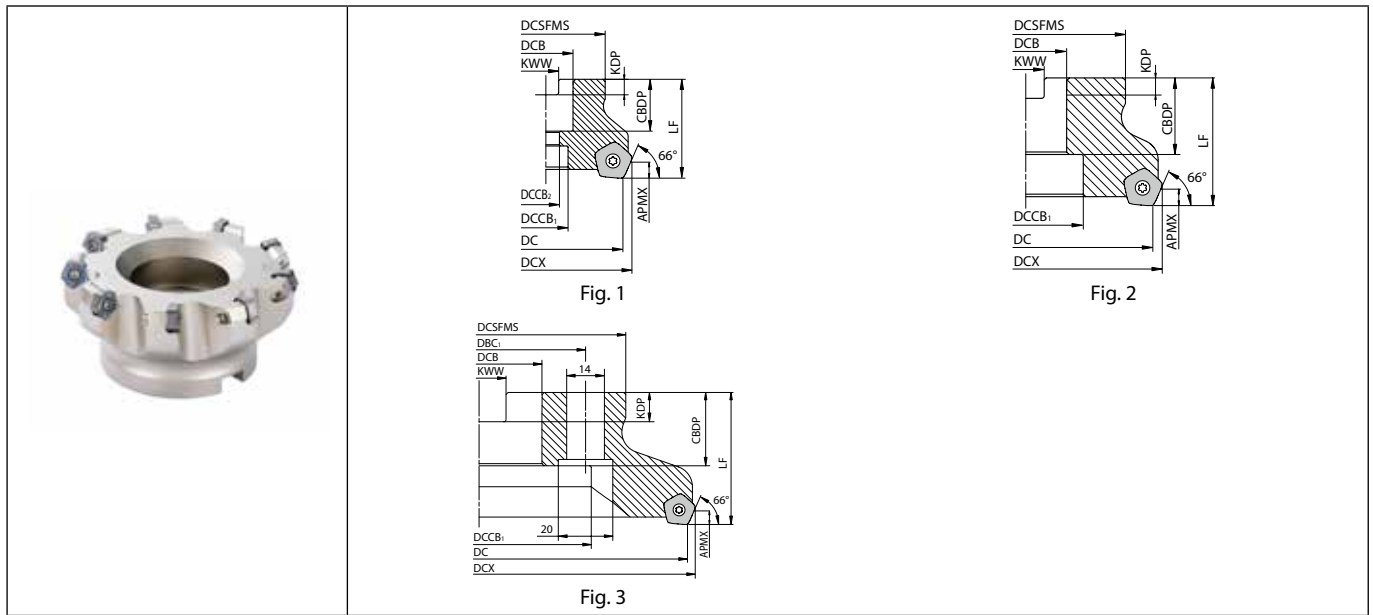


Tough edge
GH chipbreaker



For stainless steel
SM chipbreaker

MFPN66 (Face mill)



Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)											A.R. max.(°)	R.R. (°)	Coolant hole	Weight (kg)	Fig.	Applicable inserts M34	
					R	DC	DCX	DCSfMS	DCB	DCCB ₁	DCCB ₂	DBC ₁	LF	CBDP	KDP							KWW
Metric	Fine pitch	MFPN	66050R-4T-M-G	●	4	50	58	48	22	18	11	-	40	21	6.3	10.4	+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				
			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				
			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		
Bore dia. inch spec	Fine pitch	MFPN	66080R-6T-G	●	6	80	88	70	25.4	20	13	-	50	27	6	9.5	+12	-7	No	1.2	1	PNMU0905...
			66100R-7T-G	●	7	100	107	78	31.75	45	-							34		8		
			66125R-9T-G	●	9	125	132	89	38.1	55		-	63	38	10	15.9						
			66160R-11T-G	●	11	160	167	110	50.8	72	-							-		11		
	Extra fine pitch	MFPN	66080R-9T-G	●	9	80	88	70	25.4	20	13	-	50	27	6	9.5	+12	-7	No	1.2	1	PNMU0905...
			66100R-11T-G	●	11	100	107	78	31.75	45	-							34		8		
			66125R-13T-G	●	13	125	132	89	38.1	55		-	63	38	10	15.9						
			66160R-15T-G	●	15	160	167	110	50.8	72	-							-		11		

APMX : 5 mm (GM, SM, GH chipbreakers, Coated cabide), 3 mm (GM chipbreaker, Cermet)

● : Standard item

Spare parts (common to Metric / Inch spec)

Description			Clamp screw	Wrench	Anti-seize compound	Mounting bolt
						
Fine pitch	MFPN	66050R-4T-M-G	SB-4090TRP	DTPM-15	P-37	HH10X30
		66063R-5T-M-G				HH10X30
		66080R-6T(-M)-G				HH12X35
		66100R-7T(-M)-G				-
		66125R-9T(-M)-G				
		66160R-11T(-M)-G				
			Recommended tightening torque for insert clamp 3.5N·m			
Extra fine pitch	MFPN	66050R-5T-M-G	SB-4090TRP	DTPM-15	P-37	HH10X30
		66063R-7T-M-G				HH10X30
		66080R-9T(-M)-G				HH12X35
		66100R-11T(-M)-G				-
		66125R-13T(-M)-G				
		66160R-15T(-M)-G				
			Recommended tightening torque for insert clamp 3.5N·m			

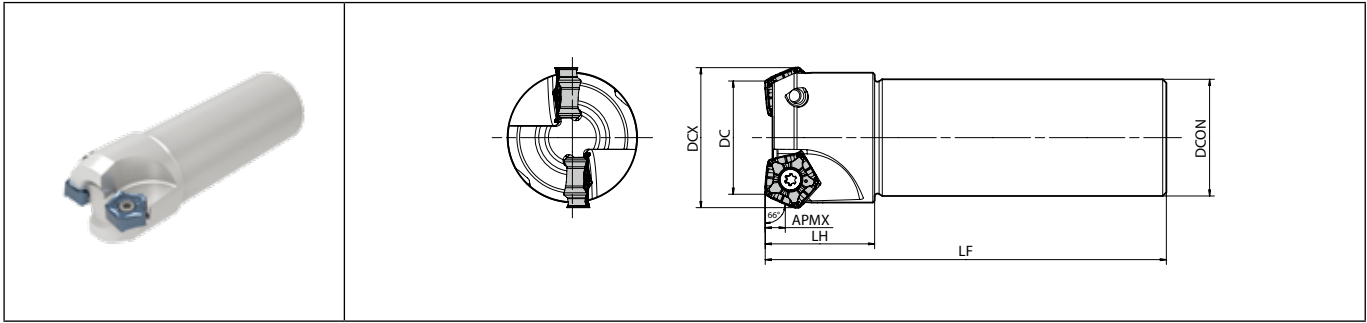
 Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.



Milling

Cutting edge angle 45°~70°
Cutting edge angle 75°
Cutting edge angle 88°/90°
Cutter for Finishing
High Feed Cutter
Multi- Function
Slot Mill
Ball-nose Radius
Others

MFPN66 (End mill)

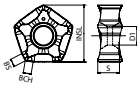
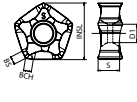
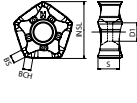


Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					A.R. max (°)	R.R. (°)	Coolant hole	Spare parts			Applicable inserts ➡ M34
											Anti-seize compound	Screw	Wrench	
	R		DC	DCX	DCON	LF	LH							
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 when insert is fixed.
Recommended tightening torque for insert clamp : 3.5N-m

PNMU

Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)		Carbon steel / Alloy steel						☆			★	☆	■	P				
		Mold and die steel						☆			★	☆	■					
		Austenitic stainless steel								☆		☆	★	M				
		Martensitic stainless steel										☆						
		Precipitation hardening stainless steel							☆			★						
		Gray cast iron						☆			★			K				
		Nodular cast iron						☆			★							
		Non-ferrous metals												N				
		Heat-resistant alloy											☆	S				
		Titanium alloy							☆			★						
Hard materials					★								H					
Insert		Description		No. of edges	Dimension (mm)					Carbide							Cerm ^{et}	Applicable toolholder ➡ M31 M33
					S	D1	INSL	BCH	BS	PVD						-		
										PR015S	PR1510	PR1525	PR1535	PR1810	PR1825			
	 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 ➡ M35

M



Milling

Cutting edge angle
45°~70°Cutting edge angle
75°Cutting edge angle
88°/90°Cutter for
FinishingHigh Feed
CutterMulti-
Function

Slot Mill

Ball-nose
Radius

Others

● : Standard item ○ : Will be replaced with a new product □ : Expected to be discontinued in September 2026

Recommended cutting conditions

Coated carbide

Chipbreaker	Workpiece material	Feed (fz: mm/t)	Recommended insert grades (Vc: m/min)			
			MEGACOAT (PVD coated carbide)			
			PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	PR0155
GM	Carbon steel	0.1~ 0.2 ~0.3	120~ 180 ~250	120~ 180 ~250	-	-
	Alloy steel	0.1~ 0.2 ~0.3	100~ 160 ~220	100~ 160 ~220	-	-
	Mold steel	0.1~ 0.18 ~0.25	80~ 140 ~180	80~ 140 ~180	-	-
	Stainless steel (Austenitic related)	0.1~ 0.18 ~0.25	100~ 150 ~200	100~ 150 ~200	-	-
	Stainless steel (Martensitic related)	0.1~ 0.18 ~0.25	100~ 150 ~200	-	-	-
	Stainless steel (Precipitation hardening)	0.1~ 0.18 ~0.25	90~ 120 ~150	-	-	-
	Gray cast iron	0.1~ 0.2 ~0.3	-	-	120~ 180 ~250	-
	Nodular cast iron	0.1~ 0.18 ~0.25	-	-	100~ 150 ~200	-
	Ni-base heat-resistant alloys	0.1~ 0.12 ~0.2	20~ 30 ~50	-	-	-
SM	Carbon steel	0.06~ 0.12 ~0.2	-	120~ 180 ~250	-	-
	Alloy steel	0.06~ 0.12 ~0.2	-	100~ 160 ~220	-	-
	Mold steel	0.06~ 0.1 ~0.15	-	80~ 140 ~180	-	-
	Stainless steel (Austenitic related)	0.06~ 0.12 ~0.2	100~ 150 ~200	100~ 150 ~200	-	-
	Stainless steel (Martensitic related)	0.06~ 0.12 ~0.2	100~ 150 ~200	-	-	-
	Stainless steel (Precipitation hardening)	0.06~ 0.12 ~0.2	90~ 120 ~150	-	-	-
	Gray cast iron	0.06~ 0.12 ~0.2	-	-	120~ 180 ~250	-
	Nodular cast iron	0.06~ 0.1 ~0.15	-	-	100~ 150 ~200	-
	Ni-base heat-resistant alloys	0.06~ 0.08 ~0.15	20~ 30 ~50	-	-	-
	Titanium alloys	0.06~ 0.08 ~0.15	40~ 60 ~80	-	-	-
GH	Carbon steel	0.15~ 0.25 ~0.35	-	120~ 180 ~250	-	-
	Alloy steel	0.15~ 0.25 ~0.35	-	100~ 160 ~220	-	-
	Mold steel	0.1~ 0.2 ~0.3	-	80~ 140 ~180	-	-
	Gray cast iron	0.15~ 0.25 ~0.35	-	-	120~ 180 ~250	-
	Nodular cast iron	0.1~ 0.2 ~0.3	-	-	100~ 150 ~200	-
	Hard materials (60HRC or less)	0.05~ 0.08 ~0.16	-	-	-	50~ 80 ~100

★: 1st Recommendation ☆: 2nd Recommendation

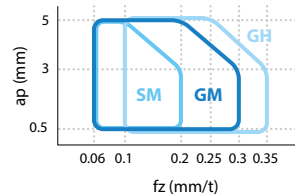
Cermet

Chipbreaker	Workpiece material	Feed (fz: mm/t)	Recommended insert grades Vc: m/min
			Cermet
			TN620M
GM	Carbon steel	0.06~ 0.12 ~0.15	200~ 250 ~300
	Alloy steel	0.06~ 0.12 ~0.15	180~ 220 ~250
	Mold steel	0.06~ 0.1 ~0.13	150~ 180 ~220

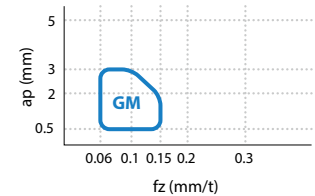
★: 1st Recommendation

Applicable chipbreaker range

Coated carbide



Cermet



Applicable chipbreaker

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

M



Milling

High precision and high efficiency high rake cutter

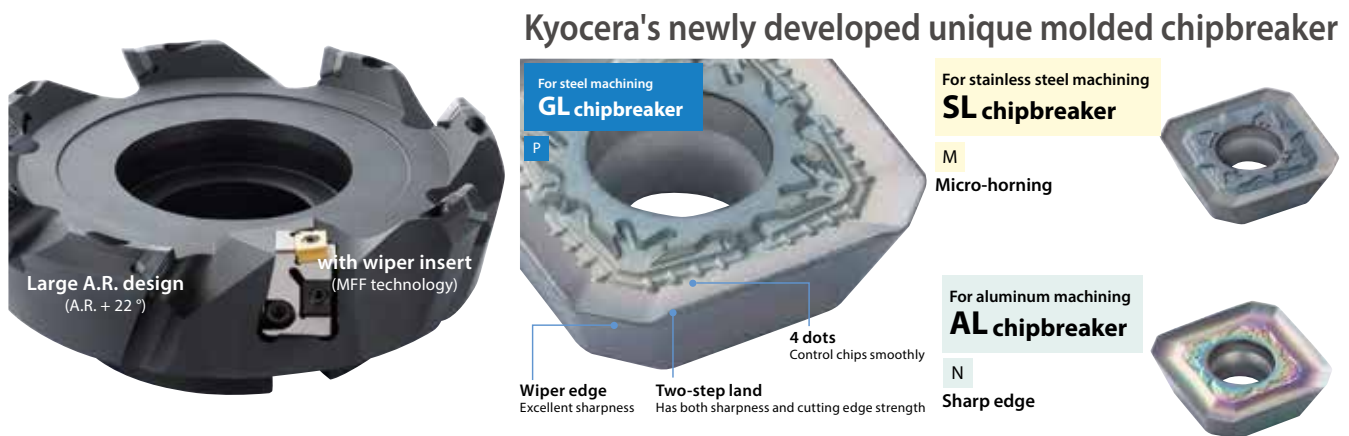
MFSE45

Rough and finish in 1 pass with excellent surface finish

Roughing condition ($fz = 0.25 \text{ mm/t}$) provides excellent surface finish ($0.8 \mu\text{Ra}$ or less)

1 The MFSE45 milling solution

Delivers high-quality surfaces by roughing and finishing simultaneously



Machining comparison simulation (example)

MFSE45 1 Pass and cutting time was cut by 1/3, with a good surface finish ($0.8 \mu\text{Ra}$ or less)

$fz = 0.25 \text{ mm/t}$ ($ap = 1.0 \text{ mm}$)

Cutting conditions: $Vc = 300 \text{ m/min}$, Dry S50C (Internal evaluation)

0.24 μRa

SOLUTION

1 Pass

Time = 1/3

Surface finish ✓



ø160-8T GL chipbreaker (With wiper insert)

Cutting time Roughing + Finishing

Conventional machining

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

$fz = 0.15 \text{ mm/t}$ ($ap = 0.8 \text{ mm}$)

$fz = 0.125 \text{ mm/t}$ ($ap = 0.2 \text{ mm}$)



ø160-8T



ø160-8T

Cutting time

Roughing

Finishing

CG image

2 Beautiful surface finish and long tool life

Strict control of insert inscribed circle tolerance

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

Excellent front edge runout accuracy

Advantage ① Theoretical reduction of roughness on finished surface, excellent surface roughness

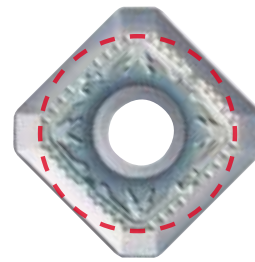
Front edge runout: Small $\Rightarrow$
Surface roughness: Good

Advantage ② Insert wear progresses evenly and tool life can be improved

Effect on wear (User evaluation)

	Average corner examples	Heavily damaged corner examples
MFSE45	 Wear: 0.145mm	 Wear: 0.172mm
Competitor A	 Wear: 0.105mm	 Wear: 0.911mm

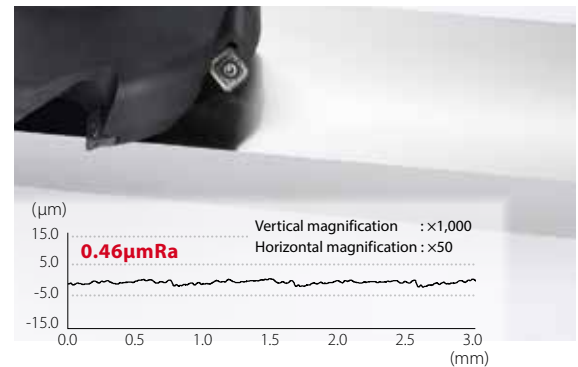
Cutting conditions : $V_c = 270$ m/min, $a_p = \sim 1.5$ mm, $f_z = 0.2$ mm/t, Wet SS400 $\phi 250$ (15 inserts) SL chipbreaker (PR1535)



Inscribed circle tolerance
 ± 0.015 mm or less

(Class E standard ± 0.025 mm or less)

Surface roughness in stainless steel machining (Internal evaluation)



Cutting conditions : $V_c = 250$ m/min, $a_p \times a_e = 1.0 \times 100$ mm, $f_z = 0.15$ mm/t, Wet SUS304 $\phi 125$ (Standard 6 inserts) SL chipbreaker

Variation : Small

Variation : Large

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

Toolholder Specifications

Type	With wiper insert	Standard
Surface roughness	Approx. $0.8 \mu\text{mRa}$	Approx. $1.6 \mu\text{mRa}$
Recommended feed	$f_z = 0.25$ mm/t	$f_z = 0.12$ mm/t (Finish machining time)
Application	High efficiency finishing	General purpose (Uses 1 insert style)



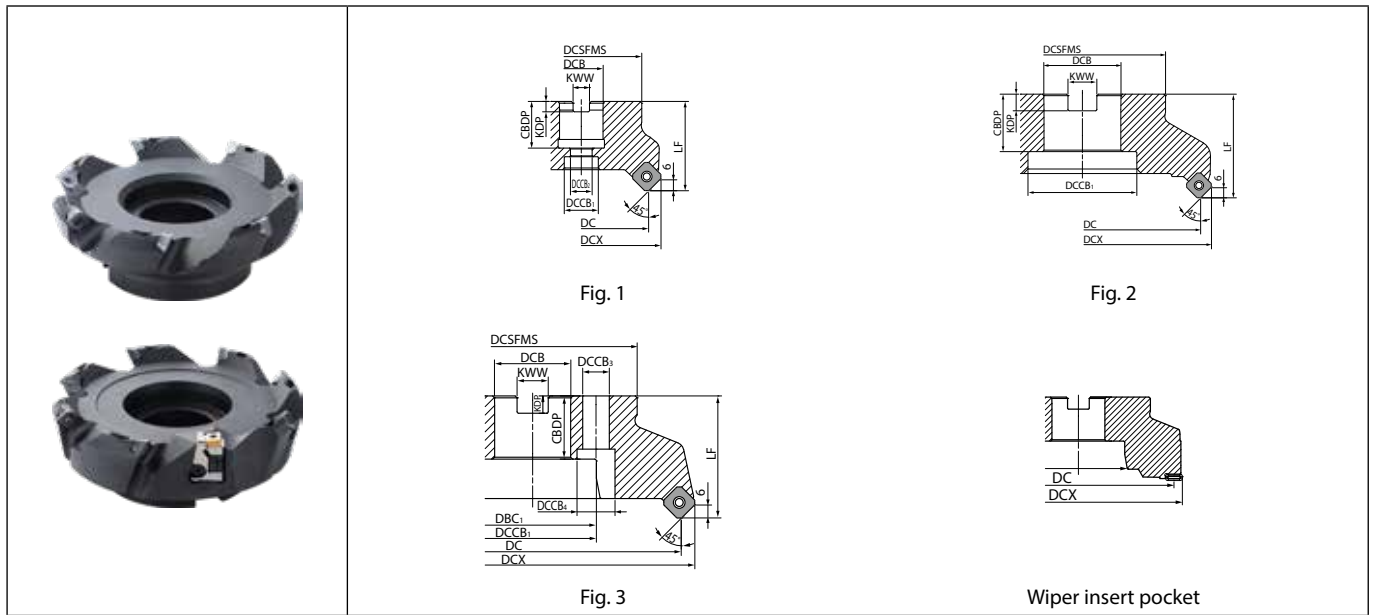
Using wiper insert for MFF
(Cutting edge adjustment mechanism with excellent operability)

M



Milling

MFSE45



Toolholder dimensions

Description				Availability		Inserts	Dimension (mm)														Coolant hole	Coolant hole (min ⁻¹)			Weight (kg)	Fig.	Applicable inserts M40 M194	
				R	L		DC	DCX	DCB	DCSFMS	DCCB ₁	DCCB ₂	DCCB ₃	DCCB ₄	DBC ₁	LF	CBDP	KDP	KWW	Max. revolution								
Standard	Metric	MFSE	45063R-5T-M	MT0		63	71.7	22	48							40	21	6.3	10.4	No	14400	0.6	1	SEET13T3...				
			45080R-5T-M	MT0	5	80	88.7	27	70		5	-	-	-		50	24	7	12.4		12800	1.4	1					
			45100R-5T-M	MT0		100	108.7	32	78					30	8	14.4	11500	1.8	2									
			45125R-6T-M	MT0		6	125	133.7		89	-	6				33			10200		3.2	2						
			45160R-7T-M	MT0	7	160	168.7	40	110		7	14	20	66.7	63	32	9	16.4	9000		5.4	3						
			45200R-8T-M	MT0	8	200	208.7		142		8				40	14	25.7	8100	7		3							
			45250R-10T-M	MT0	10	250	258.7	60	222		10	18	26	101.6				7200	15.5		3							
	Bore dia. inch spec	MFSE	45080R-5T	MT0	5	80	88.7	25.4	70	20	13				50	27	6	9.5	12800	1.4	1	SEET13T3...						
			45100R-5T	MT0		100	108.7	31.75	78	48		-	-	-	32	8	12.7	11500	1.9	2								
			45125R-6T	MT0		6	125	133.7	38.1	89	55				38	10	15.9	10200	3.3	2								
			45160%/-7T	MT0	7	160	168.7	50.8	110	72	-			63	11	19.1	9000	5.3	2									
			45200%/-8T	MT0	8	200	208.7		142	100		18	26	101.6	40	14	25.4	8100	7.3	3								
45250%/-10T			MT0	10	250	258.7	47.625	222	110					40	14	25.4	7200	15.8	3									
Wiper insert			Metric	MFSE	45160R-8T-W-M	MT0	8	160	168.7	40	110		8	-	-	-	33	9	16.4	No	1000		5.5	2	SEET13T3... LNGX1209...			
	45200R-9T-W-M	MT0			9	200	212.8		142	1	9				40			800	7.3		3							
	45250-11T-W-M	MT0			11	250	262.7	60	222		11	18	26	101.6	38	14	25.7	800	12		3							
	Bore dia. inch spec	MFSE	45160R-8T-W	MT0	8	160	168.7	50.8	102	72			-	-	-	38	11	19.1	No	1000	5.5	3	SEET13T3... LNGX1209...					
			45200R-9T-W	MT0	9	200	208.7		142					63	40			800		7.6	3							
			45250R-11T-W	MT0	11	250	258.7	47.625	222	133	-	18	26	101.6	38	14	25.4	800		12.3	3							

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.

MT0 : Made to order

Spare parts

Common

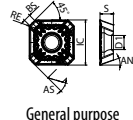
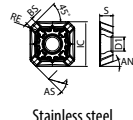
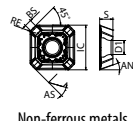
Clamp Screw	Wrench	Shim	Shim screw	Wrench	Anti-seize compound
					
SB-35120TRP	DTPM-15	MFSE-105	SPW-5035	LW-3.5	P-37
Recommended tightening torque for insert clamp 4N·m		Recommended tightening torque for shim clamp 5N·m			

Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

For Wiper insert

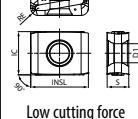
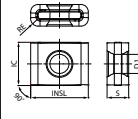
Clamp screw	Wrench	Wedge	Cartridge	Cartridge clamp screw	Wrench	Adjustment Screw
						
SB-3592TR	DTM-10	AD-MFF	CR-MFF	HH5X15L	TTW-15	W6X18N
Recommended tightening torque for wiper insert clamp 1.2N·m						

SEET

Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)		Carbon steel / Alloy steel										☆		☆	☆	★	P	
		Mold and die steel										☆		☆		★		
		Austenitic stainless steel										☆			☆	★	M	
		Martensitic stainless steel										★			☆	☆		
		Precipitation hardening stainless steel																
		Gray cast iron										★			☆	☆	K	
		Nodular cast iron										★			☆	☆		
		Non-ferrous metals											★				N	
		Heat-resistant alloy										★				☆	S	
		Titanium alloy													☆	★		
Hard materials															H			
Insert		Description		No. of edges	Dimension (mm)					Angle (°)		Carbide					Applicable toolholder ➡ M38	
					IC	S	D1	RE	BS	AN	AS	CVD	DLC	PVD				
												CA635	PDL025	PR1525	PR1535	PR1825		PR1835
	 General purpose	4	13.4	3.97	4.2	1.5	2.1	20	29	●		○	●	●	●	MFSE45...		
	 Stainless steel	4	13.4	3.97	4.2	1.5	2.1	20	29	●		○	●	●	●	MFSE45...		
	 Non-ferrous metals	4	13.4	3.97	4.2	1.5	2.1	20	29		●					MFSE45...		

M

LNGX

Insert	Description	No. of edges	Dimension (mm)					Carbide		Cermet	Applicable toolholder ➡ M38 M193
			IC	S	D1	RE	INSL	PVD		PVD	
								PR1525	PR1825	PV60M	
	 Low cutting force	4	9.525	4.76	4.2	1.6	12.7	MT0	MT0	MT0	MFSE45...-W MFSE45...-W-M MFF...-SF
		4	9.525	4.76	4.2	1.6	12.7	MT0	MT0	MT0	MFSE45...-W MFSE45...-W-M MFF...-SF

Recommended cutting conditions ➡ M41

● : Standard item ○ : Will be replaced with a new product MT0 : Made to order

M40

Cutting edge angle
45°~70°Cutting edge angle
75°Cutting edge angle
88°/90°Cutter for
FinishingHigh Feed
CutterMulti-
Function

Slot Mill

Ball-nose
Radius

Others

Recommended cutting conditions

Chipbreaker	Workpiece	Feed (fz: mm/t)	Recommended insert grade (Vc: m/min)			
			MEGACOAT NANO EX (MEGACOAT NANO)		CVD coating	DLC coated carbide
			PR1835 (PR1535)	PR1825 (PR1525)	CA6535	PDL025
GL	Carbon steel	0.1 – 0.15 – 0.3	150 – ★ 200 – 300	150 – ☆ 200 – 300	150 – ☆ 200 – 300	–
	Alloy steel	0.1 – 0.15 – 0.3	150 – ★ 200 – 300	150 – ☆ 200 – 300	150 – ☆ 200 – 300	–
	Mold steel	0.1 – 0.15 – 0.25	100 – ☆ 150 – 250	100 – ★ 150 – 250	100 – ☆ 150 – 250	–
	Stainless steel (Austenitic related)	0.1 – 0.15 – 0.25	100 – ★ 200 – 250	100 – ☆ 200 – 250	100 – ☆ 200 – 250	–
	Stainless steel (Martensitic related)	0.1 – 0.15 – 0.25	100 – ★ 200 – 250	100 – ☆ 200 – 250	100 – ☆ 200 – 250	–
	Gray cast iron	0.1 – 0.15 – 0.25	100 – ☆ 200 – 250	100 – ☆ 200 – 250	100 – ☆ 200 – 250	–
	Nodular cast iron	0.1 – 0.15 – 0.25	100 – ☆ 200 – 250	100 – ☆ 200 – 250	100 – ★ 200 – 250	–
SL	Carbon steel	0.1 – 0.12 – 0.15	150 – ☆ 200 – 300	150 – ☆ 200 – 300	150 – ☆ 200 – 300	–
	Alloy steel	0.1 – 0.12 – 0.15	150 – ☆ 200 – 300	150 – ☆ 200 – 300	150 – ☆ 200 – 300	–
	Mold steel	–	–	–	–	–
	Stainless steel (Austenitic related)	0.1 – 0.15 – 0.2	100 – ★ 200 – 250	100 – ☆ 200 – 250	100 – ☆ 200 – 250	–
	Stainless steel (Martensitic related)	0.1 – 0.15 – 0.2	100 – ★ 200 – 250	100 – ☆ 200 – 250	100 – ☆ 200 – 250	–
AL	Aluminum alloys (Si Ratio 13% or less)	0.1 – 0.15 – 0.3	–	–	–	★ 200 – 400 – 500

★ : 1st recommendation ☆ : 2nd 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.

Face mills for heavy milling

MFLN

Tough 4-edge tangential inserts provide high reliability on heavy milling at large depths of cut and high feed rates.

Three cutting edge angles (incl. MFLN90) optimized for various machining applications.

1 Tough and reliable inserts for stable heavy milling

22 mm long inserts offer increased rigidity

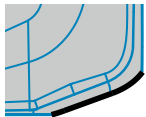
Tangentially mounted inserts provide
2 cutting edges on both sides

Corner chamfer

only available on MFLN90

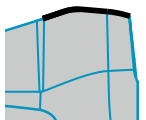
Both general corner-R type and chamfered corner type available

Prevents chattering and insert fracturing



Convex cutting edge ridge

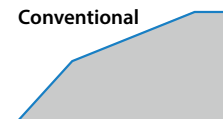
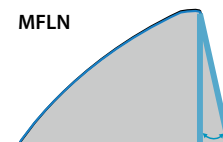
Reduced impact forces
when entering the workpiece



Obtuse edge design

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

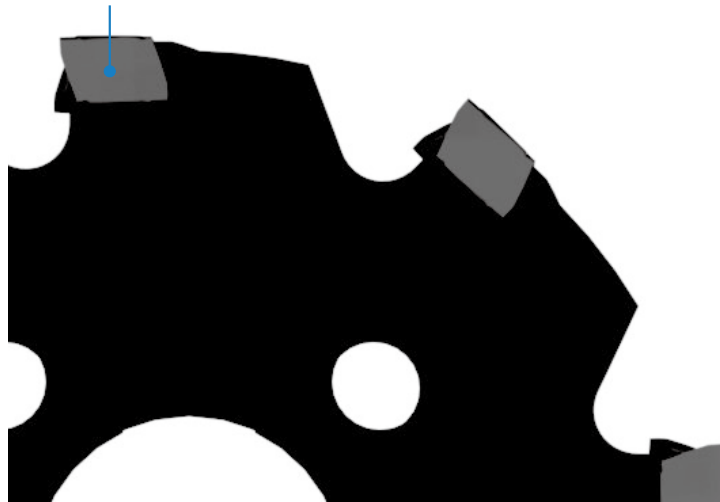
Cross-section view of cutting edge



Wide flat mounting surface

Hold an insert firmly in heavy milling

Tangentially mounted inserts increase rigidity



M



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

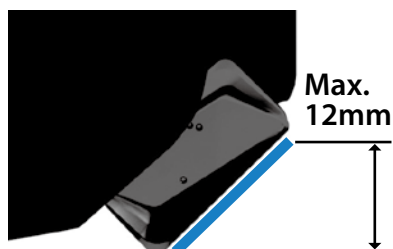
Ball-nose
Radius

Others

2 Large D.O.C. and high feed rates

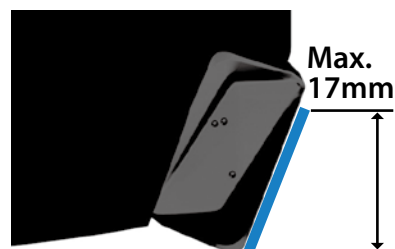
MFLN45

Cutting edge angle 45°

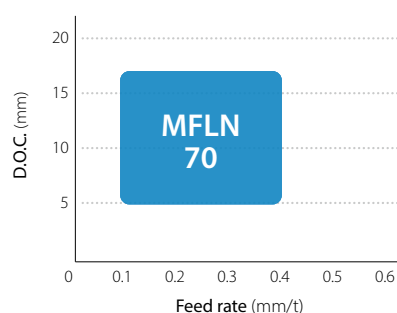
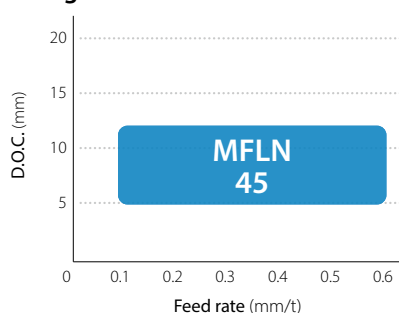


MFLN70

Cutting edge angle 70°



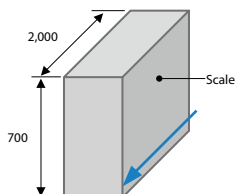
Applicable range



Case Studies

Forging Die for Automotive Parts

Vc = 90 m/min
ap × ae = ~10 × ~80 mm
fz = 0.36 mm/t Dry
MFLN45080R-4T-M (ø80-4 flutes)
LOGU221616ER-GM PR1535



Chip Evacuation Rate

MFLN45
(ø80-4 flutes)

Q=416 cc/min

Machining efficiency
↑
x1.2

Competitor H
(ø100-5 flutes)

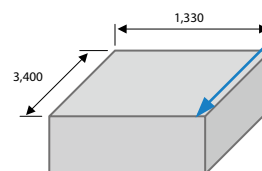
Q=336 cc/min

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

(User Evaluation)

Machining base FCD600

Vc = 120 m/min
ap = 11×165 mm
fz = 0.65 mm/t Dry
XMFLN70250R-13T-OH-M (ø250-13 flutes)
Fine pitch, internal coolant, custom holder
LOGU221616ER-GM PR1525



Chip Evacuation Rate

MFLN70

Roughing

Q=2,340 cc/min

Roughing (Competitor F)

Competitor

Q=2,100 cc/min

Finishing

Q=2,340 cc/min

Finishing (Competitor G)

Q=1,970 cc/min

Machining efficiency
↑
x1.1

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

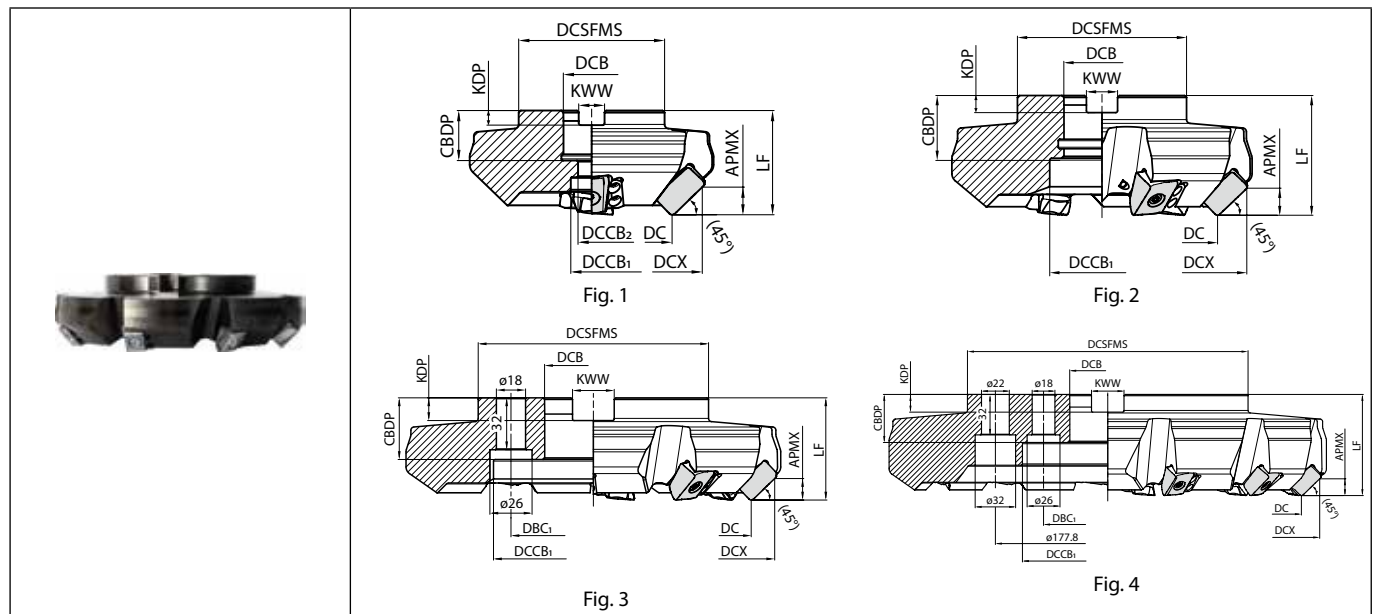
(User Evaluation)

M



Milling

MFLN45



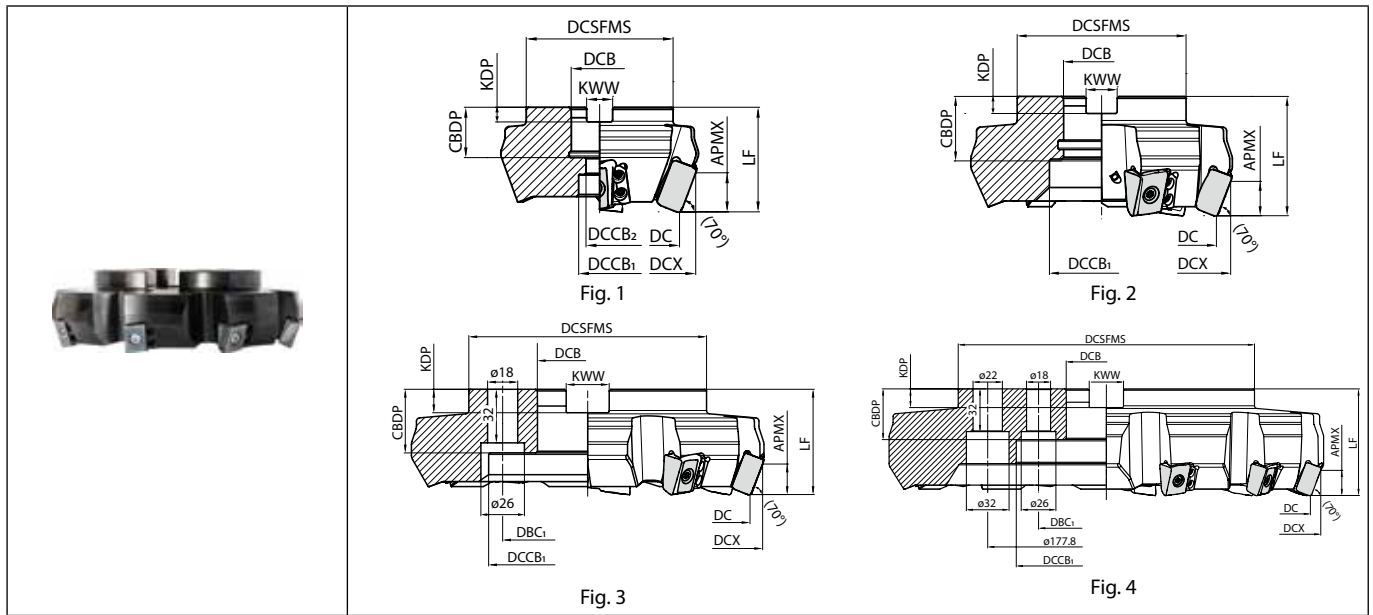
Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)												A.R. max.(°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts 🔄 M46
					R	DC	DCX	DCSfMS	DCB	DCCB ₁	DCCB ₂	DBG ₁	LF	CBDP	KDP	KWW							
Metric	MFLN	45080R-4T-M	●	4	80	104	70	27	20	13	-	50	24	7	12.4	12	+2	-15.5	Yes	5970	2	1	LOGU221616ER-GM
		45100R-4T-M	●		100	124	78	32	45	30		8	14.4	-14.5	4780					2.7	2		
		45125R-6T-M	●		6	125	149	89	40	55		66.7	33	9	16.4					3820	4.6	2	
		45160R-7T-M	●	7	160	184	110	90		2990	6.7							3					
		45200R-8T-M	●	8	200	224	142	124	101.6	63	38	14	25.7	-13.5	No			2390	9.7	3			
		45250R-10T-M	●	10	250	274	222	60										160	1910	16.9	3		
		45315R-12T-M	MT0	12	315	339	215	1520										25.1	4				
Bore dia. inch spec	MFLN	45080R-4T	●	4	80	104	70	25.4	20	13	-	50	27	6	9.5	12	+2	-15.5	Yes	5970	2	1	LOGU221616ER-GM
		45100R-4T	●		100	124	78	31.75	45	34		8	12.7	-14.5	4780					2.7	2		
		45125R-6T	●		6	125	149	89	38.1	55		10	15.9	3820	4.6					2			
		45160R-7T	●	7	160	184	110	50.8	90	11	19.1							2990	6.8		2		
		45200R-8T	●	8	200	224	142	124	101.6	63	38	14	25.4	-13.5	No			2390	10	3			
		45250R-10T	●	10	250	274	222	47.625										160	1910	17.1	3		
		45315R-12T	MT0	12	315	339	215	1520										25.3	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.

● : Standard item MT0 : Made to order

MFLN70



Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)												A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts ➡ M46
					DC	DCX	DCSFMS	DCB	DCB ₁	DCB ₂	DBC ₁	LF	CBDP	KDP	KWW	APMX							
Metric	MFLN	70080R-4T-M	●	4	80	93	70	27	20	13	-	50	24	7	12.4	17	+1	-16.5	Yes	5970	1.4	1	LOGU221616ER-GM
	70100R-4T-M	●	100		113	78	32	45	-	30		8	14.4	-14.5	4780			1.9		2			
	70125R-6T-M	●	6		125	138	89	40		55		66.7	33	9	16.4			3820		3.4	2		
	70160R-7T-M	●	7		160	173	110	90		63			38	14	25.7			2990		5.3	3		
	70200R-8T-M	●	8		200	213	142	120										2390		8.2	3		
	70250R-10T-M	●	10		250	263	222	60										160		1910	14.8	3	
	70315R-12T-M	MTD	12		315	328	222	215										80		1520	21.9	4	
Bore dia. inch spec	MFLN	70080R-4T	●	4	80	93	70	25.4	20	13	-	50	27	6	9.5	17	+1	-16.5	Yes	5970	1.4	1	LOGU221616ER-GM
	70100R-4T	●	100		113	78	31.75	45	-	34		8	12.7	-14.5	4780			2		2			
	70125R-6T	●	6		125	138	89	38.1		55		63	38	14	25.4			3820		3.5	2		
	70160R-7T	●	7		160	173	110	50.8		70								2990		5.8	2		
	70200R-8T	●	8		200	213	142	120		2390								8.5		3			
	70250R-10T	●	10		250	263	222	47.625		160								1910		15.1	3		
	70315R-12T	MTD	12		315	328	222	215		80								1520		22.2	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.

Spare parts

Description	Parts						
	Clamp screw	Wrench	Shim	Clamp screw	Wrench	Anti-seize compound	Arbor bolt
MFLN ○○080R-4T(-M)							
MFLN ○○100R-4T(-M)	SB-60200TRP	TTP-20	MAP-2216	SB-40140TR	DTM-15	P-37	HH12X35
MFLN ○○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 when insert is fixed.

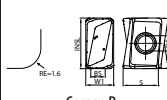
● : Standard item MTD : Made to order

M



Milling

LOGU

Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)		Carbon steel / Alloy steel							☆	★	☆	P			
		Mold and die steel							☆	★	☆				
		Austenitic stainless steel										M			
		Martensitic stainless steel													
		Precipitation hardening stainless steel													
		Gray cast iron							☆	★	☆	K			
		Nodular cast iron							☆	★	☆				
		Non-ferrous metals										N			
		Heat-resistant alloy										S			
		Titanium alloy													
Hard materials										H					
Insert		Description		No. of edges	Dimension (mm)						Carbide			Applicable toolholder ➡ M44 M45 M152	
					S	D1	RE	W1	INSL	BS	PVD				
											PR1525	PR1535	PR1825		PR1835
		LOGU	221616ER-GM	4	16.6	6.8	1.6	12.5	22.8	6.3	○	●	●	●	MFLN45... MFLN70... MFLN90...

Recommended cutting conditions ● M47

About applicable insert

	LOGU221616ER-GM (Corner-R)	LOGU2216PAER-GM (Corner Chamfer)
MFLN 45	✓	not applicable
MFLN 70	✓	not applicable

M



Milling

Cutting edge angle
45°~70°Cutting edge angle
75°Cutting edge angle
88°/90°Cutter for
FinishingHigh Feed
CutterMulti-
Function

Slot Mill

Ball-nose
Radius

Others

● : Standard item ○ : Will be replaced with a new product

M46

Recommended cutting conditions

	Workpiece	D.O.C. (mm)		fz: mm/t	Recommended insert grades (Vc: m/min)	
		Width of cut ≤0.5×DC	Width of cut >0.5×DC		MEGACOAT NANO EX (MEGACOAT NANO)	
					PR1825 (PR1525)	PR1835 (PR1535)
MFLN 45	Carbon steel	~10	~8	0.1 – 0.3 – 0.6	★ 100 – 150 – 180	☆ 80 – 120 – 150
	Alloy steel				★ 100 – 150 – 180	☆ 80 – 120 – 150
	Mold steel				★ 80 – 120 – 150	☆ 70 – 100 – 120
	Gray cast iron	~12	~10	0.1 – 0.3 – 0.6	★ 100 – 150 – 180	☆ 80 – 120 – 150
	Nodular cast iron				★ 100 – 150 – 180	☆ 80 – 120 – 150
MFLN 70	Carbon steel	~15	~12	0.1 – 0.2 – 0.4	★ 100 – 150 – 180	☆ 80 – 120 – 150
	Alloy steel				★ 100 – 150 – 180	☆ 80 – 120 – 150
	Mold steel				★ 80 – 120 – 150	☆ 70 – 100 – 120
	Gray cast iron	~17	~15	0.1 – 0.2 – 0.4	★ 100 – 150 – 180	☆ 80 – 120 – 150
	Nodular cast iron				★ 100 – 150 – 180	☆ 80 – 120 – 150

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

How to mount an insert

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.

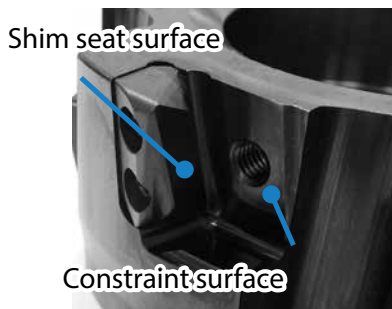


Fig.1

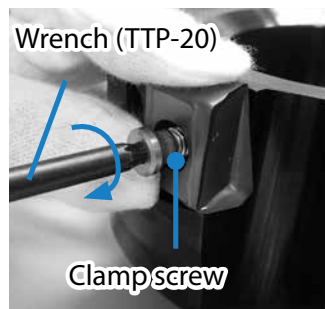


Fig.2

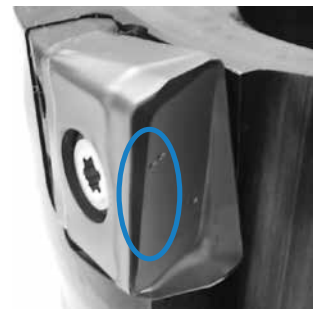


Fig.3

How to replace a 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)
Perform temporarily tightening and tightening in the order of (1) and (2) (See Figs. 2 and 3).
5. Please check that there is no gap between the shim and the pocket surfaces of toolholder.



Fig.1

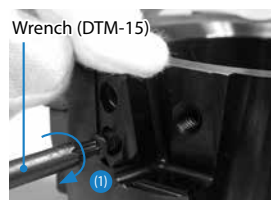


Fig.2

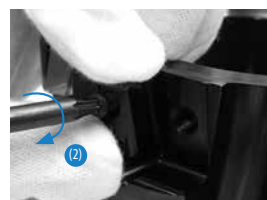


Fig.3



Fig.4

High efficiency cast iron machining

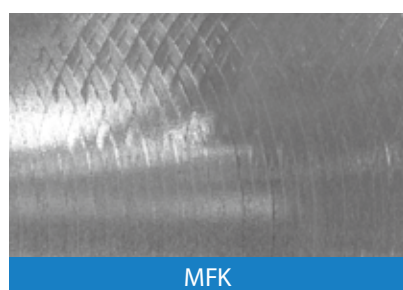
MFK

10-edge pentagonal inserts for stable
and economical machining

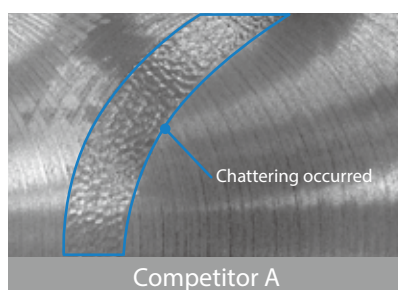


MFK reduces cutting force by good balanced design
Excellent surface finish by controlling chattering

Surface finish comparison (Internal evaluation)



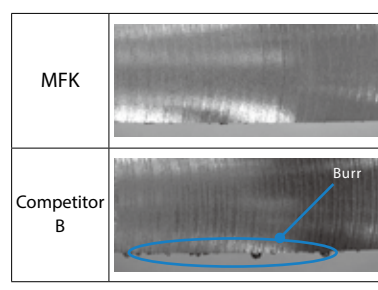
MFK



Competitor A

Cutting conditions:
Workpiece material: FCD600, Dry, $V_c=180\text{m/min}$, $a_p=3\times 78\text{mm}$, $f_z=0.3\text{mm/t}$

Burr comparison (Internal evaluation)



MFK

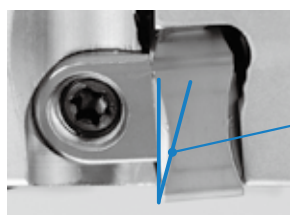
Competitor B

Cutting direction

Sharp cutting prevents burr formation

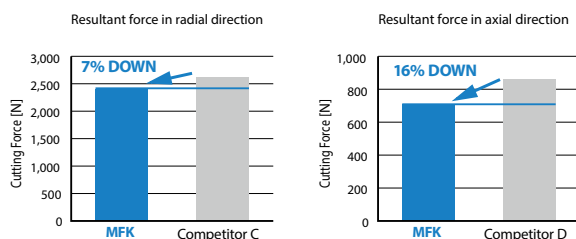
Two special insert structures reduce cutting force and improve edge strength

1 Low cutting force with helical cutting-edge design



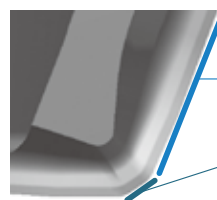
A.R. max. +15°

Cutting force comparison (Internal evaluation)



Cutting conditions:
Workpiece material: FCD600, dry, $\phi 125$
 $V_c=180\text{ m/min}$, $a_p=3.0\times 62\text{ mm}$, $f_z=0.3\text{ mm/t}$

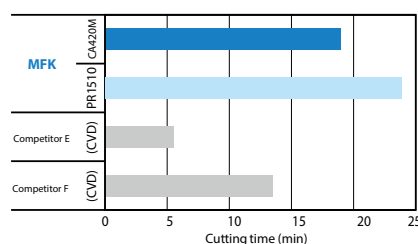
2 Dual cutting edge design (High toughness)



Second main cutting edge

First main cutting edge

Fracture resistance comparison (Internal evaluation)



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

Reducing impact load when biting into the workpiece

Toolholder lineup to meet various applications

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



Fine pitch (Example: $\phi 125$ 12 flutes)

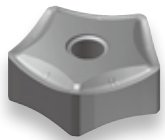
- Recommended for low rigid workpiece
- For wide application range



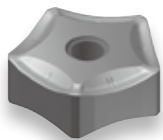
Extra fine pitch (Example: $\phi 125$ 18 flutes)

- Recommended for high rigid workpiece
- For high efficiency machining

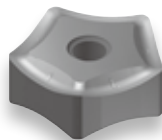
Applicable to various applications with wide range lineup of chipbreakers



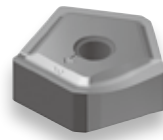
General purpose:
GM chipbreaker



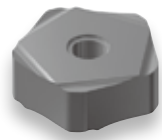
Tough edge:
GH chipbreaker



Finishing:
GL ground chipbreaker

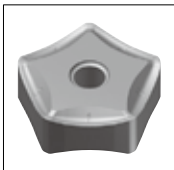


With wiper edge:
W ground chipbreaker

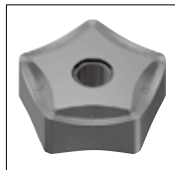


High speed machining:
Ceramic with chipbreaker

Insert grade lineup



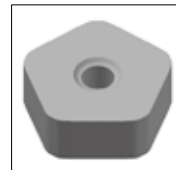
Long tool life
(1st Recommendation)
CA420M
(CVD)



Stable machining
PR1510
(PVD)



Fracture resistance
oriented
PR1525
(PVD)



High speed machining
KS6050/CS7050
(Ceramic)



High speed and high
precision machining
KBN475
(CBN wiper insert)

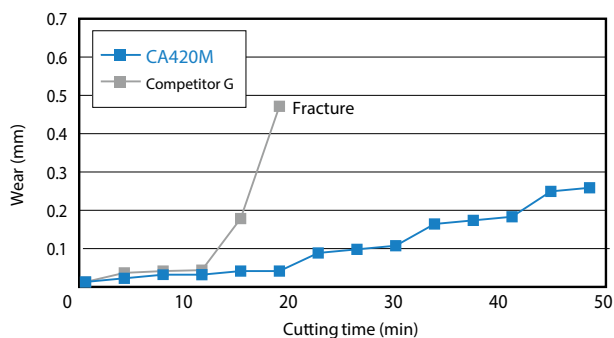
Use CBN wiper inserts together with
ceramic (KS6050/CS7050) inserts.

M

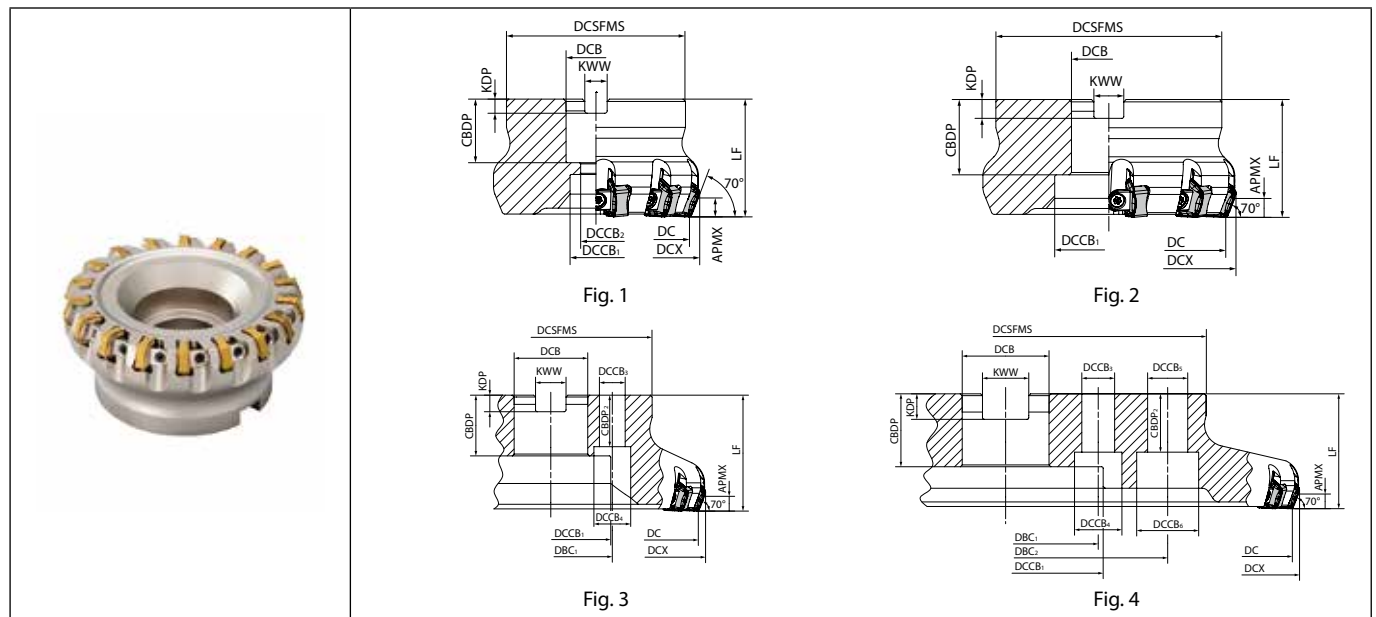


Milling

Wear resistance comparison (Internal evaluation)



Cutting conditions:
Workpiece material: FCD450, dry
 $V_c = 200$ m/min, $a_{pxae} = 2.0 \times 80$ mm, $f_z = 0.3$ mm/t



Toolholder dimensions

Description			Availability	Dimension (mm)																	A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.
				Inserts																						
				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						
Metric	Fine pitch	MFK	080R-11-8T-M	●	8	80	89	76	27	20	13						24	7	12.4			-7		8000	1.87	1
			100R-11-10T-M	●	10	100	109	96	32	26	17	-	-		-		28	8	14.4			-6		7000	2.99	1
			125R-11-12T-M	●	12	125	134		40	55						63	33	9	16.4					6100	3.56	2
			160R-11-16T-M	●	16	160	169			70		14	20			66.7				6	28	+15	No	5300	4.51	3
			200R-11-20T-M	●	20	200	209				-		18	26										4700	7.35	3
			250R-11-24T-M	●	24	250	259		60	110			18	26			101.6		40	14	25.7		32	4200	10.43	3
			315R-11-28T-M	MTO	28	315	324	220							22	32		177.8						3700	19.41	4
	Extra fine pitch	MFK	080R-11-10T-M	●	10	80	89	76	27	20	13						24	7	12.4			-7		8000	1.81	1
			100R-11-14T-M	●	14	100	109	96	32	26	17	-	-		-		28	8	14.4			-6		7000	2.86	1
			125R-11-18T-M	●	18	125	134		40	55							63	33	9	16.4				6100	3.38	2
			160R-11-22T-M	●	22	160	169			70		14	20	-	-	66.7				6	28	+15	No	5300	4.32	3
			200R-11-28T-M	●	28	200	209				-		18	26										4700	7.1	3
			250R-11-36T-M	●	36	250	259		60	110			18	26			101.6		40	14	25.7		32	4200	10.07	3
			315R-11-44T-M	MTO	44	315	324	220							22	32		177.8						3700	18.92	4
Bore dia. inch spec	Fine pitch	MFK	080R-11-8T	●	8	80	89	76	31.75	26	17						32	8	12.7			-7		8000	1.76	1
			100R-11-10T	●	10	100	109	96				-	-		-							-6		7000	2.98	1
			125R-11-12T	●	12	125	134		38.1	55							63		10	15.9				6100	3.65	2
			160R-11-16T	●	16	160	169		50.8	70								38	11	19.1	6	+15	No	5300	4.62	2
			200R-11-20T	●	20	200	209				-													4700	7.65	3
			250R-11-24T	●	24	250	259		47.625	110		18	26			101.6		40	14	25.4		32		4200	10.73	3
			315R-11-28T	MTO	28	315	324	220						22	32		177.8							3700	19.71	4
	Extra fine pitch	MFK	080R-11-10T	●	10	80	89	76	31.75	26	17						32	8	12.7			-7		8000	1.7	1
			100R-11-14T	●	14	100	109	96				-	-		-							-6		7000	2.85	1
			125R-11-18T	●	18	125	134		38.1	55							63		10	15.9				6100	3.44	2
			160R-11-22T	●	22	160	169		50.8	70					-	-		38	11	19.1	6	+15	No	5300	4.44	2
			200R-11-28T	●	28	200	209				-		18	26										4700	7.4	3
			250R-11-36T	●	36	250	259		47.625	110			18	26			101.6		40	14	25.4		32	4200	10.36	3
			315R-11-44T	MTO	44	315	324	220							22	32		177.8						3700	19.21	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.

● : Standard item MTO : Made to order

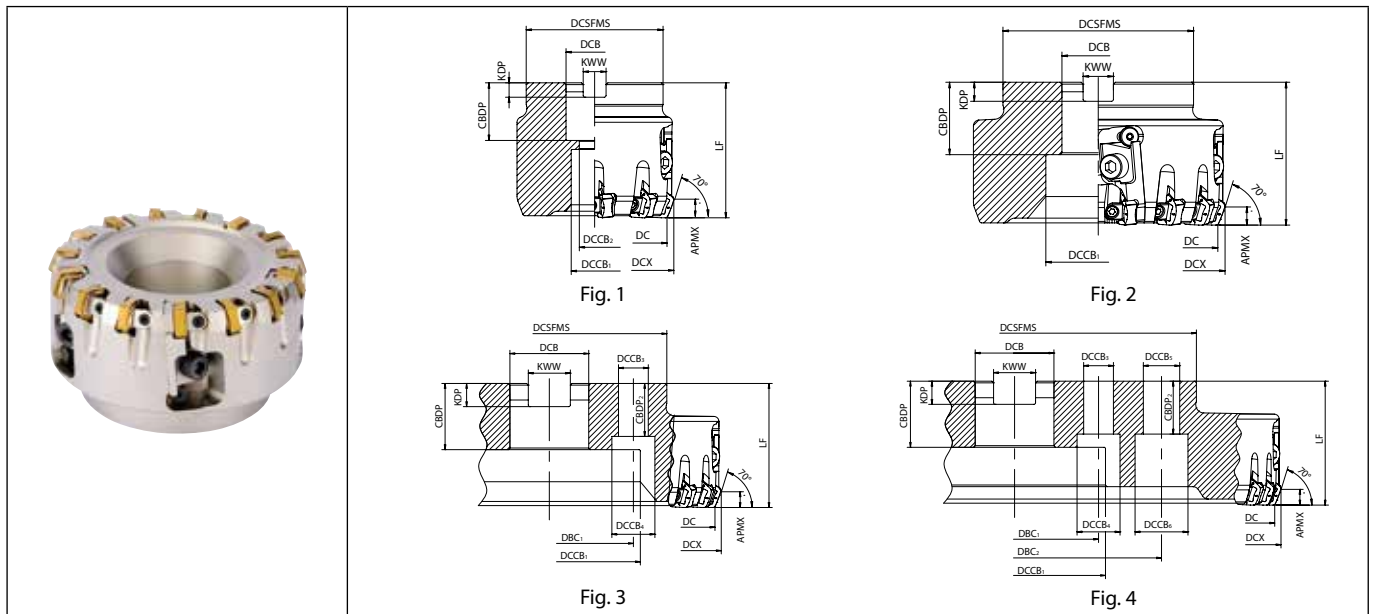
Spare parts and applicable inserts (MFK)

Description	Spare parts				Applicable inserts  M54
	Wedge	Wedge screw	Wrench	Mounting bolt	
					
MFK 080R-11-8T-M	C09N	W6X18N	TT-15	HH12X35	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W
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					

Description	Spare parts				Applicable inserts  M54
	Wedge	Wedge screw	Wrench	Mounting bolt	
					
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					



MFK-SF



Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)																A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.
					DC	DCX	DCSfMS	DCB	DCCB ₁	DCCB ₂	DCCB ₃	DCCB ₄	DCCB ₅	DCCB ₆	DBC ₁	DBC ₂	LF	CBDP	KDP	KWW						
Metric	MFK	080R-11-9T-M-SF	●	9 (3)	80	89	76	27	20	13							24	7	12.4			-7	8000	2.21	1	
		100R-11-12T-M-SF	●	12 (4)	100	109	96	32	26	17	-	-				-	28	8	14.4		-	-6	7000	3.49	1	
		125R-11-15T-M-SF	●	15 (5)	125	134											33	9	16.4				6100	4.47	2	
		160R-11-18T-M-SF	●	18 (6)	160	169	100	40	55		14	20			66.7		75			6	28	+15	No	5300	6.99	3
		200R-11-24T-M-SF	●	24 (8)	200	209				-												-5	4700	9.89	3	
		250R-11-30T-M-SF	MT0	30 (10)	250	259	142	60	110		18	26			101.6			35	14	25.7		32		4200	16.35	3
		315R-11-39T-M-SF	MT0	39 (13)	315	324	220						22	32		177.8								3700	28.14	4
Bore dia. inch spec	MFK	080R-11-9T-SF	●	9 (3)	80	89	76															-7	8000	2.08	1	
		100R-11-12T-SF	●	12 (4)	100	109	96															-6	7000	3.49	1	
		125R-11-15T-SF	●	15 (5)	125	134		38.1	55		-	-												6100	4.54	2
		160R-11-18T-SF	●	18 (6)	160	169	100	50.8	70													+15	No	5300	6.82	2
		200R-11-24T-SF	●	24 (8)	200	209				-							75	38	10	15.9				4700	10.39	3
		250R-11-30T-SF	MT0	30 (10)	250	259	142	47.625	110		18	26			101.6			40	14	25.4		32		4200	16.85	3
		315R-11-39T-SF	MT0	39 (13)	315	324	220						22	32		177.8								3700	28.65	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.

Numbers in parentheses () are the number of adjustable cutting edge pockets.

Please install wiper inserts in the adjustable cutting edge pockets.

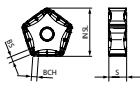
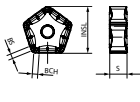
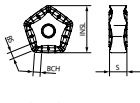
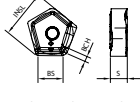
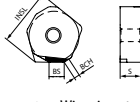
● : Standard item MT0 : Made to order

Spare parts and applicable inserts (MFK-SF)

Description	Spare parts								Applicable inserts ➡ M54
	Wedge 	Wedge screw 	Wrench 	Cartridge 	Cartridge clamp screw 	Wrench 	Adjustment screw 	Mounting bolt 	
MFK 080R-11-9T-M-SF	C09N	W6X18N	TT-15	CR-MFK70R	HH8X25	LW-6	AJ-519TR	HH12X35	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W
100R-11-12T-M-SF								HH16X40	
125R-11-15T-M-SF								-	
160R-11-18T-M-SF								-	
200R-11-24T-M-SF								-	
250R-11-30T-M-SF								-	
315R-11-39T-M-SF								-	
MFK 080R-11-9T-SF	C09N	W6X18N	TT-15	CR-MFK70R	HH8X25	LW-6	AJ-519TR	HH16X40	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W
100R-11-12T-SF								-	
125R-11-15T-SF								-	
160R-11-18T-SF								-	
200R-11-24T-SF								-	
250R-11-30T-SF								-	
315R-11-39T-SF								-	



PNMG/PNEG/PNEA

Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)		Carbon steel / Alloy steel											P		
		Mold and die steel													
		Austenitic stainless steel											M		
		Martensitic stainless steel													
		Precipitation hardening stainless steel													
		Gray cast iron				★		☆	☆	★				K	
		Nodular cast iron				★		☆	★	☆					
		Non-ferrous metals												N	
		Heat-resistant alloy												S	
		Titanium alloy													
Hard materials												H			
Insert		Description	No. of edges	Dimension (mm)				Carbide			Cera- mic	CBN	Applicable toolholder ➡ M50 M52		
				S	INSL	BCH	BS	CVD	PVD		CVD	-		-	
									CA420M	PR1510					PR1525
	 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

Handed insert shows Right-hand

Recommended cutting conditions M55, M56

● : Standard item ○ : Will be replaced with a new product □ : Expected to be discontinued in September 2026

PNEG1106XNER-W inserts are
sold in 5 piece boxesPNEG1106XNTR-T01015W inserts are
sold in 1 piece boxes

Recommended cutting conditions (Ceramic/CBN)

Without chipbreaker

Workpiece material	Insert grades	Vc (m/min)	Edge preparation	fz(mm/t)				
				0.05	0.1	0.2	0.3	0.4
Gray cast iron	KS6050 ★ CS7050 ☆	600~900~1,200	0.10x20°					
Nodular cast iron	KS6050 ☆ CS7050 ★	400~600~900						

With chipbreaker

Workpiece material	Insert grades	Vc (m/min)	Edge preparation	fz(mm/t)				
				0.05	0.1	0.2	0.3	0.4
Gray cast iron	KS6050 ★ CS7050 ☆	600~900~1,200	0.05x15°					
Nodular cast iron	KS6050 ☆ CS7050 ★	400~600~900						

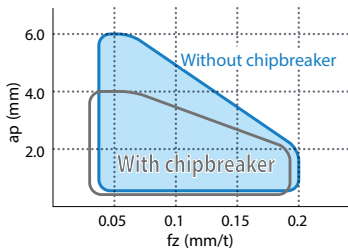
CBN wiper insert

Workpiece material	Insert grades	Vc (m/min)	Edge preparation	fz(mm/t)				
				0.05	0.1	0.2	0.3	0.4
Gray cast iron	KBN475	600~900~1,200	0.10x15°					
Nodular cast iron		400~600~900						

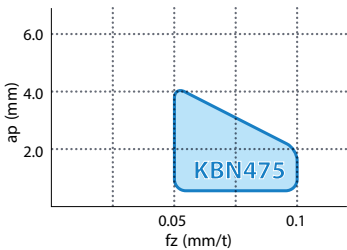
★ : 1st Recommendation ☆ : 2nd Recommendation

Recommended application range (Ceramic/CBN)

Workpiece material: Cast iron
(Ceramic)



Workpiece material: Cast iron
(CBN)



When using CBN wiper inserts

- Please use CBN wiper inserts together with ceramic inserts. Feed rate should be fz=0.1mm/t or under.
- 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.

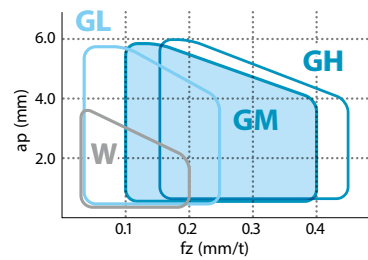
Recommended cutting conditions (Coated carbide)

Workpiece material	Insert grades	Vc (m/min)	Chipbreaker	fz(mm/t)				
				0.06	0.1	0.2	0.3	0.4
Gray cast iron	CA420M	170~230~300	GM★			0.25		
	PR1810	120~180~250	GH☆				0.3	
	PR1825		GL		0.12			
	PR1510	120~180~250	GH				0.3	
	PR1525		GL		0.12			
Nodular cast iron	CA420M	150~200~250	GM★			0.2		
	PR1810	100~150~200	GH☆				0.25	
	PR1825		GL		0.1			
	PR1510	100~150~200	GH				0.25	
	PR1525		GL		0.1			

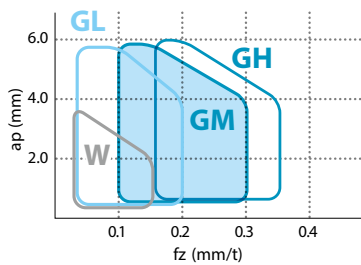
★ : 1st Recommendation ☆: 2nd Recommendation

Recommended application range

Workpiece material: Gray cast iron



Workpiece material: Nodular cast iron



- Notes:
1. When using W, please use together with GM or GH.
 2. If machining fz=0.2 or over, insert corner will be damaged. The main cutting edge of W insert is receding from that of GM and GH. Therefore, the feed rate for the insert next to W type is double of the other inserts.

M

Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

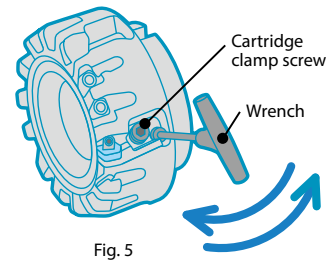
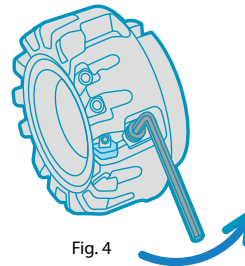
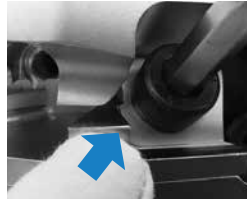
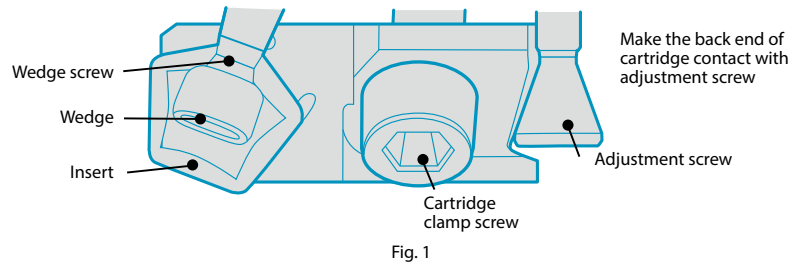
Slot Mill

Ball-nose
Radius

Others

How to adjust cutting edge height

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



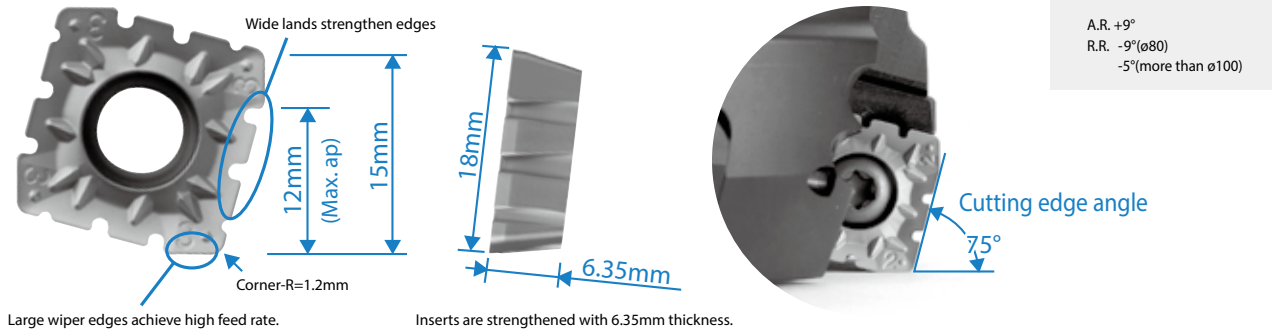
Notes:

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 5 μ m.

MSRS15 face mill for heavy milling

Large depth of cut and high feed rate achieves high efficiency machining

Recommended ap: 5 ~ 10mm



Large wiper edges achieve high feed rate.

Inserts are strengthened with 6.35mm thickness.

Selection of chipbreaker

	Low cutting force	General purpose	Edge strength oriented
Insert type	 NB2P(4-Notched) + NB3P(5-Notched)	 NB2(2-Notched) + NB3(3-Notched)	 NB2T(2-Notched) + NB3T(3-Notched)
Applications	When using long arbor or for machining of thin-plate workpieces	General purpose type with good balance of strength and cutting force	For interrupted machining and high load machining When feed rate is increased or workpiece material is cast iron
Edge preparation	As many as four (or five) notches help to alleviate the shock when biting into the workpiece 	Strength, edge and chip control are all well balance 	Strength is increased by the edge shape and moderate rake angle of the chamfer edge

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

or +

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

Features of toolholder

Coarse pitch

Design of large chip pocket
Good chip evacuation

Display the applicable insert number (Notch number)

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

Fine pitch

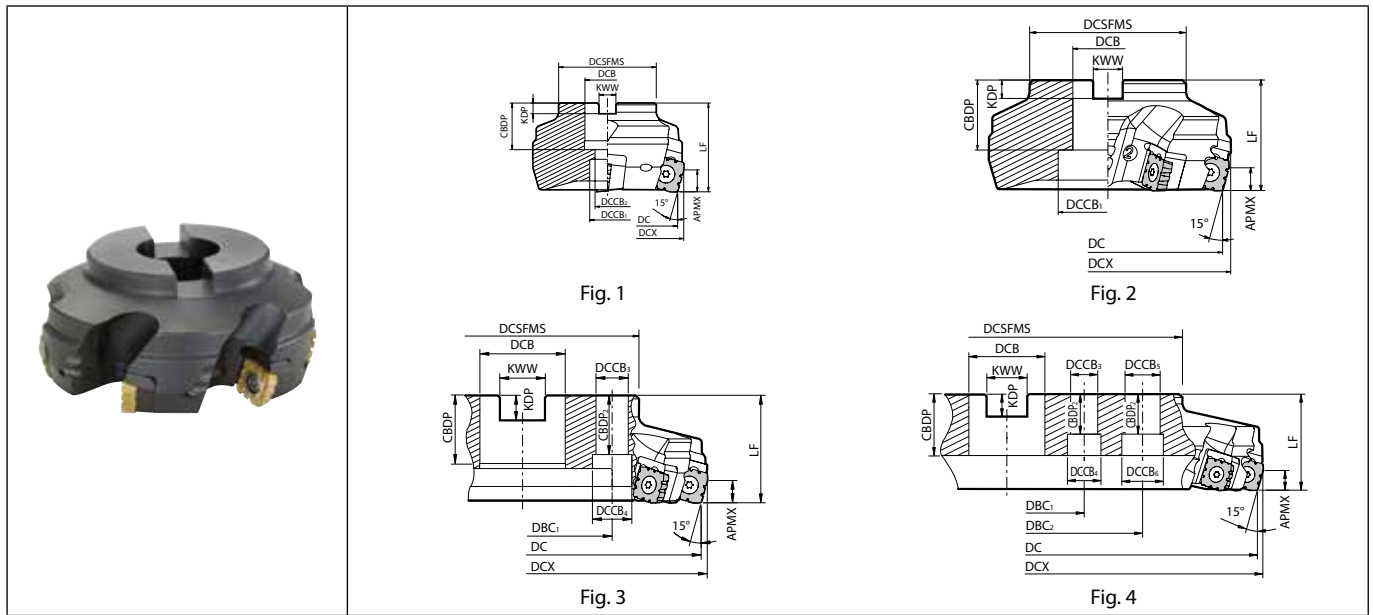
Higher productivity with fine pitch design

Insert replacement identification

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

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

MSRS15



Toolholder dimensions

Description		Availability	Inserts	Dimension (mm)																	A.R. (°)	R.R. (°)	Coolant hole	Weight (kg)	Fig.	Applicable inserts M60
				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				
Metric	Coarse pitch	MSRS	15080R-4T-M	●	4	80	87	70	27	20	13						50	24	7	12.4			-9	1.3	1	SPMT1806EDER... SPMT1806EDSR...
			15100R-4T-M	●		100	107		32	45		-	-				29	8	14.4					2	2	
			15125R-6T-M	●	6	125	132			55														3.6	2	
			15160R-8T-M	●	8	160	167	110		68		14	20			66.7								5	3	
			15200R-10T-M	●	10	200	207																	7.7	3	
			15250R-12T-M	●	12	250	257		60	-		18	26			101.6								12	3	
	Fine pitch		15315R-14T-M	●	14	315	322	230						22	32		177.8							17	4	SPMT1806EDER... SPMT1806EDSR...
		MSRS	15080R-6T-M	●	6	80	87	70	27	20	13						50	24	7	12.4			-9	1.3	1	
			15100R-6T-M	●		100	107		32	45		-	-				29	8	14.4					1.9	2	
			15125R-8T-M	●	8	125	132			55														3.5	2	
			15160R-10T-M	●	10	160	167	110		68		14	20			66.7								4.9	3	
			15200R-12T-M	●	12	200	207																	7.6	3	
Bore dia. inch spec	Coarse pitch		15250R-14T-M	●	14	250	257		60	-		18	26			101.6								11.9	3	SPMT1806EDER... SPMT1806EDSR...
			15315R-16T-M	MTD	16	315	322	230						22	32		177.8							17	4	
		MSRS	15080R-4T	●	4	80	87	55	25.4	20	13						50	26	6	9.5			-9	1.3	1	
			15100R-4T	●		100	107	70	31.75	42		-	-				32	8	12.7					2	2	
			15125R-6T	●	6	125	132	85	38.1	54														3.6	2	
			15160R-8T	●	8	160	167	100	50.8	68														5	2	
	Fine pitch		15200R-10T	●	10	200	207																	7.7	3	SPMT1806EDER... SPMT1806EDSR...
			15250R-12T	●	12	250	257		47.625	-		18	26			101.6								12	3	
			15315R-14T	●	14	315	322	220						22	32		177.8							17	4	
		MSRS	15080R-6T	●	6	80	87	55	25.4	20	13						50	26	6	9.5			-9	1.3	1	
			15100R-6T	●		100	107	70	31.75	42		-	-				32	8	12.7					1.9	2	
			15125R-8T	●	8	125	132	85	38.1	54														3.5	2	
Bore dia. inch spec	Fine pitch		15160R-10T	●	10	160	167	100	50.8	68														4.9	2	SPMT1806EDER... SPMT1806EDSR...
			15200R-12T	●	12	200	207																	7.6	3	
			15250R-14T	●	14	250	257		47.625	-		18	26			101.6								11.9	3	
			15315R-16T	MTD	16	315	322	220						22	32		177.8							17	4	
		MSRS	15080R-6T	●	6	80	87	55	25.4	20	13						50	26	6	9.5			-9	1.3	1	
			15100R-6T	●		100	107	70	31.75	42		-	-				32	8	12.7					1.9	2	

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.

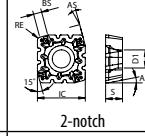
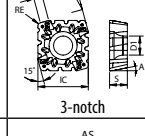
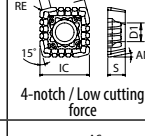
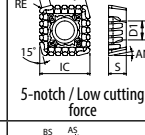
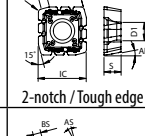
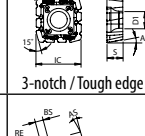
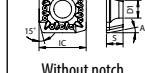
● : Standard item MTD : Made to order

M



Milling

SPMT

Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)			Carbon steel / Alloy steel							★	☆	P
			Mold and die steel							★	☆	
			Austenitic stainless steel									M
			Martensitic stainless steel									
			Precipitation hardening stainless steel									
			Gray cast iron							★		K
			Nodular cast iron							★		
			Non-ferrous metals									N
			Heat-resistant alloy								★	S
			Titanium alloy								★	
			Hard materials									H
Insert		Description	No. of edges	Dimension (mm)					Angle (°)		Carbide	Applicable toolholder M59
				IC	S	D1	RE	BS	AN	AS	PVD	
											PR1810	
		SPMT 1806EDER-NB2	4	18	6.35	6.8	1.2	3.1	11	15	●●●	MSRS15...
		SPMT 1806EDER-NB3	4	18	6.35	6.8	1.2	3.1	11	15	●●●	MSRS15...
		SPMT 1806EDER-NB2P	4	18	6.35	6.8	1.2	3.1	11	15	●●●	MSRS15...
		SPMT 1806EDER-NB3P	4	18	6.35	6.8	1.2	3.1	11	15	●●●	MSRS15...
		SPMT 1806EDSR-NB2T	4	18	6.35	6.8	1.2	3.1	11	15	●●	MSRS15...
		SPMT 1806EDSR-NB3T	4	18	6.35	6.8	1.2	3.1	11	15	●●	MSRS15...
		SPMT 1806EDER-V	4	18	6.35	6.8	1.2	3.1	11	15	●●●	MSRS15...

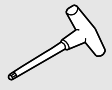
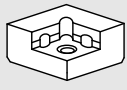
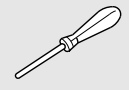
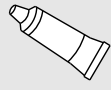
Handed insert shows Right-hand

Recommended cutting conditions M61

● : Standard item

M60

Spare parts (common to Metric / Inch spec)

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



Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

Recommended cutting conditions

Workpiece material	fz (mm/t)			Recommended insert grades (Vc: m/min)		
	NB2P + NB3P	NB2 + NB3	NB2T + NB3T	MEGACOAT NANO EX		
				PR1810	PR1825	PR1835
Carbon steel	0.15	0.2	0.3	-	★ 120~ 180 ~250	☆ 120~ 180 ~220
Alloy steel	0.15	0.2	0.3	-	★ 120~ 180 ~250	☆ 120~ 180 ~220
Mold steel	0.1	0.15	0.2	-	★ 100~ 160 ~220	☆ 100~ 160 ~200
Gray cast iron	0.2	0.25	0.35	★ 120~ 180 ~250	-	-
Nodular cast iron	0.15	0.2	0.3	★ 100~ 160 ~220	-	-
Stainless steel	Not recommended					
Aluminum/Copper	Not recommended					

★: 1st Recommendation ☆: 2nd Recommendation



Tangential 90° end mill 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

Challenges

Conventional end mill

- Sudden fractures can cause damage to the holder
- Insert defects preventing use of all four corners

Tangential end mill

- Premature tool wear can quickly deteriorate the surface finish quality
- Poor wall accuracy

SOLUTION

Kyocera's MA90 tangential end mill solves these problems with a unique insert shape and PR18 Series grade technology.

M

Large web thickness

High rigidity

Peripheral grinding specifications

Excellent wall accuracy

Special wiper edge

Large relief angle suppresses wear

High-quality surface finish

Multifunctional (G-class insert)

Supports three-dimensional machining (Excluding R4-R6)

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



Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

Ball-nose
Radius

Others

2

New insert grade PR18 Series provides a significantly longer tool life

Extensive lineup of insert grades covers a variety of machining materials and applications

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 Hard materials	PR015S (GH)	S Heat-resistant alloy	CA6535 (PR1835)	Titanium alloy	PR1835
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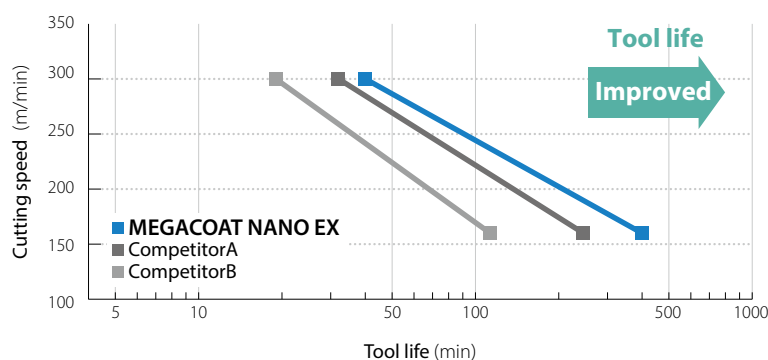
PR1825 Wear resistance comparison (Internal evaluation)

V-T graph

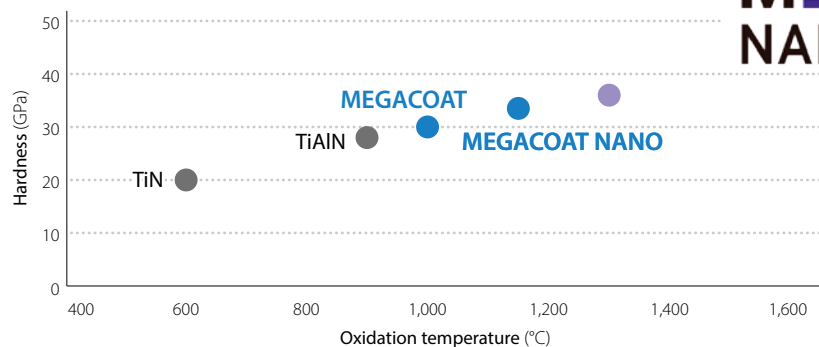
Life criteria:
Flank face wear = 0.10 mm

Cutting conditions:

Vc = 160/300 m/min
ap x ae = 2.0 x 110 mm, fz = 0.12 mm/t
SCM440 Dry
PNMU1205ANER-GM (MFPN)



Coating characteristics (Internal evaluation)



MEGACOAT
NANO EX | Milling

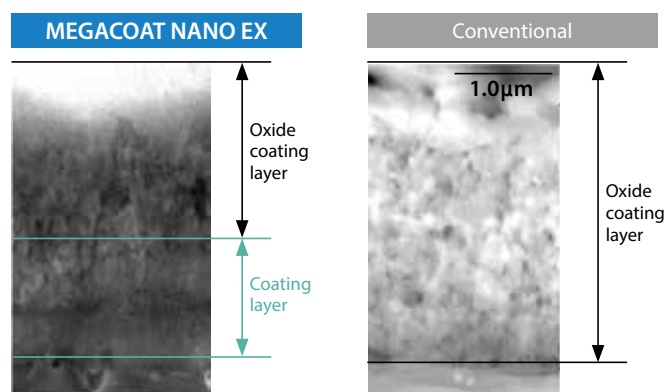
M



Milling

Oxidation progression comparison (Internal evaluation)

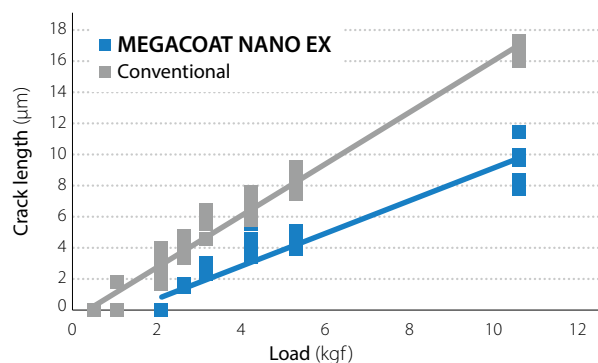
Suppresses oxidation progression with excellent oxidation resistance



*Section after holding at 1,200 degrees for 30 minutes in air

Coating layer toughness evaluation (Internal evaluation)

Excellent coating toughness with small crack length



*Micro-Vickers measurement

3

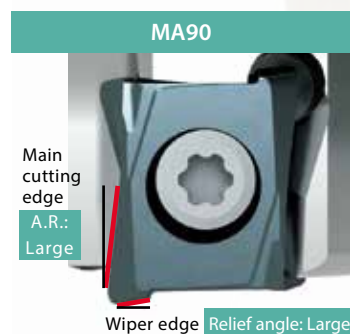
Achieve reliable results with an insert shape designed for high quality machining and long tool life

Unique cutting edge design delivers high fracture resistance and low cutting forces

Special wiper edge and peripheral grinding specifications provide high quality finish and long tool life

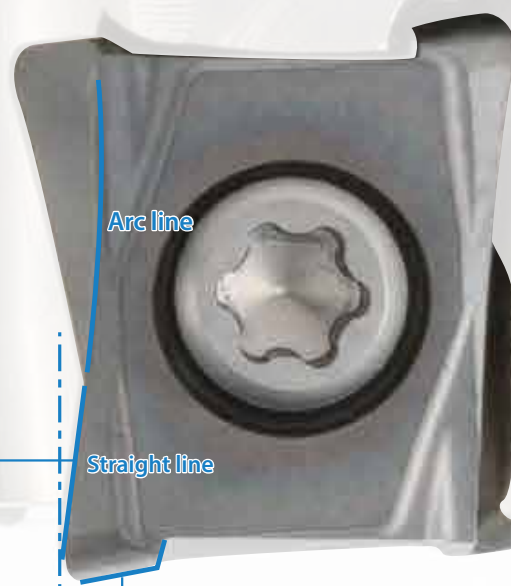
Advantage

Both the A.R. and the relief angle of the wiper edge are large.
Low resistance and excellent surface finish



Unique cutting edge design

Superior fracture resistance and low cutting force



Special wiper edge

Large relief angle: Excellent surface finish and wear suppression
Stepped corners: Designed to prevent seat damage

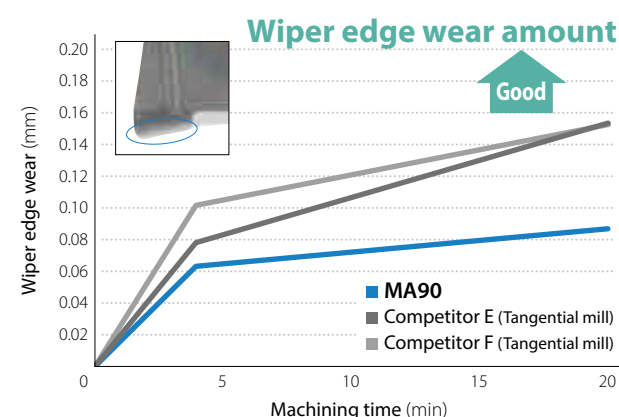
Excellent

Excellent surface finish >>>

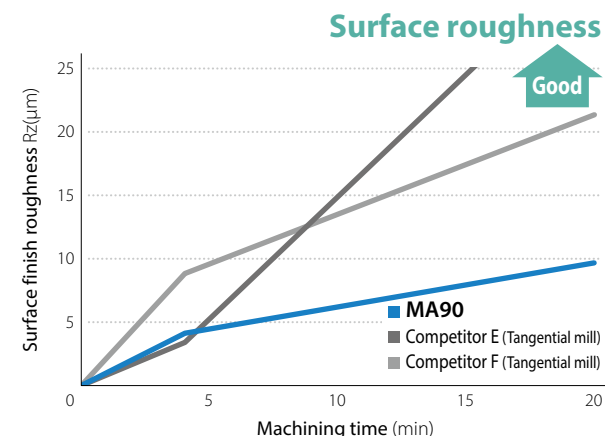
Special wiper edge design suppresses abrasion progress of the edge. Maintains high-quality finished surface

Wear and surface finish comparison (Internal evaluation)

Wiper edge wear



Surface finish roughness (Bottom surface)



Cutting conditions: Vc = 200 m/min, ap × ae = 1 × 37.5 mm, fz = 0.1/0.12 mm/t, Dry S50C ø50 (6/7 inserts) BT50

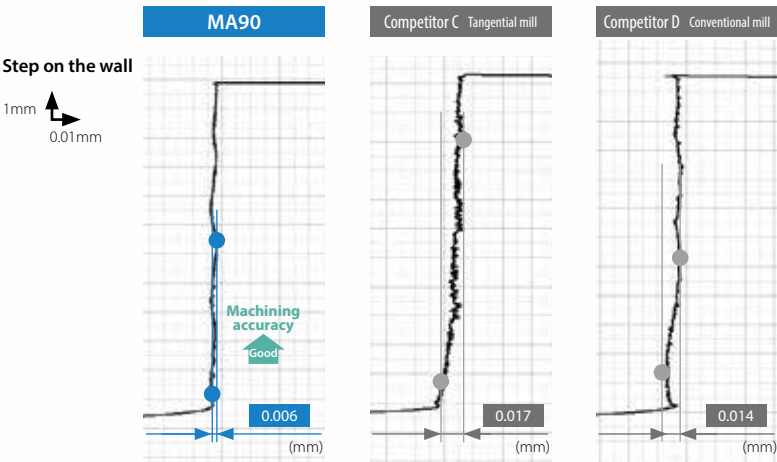
Excellent wall accuracy

Excellent

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



Wall accuracy comparison (Internal evaluation)



Wall condition



Cutting conditions: Vc = 150 m/min, ap x ae = 3 x 5 mm 4passes, fz = 0.1 mm/t, Dry S50C ø20 (3 inserts) BT50

Long tool life and high-speed machining

CASE Even if the main cutting edge is in good condition, the tool reached the end of life due to deterioration of the finished surface.



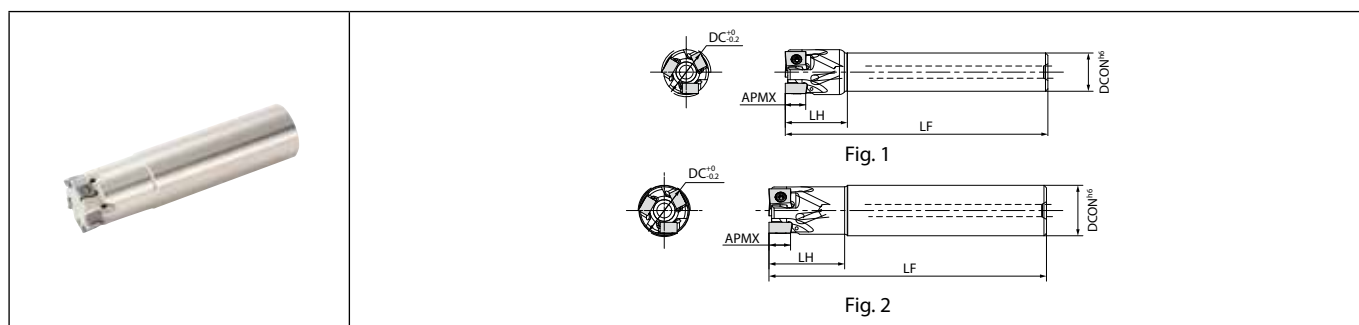
CASE Machined with reduced cutting speed because the surface finish deteriorated early.



Edge condition and finished surface (Internal evaluation)

		MA90	Competitor E Tangential	Competitor F Tangential
Wiper edge	After 3.8 min			
	After 6.5 min			
Main cutting edge		Abrasion progress: Small Good	Abrasion progress: Large Spark generation Good	Abrasion progress: Large Spark generation Good
Finished surface	After 13.1 min			
		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 can continue to use	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)



Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)					Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Spare parts			Applicable inserts											
														Anti-seize compound	Screw	Wrench												
Cylindrical	Standard shank	MA90	-16S12-09T2C	●	2	16	12	100	23	8	Yes	1	P-37	SB-44865UTRP	DTPM-8	LOGU0904...												
			-18S16-09T2C	●		18	16										110	26	29500	0.1	27900							
			-20S16-09T2C	●	20	110		26	26600										0.2	25400								
			-20S16-09T3C	●			22										20	120			29	23900	0.3	22600				
			-22S20-09T3C	●	25	120		29	21900										0.5	21200								
			-25S20-09T3C	●			3										28	130			32	20300	0.9	19000				
			-25S20-09T4C	●	4	30		130	32										17000	0.9								
			-28S25-09T3C	●			5										32	150			50	17000	0.9					
			-30S25-09T4C	●	4	35		150	50										17000	0.9								
			-32S25-09T4C	●			5										40	120			40	17000	0.9					
			-32S25-09T5C	●	6	50		120	40										17000	0.9								
			-35S32-09T4C	●			5										50	120			40	17000	0.9					
			-35S32-09T5C	●	6	50		120	40										17000	0.9								
			-40S32-09T4C	●			7										50	120			40	17000	0.9					
			-40S32-09T6C	●	7	50		120	40										17000	0.9								
			-50S32-09T5C	●			7										50	120			40	17000	0.9					
			-50S32-09T7C	●	7	50		120	40										17000	0.9								
	Same shank	MA90	-16S16-09T2C	●			2			16	16	100	26	8	Yes	2	P-37	SB-44865UTRP			DTPM-8	LOGU0904...						
			-20S20-09T2C	●	20	20		110	30	29500	0.1	26600	0.2															
			-20S20-09T3C	●	3	25	25	120	32	23900	0.4								21200	0.7								
			-25S25-09T3C	●								4	32										32	130	40	21200	0.7	
			-25S25-09T4C	●	5	32	32	130	40	21200	0.7																	
			-32S32-09T4C	●								5	32						32	130			40	21200	0.7			
			-32S32-09T5C	●	5	32	32	130	40	21200	0.7																	
			Long shank	MA90								-20S18-09T2CL	●						2	20			18	30	8	Yes	1	P-37
					-20S20-09T2CL	●	20	20	40	26600	0.3	23900	0.6															
					-25S25-09T2CL	●	25	25	50	23900	0.6									21200			1.1					
-32S32-09T2CL	●	32			32	65	21200	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.

● : Standard item

Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)					Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Spare parts			Applicable inserts	
					DC	DCON	LF	LH	APMX									
Cylindrical	Standard shank	MA90	-25S20-12T2C	●	25	20	120	29	12	Yes	18300	0.3	1	P-37	SB-40104TRP	DTPM-15	LOGT1206... LOGU1206...	
			-28S25-12T2C	●	2	28	25	130			32	17300						0.4
			-30S25-12T2C	●	3	30						16800						0.5
			-30S25-12T3C	●		32	16300											
			-32S25-12T2C	●	2	32	15600	0.9										
			-32S25-12T3C	●	3	35	14600											
			-35S32-12T3C	●		40	13100	0.8										
			-40S32-12T3C	●	4	40	32				120	40						
			-40S32-12T4C	●		50												
			-50S32-12T4C	●	6													
			-50S32-12T6C	●														
	Same shank	MA90	-25S25-12T2C	●	25	25	120	32	12	Yes	18300	0.4	2	P-37	SB-40104TRP	DTPM-15	LOGT1206... LOGU1206...	
			-32S32-12T2C	●	2	32	32	130			40	16300						0.7
			-32S32-12T3C	●	3													
Long shank	MA90	-25S25-12T2CL	●	25	25	170	50	12	Yes	18300	0.6	2	P-37	SB-40104TRP	DTPM-15	LOGT1206... LOGU1206...		
		-32S32-12T2CL	●	2	32	32	200			65	16300						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.



MA90 (Face mill)

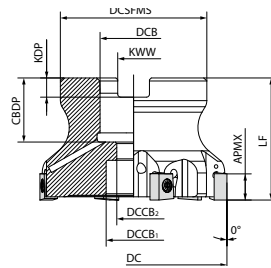


Fig. 1

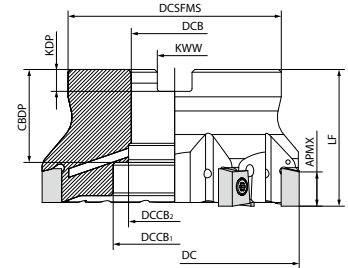


Fig. 2

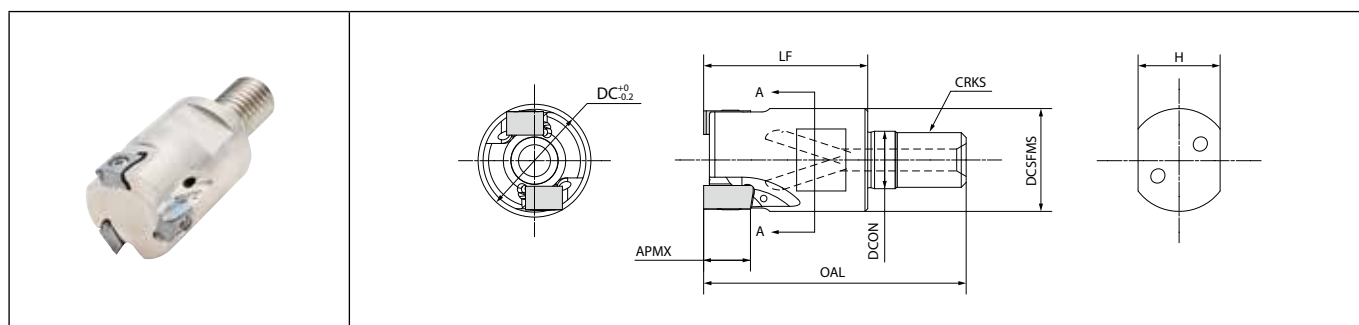
Toolholder dimensions

Description		Availability	Inserts	Dimension (mm)										Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Spare parts			Applicable inserts
				DC	DCSfMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX					Anti-seize compound	Screw	Wrench	
Metric	MA90	-040R-09T4C-M	● 4	40	38	16	15	9	40	19	5.6	8.4	8	Yes	26600	0.2	1	P-37	SB-44880UTRP	DTPM-8	LOGU0904...
		-040R-09T6C-M	● 6												50	21					
		-050R-09T5C-M	● 5	63	21	6.3	10.4	21200	0.5												
		-050R-09T7C-M	● 7							63	21	6.3			10.4	21200					
		-063R-09T6C-M	● 6	63	21	6.3	10.4	21200	0.5												
		-063R-09T9C-M	● 9							63	21	6.3			10.4	21200					
	MA90	-040R-12T3C-M	● 3	40	38	16	14	9	40				19	5.6			8.4	12	Yes	14600	0.2
		-040R-12T4C-M	● 4							50	21	6.3			10.4	13100				0.3	
		-050R-12T4C-M	● 5	63	21	6.3	10.4	11700	0.4												
		-050R-12T6C-M	● 6							63	21	6.3	10.4	11700	0.4						
		-063R-12T6C-M	● 7	80	70	27	20	13	24							7	12.4			10400	1.2
		-063R-12T8C-M	● 8							80	70	27	20	13	24						
		-080R-12T7C-M	● 7	100	78	32	45	50	30							8	14.4			9300	1.5
		-080R-12T10C-M	● 10							100	78	32	45	50	30						
		-100R-12T9C-M	● 9	125	89	40	55	63	33							9	16.4			8300	2.5
		-100R-12T13C-M	● 13							125	89	40	55	63	33						
		-125R-12T12C-M	● 12	125	89	40	55	63	33							9	16.4			8300	2.5
		-125R-12T16C-M	● 16							125	89	40	55	63	33						
Bore dia. inch spec	MA90	-080R-12T7C	● 7	80	70	25.4	20	13	50							27	6	9.5	12	Yes	10400
		-080R-12T10C	● 10							100	78	31.75	45	34	8						12.7
		-100R-12T9C	● 9	100	78	31.75	45	34	8							12.7	9300	1.5			
		-100R-12T13C	● 13							125	89	38.1	55	63	38						10
		-125R-12T12C	● 12	125	89	38.1	55	63	38							10	15.9	8300			
		-125R-12T16C	● 16							125	89	38.1	55	63	38						10

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.

● : Standard item

MA90 (Modular type)

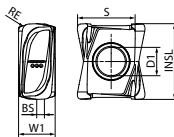
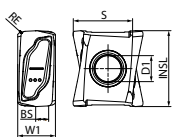
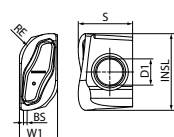
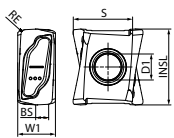
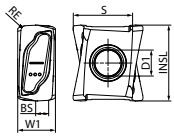


Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)								Coolant hole	Max. revolution (min ⁻¹)	Spare parts			Applicable inserts
			DC	DCON	DCFMS	OAL	LF	APWX	CRKS	H			Anti-seize compound	Screw	Wrench	
																
MA90 -20M10-09T2C -20M10-09T3C -25M12-09T3C -25M12-09T4C -32M16-09T4C -32M16-09T5C		2	20	10.5	18.8	48	30		M10×1.5	15		19000	P-37	SB-44880UTRP	DTPM-8	LOGU0904...
		3										17000				
			25	12.5	23	56	35	8	M12×1.75	19	Yes					
		4										15100				
			32	17	30	62	40		M16×2.0	24						
		5														
MA90 -25M12-12T2C -32M16-12T2C -32M16-12T3C		2	25	12.5	23	56	35		M12×1.75	19		18300	P-37	SB-40104TRP	DTPM-15	LOGT1206... LOGU1206...
			32	17	30	62	40	12	M16×2.0	24	Yes	16300				
		3														

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.

LOGU

Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)		Carbon steel / Alloy steel						★	☆	P				
		Mold and die steel						★	☆					
		Austenitic stainless steel						☆	★	M				
		Martensitic stainless steel		★					☆					
		Precipitation hardening stainless steel							★					
		Stainless steel												
		Gray cast iron							★	K				
		Nodular cast iron							★					
		Non-ferrous metals								N				
		Heat-resistant alloy		★					☆	S				
		Titanium alloy							★					
		Hard materials								H				
Insert		Description	No. of edges	Dimension (mm)						Carbide				Applicable toolholder
				S	D1	RE	INSL	W1	BS	CVD		PVD		
CA6535	PR0155	PR1810	PR1825							PR1835				
 General purpose		LOGU 090404ER-GM 090408ER-GM 090412ER-GM 090416ER-GM	4	6.77 6.71 6.65 6.59	3.33	0.4 0.8 1.2 1.6	8.89	4.3	1.29 0.9 0.49 0.1	● ● ● ●	● ● ● ●	● ● ● ●	MA90-...-09T...	
 Low cutting force		LOGU 090404ER-SM 090408ER-SM 090412ER-SM 090416ER-SM	4	6.77 6.71 6.65 6.59	3.33	0.4 0.8 1.2 1.6	8.89	4.3	1.29 0.89 0.49 0.1	● ● ● ●	● ● ● ●	● ● ● ●	MA90-...-09T...	
 Tough edge		LOGU 090408ER-GH	4	6.71	3.33	0.8	8.89	4.3	0.9	●	●	●	●	MA90-...-09T...
 General purpose		LOGU 120604ER-GM 120608ER-GM 120612ER-GM 120616ER-GM 120620ER-GM 120624ER-GM 120630ER-GM	4	10.1 10.04 9.97 9.92 9.85 9.79 9.69	4.55	0.4 0.8 1.2 1.6 2 2.4 3	13.28	6.6	2.5 2.14 1.79 1.44 1.08 0.72 0.2	● ● ● ● ● ● ●	● ● ● ● ● ● ●	● ● ● ● ● ● ●	MA90-...-12T...	
 General purpose (Single-sided)		LOGT 120640ER-GM 120650ER-GM 120660ER-GM	2	9.56 9.40 9.24	4.55	4 5 6	13.28	6.6	1.69 0.63 0.37	● ● ●	● ● ●	● ● ●	MA90-...-12T...	
 Low cutting force		LOGU 120604ER-SM 120608ER-SM 120612ER-SM 120616ER-SM 120620ER-SM 120624ER-SM 120630ER-SM	4	10.1 10.04 9.97 9.92 9.85 9.79 9.69	4.55	0.4 0.8 1.2 1.6 2 2.4 3	13.28	6.6	2.5 2.14 1.79 1.44 1.08 0.72 0.2	● ● ● ● ● ● ●	● ● ● ● ● ● ●	● ● ● ● ● ● ●	MA90-...-12T...	
 Tough edge		LOGU 120608ER-GH	4	10.16	4.55	0.8	13.25	6.6	2.26	●	●	●	●	MA90-...-12T...

● : Standard item

Recommended cutting conditions

Chipbreaker	Workpiece material	Toolholder description and Feed fz (mm/t)				Recommended insert grade (Cutting speed Vc: m/min)				
		09 Size (LOGU09...)		12 Size (LOG□12...)		CVD coated carbide	MEGACOAT HARD	MEGACOAT NANO EX		
		MA90-16~18	MA90-20~50 MA90-040~063	MA90-25~30	MA90-32~50 MA90-040~125			PR1810	PR1825	PR1835
GM	Carbon steel	0.05 ~ 0.1 ~ 0.14	0.05 ~ 0.1 ~ 0.16	0.05 ~ 0.1 ~ 0.18	0.06 ~ 0.15 ~ 0.23	-	-	-	★ 120 ~ 180 ~ 250	☆ 120 ~ 180 ~ 250
	Alloy steel	0.05 ~ 0.08 ~ 0.12	0.05 ~ 0.1 ~ 0.14	0.05 ~ 0.1 ~ 0.16	0.06 ~ 0.13 ~ 0.2	-	-	-	★ 100 ~ 160 ~ 220	☆ 100 ~ 160 ~ 220
	Mold steel	0.05 ~ 0.08 ~ 0.1	0.05 ~ 0.1 ~ 0.12	0.05 ~ 0.1 ~ 0.14	0.06 ~ 0.12 ~ 0.18	-	-	-	★ 80 ~ 140 ~ 180	☆ 80 ~ 140 ~ 180
	Stainless steel (Austenitic related)	0.05 ~ 0.08 ~ 0.1	0.05 ~ 0.1 ~ 0.12	0.05 ~ 0.1 ~ 0.14	0.06 ~ 0.12 ~ 0.18	-	-	-	☆ 100 ~ 160 ~ 200	★ 100 ~ 160 ~ 200
	Stainless steel (Martensitic related)	0.05 ~ 0.08 ~ 0.1	0.05 ~ 0.1 ~ 0.12	0.05 ~ 0.1 ~ 0.14	0.06 ~ 0.12 ~ 0.18	★ 180 ~ 240 ~ 300	-	-	-	☆ 150 ~ 200 ~ 250
	Stainless steel (Precipitation hardening)	0.05 ~ 0.08 ~ 0.1	0.05 ~ 0.1 ~ 0.12	0.05 ~ 0.1 ~ 0.14	0.06 ~ 0.12 ~ 0.18	-	-	-	-	★ 90 ~ 120 ~ 150
	Gray cast iron	0.05 ~ 0.1 ~ 0.14	0.05 ~ 0.1 ~ 0.16	0.05 ~ 0.1 ~ 0.18	0.06 ~ 0.15 ~ 0.23	-	-	☆ 120 ~ 180 ~ 250	-	-
	Nodular cast iron	0.05 ~ 0.08 ~ 0.1	0.05 ~ 0.1 ~ 0.12	0.05 ~ 0.1 ~ 0.14	0.06 ~ 0.12 ~ 0.18	-	-	☆ 100 ~ 150 ~ 200	-	-
	Ni-base heat-resistant alloys	0.05 ~ 0.06 ~ 0.08	0.05 ~ 0.08 ~ 0.1	0.05 ~ 0.08 ~ 0.12	0.06 ~ 0.1 ~ 0.15	★ 20 ~ 30 ~ 50	-	-	-	☆ 20 ~ 30 ~ 50
	Titanium alloys	0.05 ~ 0.08 ~ 0.1	0.05 ~ 0.09 ~ 0.12	0.05 ~ 0.09 ~ 0.12	0.06 ~ 0.1 ~ 0.15	-	-	-	-	☆ 30 ~ 50 ~ 70
SM	Carbon steel	0.05 ~ 0.08 ~ 0.11	0.05 ~ 0.1 ~ 0.14	0.05 ~ 0.1 ~ 0.14	0.06 ~ 0.1 ~ 0.18	-	-	-	★ 120 ~ 180 ~ 250	☆ 120 ~ 180 ~ 250
	Alloy steel	0.05 ~ 0.07 ~ 0.1	0.05 ~ 0.08 ~ 0.12	0.05 ~ 0.08 ~ 0.12	0.06 ~ 0.1 ~ 0.14	-	-	-	★ 100 ~ 160 ~ 220	☆ 100 ~ 160 ~ 220
	Mold steel	0.05 ~ 0.07 ~ 0.1	0.05 ~ 0.08 ~ 0.1	0.05 ~ 0.08 ~ 0.12	0.06 ~ 0.1 ~ 0.14	-	-	-	★ 80 ~ 140 ~ 180	☆ 80 ~ 140 ~ 180
	Stainless steel (Austenitic related)	0.05 ~ 0.08 ~ 0.11	0.05 ~ 0.08 ~ 0.12	0.05 ~ 0.08 ~ 0.12	0.06 ~ 0.1 ~ 0.14	-	-	-	☆ 100 ~ 160 ~ 200	★ 100 ~ 160 ~ 200
	Stainless steel (Martensitic related)	0.05 ~ 0.08 ~ 0.11	0.05 ~ 0.08 ~ 0.12	0.05 ~ 0.08 ~ 0.12	0.06 ~ 0.1 ~ 0.14	★ 180 ~ 240 ~ 300	-	-	-	☆ 150 ~ 200 ~ 250
	Stainless steel (Precipitation hardening)	0.05 ~ 0.08 ~ 0.11	0.05 ~ 0.08 ~ 0.12	0.05 ~ 0.08 ~ 0.12	0.06 ~ 0.1 ~ 0.14	-	-	-	-	★ 90 ~ 120 ~ 150
	Ni-base heat-resistant alloys	0.05 ~ 0.06 ~ 0.08	0.05 ~ 0.08 ~ 0.1	0.05 ~ 0.08 ~ 0.1	0.06 ~ 0.08 ~ 0.12	★ 20 ~ 30 ~ 50	-	-	-	☆ 20 ~ 30 ~ 50
	Titanium alloys	0.05 ~ 0.08 ~ 0.1	0.05 ~ 0.08 ~ 0.12	0.05 ~ 0.08 ~ 0.12	0.06 ~ 0.09 ~ 0.12	-	-	-	-	★ 30 ~ 50 ~ 70
GH	Carbon steel	0.05 ~ 0.1 ~ 0.14	0.05 ~ 0.1 ~ 0.16	0.05 ~ 0.1 ~ 0.18	0.06 ~ 0.15 ~ 0.23	-	-	-	★ 120 ~ 180 ~ 250	☆ 120 ~ 180 ~ 250
	Alloy steel	0.05 ~ 0.08 ~ 0.12	0.05 ~ 0.1 ~ 0.14	0.05 ~ 0.1 ~ 0.16	0.06 ~ 0.13 ~ 0.2	-	-	-	★ 100 ~ 160 ~ 220	☆ 100 ~ 160 ~ 220
	Mold steel	0.05 ~ 0.08 ~ 0.1	0.05 ~ 0.1 ~ 0.12	0.05 ~ 0.1 ~ 0.14	0.06 ~ 0.12 ~ 0.18	-	-	-	★ 80 ~ 140 ~ 180	☆ 80 ~ 140 ~ 180
	Stainless steel (Austenitic related)	0.05 ~ 0.08 ~ 0.1	0.05 ~ 0.1 ~ 0.12	0.05 ~ 0.1 ~ 0.14	0.06 ~ 0.12 ~ 0.18	-	-	-	☆ 100 ~ 160 ~ 200	★ 100 ~ 160 ~ 200
	Stainless steel (Martensitic related)	0.05 ~ 0.08 ~ 0.1	0.05 ~ 0.1 ~ 0.12	0.05 ~ 0.1 ~ 0.14	0.06 ~ 0.12 ~ 0.18	-	-	-	-	☆ 150 ~ 200 ~ 250
	Stainless steel (Precipitation hardening)	0.05 ~ 0.08 ~ 0.1	0.05 ~ 0.1 ~ 0.12	0.05 ~ 0.1 ~ 0.14	0.06 ~ 0.12 ~ 0.18	-	-	-	-	☆ 90 ~ 120 ~ 150
	Gray cast iron	0.05 ~ 0.1 ~ 0.14	0.05 ~ 0.1 ~ 0.16	0.05 ~ 0.1 ~ 0.18	0.06 ~ 0.15 ~ 0.23	-	-	★ 120 ~ 180 ~ 250	-	-
	Nodular cast iron	0.05 ~ 0.08 ~ 0.1	0.05 ~ 0.1 ~ 0.12	0.05 ~ 0.1 ~ 0.14	0.06 ~ 0.12 ~ 0.18	-	-	★ 100 ~ 150 ~ 200	-	-
	Ni-base heat-resistant alloys	0.05 ~ 0.06 ~ 0.08	0.05 ~ 0.08 ~ 0.1	0.05 ~ 0.08 ~ 0.12	0.06 ~ 0.1 ~ 0.15	-	-	-	-	☆ 20 ~ 30 ~ 50
	Titanium alloys	0.05 ~ 0.08 ~ 0.1	0.05 ~ 0.09 ~ 0.12	0.05 ~ 0.09 ~ 0.12	0.06 ~ 0.1 ~ 0.15	-	-	-	-	☆ 30 ~ 50 ~ 70

★: 1st Recommendation ☆: 2nd Recommendation

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

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys. When choosing wet machining for other workpiece materials, reduce the cutting speed to 70% or less.

* Face milling does not recommend slotting or pocketing. We recommend setting the ae to 75% or less. We recommend the small number insert type for ae of 30% or more.

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

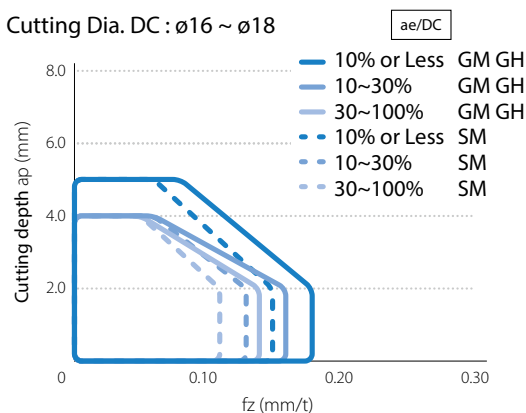
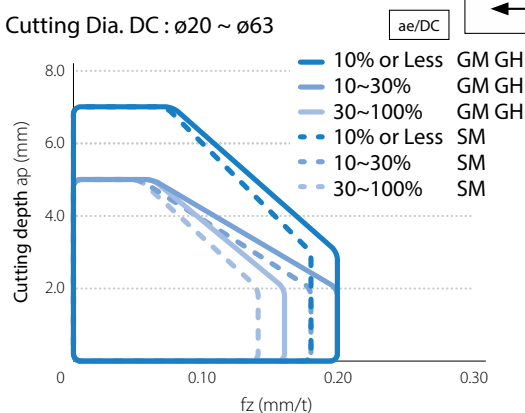
* Ramping and Helical milling are not recommended if the corner R is R4.0/R5.0/R6.0.



Milling

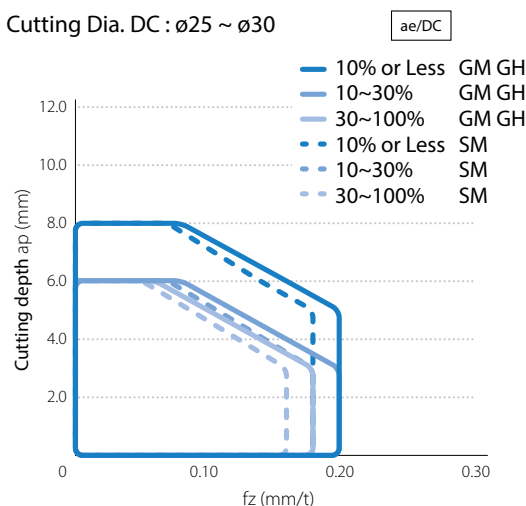
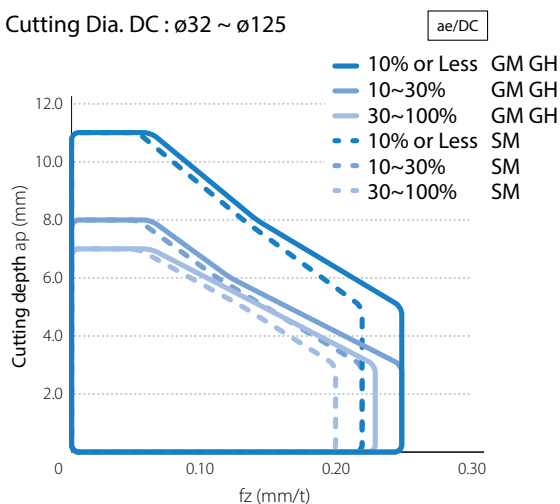
Cutting Performance

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

Cutting Dia. DC : $\phi 16 \sim \phi 18$ Cutting Dia. DC : $\phi 20 \sim \phi 63$ 

For other workpiece material, set ap and fz appropriately for each ae.

12 Size (LOG12...) Machining for Steel (Dry)

Cutting Dia. DC : $\phi 25 \sim \phi 30$ Cutting Dia. DC : $\phi 32 \sim \phi 125$ 

For other workpiece material, set ap and fz appropriately for each ae.

M



Milling

Case studies

Brake parts FCD500

Vc = 135 m/min
n = 535 min⁻¹
ap x ae = 3.4 x 25 mm
fz = 0.15 mm/t
Vf = 560 mm/min
Wet
MA90-080R-12T7C-M
LOGU120616ER-GM (PR1810)



Number of Workpieces

MA90
(7 inserts)

1,000 pcs

Tool life

x1.6

Competitor G
(7 inserts)

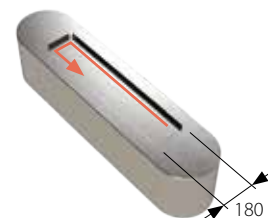
600 pcs

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

(User evaluation)

Mold parts Stainless steel

Vc = 125 m/min
n = 1,600 min⁻¹
ap x ae = 1.0 x 25 mm
fz = 0.12 mm/t
Vf = 570 mm/min
Dry
MA90-25S20-09T3C
LOGU090408ER-GM (PR1835)



Machining efficiency

MA90
(3 inserts)

Q = 14.5 cc/min

x1.5

Competitor H
(3 inserts)

Q = 9.5 cc/min

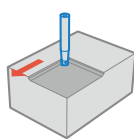
Machining efficiency

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

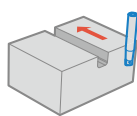
(User evaluation)

Notes

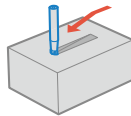
Applications



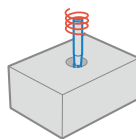
Face milling & Shouldering



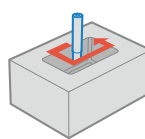
Slotting



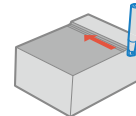
Ramping



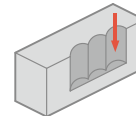
Helical milling



Pocketing



Contouring



Plunging

Ramping reference table

Description	Cutter diameter DC (mm)	16	20	25	32	40	50
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 (mm)	25	28	30	32	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

Decrease the angle of inclination when the chips extend longer.
Ramping is not recommended if the corner R is R4.0/R5.0/R6.0.

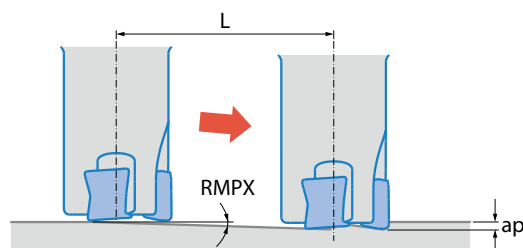
Guide for Ramping

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

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

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

Ramping is not recommended if the corner R is R4.0/R5.0/R6.0.

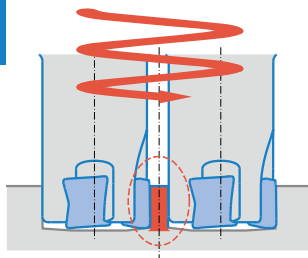


Guide for Helical milling

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

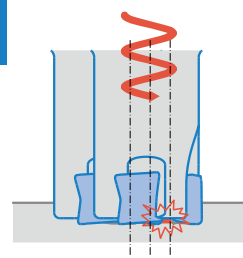
Exceeding Max. cutting dia.

Center core part remains after machining



Under Min. cutting dia.

Center core part interferes with toolholder

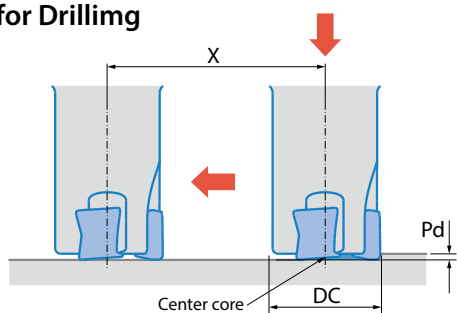


Unit : mm

Description	Min. cutting dia. øDh1	Max. cutting dia. øDh2
MA... - 09 - ...	2×DC-4	2×DC-2
MA... - 12 - ...	2×DC-6	2×DC-2

Helical milling is not recommended if the corner R is R4.0/R5.0/R6.0.

Guide for Drilling

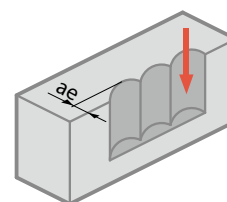


Unit : mm

Description	Max. cutting depth Pd	Min. cutting length X for flat bottom surface
MA... - 09 - ...	0.25	DC-3
MA... - 12 - ...	0.5	DC-5

It is recommended to reduce feed by 25% of recommendation until the center core is removed when traversing after drilling.

Guide for Plunging



Available for vertical milling (plunging)
Feed should be set within $fz = 0.1$ (mm/t) when plunging.

Unit : mm

Description	Maximum width of cut (ae)
MA... - 09 - ...	2
MA... - 12 - ...	3

M



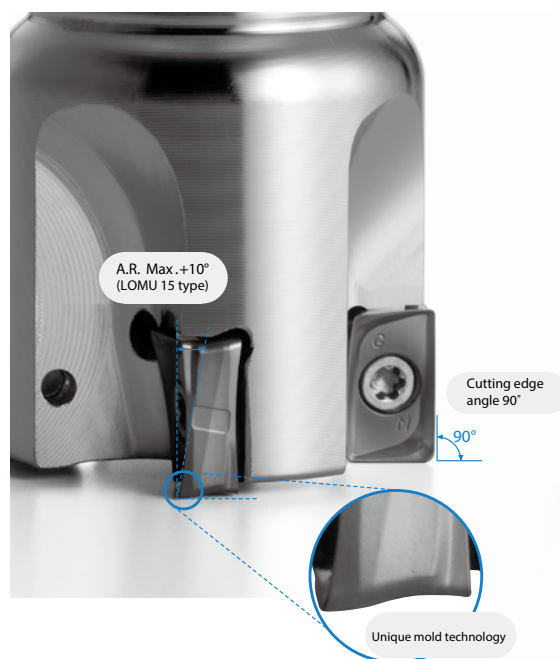
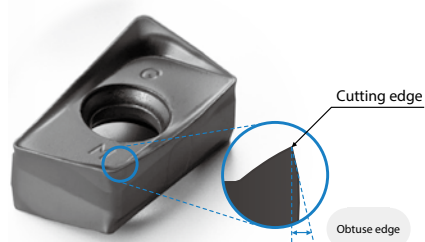
Milling

Double-sided 4-edge insert

MEW

Kyocera's unique mold technology reduces cutting force equivalent to positive inserts

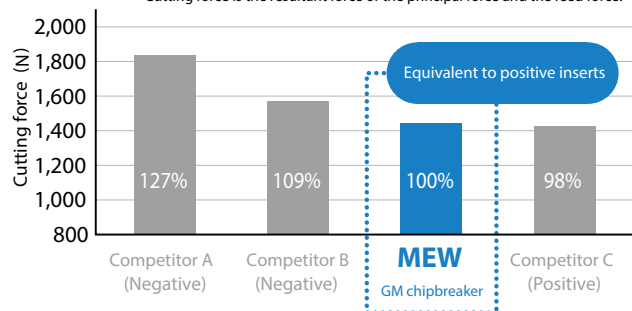
Obtuse edge increases cutting edge toughness



Low cutting force equivalent to positive inserts

Cutting force comparison (Internal evaluation)

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

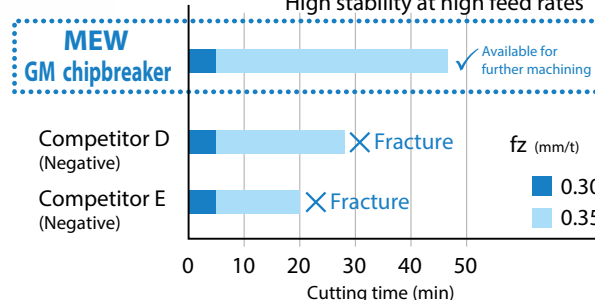


<Cutting conditions>

Vc=150m/min apxae=3x15mm fz=0.15mm/t S50C Cutting dia. ø20

Fracture resistance comparison (Internal evaluation)

High stability at high feed rates



<Cutting conditions>

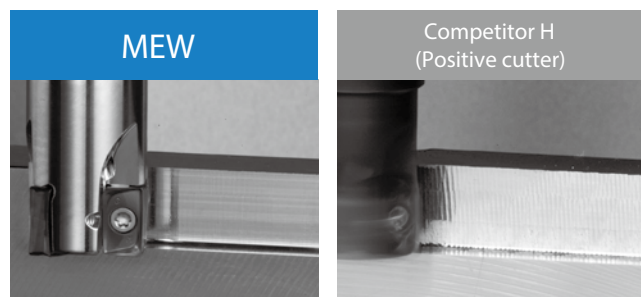
Vc=120m/min apxae=3x10mm fz=0.3~0.35mm/t
SCM440H (37~39HS) Cutting dia. ø20

Improved surface finish, minimizing chattering

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

Surface of shoulder wall

(Internal evaluation)



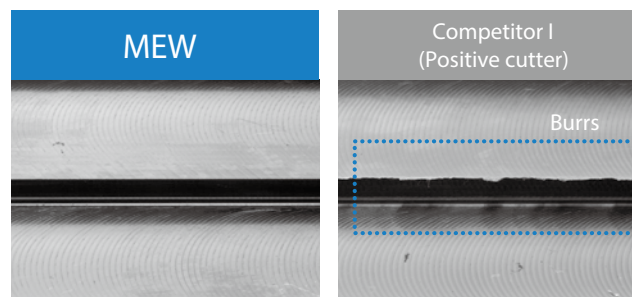
Smooth surface of MEW without chattering

<Cutting conditions>

Vc=240m/min apxae= 4 (3passes) x5mm fz=0.12mm/t Dry S5400 Cutting dia. ø20

Burr comparison with positive cutters

(Internal evaluation)



Sharp cutting enables less burrs than positive cutters

<Cutting conditions>

Vc=250m/min apxae=4x5mm fz=0.1mm/t Dry S50C Cutting dia. ø20

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

Large actual rake angle lowers cutting force

Cutting edge angle 45°~70°
Cutting edge angle 75°
Cutting edge angle 88°/90°
Cutter for Finishing
High Feed Cutter
Multi- Function
Slot Mill
Ball-nose Radius
Others

Long tool life by MEGACOAT NANO technology

Stable and longer tool life by special nano coating layer "MEGACOAT NANO EX"

PR1825

For steel and stainless steel (austenitic related)

PR1810

For cast iron

PR1835(PR1535)

For heat-resistant alloys, titanium and stainless steel (precipitation hardening)

CA6535

CVD coated carbide for heat-resistant alloys and stainless steel (martensitic)

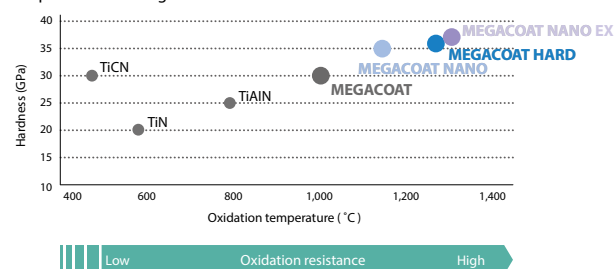
PDL025

DLC coated carbide for non-ferrous metals

GW25

Carbide for non-ferrous metals

Properties of coating



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

PR015S

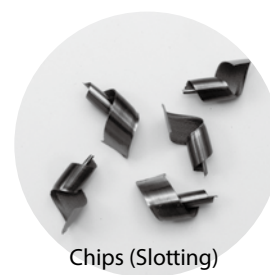
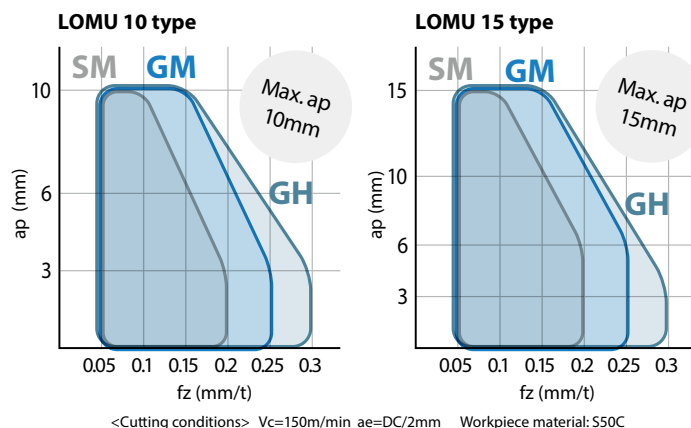
MEGACOAT HARD for hard materials

Various chipbreaker lineup

Newly developed 4 chipbreakers for various applications

Applicable to a wide range of application

Chipbreaker	Applications	Insert
GM	General purpose	
SM	Low cutting force	
GH	For heavy milling	
AM	For non-ferrous metals	



M



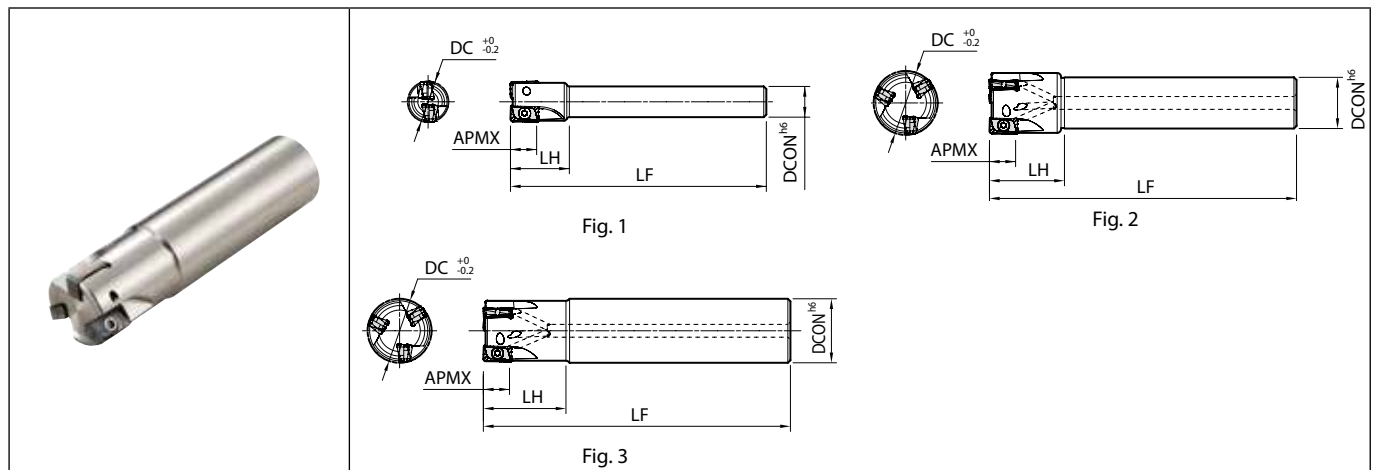
Milling

Lineup of corner-R(RE)

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

Marking of 04	08 has No dimension marking	Marking of 10	Marking of 12	Marking of 16	Marking of 20
LOMU100404ER-GM LOMU150504ER-GM	LOMU100408ER-GM LOMU150508ER-GM	LOMU150510ER-GM	LOMU100412ER-GM LOMU150512ER-GM	LOMU100416ER-GM LOMU150516ER-GM	LOMU100420ER-GM LOMU150520ER-GM

MEW (End mill)



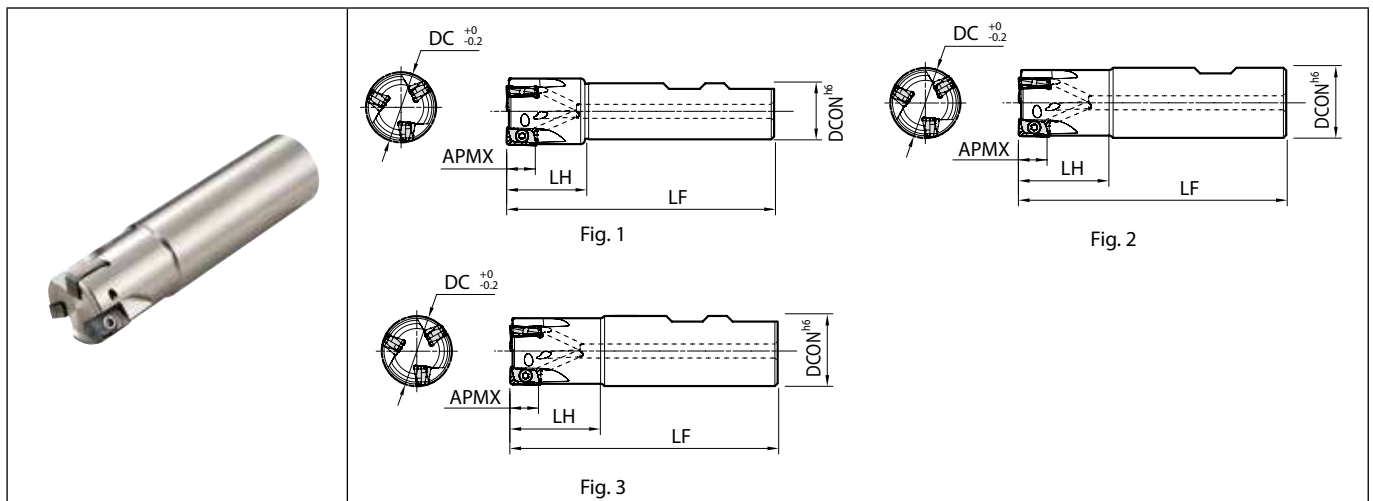
Toolholder dimensions

Description				Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Fig.	Spare parts			Applicable inserts ➡ M81
																Anti-seize compound	Screw	Wrench	
																			
Cylindrical	Standard shank	MEW	16-S12-10-2T	●	2	16	12	100	23	10	+7	-22	No	43750	1	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
			18-S16-10-2T	●		18	16		25			-21	43000	2					
			20-S16-10-2T	●	20	110		26	41000			2							
			22-S20-10-3T	●	22		20	39600	2										
			25-S20-10-3T	●	25	120		29	37500			2							
			28-S25-10-3T	●	28		25	35800	2										
			30-S25-10-4T	●	30	130		32	34800			2							
			32-S25-10-4T	●	32		150	50	33900			2							
			40-S32-10-5T	●	40	120		40	30000			2							
			50-S32-10-5T	●	50		22500	2											
	Same shank	MEW	16-S16-10-2T	●	2	16	16	100	26	10	+7	-22	Yes	43750	3	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
			20-S20-10-2T	●		20	20		110					30	41000				
			20-S20-10-3T	●	3	20	20	110	30					37500	3				
			25-S25-10-2T	●															
			25-S25-10-3T	●	3	32	32	130	40					33900	3				
			32-S32-10-3T	●															
			32-S32-10-4T	●	4														
	Long shank	MEW	20-S20-10-150-2T	●	2	20	20	150	40	10	+7	-20	Yes	41000	3	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
			25-S25-10-170-2T	●		25	25		170					50	37500				
	Standard shank	MEW	25-S20-15-2T	●	2	25	20	120	29	15	+10	-22	Yes	35000	2	P-37	SB-4090TRP	DTPM-15	LOGT1505... LOMU1505...
			32-S25-15-2T	●		32	25		130					32	30000				
			40-S32-15-3T	●	3	40	32	150	50					25000	2				
			40-S32-15-4T	●															
			50-S32-15-4T	●	4														
Same shank	MEW	25-S25-15-2T	●	2	25	25	120	32	15	+10	-22	Yes	35000	3	P-37	SB-4090TRP	DTPM-15	LOGT1505... LOMU1505...	
		32-S32-15-2T	●		32	32		130					40	30000					3
		32-S32-15-3T	●	3															

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.

● : Standard item

MEW (End mill)

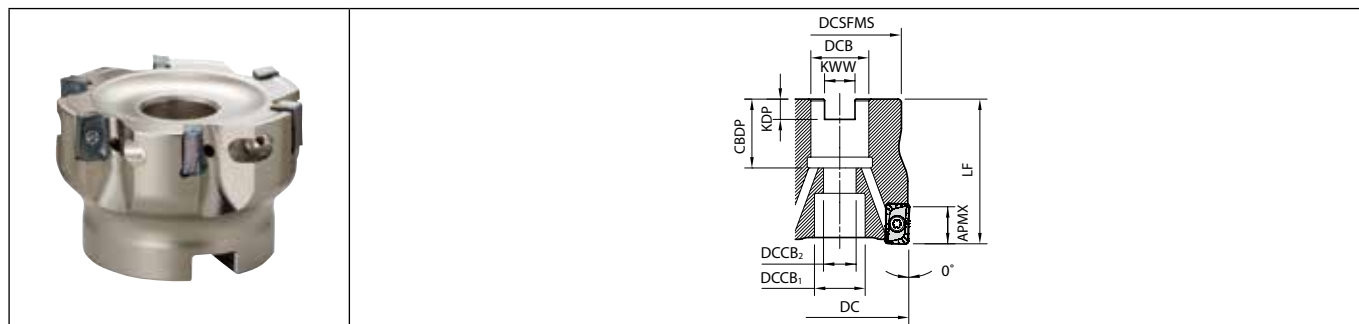


Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Fig.	Spare parts			Applicable inserts  M81			
					DC	DCON	LF	LH	APMX												
Weldon	Standard shank	MEW	40-W32-10-5T	MT0	5	40	32	111	50	10	+7	-19	Yes	30000	1	P-37	SB-3065TRP	DTPM-8	LOGT1004... , LOMU1004...		
		MEW	40-W32-15-4T	MT0	4	40	32	111	50	15	+10	-21	Yes	25000	1	P-37	SB-4090TRP	DTPM-15	LOGT1505... , LOMU1505...		
	Same Shank	MEW	16-W16-10-2T	MT0	2	16	16	75	25	10	+7	-22	Yes	43750	2	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...		
			20-W20-10-2T	MT0		20	20	77						41000	2						
			20-W20-10-3T	MT0	3	25	25	90	32			37500		3							
			25-W25-10-3T	MT0		32-W32-10-4T	MT0	4	32			32		102	40					33900	3
			MEW	25-W25-15-2T		MT0	2	25	25			90		32	15					+10	-22
		32-W32-15-3T		MT0	3	32	32	102	40	30000	3										

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.

MEW (Face mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)										A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Applicable inserts ➡ M81
			R	DC	DCSFS	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW	APMX					
MEW 032R-10-4T-M	●	4	32	30	16	14	9	35	19	5.6	8.4	10	+7	-20	Yes	33900	0.1	LOGT1004... LOMU1004...
040R-10-5T-M	●	5	40	34	22	18	11	40	21	6.3	10.4	10	+7	-19	Yes	30000	0.2	
050R-10-5T-M	●	5	50	45	22	18	11	40	21	6.3	10.4	10	+7	-19	Yes	22500	0.4	
063R-10-6T-M	●	6	63	47	22	18	11	40	21	6.3	10.4	10	+7	-19	Yes	20500	0.5	
MEW 040R-15-4T-M	●	4	40	34	16	14	9	35	19	5.6	8.4	15	+10	-21	Yes	25000	0.2	LOGT1505... LOMU1505...
050R-15-4T-M	●	5	50	45	22	18	11	40	21	6.3	10.4	15	+10	-21	Yes	17000	0.3	
063R-15-5T-M	●	5	63	47	22	18	11	40	21	6.3	10.4	15	+10	-21	Yes	14500	0.5	
080R-15-6T-M	●	6	80	60	27	20	13	50	25	7	12.4	15	+10	-20	Yes	12000	1	
080R-15-6T	●	6	80	60	25.4	20	13	50	27	6	9.5	15	+10	-20	Yes	12000	1	
080R-15-6T	●	6	80	60	25.4	20	13	50	27	6	9.5	15	+10	-20	Yes	12000	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.

Spare parts and applicable inserts (End mill/face mill)

Description	Spare parts				Applicable inserts ➡ M81			
	Clamp screw	Wrench	Anti-seize compound	Mounting bolt	General purpose	Low cutting force	Tough edge (For heavy milling)	Non-ferrous metals
MEW ...-10-_T								
MEW 032R-10-_M	SB-3065TRP	DTPM-8	P-37	HH8X25	LOMU10...-GM	LOMU10...-SM	LOMU10...-GH	LOGT10...-AM
040R-10-_M				HH10X30				
050R-10-_M				HH10X30				
063R-10-_M				HH10X30				
MEW ...-15-_T								
MEW 040R-15-_M	SB-4090TRP	DTPM-15	P-37	HH8X25	LOMU15...-GM	LOMU15...-SM	LOMU15...-GH	LOGT15...-AM
050R-15-_M				HH10X30				
063R-15-_M				HH10X30				
080R-15_(-M)				HH12X35				

Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

About wrench specifications

Wrenches and clamp screws are "Torx Plus".

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

2. Ref. to Fig. 2 for "Torx" Wrench. (Black grip)

A "Torx Plus" Wrench and a "Torx" Wrench have different top shapes.

Please use a "Torx Plus" Wrench.

* If a "Torx" Wrench is used to tighten, the screw head might become damaged and then the screw cannot be removed.

● : Standard item

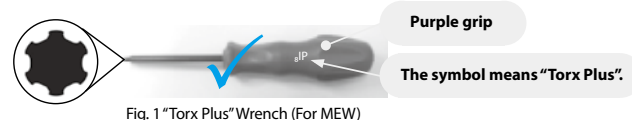
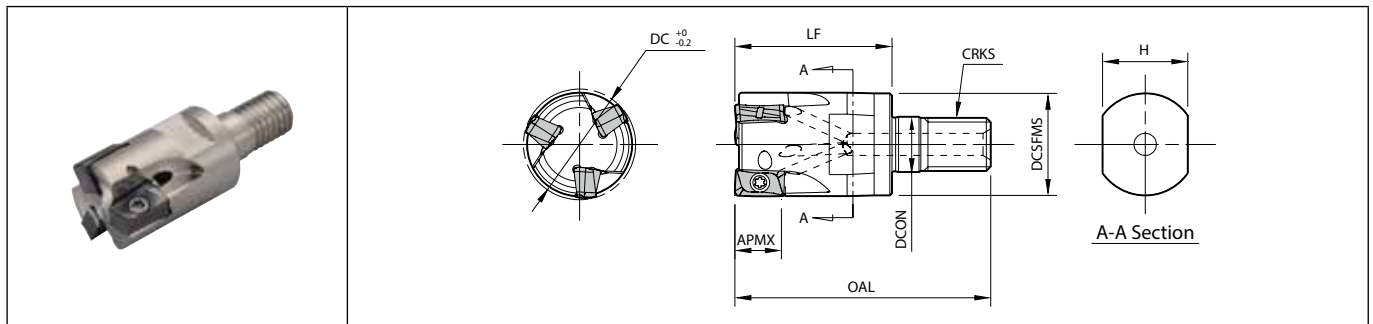


Fig. 1 "Torx Plus" Wrench (For MEW)



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

MEW (Modular type)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)								A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Applicable inserts ➡ M81
			DC	DCON	DCSFMS	OAL	LF	APMX	CRKS	H					
MEW 16-M08-10-2T 20-M10-10-2T 20-M10-10-3T 25-M12-10-3T 32-M16-10-4T	●	2	16	8.5	14.7	42	25	10	M8x1.25	12	+7	-22	Yes	43750	LOGT1004... LOMU1004...
	●	3	20	10.5	18.7	48	30		M10x1.5	15				41000	
	●		25	12.5	23	56	35		M12x1.75	19				37500	
	●		32	17	30	62	40		M16x2.0	24				33900	
	●	4	32	17	30	62	40		M16x2.0	24				33900	
MEW 25-M12-15-2T 32-M16-15-3T	●	2	25	12.5	23	56	35	15	M12x1.75	19	+10	-22	Yes	35000	LOGT1505... LOMU1505...
	●	3	32	17	30	62	40		M16x2.0	24				30000	

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.
See page M82 for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

Spare parts and applicable inserts (MEW modular type)

Description		Spare parts			Applicable inserts ➡ M81					
		Clamp screw	Wrench	Anti-seize compound						
										
MEW	16-M08-10-2T	SB-3065TRP	DTPM-8	P-37	General purpose	Low cutting force	Tough edge (For heavy milling)	Non-ferrous metals		
	20-M10-10-2T				LOMU10...-GM	LOMU10...-SM	LOMU10...-GH	LOGT10...-AM		
	20-M10-10-3T									
	25-M12-10-3T									
	32-M16-10-4T									
Recommended tightening torque for insert clamp 1.2N·m										
MEW	25-M12-15-2T	SB-4090TRP	DTPM-15	P-37	LOMU15...-GM	LOMU15...-SM	LOMU15...-GH	LOGT15...-AM		
	32-M16-15-3T								Recommended tightening torque for insert clamp 3.5N·m	



Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

Modular end mill head identification system

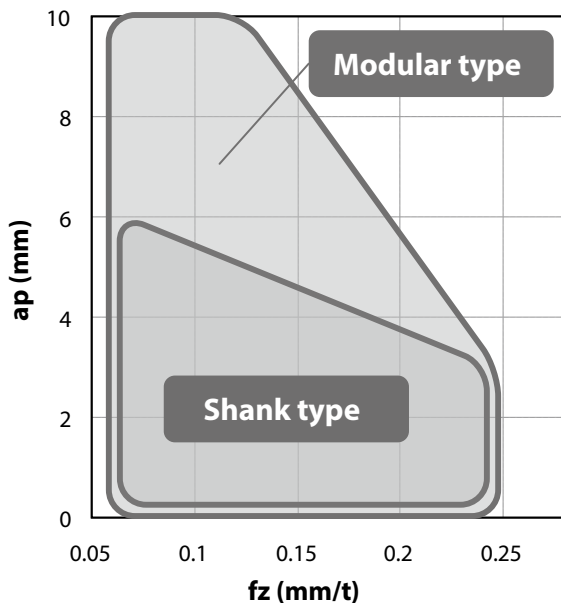
MEW	16	-	M08	-	10	-	2T
Series	Cutting dia.		Thread size for clamping		Insert size		No. of inserts

● : Standard item



Feature of modular type

Applicable to a wide range of applications



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

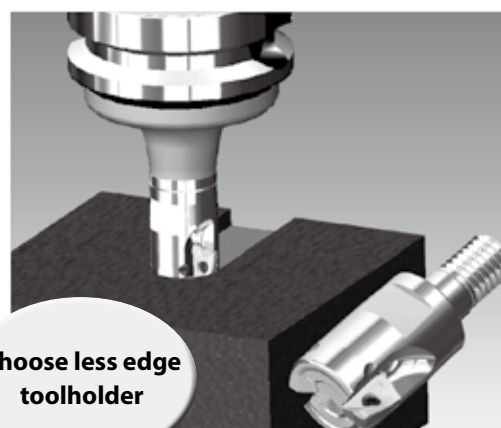
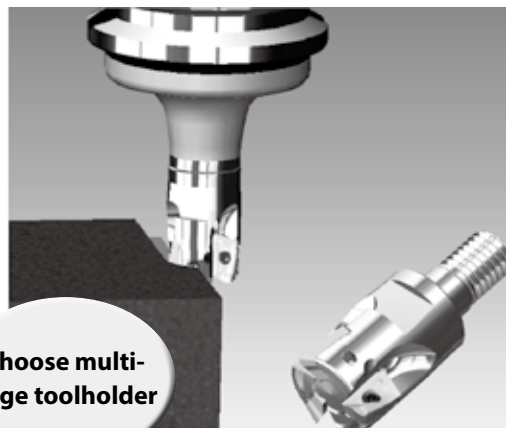
<Cutting conditions>

- Cutting speed: $V_c=150\text{m/min}$ ($n=2,390\text{min}^{-1}$)
- Width of cut: $a_e=10\text{mm}$ (Shouldering)
- Workpiece material: S55C, Dry
- **Machine: BT30 M/C**
- <Cutting tool>
- Modular type
 - Head: MEW20-M10-10-3T
 - Arbor: BT30K-M10-45
 - Insert: LOMU100408ER-GM (PR1525)
- Shank type
 - Toolholder: MEW20-S20-10-3T
 - Arbor: BT30 Milling Chuck (Double-face clamping)
 - Insert: LOMU100408ER-GM (PR1525)

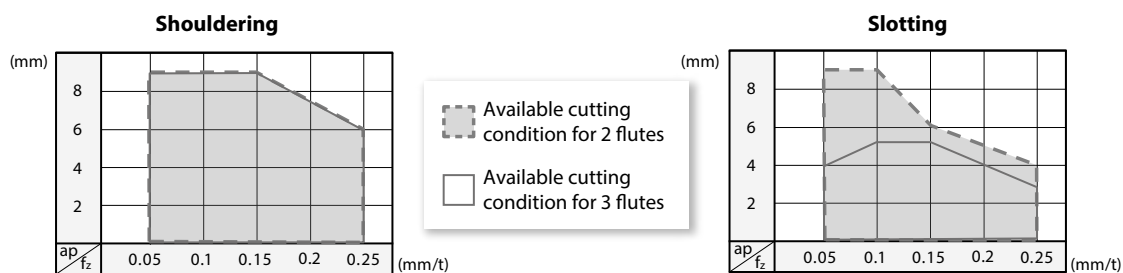
How to select multi-edge or less edge toolholder

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

Slotting



Available cutting condition of modular type



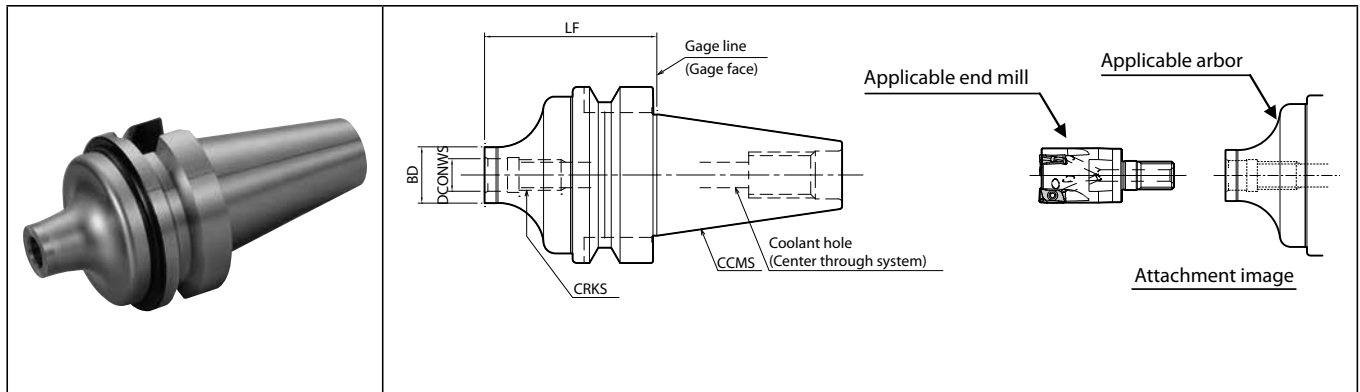
Choose multi-edge toolholder for shouldering; higher efficiency in machining by higher feed rate. For grooving, choose less edge toolholder to lower cutting force.

LOMU/LOGT

Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)		Carbon steel / Alloy steel										☆	★	☆	P					
		Mold and die steel										☆	★	☆						
		Austenitic stainless steel												☆	☆	★	M			
		Martensitic stainless steel										★			☆					
		Precipitation hardening stainless steel												☆		★				
		Gray cast iron											☆		★		K			
		Nodular cast iron											☆		★					
		Non-ferrous metals										★				☆	N			
		Heat-resistant alloy										★				☆	S			
		Titanium alloy												☆		★				
Hard materials											★				H					
Insert		Description	No. of edges	Dimension (mm)						Carbide										Applicable toolholder ➡ M76~M79
				S	D1	RE	L	W1	BS	CVD	DLC	PVD						-		
												CA635	PDL025	PR0155	PR1510	PR1525	PR1535		PR1510	
	 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	●		□	○	●	●	●	●			
	 General purpose	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-...		

Handed insert shows Right-hand

Recommended cutting conditions M84

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

Dimensions

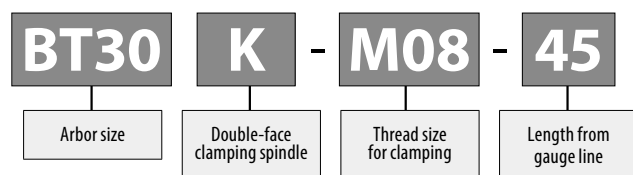
Description	Availability	Dimension (mm)				Coolant hole	Arbor (Double-face clamping)	Applicable end mill (Head) MA90, MEW, MEC, MEV, MFH Harrier, MFH Boost, MFH Mini, MFH Micro, MRX ➡ M69(MA90), M79(MEW), M90(MEC) M108(MEV), M202(MFH Harrier) M213(MFH Boost), M220(MFH Mini) M227(MFH Micro), M275(MRX)
		LF	BD	DCONWS	CRKS			
BT30K- M08-45 M10-45 M12-45	●	45	14.7	8.5	M8×1.25	Yes	BT30	(MEW/MEC/MFH/MRX)..-M08-..
	●		18.7	10.5	M10×1.5			(MA90/MEW/MEC/MEV/MFH/MRX)..-M10-..
	●		23	12.5	M12×1.75			(MA90/MEW/MEC/MEV/MFH/MRX)..-M12-..
BT40K- M08-55 M10-60 M12-55 M16-65	●	55	14.7	8.5	M8×1.25	Yes	BT40	(MEW/MEC/MFH/MRX)..-M08-..
	●	60	18.7	10.5	M10×1.5			(MA90/MEW/MEC/MEV/MFH/MRX)..-M10-..
	●	55	23	12.5	M12×1.75			(MA90/MEW/MEC/MEV/MFH/MRX)..-M12-..
	●	65	30	17	M16×2.0			(MA90/MEW/MEC/MEV/MFH/MRX)..-M16-..

Actual end mill depth (See page M227 for MFH Micro)

Arbor description	Applicable end mill (Head)			Actual end mill depth (mm)
	Description	Cutting dia. (mm)	Dimension (mm)	
		DC	LF	
BT30K- M08-45 M10-45 M12-45	...16-M08-...	16	25	31.8
	...17-M08-...	17		33.2
	...18-M08-...	18		34.2
	...20(-)M10-...	20	30	36.8
	...22-M10-...	22		39.2
	...25(-)M12-...	25	35	42.8
BT40K- M08-55 M10-60 M12-55 M16-65	...28-M12-...	28		45.5
	...16-M08-...	16	25	31.7
	...17-M08-...	17		33.2
	...18-M08-...	18		34.3
	...20(-)M10-...	20	30	38.7
	...22-M10-...	22		44.5
	...25(-)M12-...	25	35	44.6
	...28-M12-...	28		47.6
	...32(-)M16-...	32	40	51.2
	...35-M16-...	35		60.2
	...40-M16-...	40		64

● : Standard item

Arbor identification system



How to attach head

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

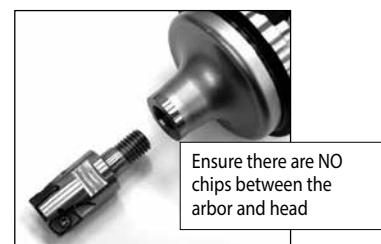


Fig. 1

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

Table 1 Recommended head tightening torque

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



Fig. 2

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

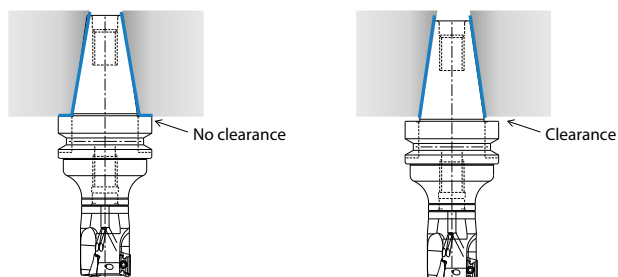


Fig. 3

Frequently asked question

Q: Can the double-face clamping arbor be mounted on a general BT spindle?

A: Yes. It can be used as a general BT arbor with a general BT spindle.



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

Double-face clamping arbor mounted on general spindle

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

M



Milling

How to mount an insert

1. Be sure to remove dust and chips from the insert mounting pocket.
2. Clamp screw
 1. Apply anti-seize compound on portion of taper and thread of clamp screw.
 2. Attach the screw (magnetic head) to the front end of the wrench. While lightly pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten. (Ref. to Fig. 1)
 3. 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.

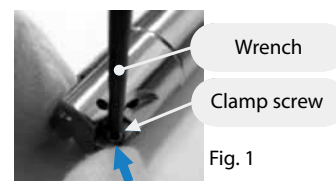


Fig. 1

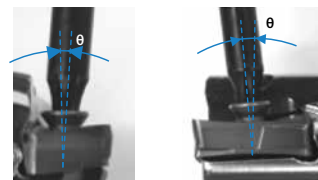


Fig. 2

Recommended cutting conditions

Chipbreaker	Workpiece material	fz (mm/t)		Recommended insert grades (Vc: m/min)				
		Toolholder description		MEGACOAT (PVD coated carbide)				CVD coated carbide
		MEW16~MEW18	MEW20~MEW40 MEW40R~MEW080R	PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	PR015S	CA6535
GM	Carbon steel	0.06~0.1~0.2	0.08~0.15~0.25	120~180~250	120~180~250	-	-	-
	Alloy steel	0.06~0.1~0.14	0.08~0.15~0.2	100~160~220	100~160~220	-	-	-
	Mold steel	0.06~0.08~0.12	0.08~0.12~0.2	80~140~180	80~140~180	-	-	-
	Stainless steel (Austenitic related)	0.06~0.08~0.12	0.08~0.12~0.15	100~160~200	100~160~200	-	-	-
	Stainless steel (Martensitic related)	0.06~0.08~0.12	0.08~0.12~0.2	150~200~250	-	-	-	180~240~300
	Stainless steel (Precipitation hardening)	0.06~0.08~0.12	0.08~0.12~0.2	90~120~150	-	-	-	-
	Gray cast iron	0.06~0.1~0.17	0.08~0.18~0.25	-	-	120~180~250	-	-
	Nodular cast iron	0.06~0.08~0.12	0.08~0.15~0.2	-	-	100~150~200	-	-
	Ni-base heat-resistant alloys	0.06~0.08~0.12	0.08~0.12~0.15	20~30~50	-	-	-	20~30~50
SM	Carbon steel	0.06~0.1~0.17	0.08~0.15~0.2	120~180~250	120~180~250	-	-	-
	Alloy steel	0.06~0.08~0.12	0.08~0.12~0.18	100~160~220	100~160~220	-	-	-
	Mold steel	0.06~0.08~0.12	0.08~0.1~0.15	80~140~180	80~140~180	-	-	-
	Stainless steel (Austenitic related)	0.06~0.08~0.12	0.08~0.1~0.15	100~160~200	100~160~200	-	-	-
	Stainless steel (Martensitic related)	0.06~0.08~0.12	0.08~0.1~0.15	150~200~250	-	-	-	180~240~300
	Stainless steel (Precipitation hardening)	0.06~0.08~0.12	0.08~0.1~0.15	90~120~150	-	-	-	-
	Ni-base heat-resistant alloys	0.06~0.08~0.1	0.08~0.1~0.12	20~30~50	-	-	-	20~30~50
	Titanium alloys	0.06~0.08~0.12	0.08~0.12~0.15	40~60~80	-	30~50~70	-	-
	Titanium alloys	0.06~0.08~0.12	0.08~0.12~0.15	40~60~80	-	30~50~70	-	-
GH	Carbon steel	0.06~0.1~0.2	0.08~0.2~0.3	120~180~250	120~180~250	-	-	-
	Alloy steel	0.06~0.1~0.14	0.08~0.2~0.25	100~160~220	100~160~220	-	-	-
	Mold steel	0.06~0.08~0.12	0.08~0.15~0.22	80~140~180	80~140~180	-	-	-
	Stainless steel (Austenitic related)	0.06~0.08~0.12	0.08~0.12~0.15	100~160~200	100~160~200	-	-	-
	Stainless steel (Martensitic related)	0.06~0.08~0.12	0.08~0.12~0.2	150~200~250	-	-	-	180~240~300
	Stainless steel (Precipitation hardening)	0.06~0.08~0.12	0.08~0.12~0.2	90~120~150	-	-	-	-
	Gray cast iron	0.06~0.1~0.2	0.08~0.22~0.3	-	-	120~180~250	-	-
	Nodular cast iron	0.06~0.08~0.15	0.08~0.18~0.25	-	-	100~150~200	-	-
	Ni-base heat-resistant alloys	0.06~0.08~0.12	0.08~0.12~0.15	20~30~50	-	-	-	20~30~50
	Titanium alloys	0.06~0.08~0.12	0.08~0.15~0.2	40~60~80	-	30~50~70	-	-
	Hard materials (60HRC or less)	0.06~0.08~0.12	0.08~0.15~0.22	-	-	-	60~80~100	-
	Hard materials (60HRC or less)	0.06~0.08~0.12	0.08~0.15~0.22	-	-	-	60~80~100	-
	Hard materials (60HRC or less)	0.06~0.08~0.12	0.08~0.15~0.22	-	-	-	60~80~100	-
Chipbreaker	Workpiece material	fz (mm/t)		Recommended insert grades (Vc: m/min)				
		Toolholder description		DLC coated carbide		Carbide		
		MEW16~MEW18	MEW20~MEW40 MEW40R~MEW080R	PDL025	GW25			
AM	Aluminum alloys	0.06~0.1~0.2	0.08~0.15~0.25	200~600~900	200~500~800			

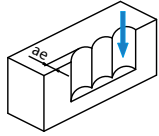
★: 1st Recommendation

☆: 2nd Recommendation

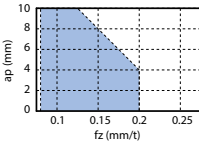
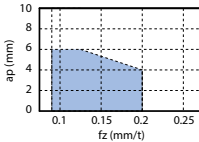
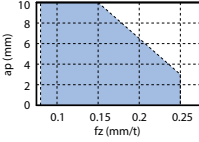
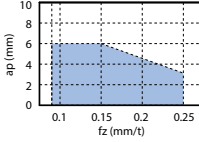
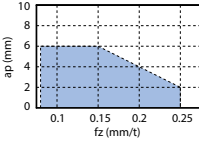
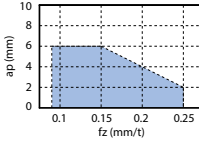
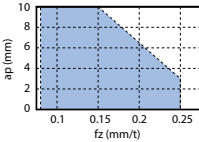
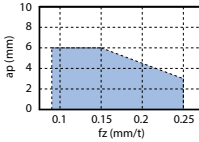
* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
 * Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

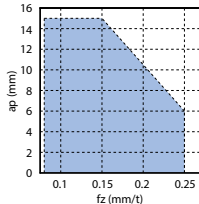
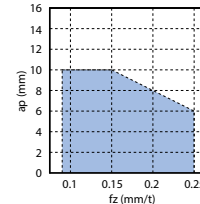
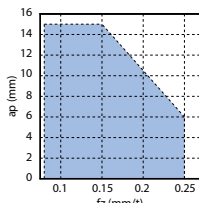
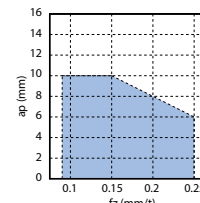
Ramping, helical milling and vertical milling (Plunging)

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

Vertical milling (Plunging)		
	Insert description	Max. width of cut
	LOMU10 type	5mm
	LOMU15 type	7mm

Cutting performance

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

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

<Cutting conditions>

- $V_c=180\text{m/min}$
- GM chipbreaker
- Workpiece material: S50C
- 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

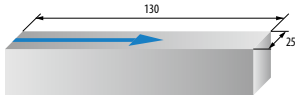
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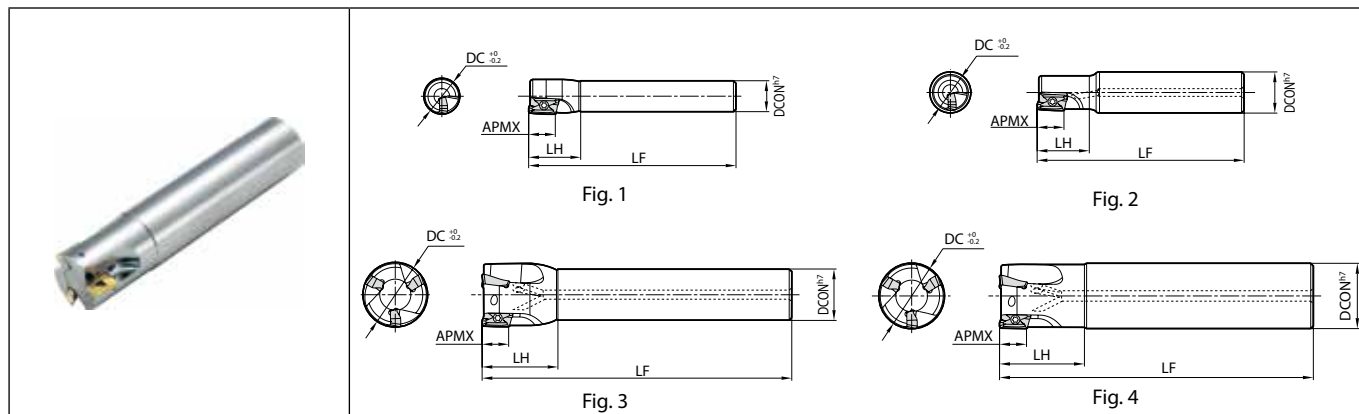
Milling

Case studies

SS400	
- Construction machine part $V_c=250\text{m/min}$ $ap_{xae}=4 \times 20\text{mm}$ $fz=0.14\text{mm/t}$ ($V_f=1,350\text{mm/min}$) - 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 $V_c=180\text{m/min}$ $ap_{xae}=2 \times 25\text{mm}$ $fz=0.1\text{mm/t}$ ($V_f=716\text{mm/min}$) - 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)



Toolholder dimensions

Description		Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Fig.	Spare parts			Applicable inserts M91														
				DC	DCON	LF	LH	APMX						Anti-seize compound	Screw	Wrench															
Cylindrical	Standard shank	MEC	10-S10-11 10-S16-11 12-S10-11 12-S12-11 12-S16-11 13-S12-11 14-S12-11 14-S16-11	●	1	10	10	80	17	10	+10	-24	No	54800	1	P-37	SB-2545TR	DTM-8	BDMT1103...												
				●		16	20		+12		-19	Yes	49200	1	47700					2											
				●		10															-21	No	50800	1							
				●		12																			12	16	1				
				●		13																						12	1		
				●		14																								16	1
				●		16																									
		MEC	16-S12-11T 17-S16-11T 18-S16-11T 19-S16-11T 20-S16-11T 21-S20-11T 22-S20-11T 24-S20-11T 25-S20-11T 25-S20-11T-4 28-S25-11T 30-S25-11T 32-S25-11T 32-S25-11T-5 40-S32-11T 50-S32-11T	●	2	16	12	100	23	10	+18	-14	No	43750	1	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...												
				●		17	16		110		26	+19		-13	43500					3											
				●		18						43000		3																	
				●	3	19	120	29	+20	-10	-9	Yes	42000	3																	
				●		20							41000	3																	
				●		21							40300	3																	
				●		22							39600	3																	
				●		24							38200	3																	
				●	4	25	130	32	+21	-10	Yes	37500	3																		
				●		28						+22	35800	3																	
				●		30						-9	34800	3																	
				●	4	32	33900	3																							
	●	32	30000	3																											
	●	5	40	150	50	+23	-8	-7	Yes	30000	3																				
	●		50							22500	3																				
	Same shank	MEC	16-S16-11T 20-S20-11T 25-S25-11T 25-S25-11T-4 32-S32-11T 32-S32-11T-5	●	2	16	16	100	30	10	+18	-14	Yes	43750	4	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...												
				●		20	20	110			+20			41000	4																
				●	3	25	25	120	32		+21	-10		37500	4																
				●		32	32	130	40		+23	-9		33900	4																
				●	4	32	32	130	40																						
●				5																											

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.

For more details, see „Warning“ on page M93.

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

● : Standard item

Toolholder dimensions

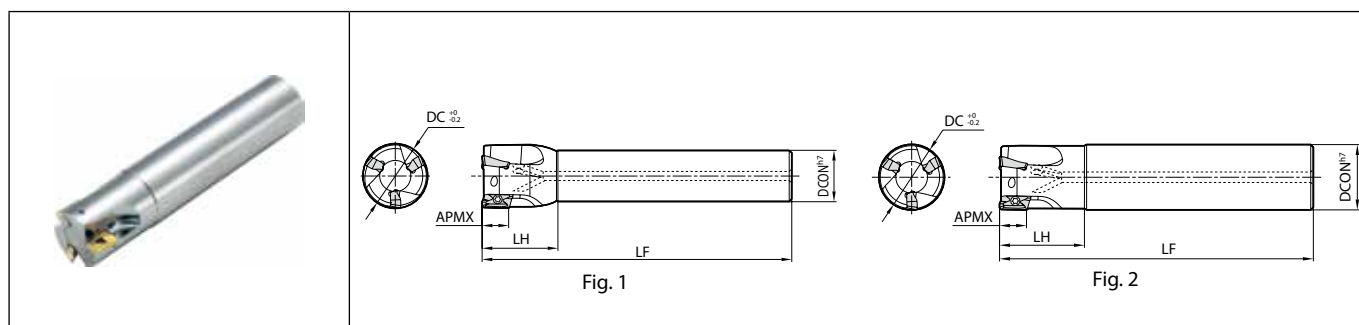
Description		Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Fig.	Spare parts			Applicable inserts  M91
				DC	DCON	LF	LH	APMX						Anti-seize compound 	Screw 	Wrench 	
Cylindrical Long shank	MEC		2	20	18	170	30	10	+20			41000	3	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
						140	60						4				
				22	20	170	30		-10			39600	3				
													4				
				25	23	210	32		+21		Yes	37500	3				
						160	60						4				
				28	25	210	32		+22			35800	3				
													4				
				32	30	250	40		-9			33900	3				
						200	65						4				
				35	32	250	40		+23			32600	3				
													4				
				40	35	240	65		-8			30000	3				
													4				
	MEC		3	20	20	150		10	+20			41000	4	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
						60							4				
			4	25	25	170			+21			37500	4				
													4				
			3	30		180	32		Yes			34800	3				
													4				
			4	32	32	200	65		+23	-9		33900	4				
													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.

For more details, see „Warning“ on page **M93**.

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

MEC (End mill)



Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)						A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Fig.	Spare parts			Applicable inserts M91	
					DC	DCON	LF	LH	APMX	Anti-seize compound						Screw	Wrench			
Cylindrical	Standard shank	MEC	25-S20-17	●	2	25	20	120	36	15.7	+16	-11	Yes	35000	1	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...	
			32-S25-17	●	3	32	25	130	40		+17	-7		30000	1					
			40-S32-17	●	4	40	32	150	50		+19	-7		25000	1					
			50-S32-17	●	4	50						17000		1						
	Same shank	MEC	25-S25-17	●	2	25	25	120	36	15.7	+16	-11	Yes	35000	2	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...	
			32-S32-17	●	3	32	32	130	40		+17	-7		30000	2					
	Long shank	MEC	25-S25-160-17	●	2	25	25	160	60	15.7	+16	-11	Yes	35000	2	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...	
			25-S25-210-17	●				210	36					32500	1					
			28-S25-210-17	●				28												
			32-S32-200-17	●				32	200					65	30000					2
			32-S32-250-17	●	32	250	40	27700	1											
			35-S32-250-17	●		35	40	25000	1											
			40-S32-240-17	●		40	240	65	+19	-7	Yes	30000	2							
			MEC	32-S32-250-17-3	●	3	32	32	250	65	15.7	+17	-7	Yes	25000					1
		40-S32-250-17-3		●	40										+19	-6	17000	1		
		40-S32-250-17-4		●	4	50	42	64												
		50-S42-250-17-4		●																

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.

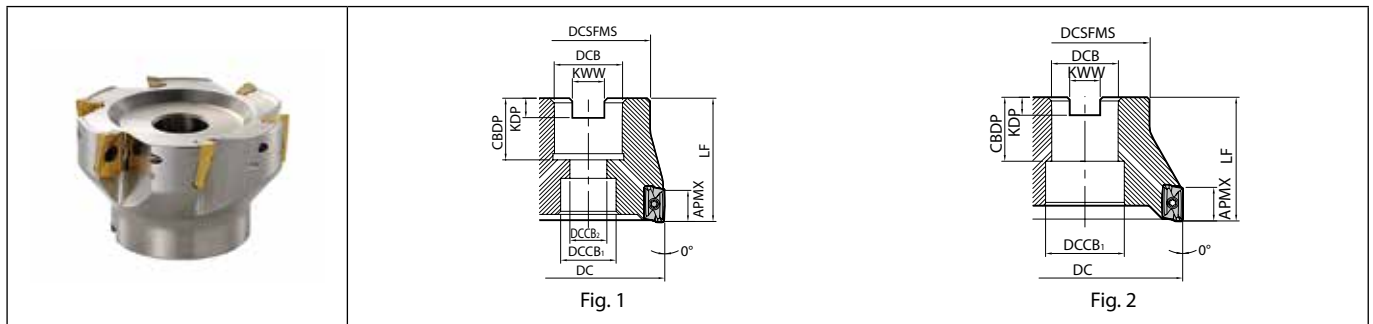
For more details, see „Warning“ on page M93.

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

Cutting edge angle 45°~70°
Cutting edge angle 75°
Cutting edge angle 88°/90°
Cutter for Finishing
High Feed Cutter
Multi- Function
Slot Mill
Ball-nose Radius
Others

● : Standard item

MEC (Face mill)



Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)										A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Spare parts			Applicable inserts ➡ M91
			R		DC	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW	APMX							Anti-seize compound	Screw	Wrench	
																								
Metric	Coarse pitch	MEC 040R-11-5T-M	●	5	40	34	16	14	8.5	40	20	5.6	8.5	10	+23	-7	Yes	30000	0.2	1	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
		MEC 050R-11-5T-M	●	5	50	40	22	18	12		22	6.3	10.4					22500	0.3	1				
		MEC 063R-11-6T-M	●	6	63	52.5	27	20	14	50	26	7	12.4					20500	0.7	1				
		MEC 080R-11-7T-M	●	7	80													26	17.6	55				
		MEC 100R-11-9T-MN	●	9	100	65	32	26	17.6	55	8	14.4	17000					1.6	1					
		MEC 125R-11-11T-M	●	11	125	85	40	45	32	63	33	9.5	16.4					15000	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	33900	0.1	1	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
		MEC 040R-11-6T-M	●	6	40	34		14		40	26.5	7	12.4					30000	0.2	1				
		MEC 080R-11-10T-M	●	10	80	52.5	27	20	14	50	26.5	7	12.4					18500	0.9	1				
		MEC 100R-11-11T-M	●	11	100	65	32	26	17.6	55	26	8	14.4					17000	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	25000	0.3	1	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...
		MEC 050R-17-4T-M	●		50	40	22	18	12		22	6.3	10.4					17000	0.4	1				
		MEC 063R-17-5T-M	●	5	63	52.5	27	20	14	50	26	7	12.4					14500	0.6	1				
		MEC 080R-17-6T-M	●	6	80													26	17.6	55				
		MEC 100R-17-7T-MN	●	7	100	65	32	26	17.6	55	8	14.4	10500					1.8	1					
		MEC 125R-17-9T-M	●	9	125	85	40	45	32	63	33	9.5	16.4					8900	3.1	1				
MEC 160R-17-12T-M		●	12	160	110	68		-	33								9.5	16.4	No	7400				
Bore dia. inch spec		Coarse pitch	MEC 063R-11-6T	●	6	63	50	25.4	20	14	50	26	6				9.5	10	+23	-7				
	MEC 080R-11-7T		●	7	80	52.5	63							32	8	12.7					18500	1	1	
	MEC 100R-11-9TN		●	9	100	65		31.75	26	17.6	63	38	10				15.9				17000	1.8	1	
	MEC 125R-11-11T		●	11	125	80	38.1	45	32	38	10	15.9	15000	3.4	1									
	Fine pitch	MEC 063R-11-8T	●	8	63	50	25.4	20	14	50	26	6	9.5	10	+23	-7	Yes	20500	0.8	1	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
		MEC 080R-11-10T	●	10	80	52.5												32	8	12.7				
	Coarse pitch	MEC 063R-17-5T	●	5	63	50	25.4	20	14	50	26	6	9.5	15.7	+19	-7	Yes	14500	0.8	1	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...
		MEC 080R-17-6T	●	6	80	52.5												63	32	8				
		MEC 100R-17-7TN	●	7	100	65	31.75	26	17.6	63	38	10	15.9											
		MEC 125R-17-9T	●	9	125	80	38.1	45	32	38	10	15.9	8900					3.4	1					
	Fine pitch	MEC 063R-17-6T	●	6	63	50	25.4	20	14	50	26	6	9.5	15.7	+19	-7	Yes	14500	0.8	1	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...
		MEC 080R-17-8T	●	8	80	52.5												32	8	12.7				
		MEC 100R-17-9TN	●	9	100	65	31.75	26	17.6	63	32	8	12.7					10500	1.8	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.

For more details, see „Warning“ on page M93.

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

When using center-through air/Coolant/Mist

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

For good shoulder finishes by MEC multistage ap.

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

● : Standard item

Table 1

Description	Mounting bolt (Attachment)	Wrench
MEC032R.....M	SP8X35	LW-5 (Double width 5 mm)
MEC040R.....M	HH8X25H	LW-5 (Double width 5 mm)
MEC050R.....M	HH10X30H	LW-6 (Double width 6 mm)
MEC063R.....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)

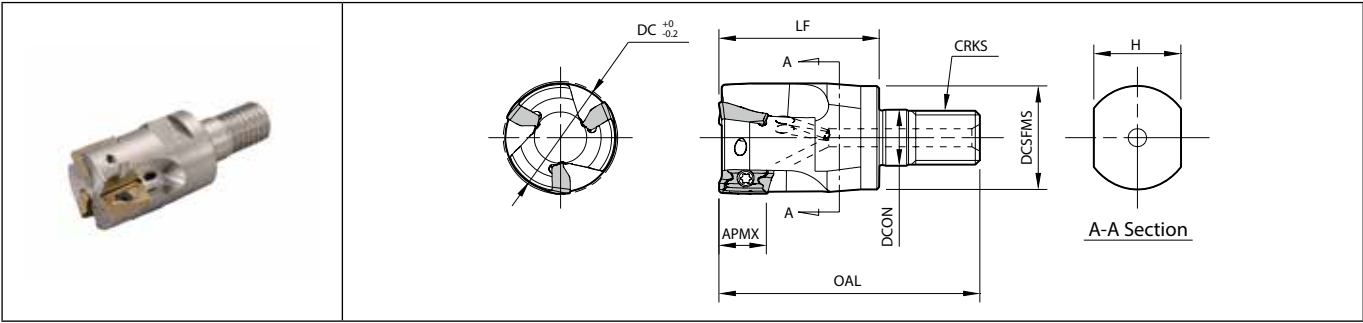
Wrench is not attached. Please purchase it separately.

M



Milling

MEC (Modular type)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)										Coolant hole	Max. revolution (min ⁻¹)	Applicable inserts ➡ M91
			DC	DCON	DCSFMS	OAL	LF	APMX	CRKS	H	A.R. max. (°)	R.R. (°)			
MEC 16-M08-11T-2T 20-M10-11T-2T 20-M10-11T-3T 25-M12-11T-3T 32-M16-11T-4T	●	2	16	8.5	14.7	42	25	10	M8x1.25	12	+18	-14	Yes	43750	BDGT11T3... BDMT11T3...
	●	3	20	10.5	18.7	48	30		M10x1.5	15	+20	-10		41000	
	●		25	12.5	23	56	35		M12x1.75	19	+21	-9		37500	
	●		32	17	30	62	40		M16x2.0	24	+23	-7		33900	
	●	4	32	17	30	62	40		M16x2.0	24	+17	-7		30000	
MEC 25-M12-17-2T 32-M16-17-3T	●	2	25	12.5	23	56	35	15.7	M12x1.75	19	+16	-11	Yes	35000	BDGT1704... BDMT1704...
	●	3	32	17	30	62	40		M16x2.0	24	+17	-7		30000	

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.
 For more details, see „Warning“ on page M93.
 See page M82 for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

M



Milling

Spare parts (MEC modular type)

Description	Spare parts		
	Clamp screw	Wrench	Anti-seize compound
MEC 16-M08-11T-2T 20-M10-11T-2T 20-M10-11T-3T 25-M12-11T-3T 32-M16-11T-4T	SB-2555TRG	DTM-8	P-37
MEC 25-M12-17-2T 32-M16-17-3T	SB-4070TRN	DTM-15	P-37

Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

● : Standard item

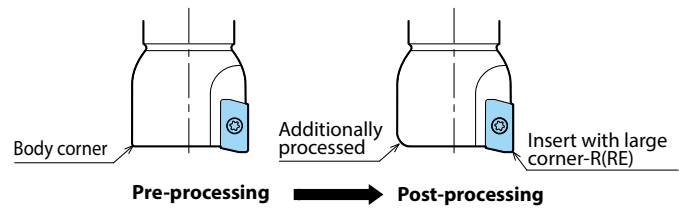
CBN & PCD Inserts are
sold in 1 piece boxes

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

* Round- shaped additional processing is recommended.

When applying chamfer shaped additional processing, do not cut away too much.

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



Recommended cutting conditions

JT chipbreaker

Workpiece material	fz (mm/t)		Recommended insert grades (Vc: m/min)				
	Toolholder description		Cermet	MEGACOAT NONA EX (MEGACOAT NANO)			CVD coated carbide
	MEC10~MEC19	MEC20~MEC40 MEC032R~MEC160R	TN100M	PR1835 (PR1535)	PR1825	PR1810	CA6535
Carbon steel	0.06 ~ 0.1 ~ 0.15	0.08 ~ 0.15 ~ 0.25	☆ 120 ~ 160 ~ 200	☆ 120 ~ 180 ~ 250	★ 120 ~ 180 ~ 250	-	-
Alloy steel	0.06 ~ 0.1 ~ 0.12	0.08 ~ 0.15 ~ 0.2	☆ 100 ~ 140 ~ 180	☆ 100 ~ 160 ~ 220	★ 100 ~ 160 ~ 220	-	-
Mold steel	0.06 ~ 0.08 ~ 0.1	0.08 ~ 0.12 ~ 0.2	☆ 80 ~ 120 ~ 150	☆ 80 ~ 140 ~ 180	★ 80 ~ 140 ~ 180	-	-
Stainless steel (Austenitic related)	0.06 ~ 0.08 ~ 0.1	0.08 ~ 0.12 ~ 0.15	-	☆ 100 ~ 160 ~ 200	☆ 100 ~ 160 ~ 200	-	-
Stainless steel (Martensitic related)	0.06 ~ 0.08 ~ 0.1	0.08 ~ 0.12 ~ 0.2	-	☆ 150 ~ 200 ~ 250	-	-	★ 180 ~ 240 ~ 300
Stainless steel (Precipitation hardening)	0.06 ~ 0.08 ~ 0.1	0.08 ~ 0.12 ~ 0.2	-	★ 90 ~ 120 ~ 150	-	-	-
Gray cast iron	0.06 ~ 0.1 ~ 0.15	0.08 ~ 0.18 ~ 0.25	-	-	-	★ 120 ~ 180 ~ 250	-
Nodular cast iron	0.06 ~ 0.08 ~ 0.1	0.08 ~ 0.15 ~ 0.2	-	-	-	★ 100 ~ 150 ~ 200	-
Ni-base heat-resistant alloys	0.06 ~ 0.08 ~ 0.1	0.08 ~ 0.12 ~ 0.15	-	☆ 20 ~ 30 ~ 50	-	-	★ 20 ~ 30 ~ 50
Titanium alloys	0.06 ~ 0.08 ~ 0.1	0.08 ~ 0.15 ~ 0.2	-	☆ 40 ~ 60 ~ 80	-	-	-

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

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

★: 1st Recommendation ☆: 2nd Recommendation

JS chipbreaker

Workpiece material	fz (mm/t)		Recommended insert grades (Vc: m/min)			
	Toolholder description		MEGACOAT NONA EX (MEGACOAT NANO)			CVD coated carbide
	MEC10~MEC19	MEC20~MEC40 MEC032R~MEC160R	PR1835 (PR1535)	PR1825	PR1810	CA6535
Carbon steel	0.06~ 0.1 ~0.12	0.08~ 0.15 ~0.18	☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-
Alloy steel	0.06~ 0.08 ~0.1	0.08~ 0.12 ~0.15	☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-
Mold steel	0.06~ 0.08 ~0.1	0.08~ 0.1 ~0.12	☆ 80~ 140 ~180	★ 80~ 140 ~180	-	-
Stainless steel (Austenitic related)	0.06~ 0.08 ~0.1	0.08~ 0.1 ~0.12	★ 100~ 160 ~200	☆ 100~ 160 ~200	-	-
Stainless steel (Martensitic related)	0.06~ 0.08 ~0.1	0.08~ 0.1 ~0.12	☆ 150~ 200 ~250	-	-	★ 180~ 240 ~300
Stainless steel (Precipitation hardening)	0.06~ 0.08 ~0.1	0.08~ 0.1 ~0.12	☆ 90~ 120 ~150	-	-	-
Ni-base heat-resistant alloys	0.06~ 0.08 ~0.1	0.08~ 0.1 ~0.12	☆ 20~ 30 ~50	-	-	★ 20~ 30 ~50
Titanium alloys	0.06~ 0.08 ~0.1	0.08~ 0.1 ~0.12	★ 40~ 60 ~80	-	-	-

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

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

★ : 1st Recommendation ☆: 2nd Recommendation

JA chipbreaker

Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)	
		DLC coated carbide	Carbide
		PDL025	GW25
Aluminum alloys (Si 13% or less)	0.05~0.3	200~1,000	200~800
Aluminum alloys (Si 13% and over)	0.05~0.2	200~300	200~300

PCD

Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)
		PCD
		KPD230 (KPD001)
Aluminum alloys (Si 13% or less)	0.05~0.2	500~1,500
Aluminum alloys (Si 13% and over)	0.05~0.15	300~1,000

 Warning

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

Warning about Max. Revolution indicated on main body

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 10,000min⁻¹), refer to the table to adjust the balance of MEC and suitable arbor.

Revolution (min ⁻¹)	Balance quality grade G ISO 1940-1/8621 (JIS B0905)
~20,000	G16
~30,000	G6.3
30,000~	G2.5

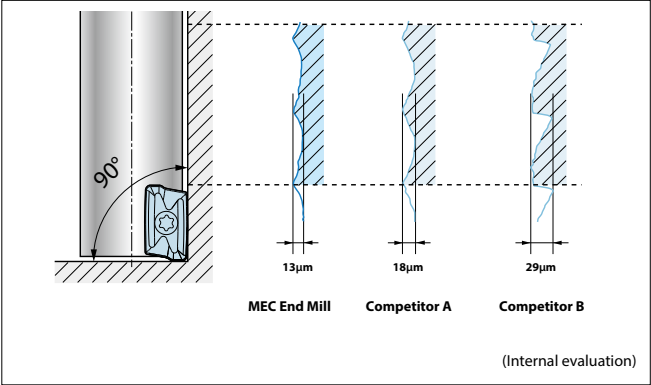
M



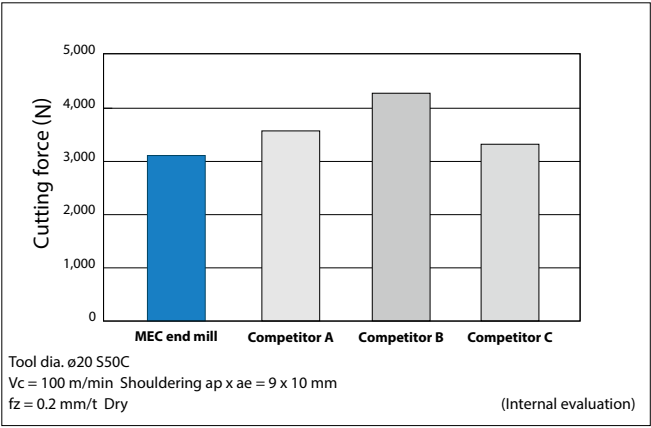
Milling

Features of MEC

Good squareness
Cutting Surface Comparison



Low cutting force
Cutting force comparison



Chipbreaker

JT chipbreaker
(General purpose)

JA chipbreaker
(For aluminum)

JS chipbreaker
(Low cutting force)

Cutting force
20% lower

Cutting performance of mec end mill

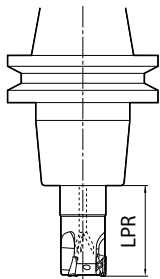
1. Cutting edge length 10mm type (Standard/Same shank with JT chipbreaker)

Cutting dia.	Description	Overhang length LPR (mm)		Shape
$\phi 10$	MEC10-S10-11	17	-	
$\phi 12$	MEC12-S16-11	20	30	
$\phi 16$	MEC16-S16-11T	30	45	
$\phi 20$	MEC20-S20-11T	30	45	
$\phi 25$	MEC25-S25-11T	32	48	
$\phi 32$	MEC32-S32-11T	40	60	

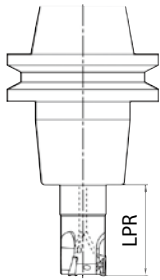
($V_c = 120$ m/min Workpiece material: S50C)

Description	Shouldering (Cutting width $a_e = DC/2$)	Slotting Ramping and helical milling
MEC10-S10-11		
MEC12-S16-11		
MEC16-S16-11T		
MEC20-S20-11T		
MEC25-S25-11T		
MEC32-S32-11T		

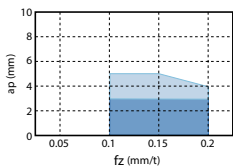
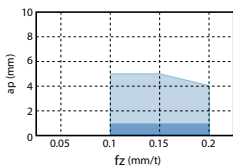
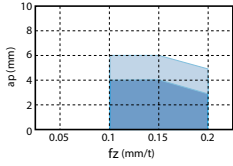
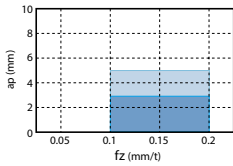
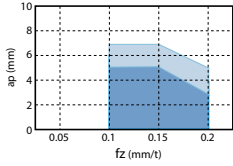
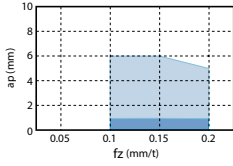
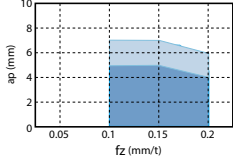
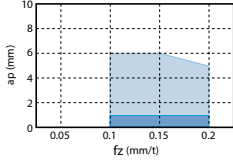
2. Cutting edge length 10 mm type (Long shank with JT chipbreaker)

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

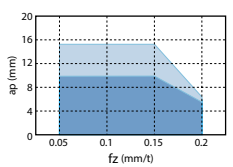
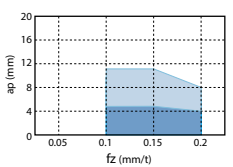
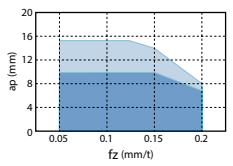
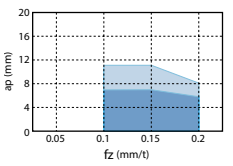
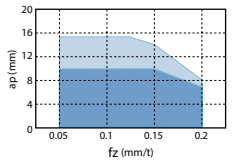
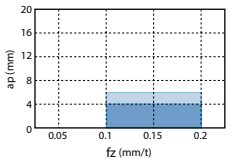
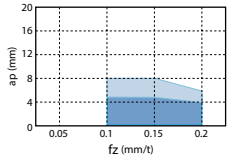
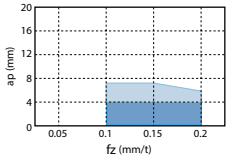
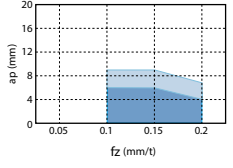
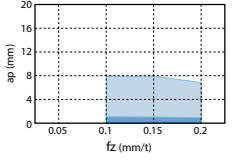
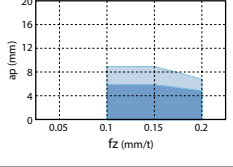
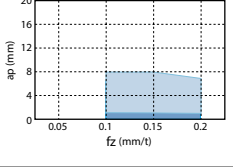
3. Cutting edge length 15.7 mm type (JT chipbreaker)

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

(Vc = 120 m/min Workpiece material: S50C)

Description	Shouldering Cutting width ae = DC/2	Slotting Ramping and helical milling
MEC20-S20-140-11T Long shank		
MEC25-S25-160-11T Long shank		
MEC32-S32-200-11T Long shank		
MEC40-S32-240-11T Long shank		

(Vc = 120 m/min Workpiece material: S50C)

Description	Shouldering Cutting width ae = DC/2	Slotting Ramping and helical milling
MEC25-S25-17		
MEC32-S32-17		
MEC40-S32-17		
MEC25-S25-160-17 Long shank		
MEC32-S32-200-17 Long shank		
MEC40-S32-240-17 Long shank		

M



Milling

Cutting performance of MEC face mill

Cutting edge length 10 mm type (JT chipbreaker)

(Vc = 120 m/min Workpiece material: S50C)

Cutting dia.	Description	Overhang length LPR (mm)
ø32	MEC032R-11-5T-M	110
ø40	MEC040R-11-T-○M	115
ø50	MEC050R-11-○T-M	100
ø63	MEC063R-11-○T	95
	MEC063R-11-○T-M	
ø80	MEC080R-11-○T	95
	MEC080R-11-○T-M	
ø100	MEC100R-11-9TN	108
	MEC100R-11-9T-MN	
ø125	MEC125R-11-11T	
	MEC125R-11-11T-M	

Shape

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

Cutting edge length 15.7 mm type (JT chipbreaker)

(Vc = 120 m/min Workpiece material: S50C)

Cutting dia.	Description	Overhang length LPR (mm)
ø40	MEC040R-17-4T-M	115
ø50	MEC050R-17-○T-M	100
ø63	MEC063R-17-○T	95
	MEC063R-17-○T-M	
ø80	MEC080R-17-○T	95
	MEC080R-17-○T-M	
ø100	MEC100R-17-○TN	108
	MEC100R-17-○T-MN	
ø125	MEC125R-17-9T	
	MEC125R-17-9T-M	
ø160	MEC160R-17-12T	
	MEC160R-17-12T-M	

Shape

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

M



Milling

Cutting edge angle
45°~70°Cutting edge angle
75°Cutting edge angle
88°/90°Cutter for
FinishingHigh Feed
CutterMulti-
Function

Slot Mill

Ball-nose
Radius

Others

Ramping, helical milling and vertical milling (Plunging)

Ramping/Helical milling

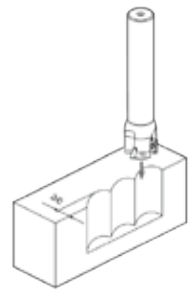
Ramping angle is recommended under RMPX.

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

Use compressed air when during machining.

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

BDMT1103 type is not recommended for ramping and helical milling.

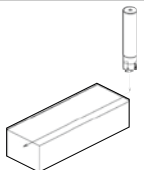
Vertical milling (Plunging)			
	Cutting dia.	Applicable inserts	Max. width of cut (ae)
	ø16 ~ ø19	BDMT11T3 type BDGT11T3 type	1.5 mm
	ø20 ~ ø160	BDMT11T3 type BDGT11T3 type	5 mm
	ø25 ~ ø160	BDMT1704 type BDGT1704 type	8 mm
	BDMT1103 type is not recommended for vertical milling (plunging).		

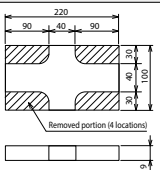
Guidance of minimum cutting dia. by helical milling

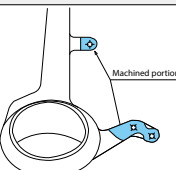
MEC	Cutting dia.	ø16	ø18	ø20	ø22	ø25	ø28	ø30	ø32	ø40	ø50
BD_T11T3 type	Guidance of minimum cutting dia. by helical milling	ø21	ø25	ø29	ø33	ø39	ø45	ø49	ø53	ø69	Helical milling is not recommended.
	Guidance of minimum cutting dia. in case of flatting bottom after helical milling.	ø28	ø32	ø36	ø40	ø46	ø52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

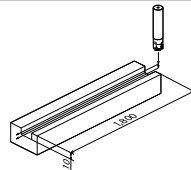
MEC	Cutting dia.	ø25	ø32	ø40	ø50
BD_T1704 type	Guidance of minimum cutting dia. by helical milling	ø34	ø48	ø64	Helical milling is not recommended.
	Guidance of minimum cutting dia. in case of flatting bottom after helical milling.	ø46	ø60	ø76	

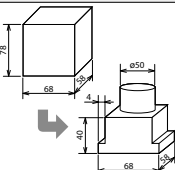
Case studies

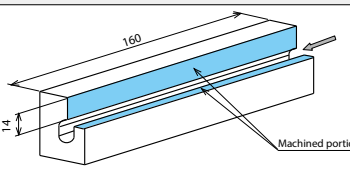
RC55 (Pre-hardened Tool Steel)	
- Test piece (54~56HRC) - Vc = 50 m/min (n = 800 min⁻¹) - ap x ae = 2 x 14 mm - fz = 0.125 mm/t (Vf = 300 mm/min) - Dry - MEC20-S20-11T 3 flutes - BDMT11T308ER-JT (PR830)	
MEC	Chip removal amount = 71.3cm ³ (Further machining possible)
Competitor's end mill A	Chip removal amount = 2.9 cm ³ (Chipping occurred)
Competitor's end mill A (a25 (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)	

SUS304	
- Plate - Vc = 125 m/min (n = 1,600 min⁻¹) - ap = 9.0 mm - fz = 0.1 mm/t (Vf = 320 mm/min) - Dry - MEC25-S25-17 2 flutes - 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)	

SCM420	
- Knuckle Steering - Vc = 150 m/min (n = 1,200 min⁻¹) - ap = 0.5~5 mm (Shouldering) - fz = 0.1 mm/t (Vf = 478 mm/min) - Dry - MEC40-S32-17 4 flutes - 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)	

SS400	
- Plate - Vc = 88 m/min (n = 1,400 min⁻¹) - ap = 5 mm x 2 passes - fz = 0.12 mm/t (Vf = 500 mm/min) - Dry - MEC20-S20-11T 3 flutes - 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)	

SKD61 (Hot work tool steel)	
- Mold - Vc = 130 m/min (n = 1,040 min⁻¹) - ap x ae = (~3) x (~5) (Varies depending on machining point) - fz = 0.18 mm/t (Vf = 936 mm/min) - Dry (Air blow) - MEC40-S32-11T • 5 flutes - 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)	

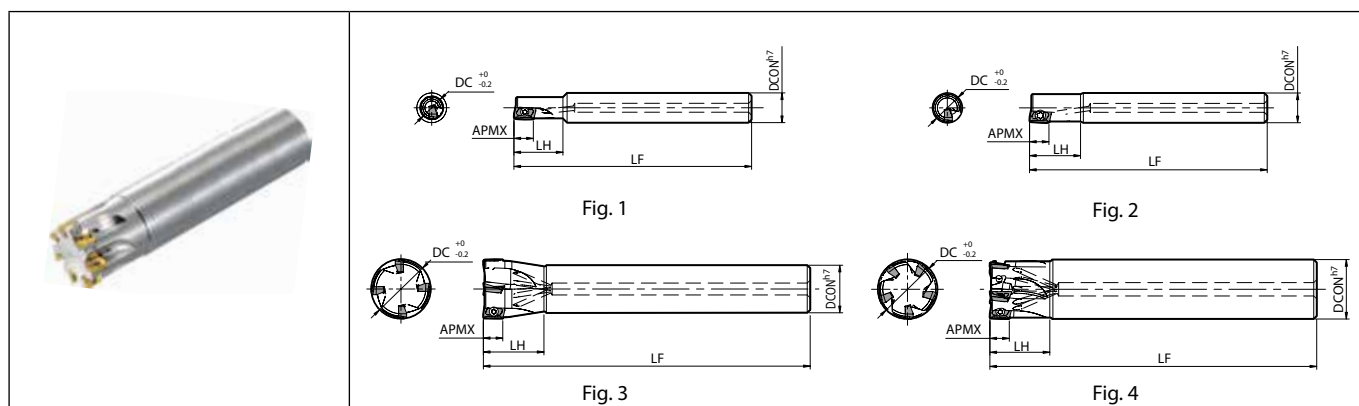
Ni-base heat-resistant alloys	
- Turbine parts - Vc = 15 m/min (n = 120 min⁻¹) - ap = 0.5 mm - fz = 0.08 mm/t (Vf = 38 mm/min) - Wet - MEC040R-17-4T-M 4 flutes - BDMT170408ER-JS (PR1025)	
MEC	9pcs/edge
Competitor's end mill F	1pc/edge or less
Competitor's end mill F (Coated carbide Insert) could not finish machining of 1 workpiece, but MEC could cut 9pcs/edge and the finished surface was good. (User evaluation)	

M



Milling

MECX (End mill)



Toolholder dimensions

Description				Availability	Inserts	Dimension (mm)					A.R. max (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Fig.	Spare parts			Applicable inserts M100																								
																Anti-seize compound	Screw	Wrench																									
Standard shank	Standard	MECX	08-S10-07-1T	● 1	8	10	80	16	6	+11.7	-24	48100	1	P-37	SB-2035TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS																										
			14-S12-07-2T	● 2	14	12	18	+16.3										-12.1	44800	3																							
			17-S16-07-3T	● 3	17	16	100														20	Yes	-11	42400	3																		
			18-S16-07-3T	● 3	18																					-10.9	41600	3															
			20-S16-07-4T	● 4	20	110	25														-10.4								40200	3													
			21-S20-07-4T	● 4	21																										-10.1	39500	3										
			25-S20-07-5T	● 5	25	120	25																											-9.7	37000	3							
			26-S25-07-5T	● 5	26																																-9.5	36500	3				
			33-S32-07-6T	● 6	33	32	130																																	30	-8.8	33100	3
				● 6	33	32	130																																	30			
	Fine pitch	MECX	20-S16-07-5T	● 5	20	16	110		20	6	+16.3	-10.4	Yes	40200	3	P-37	SB-2042TRG																							DTM-6			
			25-S20-07-7T	● 7	25	20	120	25	-9.7										37000	3																							
Same shank	Standard	MECX	10-S10-07-1T	● 1	10	10	80	17		6	+12.8	-18.7	47100	2	P-37	SB-2035TRG	DTM-6					BDMT0703...-JT BDMT0703...-JS																					
			12-S12-07-2T	● 2	12	12	18	+14.3	-13.7									46200	4																								
			16-S16-07-3T	● 3	16	16	100													20	Yes		-11.3	43200	4																		
			20-S20-07-4T	● 4	20	20	110																			+16.3	-10.4	40200	4														
			25-S25-07-5T	● 5	25	25	120													25										-9.7	37000	4											
	Fine pitch	MECX	16-S16-07-4T	● 4	16	16	100			20	6	+16.3	-11.3	Yes	43200	4	P-37			SB-2042TRG		DTM-6											BDMT0703...-JT BDMT0703...-JS										
			20-S20-07-5T	● 5	20	20	110	-10.4	40200									4																									
			25-S25-07-7T	● 7	25	25	120												25		-9.7		37000	4																			
			32-S32-07-8T	● 8	32	32	130												30						-8.9	33600	4																
				● 8	32	32	130												30																								
Long shank	Standard	MECX	17-S16-130-07-3T	● 3	17	16	130			20	6	+16.3	-11	Yes	42400	3	P-37		SB-2042TRG	DTM-6		BDMT0703...-JT BDMT0703...-JS																					
			21-S20-140-07-4T	● 4	21	20	140	-10.1	39500									3																									
			26-S25-160-07-5T	● 5	26	25	160														25		-9.5	36500				3															

For good shoulder finishes by MECX multistage ap.

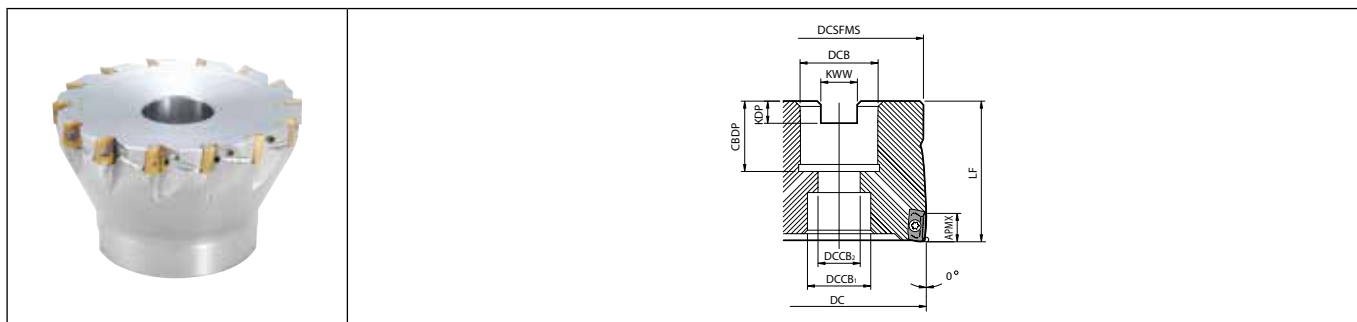
In order to obtain smooth machining wall surface by MECX multistage ap set ap within 5mm for each cut.

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

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.

For more details, see „Warning“ on page M101.

● : Standard item

MECX (Face mill)**Toolholder dimensions**

Description	Availability	Inserts	Dimension (mm)										A.R. MAX. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Spare parts			Applicable inserts ➡ M100
			DC	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW	APMX						Anti-seize compound	Screw	Wrench	
MECX 032R-07-8T-M 040R-07-10T-M	●	8	32	30	16	14	8.5	40	20	5.5	8.5	6	+7	-8.9	Yes	33600	0.15				BDMT0703...-JT BDMT0703...-JS
	●	10	40	38	22	18	12		22	6.3	10.4			-8.4		30500	0.25				

For good shoulder finishes by MECX multistage ap.

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

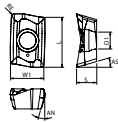
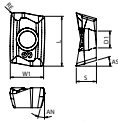
Coat anti-seize compound(P-37) thinly on portion of taper and thread when insert is fixed.

MECX032R comes with mounting bolt (HH8X25H) and MECX040R comes with mounting bolt (HH10X30H).

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.

For more details, see „Warning“ on page **M101**.

BDMT

Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)		Carbon steel / Alloy steel										★	☆	P		
		Mold and die steel										★	☆			
		Austenitic stainless steel								☆		☆	★	M		
		Martensitic stainless steel						★				☆				
		Precipitation hardening stainless steel								☆			★			
		Gray cast iron										★		K		
		Nodular cast iron										★				
		Non-ferrous metals												N		
		Heat-resistant alloy						★					☆	S		
		Titanium alloy								☆			★			
Hard materials												H				
Insert		Description		No. of edges	Dimension (mm)					Angle (°)		Carbide				Applicable toolholder ➡ M98 M99
					S	D1	RE	L	W1	AN	AS	CVD	PVD			
													CA6535	PR1535	PR1810	
		BDMT 070302ER-JT 070304ER-JT 070308ER-JT	2	2.6	2.3	0.2 0.4 0.8	6.7	4.6	15	16	● ● ●	● ● ●	● ● ●	● ● ●	MECX...-07-...	
	 Low cutting force / Stainless steel	BDMT 070302ER-JS 070304ER-JS 070308ER-JS	2	2.6	2.3	0.2 0.4 0.8	6.7	4.6	15	16	● ● ●	● ● ●	● ● ●	● ● ●	MECX...-07-...	

Handed insert shows Right-hand

Recommended cutting conditions ➡ M101

M



Milling

Cutting edge angle
45°~70°Cutting edge angle
75°Cutting edge angle
88°/90°Cutter for
FinishingHigh Feed
CutterMulti-
Function

Slot Mill

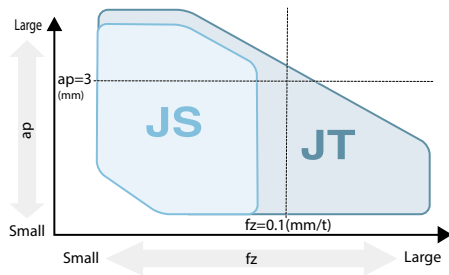
Ball-nose
Radius

Others

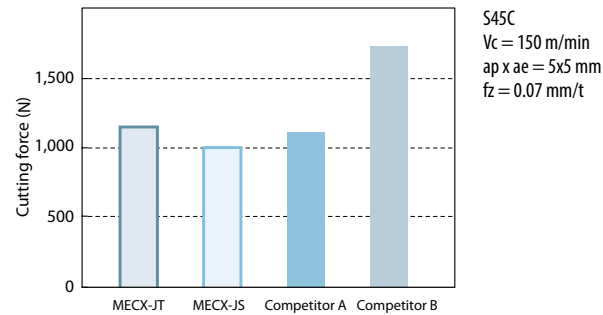
● : Standard item

M100

Chipbreaker selection



Cutting force comparison (Internal evaluation)



Warning

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

Warning about max. revolution indicated on main body

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 10,000min⁻¹), refer to the table to adjust the balance of MECX and suitable arbor.

Revolution (min ⁻¹)	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	f_z (mm/t)		Recommended insert grades (V_c : m/min)			
	JS chipbreaker	JT chipbreaker	MEGACOAT NANO EX (MEGACOAT NANO)			CVD coated carbide
			PR1835 (PR1535)	PR1825	PR1810	CA6535
Carbon steel	0.04~ 0.08 ~0.1	0.06~ 0.1 ~0.12	☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-
Alloy steel	0.04~ 0.06 ~0.08	0.06~ 0.08 ~0.1	☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-
Mold steel	0.04~ 0.06 ~0.08	0.06~ 0.08 ~0.1	☆ 80~ 140 ~180	★ 80~ 140 ~180	-	-
Stainless steel (Austenitic related)	0.03~ 0.04 ~0.05	0.05~ 0.06 ~0.07	★ 100~ 160 ~200	☆ 100~ 160 ~200	-	-
Stainless steel (Martensitic related)	0.03~ 0.04 ~0.05	0.05~ 0.06 ~0.1	☆ 150~ 200 ~250	-	-	★ 180~ 240 ~300
Stainless steel (Precipitation hardening)	0.03~ 0.04 ~0.05	0.05~ 0.06 ~0.1	★ 90~ 120 ~150	-	-	-
Gray cast iron	0.04~ 0.08 ~0.1	0.08~ 0.1 ~0.15	-	-	★ 120~ 180 ~250	-
Nodular cast iron	0.04~ 0.06 ~0.08	0.08~ 0.1 ~0.12	-	-	★ 100~ 150 ~200	-
Ni-base heat-resistant alloys	0.03~ 0.04 ~0.05	0.05~ 0.06 ~0.07	☆ 20~ 30 ~50	-	-	★ 20~ 30 ~50
Titanium alloys	0.04~ 0.06 ~0.08	0.08~ 0.1 ~0.12	★ 40~ 60 ~80	-	-	-

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

★ : 1st Recommendation ☆ : 2nd Recommendation

M



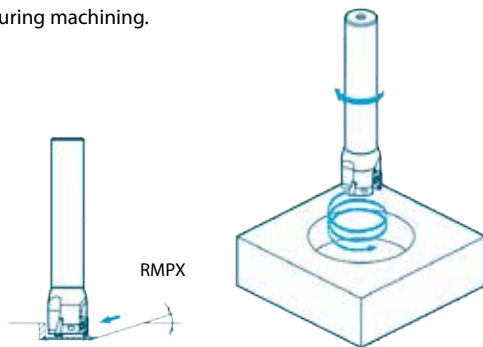
Milling

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

Guidance of minimum cutting dia. by helical milling

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

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

M



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

Ball-nose
Radius

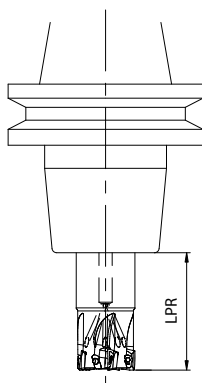
Others

Cutting performance of MECX end mill

(Vc = 150 m/min Workpiece material: S50C)

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

Shape



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

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

For multi-edge type, use with 70% or less of ap.

* Cutting conditions of JS chipbreaker

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

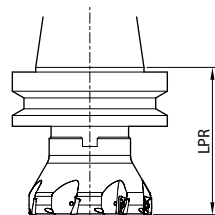
Description	Shouldering (Cutting width ae = DC/2)	Slotting Ramping and helical milling
MECX08-S10-07-1T		
MECX10-S10-07-1T		
MECX12-S12-07-2T		
MECX16-S16-07-3T		
MECX20-S20-07-4T		
MECX25-S25-07-5T		
MECX32-S32-07-6T		

Cutting performance of MECX face mill

(Vc = 150 m/min Workpiece material: S50C)

Cutting dia.	Description	Overhang length LPR (mm)
ø32	MECX032R-07-8T-M	100
ø40	MECX040R-07-10T-M	

Shape



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

- * Use JT chipbreaker.
- * Slotting is not recommended.

M



Milling

High performance milling

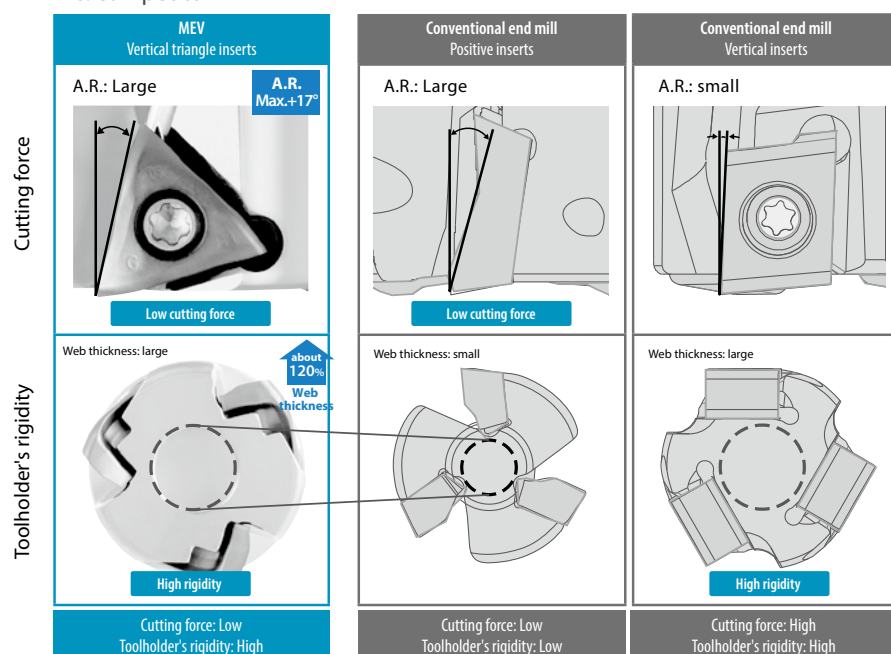
MEV

Newly developed triangular inserts providing low cutting force and increased toolholder rigidity. High performance, economical, and multi-functional milling solutions.

1 High performance: low cutting force and high rigidity

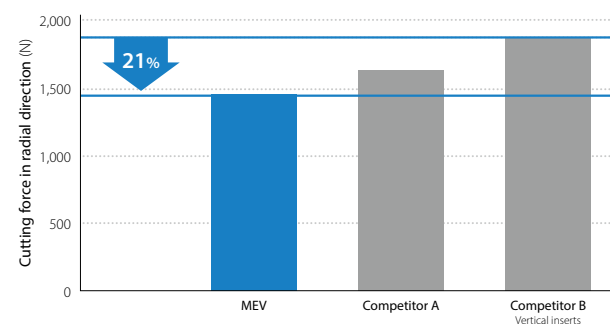
Newly developed vertical triangle inserts with 3 cutting edges achieve stable machining with reduced chattering.

MEV vs. competitor



Keeping A.R. max. at 17°, provides lower cutting force than the positive insert types of competitors

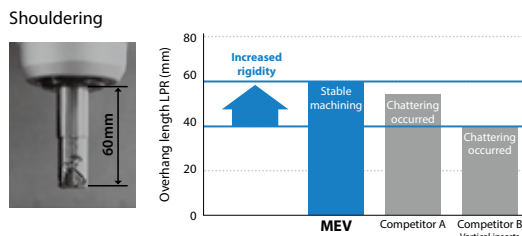
Cutting force comparison (internal evaluation)



Cutting conditions: $V_c = 200$ m/min, $a_p \times a_e = 3 \times 18$ mm, $f_z = 0.10$ mm/t, $\phi 20$ (3 inserts), Dry, Workpiece material: SCM440 (H)

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

Chattering resistance comparison (internal evaluation)



Cutting conditions: $V_c = 200$ m/min, $a_p \times a_e = 3 \times 18$ mm, $f_z = 0.10$ mm/t, $\phi 20$ (3 inserts), Dry, Workpiece material: SCM440 (H)

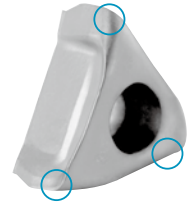
Slotting



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

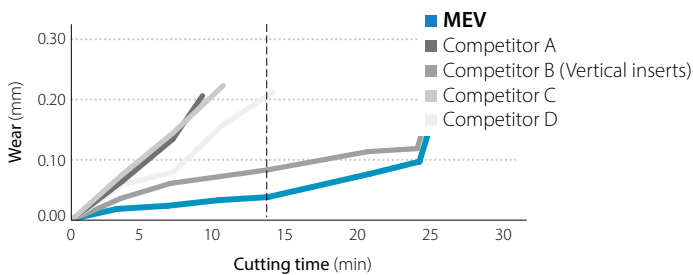
Insert

Unique triangle inserts with 3 cutting edges. PR15 series utilizes MEGACOAT NANO coating technology with excellent wear and adhesion resistance.



Long tool life with excellent wear resistance

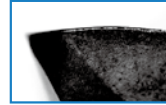
Wear resistance comparison (internal evaluation)



Cutting conditions: $V_c = 180$ m/min, $a_p \times a_e = 3 \times 10$ mm, $f_z = 0.1$ mm/t, $\phi 20$, Dry, Workpiece material: SKD11 (30~35HS)

Cutting edge (after machining 14 min)

MEV



Competitor A



After machining 9.1 min

Competitor B (Vertical inserts)



Competitor C



After machining 10.5 min

Competitor D



Improved stability with superior fracture resistance



Cutting edge cross-section

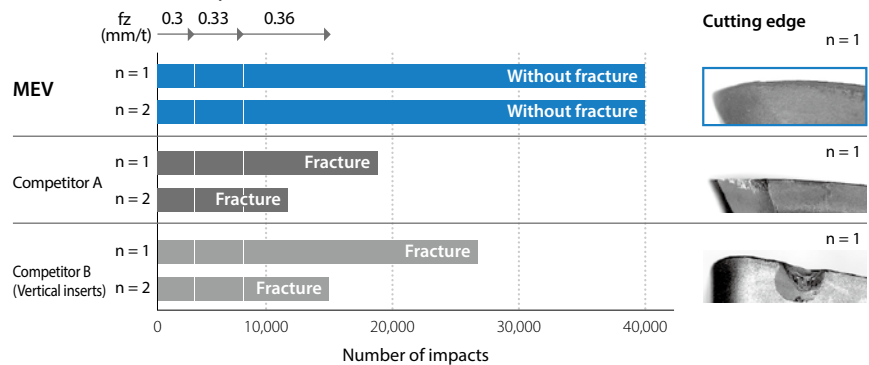
MEV

Conventional



The MEV features a larger cutting edge to increase strength

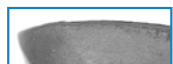
Wear resistance comparison (internal evaluation)



Cutting conditions: $V_c = 120$ m/min, $a_p \times a_e = 2 \times 10$ mm, $f_z = 0.3 - 0.36$ mm/t, $\phi 20$ (1 insert), Dry, Workpiece material: SCM440 (37~39HS)

Cutting edge

n = 1



n = 1



n = 1



n = 1

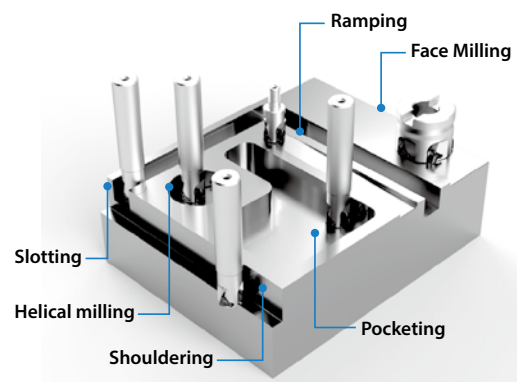
3 Multi-functional: The MEV can perform a wide variety of machining processes

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

Chip example (slotting)



Cutting conditions: $V_c = 150$ m/min, $a_p = 6$ mm (Slotting), $f_z = 0.2$ mm/t, $\phi 20$ (3 insert), Dry, Workpiece material: SS400

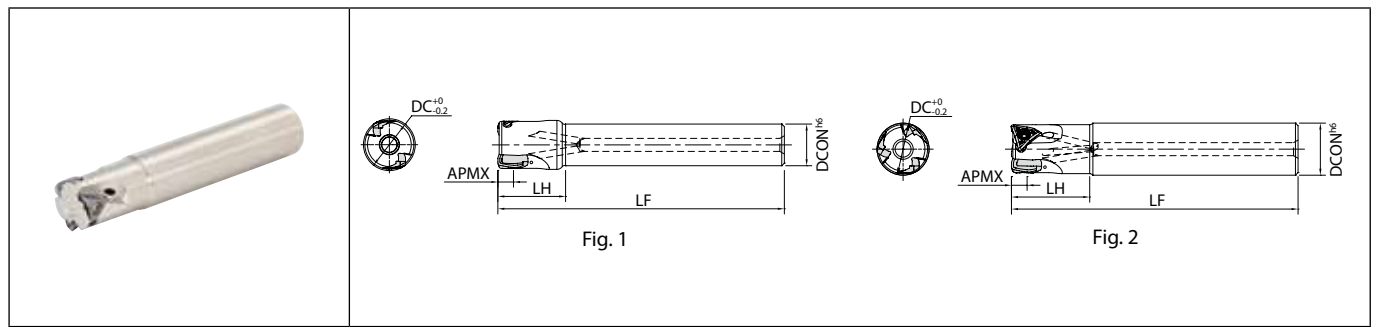


M



Milling

MEV (End mill)



Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)						A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Spare parts			Applicable inserts ➡ M109						
					DC	DCON	LF	LH	APMX	Anti-seize compound							Screw	Wrench								
Cylindrical	Standard shank	MEV	20-S16-06-2T	●	2	20	16	110	26	6	+17	-38	32000	0.2	1	P-37	SB-3076TRP	DTPM-10	TOMT0605...-GM TOMT0605...-SM							
			22-S20-06-3T	●	22	20			-37			29000		1												
			25-S20-06-3T	●	3	25		120	29			25000	0.3	1												
			28-S25-06-3T	●		28			23000			0.4	1													
			30-S25-06-4T	●	4	30	25	130	32			21500	0.5	1												
			32-S25-06-4T	●		32			20000				1													
			40-S32-06-5T	●	5	40		150	50			16000	1	1												
			50-S32-06-5T	●		50	32	120	40			13000	0.9	1												
	Same shank	MEV	20-S20-06-2T	●	2	20	20	110	30	6	+17	-38	32000	0.2	2	P-37	SB-3076TRP	DTPM-10	TOMT0605...-GM TOMT0605...-SM							
			20-S20-06-3T	●	3				-37			25000	0.4	2												
			25-S25-06-2T	●	2	25	25	120	32			25000	0.4	2												
			25-S25-06-3T	●	3				20000			0.7	2													
			32-S32-06-3T	●		32	32	130	40			20000	0.7	2												
			32-S32-06-4T	●	4																					
			Long shank	MEV	20-S18-06-150-2T	●	2	20	18			30	6	+17	-38					32000	0.3	1	P-37	SB-3076TRP	DTPM-10	TOMT0605...-GM TOMT0605...-SM
					20-S18-06-150-3T	●	3		150																	
	20-S20-06-150-2T	●			2	20	40																			
	20-S20-06-150-3T	●			3																					
	25-S25-06-170-2T	●			2	25	25	170	50	-37	25000	0.6			2											
	25-S25-06-170-3T	●			3																					
	32-S32-06-200-2T	●			2	32	32	200	65	-36	20000	1.1			2											
	32-S32-06-200-3T	●			3					-35																

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 when insert is fixed.

● : Standard item

M106

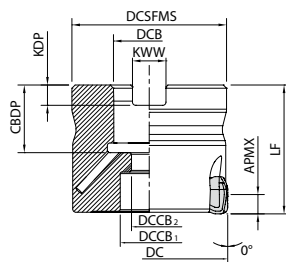
MEV (Face mill)

Fig. 1

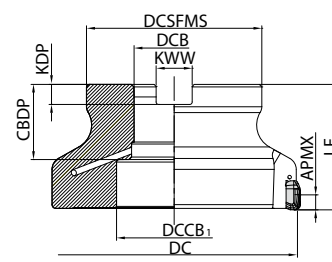


Fig. 2

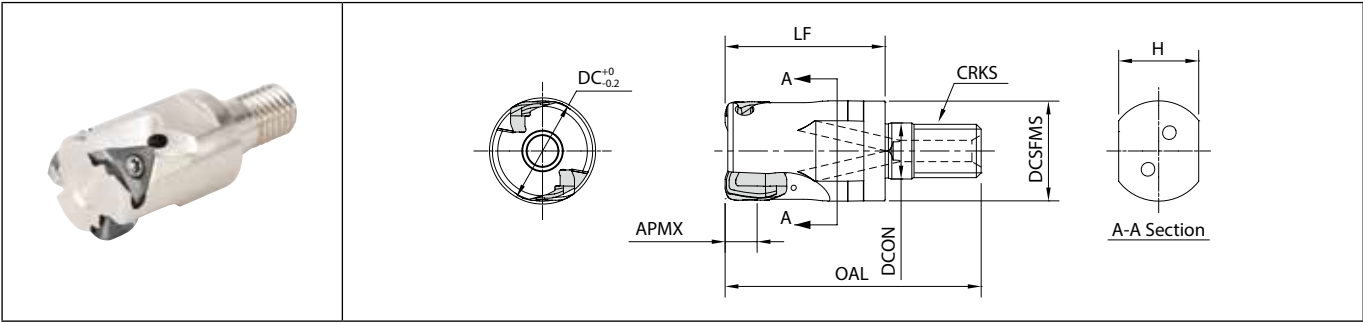
Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)											A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Spare parts				Applicable inserts ➡ M109
			R	DC	DCSFS	DCB	DCCB ₁	DCCB ₂	LF	CDBP	KDP	KWW	APMX											
MEV 032R-06-4T-M 040R-06-5T-M 050R-06-5T-M 063R-06-6T-M 080R-06-7T-M 080R-06-7T 100R-06-9T-M 100R-06-9T	●	4	32	30	16	13.5	9	35	19	5.6	8.4	6	+17	-36	Yes	20000	0.1	1	P-37	HH8X25	SB-3076TRP	DTPM-10	TOMT0605...-GM TOMT0605...-SM	
	●	5	40	38	15	20	13		50	24	7		12.4			16000	0.2	1						
	●		50	48				22		18	11	40	21	6.3	10.4	13000	0.4	1						
	●	6	63	60	27	25.4	46	-	50	30	8	14.4	10000	0.6	1	HH10X30								
	●	7	80						20	13	50	27	6	9.5	7900		1.1	1		HH12X35				
	●	9	100	70	32	46	-	50	30	8	14.4	6300	1.4	2	Recommended tightening torque for insert clamp 2.0N-m									
	●				31.75			63	34	8	12.7		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 when insert is fixed.

MEV (Modular type)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)							A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Spare parts			Applicable inserts ➡ M109
			DC	DCON	DCSFMS	OAL	LF	APMX	CRKS	H				Anti-seize compound	Screw	Wrench	
MEV 20-M10-06-2T	●	2	20	10.5	18.7	48	30	6	M10x1.5	15	-38	Yes	32000	P-37	SB-3076TRP	DTPM-10	TOMT0605...-GM TOMT0605...-SM
20-M10-06-3T	●	3	25	12.5	23	56	35		M12x1.75	19	-37		25000				
25-M12-06-3T	●	3	25	12.5	23	56	35		M12x1.75	19	-37		25000				
32-M16-06-4T	●	4	32	17	30	62	40		M16x2.0	24	-36		20000				

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 when insert is fixed.

See page M82 for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

M

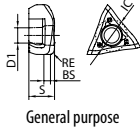
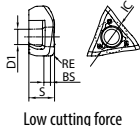


Milling

Cutting edge angle 45°~70°
Cutting edge angle 75°
Cutting edge angle 88°/90°
Cutter for Finishing
High Feed Cutter
Multi- Function
Slot Mill
Ball-nose Radius
Others

● : Standard item

TOMT

Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)		Carbon steel / Alloy steel						★	☆	P				
		Mold and die steel						★	☆					
		Austenitic stainless steel						☆	★	M				
		Martensitic stainless steel					★		☆					
		Precipitation hardening stainless steel							★					
		Gray cast iron						★		K				
		Nodular cast iron						★						
		Non-ferrous metals								N				
		Heat-resistant alloy					★		☆	S				
		Titanium alloy							★					
		Hard materials								H				
Insert		Description		No. of edges	Dimension (mm)					Carbide				Applicable toolholder ● M106~M108
					IC	S	D1	RE	BS	CVD		PVD		
										CA635	PR1510	PR1525	PR1535	
	 General purpose	TOMT 060504ER-GM 060508ER-GM	3	7.2	5.7	3.4	0.4 0.8	1.9 1.5	● ●	● ●	● ●	MEV...-06-...		
	 Low cutting force	TOMT 060508ER-SM	3	7.2	5.7	3.4	0.8	1.5	●	●	●	MEV...-06-...		

Handed insert shows Right-hand

Recommended cutting conditions ➡ M110

Recommended cutting conditions

Chipbreaker	Workpiece	Feed (fz: mm/t)	Recommended insert grade (Vc: m/min)			
			MEGACOAT NANO			CVD coating
			PR1535	PR1525	PR1510	CA6535
GM	Carbon steel	0.08 – 0.15 – 0.25	120 – 180 – 250	120 – 180 – 250	–	–
	Alloy steel	0.08 – 0.15 – 0.2	100 – 160 – 220	100 – 160 – 220	–	–
	Mold steel	0.08 – 0.12 – 0.2	80 – 140 – 180	80 – 140 – 180	–	–
	Stainless steel (Austenitic related)	0.08 – 0.12 – 0.15	100 – 160 – 200	100 – 160 – 200	–	–
	Stainless steel (Martensitic related)	0.08 – 0.12 – 0.2	150 – 200 – 250	–	–	180 – 240 – 300
	Stainless steel (Precipitation hardening)	0.08 – 0.12 – 0.2	90 – 120 – 150	–	–	–
	Gray cast iron	0.08 – 0.18 – 0.25	–	120 – 180 – 250	120 – 180 – 250	–
	Nodular cast iron	0.08 – 0.15 – 0.2	–	100 – 150 – 200	100 – 150 – 200	–
	Ni-base heat-resistant alloy	0.08 – 0.12 – 0.15	20 – 30 – 50	–	–	20 – 30 – 50
	Titanium alloy	0.08 – 0.15 – 0.2	40 – 60 – 80	–	30 – 50 – 70	–
SM	Carbon steel	0.08 – 0.15 – 0.2	120 – 180 – 250	120 – 180 – 250	–	–
	Alloy steel	0.08 – 0.12 – 0.18	100 – 160 – 220	100 – 160 – 220	–	–
	Mold steel	0.08 – 0.1 – 0.15	80 – 140 – 180	80 – 140 – 180	–	–
	Stainless steel (Austenitic related)	0.08 – 0.1 – 0.15	100 – 160 – 200	100 – 160 – 200	–	–
	Stainless steel (Martensitic related)	0.08 – 0.1 – 0.15	150 – 200 – 250	–	–	180 – 240 – 300
	Stainless steel (Precipitation hardening)	0.08 – 0.1 – 0.15	90 – 120 – 150	–	–	–
	Ni-base heat-resistant alloy	0.08 – 0.1 – 0.12	20 – 30 – 50	–	–	20 – 30 – 50
	Titanium alloy	0.08 – 0.12 – 0.15	40 – 60 – 80	–	–	–

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 finished surface.

★ : 1st recommendation ☆ : 2nd recommendation

M



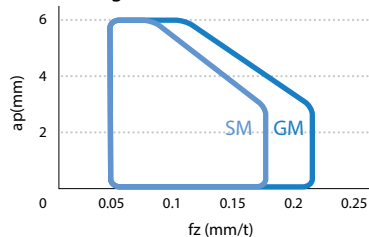
Milling

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

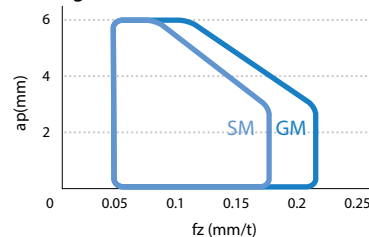
DC : $\phi 20 \sim \phi 50$

Shouldering



Cutting conditions : Vc = 150 m/min, ae = DC/2 mm, Workpiece material : S50C

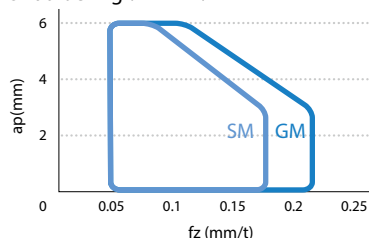
Slotting



Cutting conditions : Vc = 150 m/min, ae = DC mm, Workpiece material : S50C

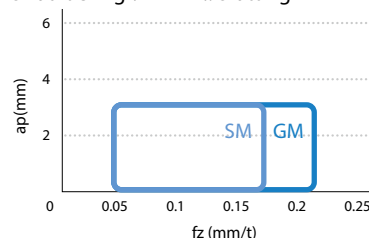
DC : $\phi 63 \sim \phi 100$

Shouldering (ae ≤ DC/4)



Cutting conditions : Vc = 150 m/min, ae = DC/4 mm, Workpiece material : S50C

Shouldering (ae > DC/4), Slotting



Cutting conditions : Vc = 150 m/min, ae = DC mm, Workpiece material : S50C

Reference data for Ramping

Description	Cutter Dia. DC (mm)	20	22	25	28	30	32	40	50
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

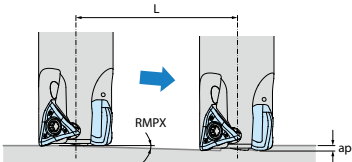
Decrease ramping angle if chips become excessively long.

Guide for Ramping (Slant Milling)

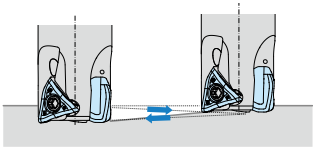
Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
Feed rate should be 70% or under of the above cutting conditions.

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

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



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

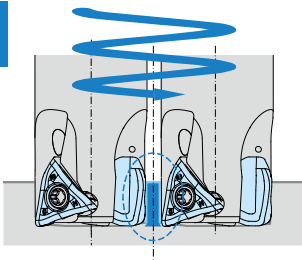


Guide for Helical milling

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

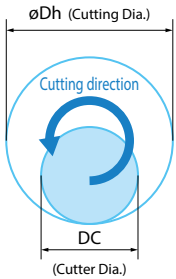
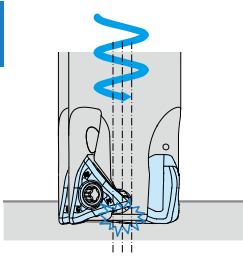
Exceeding Max. Cutting Dia.

Center core part remains after machining



Under Min. Cutting Dia.

Center core part interferes with toolholder

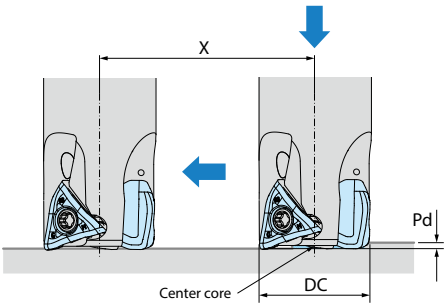


Unit : mm

Description	Min. Cutting Dia.	Max. Cutting Dia.
MEV···-06-···	2×DC-5	2×DC-2

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

Guide for Drilling

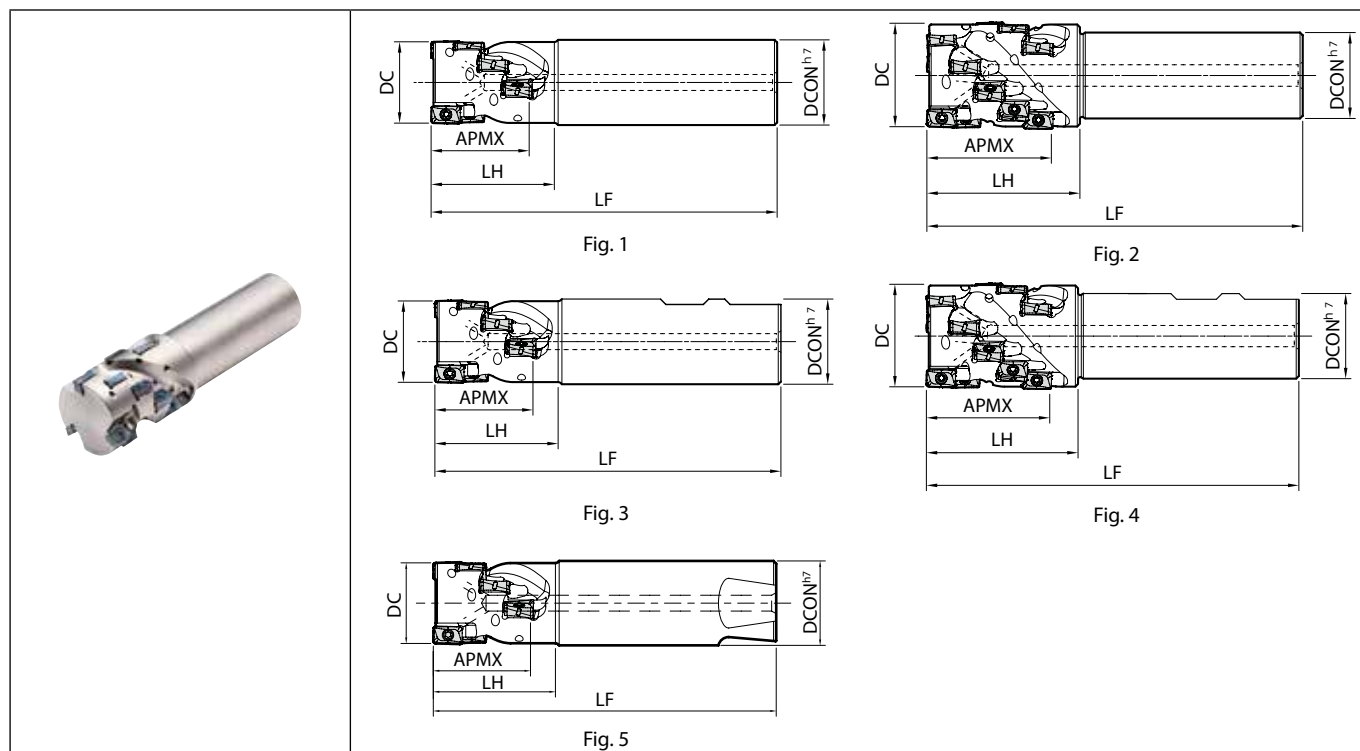


Unit : mm

Description	Max. cutting depth Pd	Min. cutting length X for flat bottom surface
MEV···-06-···	0.25	DC-3

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 < 0.1mm/rev.

MEWH (End mill)



Toolholder dimensions

Description	Availability	Inserts	Flutes	Stages	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts			Applicable inserts ➡ M114
					DC	DCON	LF	LH	APMX					Anti-seize compound	Screw	Wrench	
MEWH 025-S25-10-3-2T	●	6	2	3	25	25	120	37	28	+13	-20	Yes	1	P-37	SB-3065TRP	DTPM-8 Recommended tightening torque for insert clamp 1.2N·m	LOMU1004...
032-S32-10-4-2T	●	8	2	4	32		130	46	37				1				
040-S32-10-5-2T	●	10				32							2				
040-S32-10-5-3T	●	15	3	5	40		140	57	46				2				
MEWH 040-S32-15-4-2T	●	8	2		40	32				+13	-20	Yes	2	P-37	SB-4090TRP	DTPM-15 Recommended tightening torque for insert clamp 3.5N·m	LOMU1505...
050-S42-15-4-2T	●			4			160	63	53				2				
050-S42-15-4-3T	●	12	3		50	42							2				
MEWH 025-W25-10-3-2T	●	6	2	3	25	25	95	37	28				3	P-37	SB-3065TRP	DTPM-8 Recommended tightening torque for insert clamp 1.2N·m	LOMU1004...
032-W32-10-4-2T	●	8		4	32		108	46	37	+13	-20	Yes	3				
040-W32-10-5-2T	●	10				32							4				
040-W32-10-5-3T	●	15	3	5	40		119	57	46				4				
MEWH 040-W32-15-4-2T	●	8	2		40	32	125			+13	-20	Yes	4	P-37	SB-4090TRP	DTPM-15 Recommended tightening torque for insert clamp 3.5N·m	LOMU1505...
050-W40-15-4-2T	●			4				63	53				4				
050-W40-15-4-3T	●	12	3		50	40	135						4				
MEWH 025S25-10-3-2TXT	●	6	2	3	25	25	118	37	28				5	P-37	SB-3065TRP	DTPM-8 Recommended tightening torque for insert clamp 1.2N·m	LOMU1004...
032S32-10-4-2TXT	●	8		4	32	32	133	46	37				5				

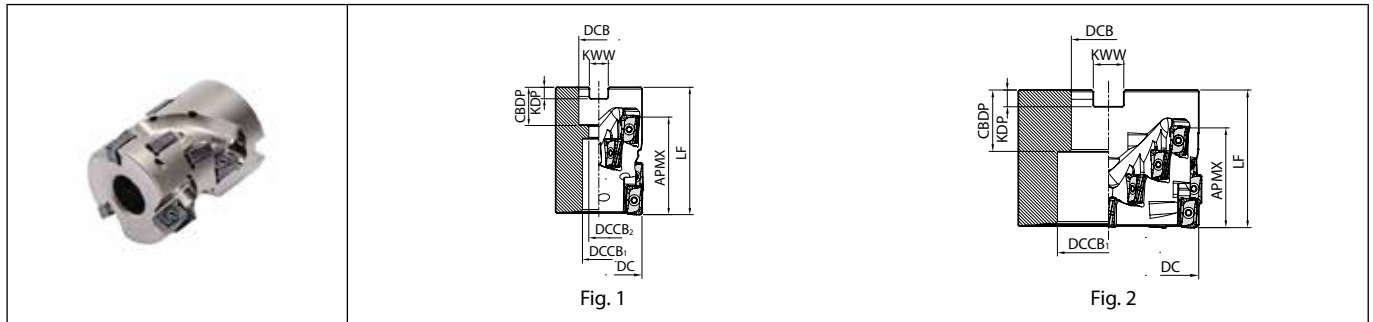
Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

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

● : Standard item

M112

MEWH (Shell mill)



Toolholder dimensions

Description	Availability	Inserts	Flutes	Stages	Dimension (mm)										A.R. max. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts				Applicable inserts ➔ M114
	R				DC	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW	APMX	Anti-seize compound					Mounting bolt	Screw	Wrench		
																							
MEWH 040R-10-4-3T-M 050R-10-5-3T-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...	
	●	15		5	50	22	18	11	64	21	6.3	10.4	46						HH10X30	Recommended tightening torque for insert clamp 1.2N·m			
MEWH 050R-15-4-3T-M 063R-15-3-3T-M 080R-15-4-4T-M 100R-15-4-5T-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...	
	●	9		3	63	27	20	13	58	24	7	12.4	41						HH12X35				
	●	16	4	80	32	26	18	70	28	8	14.4	53	HH16X45						Recommended tightening torque for insert clamp 3.5N·m				
	●	20	5	100	40	55	-	74	33	9	16.4												

Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

Guidance of applicable inserts for MEWH

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

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

LOMU

Recommended cutting conditions ➡ M115

LOMU1004 type

LOMU1505 type

Cutting conditions>

- $V_c = 120$ m/min
- $f_z = 0.08 \sim 0.12$ mm/t
- GM chipbreaker
- Workpiece material: SCM435
- Overhang length

End mill: Overhang length is "LH" of the dimension list

● : Standard item ○ : Will be replaced with a new product □ : Expected to be discontinued in September 2026

Recommended cutting conditions

Chipbreaker	Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)			
		Toolholder description	MEGACOAT NANO EX (MEGACOAT NANO)			CVD coated carbide
		MEWH025~MEWH050 (Helical end mill)	PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	CA6535
GM	Carbon steel	0.06~ 0.1 ~0.2	☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-
	Alloy steel	0.06~ 0.1 ~0.14	☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-
	Mold steel	0.06~ 0.08 ~0.12	☆ 80~ 140 ~180	★ 80~ 140 ~180	-	-
	Stainless steel (Austenitic related)	0.06~ 0.08 ~0.12	☆ 100~ 160 ~200	☆ 100~ 160 ~200	-	-
	Stainless steel (Martensitic related)	0.06~ 0.08 ~0.1	☆ 150~ 200 ~250	-	-	★ 180~ 240 ~300
	Stainless steel (Precipitation hardening)	0.06~ 0.08 ~0.1	★ 90~ 120 ~150	-	-	-
	Gray cast iron	0.06~ 0.1 ~0.17	-	-	★ 120~ 180 ~250	-
	Nodular cast iron	0.06~ 0.08 ~0.12	-	-	★ 100~ 150 ~200	-
	Ni-base heat-resistant alloys	0.06~ 0.08 ~0.1	☆ 20~ 30 ~50	-	-	★ 20~ 30 ~50
	Titanium alloys	0.06~ 0.08 ~0.12	☆ 40~ 60 ~80	-	☆ 30~ 50 ~70	-
SM	Carbon steel	0.06~ 0.1 ~0.17	☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-
	Alloy steel	0.06~ 0.08 ~0.12	☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-
	Mold steel	0.06~ 0.08 ~0.12	☆ 80~ 140 ~180	★ 80~ 140 ~180	-	-
	Stainless steel (Austenitic related)	0.06~ 0.08 ~0.12	★ 100~ 160 ~200	☆ 100~ 160 ~200	-	-
	Stainless steel (Martensitic related)	0.06~ 0.08 ~0.1	☆ 150~ 200 ~250	-	-	★ 180~ 240 ~300
	Stainless steel (Precipitation hardening)	0.06~ 0.08 ~0.1	☆ 90~ 120 ~150	-	-	-
	Ni-base heat-resistant alloys	0.06~ 0.08 ~0.1	☆ 20~ 30 ~50	-	-	★ 20~ 30 ~50
	Titanium alloys	0.06~ 0.08 ~0.12	★ 40~ 60 ~80	-	☆ 30~ 50 ~70	-
GH	Carbon steel	0.06~ 0.1 ~0.2	☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-
	Alloy steel	0.06~ 0.1 ~0.14	☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-
	Mold steel	0.06~ 0.08 ~0.12	☆ 80~ 140 ~180	★ 80~ 140 ~180	-	-
	Stainless steel (Austenitic related)	0.06~ 0.08 ~0.12	☆ 100~ 160 ~200	☆ 100~ 160 ~200	-	-
	Stainless steel (Martensitic related)	0.06~ 0.08 ~0.1	☆ 150~ 200 ~250	-	-	☆ 180~ 240 ~300
	Stainless steel (Precipitation hardening)	0.06~ 0.08 ~0.1	☆ 90~ 120 ~150	-	-	-
	Gray cast iron	0.06~ 0.1 ~0.2	-	-	☆ 120~ 180 ~250	-
	Nodular cast iron	0.06~ 0.08 ~0.15	-	-	☆ 100~ 150 ~200	-
	Ni-base heat-resistant alloys	0.06~ 0.08 ~0.1	☆ 20~ 30 ~50	-	-	☆ 20~ 30 ~50
	Titanium alloys	0.06~ 0.08 ~0.12	☆ 40~ 60 ~80	-	☆ 30~ 50 ~70	-

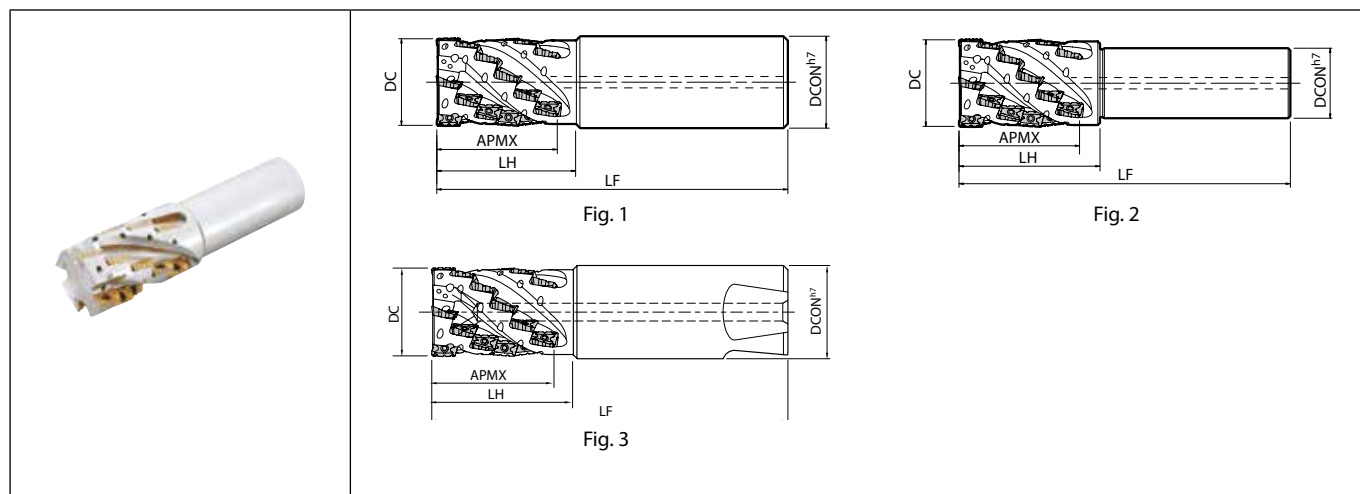
* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

* Machining with coolant is recommended for Stainless steel, Ni-base heat-resistant alloys and titanium alloys with MEWH.

★ : 1st Recommendation

☆ : 2nd Recommendation



MECH (End mill, with coolant hole for bottom insert)

Toolholder dimensions

Description	Availability	Inserts	Flutes	Stages	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts			Applicable inserts ➡ M121
					DC	DCON	LF	LH	APMX					Anti-seize compound	Screw	Wrench	
MECH 025-S25-11-4-2T 032-S32-11-5-2T 032-S32-11-5-4T 040-S32-11-6-4T 040-S42-11-6-4T 050-S42-11-7-4T 050-S42-11-7-6T	●	8	2	4	25	25	120	46	37	+21	-10	Yes	1	P-37	SB-2555TRG	DTM-8	BDMT11T3...-N2 + BDMT11T3...-N3
	●	10		5	32	32	140	55	46	-9	1						
	●	20	4								6		40				
	●	24		160	75	64	-7	1									
	●	28						7	50	42							
	●	42	6	2													
	MECH 040-S32-17-4-2T 040-S42-17-4-2T 050-S42-17-5-4T	●	8	2	4	40	32	160	73	59	+19		-7				
●		20	4	5	50	42	170	88	74	-6	2	1					
●												2					
●												2					
MECH 025S25-11-4-2TXT 032S32-11-5-2TXT 032S32-11-5-4TXT	●	8	2	4	25	25	127	46	37	+21	-10	Yes	3	P-37	SB-2555TRG	DTM-8	BDMT11T3...-N2 + BDMT11T3...-N3
	●	10		5	32	32	142	55	46	+23	-9		3				
	●	20	4										3				

For installation of notched insert, see page **M122**.

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

Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

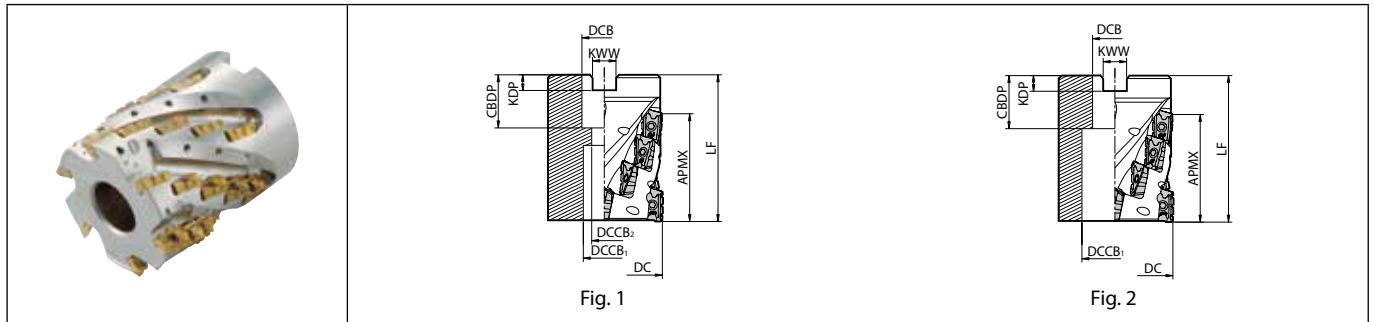
Cutting edge angle
45°~70°Cutting edge angle
75°Cutting edge angle
88°/90°Cutter for
FinishingHigh Feed
CutterMulti-
Function

Slot Mill

Ball-nose
Radius

Others

● : Standard item

MECH (Shell mill, without coolant hole)

Toolholder dimensions

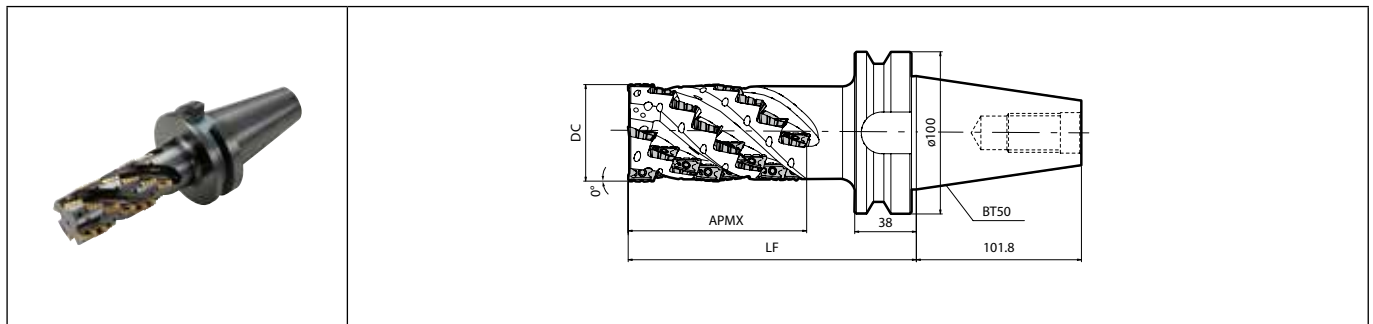
Description		Availability		Inserts	Flutes	Stages	Dimension (mm)								A.R. max. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts				Applicable inserts ➡ M121
		R	DC				DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW	APMX					Anti-seize compound	Mounting bolt	Screw	Wrench	
																							
MECH	040R-11-4-4T-M 050R-11-5-6T-M	● ●	16 30	4 6	4 5	40 50	16 22	15 18	9 11	50 63	19 21	5.6 6.3	8.4 10.4	37 46	+23	-8	No	1 1	P-37	HH8X25 HH10X30	SB-2555TRG	DTM-8	BDMT11T3...-N2 + BDMT11T3...-N3
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		-			
MECH	063R-17-3-4T	●	12	4	3	63	25.4	20	14	70	26	6	9.5	45	+19	-7	No	1	P-37	HH12X35	SB-4070TRN	DTM-15	BDMT1704...-N3 + BDMT1704...-N4
	080R-17-4-6T	●	24	6	4	80	31.75	26	18	85	32	8	12.7	59				1		HH16X45			
	100R-17-4-6T	●				100	38.1	56	-		38	10	15.9					2		-			

For installation of notched insert, see page M122.

Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

X-Treme Chuck [NIKKEN]

Description	See Page	Shank Dia. (DCON)	X-Treme Chuck			
			BT		HSK	
			BT40	BT50	HSK63A	HSK100A
4TFR 120-260-R○○-XT 160-350-R○○-XT 200-450-R○○-XT	L9	12.0	NBT40-C12EX-86	NBT50-C12EX-96	HSK63A-C12EX-96	HSK100A-C12EX-96
		16.0	NBT40-C16EX-96	NBT50-C16EX-106	HSK63A-C16EX-101	HSK100A-C16EX-106
		20.0	NBT40-C20EX-96	NBT50-C20EX-116	HSK63A-C20EX-106	HSK100A-C20EX-116
MEWH 025S25-10-3-2TXT	M112	25.0	-	NBT50-C25EX-116	-	HSK100A-C25EX-116
032S32-10-4-2TXT		32.0	-	NBT50-C32EX-121	-	HSK100A-C32EX-121
MECH 025S25-11-4-2TXT	M116	25.0	-	NBT50-C25EX-116	-	HSK100A-C25EX-116
032S32-11-5-○TXT		32.0	-	NBT50-C32EX-121	-	HSK100A-C32EX-121

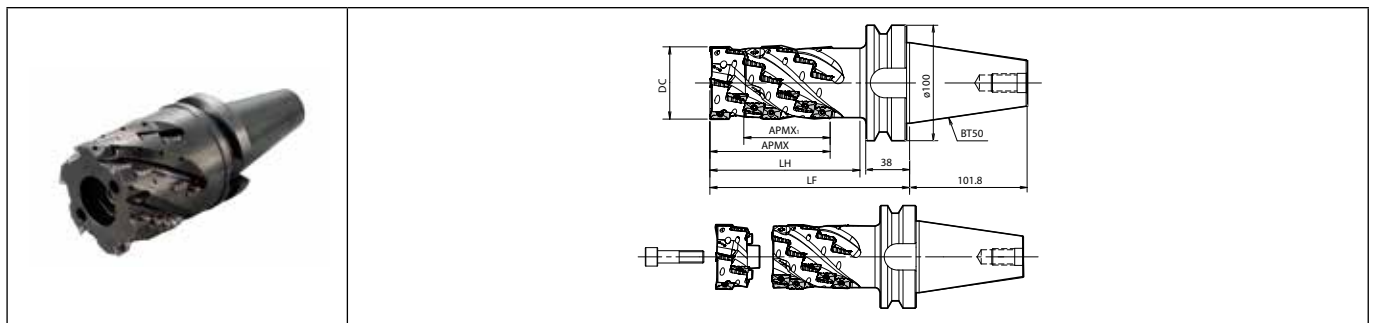
MECH-BT50 (Integral Arbor type, without coolant hole)

Toolholder dimensions

Description	Availability	Inserts	Flutes	Stages	Dimension (mm)			A.R. max. (°)	R.R. (°)	Coolant hole	Weight (kg)	Spare parts			Applicable inserts ➔ M121
	R				DC	LF	APMX					Anti-seize compound	Screw	Wrench	
MECH 050R11-8-4T-BT50	●	32	4	8	50	143	73	+23	-7	No	4.8	P-37	SB-2555TRG	DTM-8	BDMT11T3...-N2 + BDMT11T3...-N3
MECH 050R17-7-4T-BT50	●	28	4	7	50	173	104	+19	-7	No	4.9	P-37	SB-4070TRN	DTM-15	BDMT1704...-N3 + BDMT1704...-N4
063R17-7-4T-BT50	●				63						5.9				
080R17-7-4T-BT50	●				80						7.8				
100R17-7-6T-BT50	●	42	6		100						10.2				

For installation of notched insert, see page **M122**.

Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

MECH-BT50SA (Arbor Integral Type, without coolant hole, Base unit + 1 Front piece + Clamp bolt)

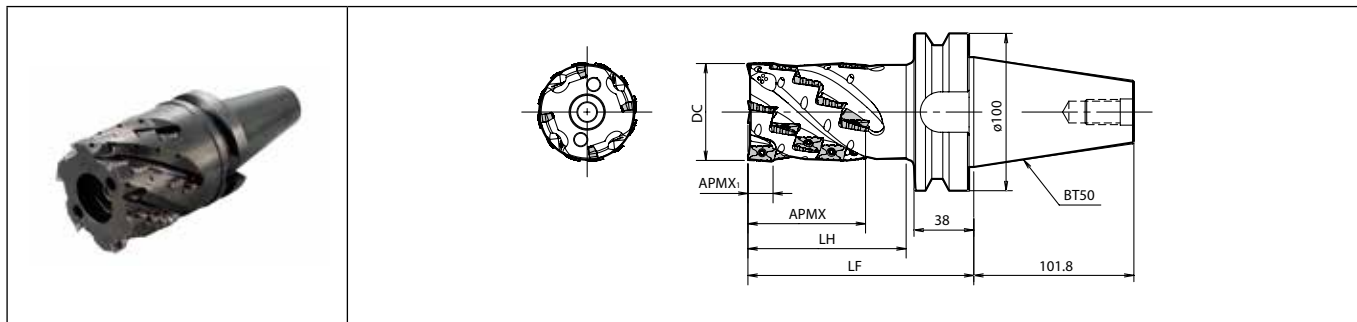
Toolholder dimensions

Description	Availability	Inserts	Flutes	Stages	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Weight (kg)	Spare parts					Applicable inserts ➔ M121
	R				DC	LF	LH	APMX	APMX1					Anti-seize compound	Mounting bolt	Wrench (for Mounting bolt)	Screw	Wrench	
MECH 050R11-4T-BT50SA	MT0	32	4	8	50	143	99	73	55	+23	-7	No	4.8	P-37	HH12X35	LW-10	SB-2555TRG	DTM-8	BDMT11T3...-N2 + BDMT11T3...-N3
MECH 063R17-4T-BT50SA	MT0	28	4	7	63	173	130	104	75	+19	-7	No	5.8	P-37	HH12X40	LW-10	SB-4070TRN	DTM-15	BDMT1704...-N3 + BDMT1704...-N4
080R17-4T-BT50SA	MT0				80								7.6		HH16X40	LW-14			
100R17-6T-BT50SA	MT0	42	6		100								9.8		HH20X40	LW-17			

For installation of notched insert, see page **M122**.

Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

● : Standard item MT0 : Made to order

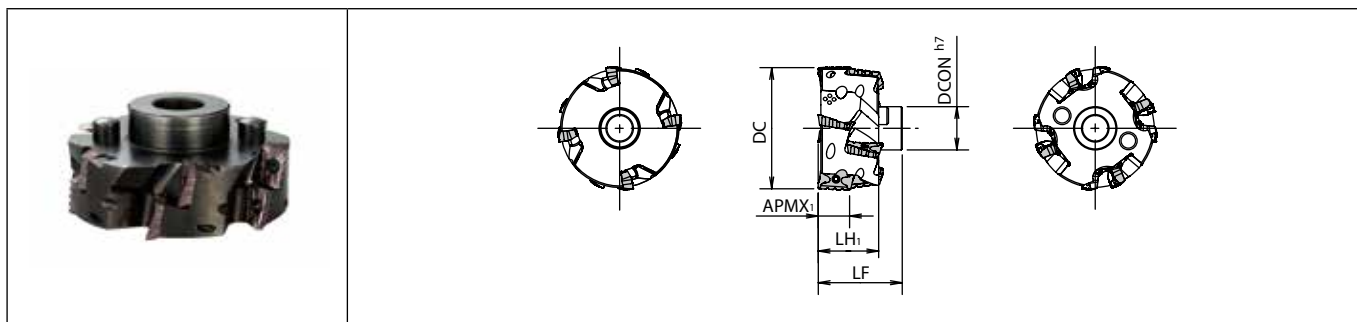
MECH-BT50-A (Base unit, without coolant hole)

Toolholder dimensions

Description		Availability	Inserts	Flutes	Stages	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Weight (kg)	Spare parts					Applicable inserts ➡ M121
						DC	LF	LH	APMX	APMX1					Anti-seize compound	Mounting bolt	Wrench (for Mounting bolt)	Screw	Wrench	
																				
MECH	050R11-4T-BT50-A	MT0	24	4	6	50	125	81	55	10	+23	-7	No	4.6	P-37	HH12X35	LW-10	SB-2555TRG	DTM-8	BDMT11T3...-N2 + BDMT11T3...-N3
MECH	063R17-4T-BT50-A	MT0	20	4	5	63	143	100	75	16	+19	-7	No	5.4	P-37	HH12X40	LW-10	SB-4070TRN	DTM-15	BDMT1704...-N3 + BDMT1704...-N4
	080R17-4T-BT50-A	MT0	80	HH16X40		LW-14														
	100R17-6T-BT50-A	MT0	30	6		100										HH20X40	LW-17			

For installation of notched insert, see page **M122**.

Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

MECH-F (Front piece, without coolant hole)

Toolholder dimensions

Description	Availability	Inserts	Flutes	Stages	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Weight (kg)	Spare parts		Applicable inserts ➡ M121
	R				DC	LF	LH	APMX1	DCON					Anti-seize compound	Screw	
																
MECH 050R11-4T-F	●	8	4	2	50	32	18	10	22	+23	-7	No	0.2	P-37	SB-255STRG	BDMT11T3...-N2 + BDMT11T3...-N3
MECH 063R17-4T-F 080R17-4T-F 100R17-6T-F	●	8	4	2	63	44	30	16	22	+19	-7	No	0.4	P-37	SB-4070TRN	BDMT1704...-N3 + BDMT1704...-N4
	80				32				0.8							
	●	12	6		100				45				1.3			

For installation of notched insert, see page **M122**.

Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

● : Standard item MT0 : Made to order



Toolholder structure

End Mill			Base Unit  M119		Front Piece (1pc)  M119		Clamp Bolt
MECH	050R11-4T-BT50SA	=	MECH050R11-4T-BT50-A	+	MECH050R11-4T-F	+	HH12X35
	063R17-4T-BT50SA		MECH063R17-4T-BT50-A		MECH063R17-4T-F		HH12X40
	080R17-4T-BT50SA		MECH080R17-4T-BT50-A		MECH080R17-4T-F		HH16X40
	100R17-6T-BT50SA		MECH100R17-6T-BT50-A		MECH100R17-6T-F		HH20X40

Applicable Inserts

End Mill		Base Unit  M119	Front Piece  M119	Applicable Inserts  M121
MECH	050R11-4T-BT50SA	MECH050R11-4T-BT50-A	MECH050R11-4T-F	BDMT11T308ER-N2 + BDMT11T308ER-N3
	063R17-4T-BT50SA	MECH063R17-4T-BT50-A	MECH063R17-4T-F	BDMT170408ER-N3 + BDMT170408ER-N4
	080R17-4T-BT50SA	MECH080R17-4T-BT50-A	MECH080R17-4T-F	
	100R17-6T-BT50SA	MECH100R17-6T-BT50-A	MECH100R17-6T-F	

· For installation of notched insert, see page  M122

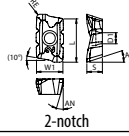
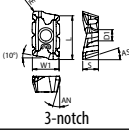
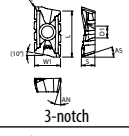
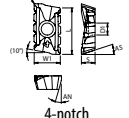
M



Milling

Cutting edge angle 45°~70°
Cutting edge angle 75°
Cutting edge angle 88°/90°
Cutter for Finishing
High Feed Cutter
Multi- Function
Slot Mill
Ball-nose Radius
Others

BDMT

Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)			Carbon steel / Alloy steel								★	☆	P
			Mold and die steel								★	☆	
			Austenitic stainless steel										M
			Martensitic stainless steel										
			Precipitation hardening stainless steel										
			Gray cast iron								★		K
			Nodular cast iron								★		
			Non-ferrous metals										N
			Heat-resistant alloy										S
			Titanium alloy								☆		
Hard materials											H		
Insert		Description	No. of edges	Dimension (mm)					Angle (°)		Carbide	Applicable toolholder ➡ M116~M119	
				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...	

Handed insert shows Right-hand

Recommended cutting conditions ➡ M123

Applicable Inserts

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

● : Standard item

Smooth chip evacuation

Smooth chip evacuation

Notched insert breaks chips into small pieces

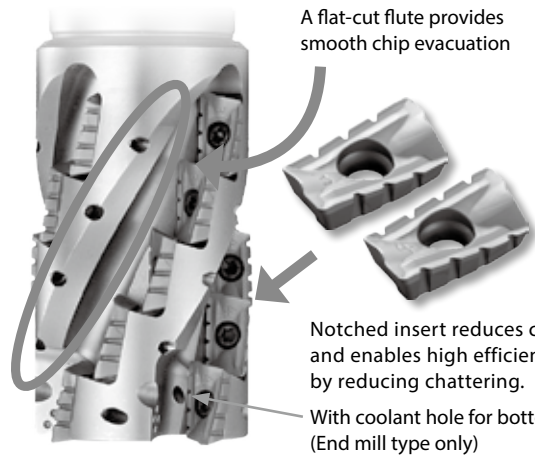


MECH



Competitor A

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



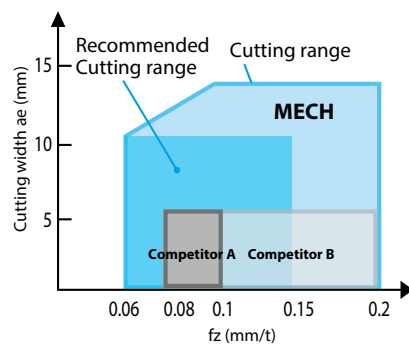
A flat-cut flute provides smooth chip evacuation

Notched insert reduces cutting force, and enables high efficiency machining by reducing chattering.

With coolant hole for bottom insert (End mill type only)

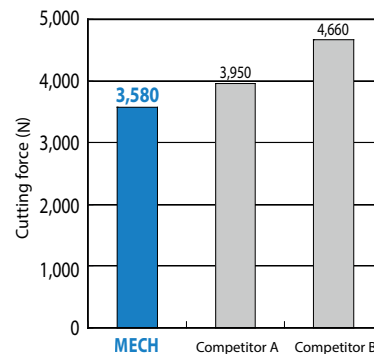
Low cutting force

Low cutting force due to notched inserts



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

Cutting force comparison (Principal force)



Workpiece material: S50C
Vc = 120 m/min
ap x ae = 40 mm x 10 mm
fz = 0.1 mm/t
MECH032-S32-11-5-4T

(Internal evaluation)

M

Number of inserts installed

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

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

Caution when installing notched insert

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

<Insert number and toolholder marks>

Insert size	11 type		17 type	
Insert no.	2	3	3	4
Marks				

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

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

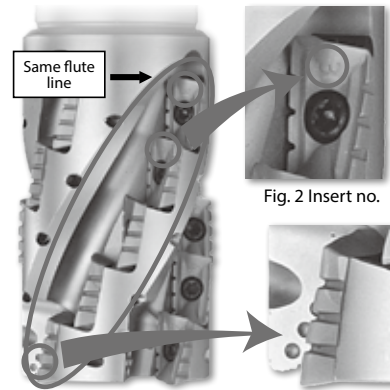


Fig. 1 Same flute line

Fig. 3 Marks

Recommended cutting conditions (When using a notched insert)

Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)			
		MEGACOAT NANO	MEGACOAT NANO EX		
		PR1535	PR1810	PR1825	PR1835
Carbon steel	0.08~ 0.1 ~0.15	☆ 120~ 180 ~250	-	★ 120~ 180 ~250	☆ 120~ 180 ~250
Alloy steel	0.08~ 0.1 ~0.15	☆ 100~ 160 ~220	-	★ 100~ 160 ~220	☆ 100~ 160 ~220
Mold steel	0.08~ 0.1 ~0.15	☆ 80~ 140 ~180	-	★ 80~ 140 ~180	☆ 80~ 140 ~180
Gray cast iron	0.08~ 0.15 ~0.18	-	★ 120~ 180 ~250	-	-
Nodular cast iron	0.08~ 0.15 ~0.18	-	★ 100~ 150 ~200	-	-
*Titanium alloys	0.08~ 0.1 ~0.15	☆ 40~ 60 ~80	-	-	★ 40~ 60 ~80-

* Machining with coolant is recommended for titanium alloys.

★: 1st Recommendation ☆: 2nd Recommendation

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

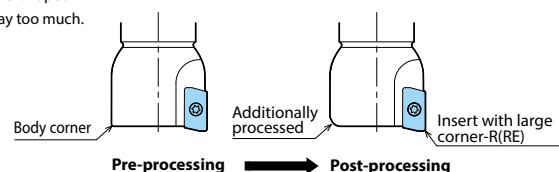
2. If using an insert without notch, the cutting depth (ap) and width (ae) should be 60% or less of those of a notched insert.

When using inserts with corner-R(RE) 1.6 or larger, additional modifications of the cutter body will be necessary.

Ref. to the chart below for the recommended modifications. (Additional grind off is not necessary when corner-R(RE) is 1.2mm or less.)

Insert Corner-R(RE) (mm)	Additional processing dimension to body corner (mm)
1.6	R1.0
2.0	
2.4	R1.2
3.1	R1.6
4.0	R2.5

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

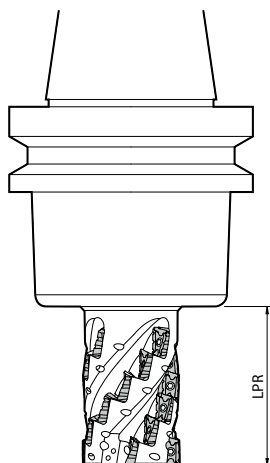


Cutting performance (Used machine: Machining center equivalent to AC15/18.5kW)

MECH end mill

Cutting dia.	Description	Overhang length LPR (mm)
ø25	MECH025-S25-11-4-2T	48
ø32	MECH032-S32-11-5-2T	57
	MECH032-S32-11-5-4T	
ø40	MECH040-S42-11-6-4T	65
	MECH040-S42-11-6-4T	
ø50	MECH050-S42-11-7-4T	76
	MECH050-S42-11-7-6T	
ø40	MECH040-S42-17-4-2T	74
	MECH040-S42-17-4-2T	
ø50	MECH050-S42-17-5-4T	89

Shape



2 flute type

(Workpiece material: S50C)

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

4 flute/6 flute type

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

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

M



Milling

Cutting edge angle
45°~70°Cutting edge angle
75°Cutting edge angle
88°/90°Cutter for
FinishingHigh Feed
CutterMulti-
Function

Slot Mill

Ball-nose
Radius

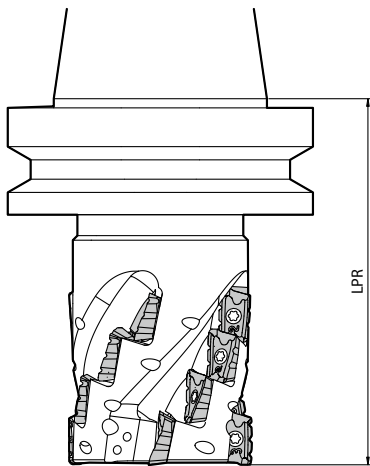
Others

MECH shell mill

(Workpiece material: S50C)

Cutting dia.	Description	Overhang length LPR (mm)
ø40	MECH040R-11-4-4T-M	125
ø50	MECH050R-11-5-6T-M	123
	MECH050R-17-2-4T-M	112
	MECH050R-17-4-4T-M	138
ø63	MECH063R-17-3-4T-□	115
ø80	MECH080R-17-4-6T-□	130
ø100	MECH100R-17-4-6T-□	130

Shape



Shouldering			
Cutting speed: $V_c = 100 \sim 180$ m/min Feed: $f_z = 0.08 \sim 0.15$ mm/t			
MECH040R-11-4-4T-M		MECH063R-17-3-4T-□	
MECH050R-11-5-6T-M		MECH080R-17-4-6T-□	
MECH050R-17-2-4T-M		MECH100R-17-4-6T-□	
MECH050R-17-4-4T-M		Slotting is not recommended.	

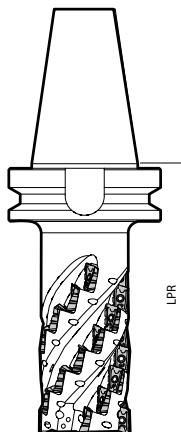
MECH-BT50 (Integral arbor type)

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

(Workpiece material: S50C)

Cutting dia.	Description	Overhang length LPR (mm)
ø50	MECH050R11-8-4T-BT50 MECH050R11-4T-BT50SA	143
	MECH050R17-7-4T-BT50	173
ø63	MECH063R17-7-4T-BT50 MECH063R17-4T-BT50SA	
ø80	MECH080R17-7-4T-BT50 MECH080R17-4T-BT50SA	
ø100	MECH100R17-7-6T-BT50 MECH100R17-6T-BT50SA	

Shape



Shouldering			
Cutting speed: $V_c = 100 \sim 180$ m/min Feed: $f_z = 0.08 \sim 0.15$ mm/t			
MECH050R11-8-4T-BT50 MECH050R11-4T-BT50SA		MECH080R17-7-4T-BT50 MECH080R17-4T-BT50SA	
MECH050R17-7-4T-BT50		MECH100R17-7-6T-BT50 MECH100R17-6T-BT50SA	
MECH063R17-7-4T-BT50 MECH063R17-4T-BT50SA		Slotting is not recommended.	

M



Milling

Helical end mill for titanium alloy machining

MECHT

Insert size combination improves roughing capabilities

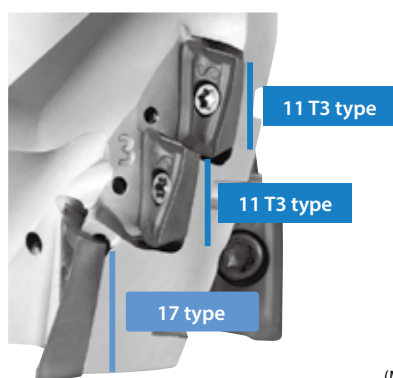
Maintains stable machining and long tool life

1 Developed to reduce chattering and chip recutting issues

Unique insert combination

The larger bottom inserts are positioned to handle larger cutting forces (excluding $\phi 32$)

Stable machining with improved fracture resistance



(MECHT50R-1711 type)

New design for higher reliability

Bottom inserts are held in place by double-faced contacts

Holding surface 1

Wide holding surface

Holding surface 2

Additional hold in the axial direction



Bore dia.

Larger bore diameter improves fastening power and reduces chattering
 $\phi 50$ mm cutter with a $\phi 27$ mm bore (conventional bore: $\phi 22$ mm)

Toolholder hardness Hardened 15% more than conventional holders

Toolholder spec Custom ordering available
Custom number of inserts and stages

Excellent chip evacuation

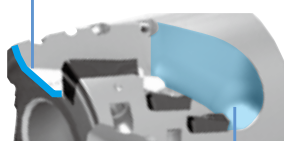
New flute design

Large, smooth flutes prevent chip clogging

MECHT ($\phi 50$ -4T 3 stages)

Conventional ($\phi 50$ -4T 4 stages)

Large flute



Smooth design



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

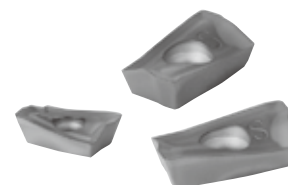
JS chipbreaker

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

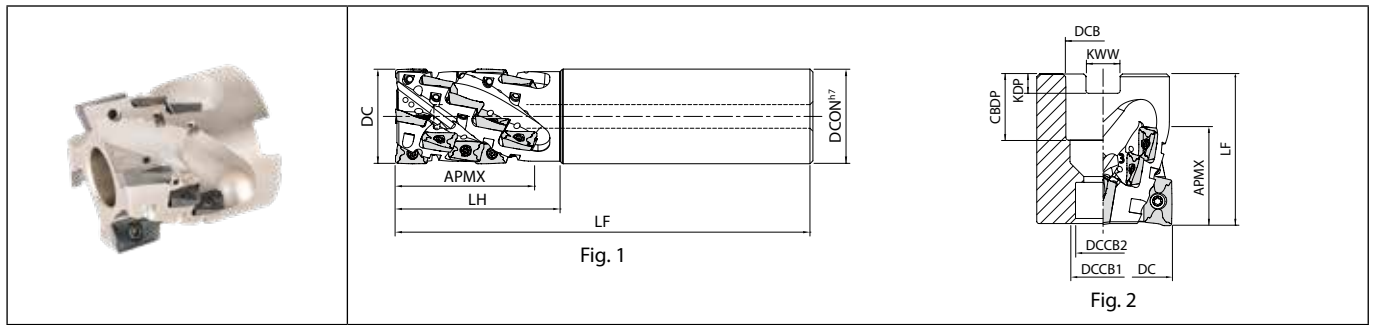
Greater toughness

PR1835

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



MECHT



Toolholder dimensions

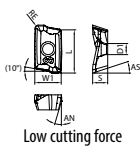
Description	Availability	Inserts	Flutes	Stages	Dimension (mm)											A.R. max. (°)	R.R. max. (°)	Coolant hole	Fig.	Spare parts			Applicable inserts ➔ M128	
																				Mounting bolt	Screw	Wrench	Stages	
																							1st	2nd or higher
MECHT 32-S32-11-5-4T	●	20	4	5	32	32	-	-	-	140	55	-	-	-	46	+23	-9	Yes	1	-	SB-2555TRG	DTM-8	BDMT11T3..	BDMT11T308..
MECHT 50R-1711-3-4T-M 50R-1711-4-5T-M 63R-17-4-5T-M 80R-17-4-6T-M	●	12	4	3	50	-	-	-	-	55	-	-	-	-	34	-	-	-	2	HH12X40	SB-2555TRG	DTM-8	BDMT1704..	BDMT11T308..
	●	20	5	4	63	-	27	20	14	65	-	24	7	12.4	43	+19	-7	Yes	2	HH12X50	SB-4070TRN	DTM-15	BDMT1704..	BDMT11T308..
	●	24	6	4	80	-	32	26	17	80	-	28	8	14.4	60	-	-	-	2	HH12X65	SB-4070TRN	DTM-15	BDMT1704..	BDMT170408..
	●	24	6	6	80	-	32	26	17	80	-	28	8	14.4	60	-	-	-	2	HH16X65	SB-4070TRN	DTM-15	BDMT1704..	BDMT170408..

Use inserts with Corner-R of 0.8 or less for the 2nd or higher stages

Machining with coolant is recommended (Internal coolant pressure 1.5 MPa or higher)

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

BDMT

Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)		Carbon steel / Alloy steel				P								
		Mold and die steel												
		Austenitic stainless steel				M								
		Martensitic stainless steel												
		Precipitation hardening stainless steel												
		Gray cast iron				K								
		Nodular cast iron												
		Non-ferrous metals				N								
		Heat-resistant alloy				S								
		Titanium alloy		☆	★									
Hard materials				H										
Insert		Description		No. of edges	Dimension (mm)					Angle (°)		Carbide	Applicable toolholder ➡ M127	
					S	D1	RE	L	W1	AN	AS	PVD		
												PH1535		PH1835
	 Low cutting force	BDMT	11T302ER-JS 11T304ER-JS 11T308ER-JS	2	3.8	2.8	0.2 0.4 0.8	11	6.7	13	18	●● ●● ●●	●● ●● ●●	MECHT...11...
		BDMT	170404ER-JS 170408ER-JS	2	4.9	4.4	0.4 0.8	17	9.6	13	18	●● ●● ●●	●● ●● ●●	MECHT...17...

Handed insert shows Right-hand

Recommended cutting conditions M129

M



Milling

Cutting edge angle
45°~70°Cutting edge angle
75°Cutting edge angle
88°/90°Cutter for
FinishingHigh Feed
CutterMulti-
Function

Slot Mill

Ball-nose
Radius

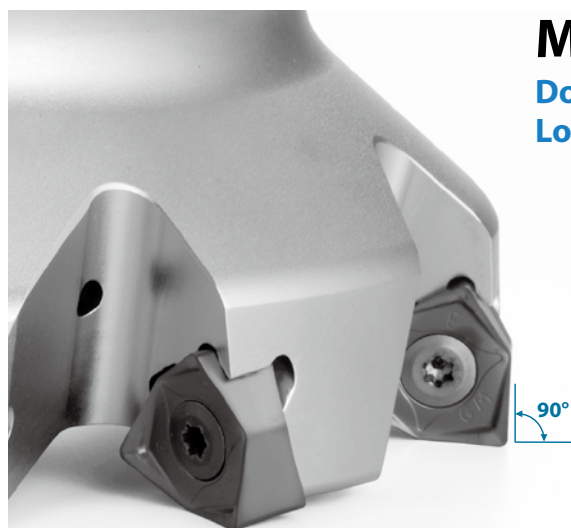
Others

● : Standard item

M128

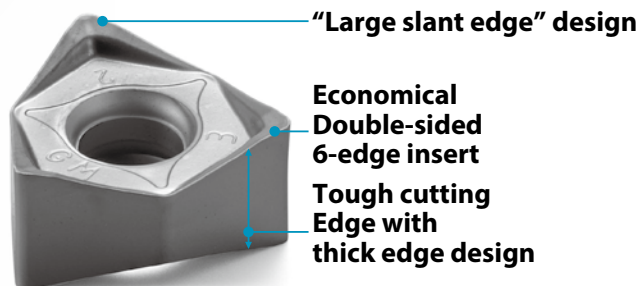
Recommended cutting conditions

Workpiece	Applications	Depth of cut (mm)		fz (mm/t)	Recommended insert grade (Vc: m/min)
					MEGACOAT NANO EX (MEGACOAT NANO)
		ap	ae		PR1835 (PR1535)
Titanium alloy (Ti6Al4V)	Shouldering	~Length of cut (APMX)	~0.5DC	0.10 ~ 0.12 ~ 0.16	30 ~ 40 ~ 60
	Slotting	~0.5DC	1DC	0.05 ~ 0.07 ~ 0.09	30 ~ 40 ~ 50



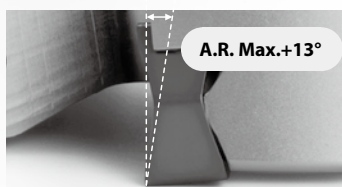
MFWN

Double-sided, 6-edge insert, 90° cutters
Low cutting force and reduced chattering

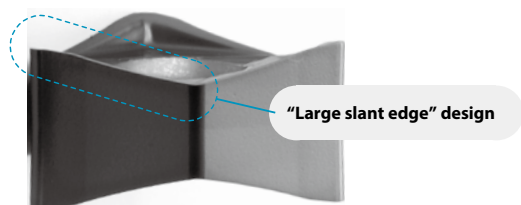


1 Sharp cutting with low cutting force

Sharp cutting by large rake angle

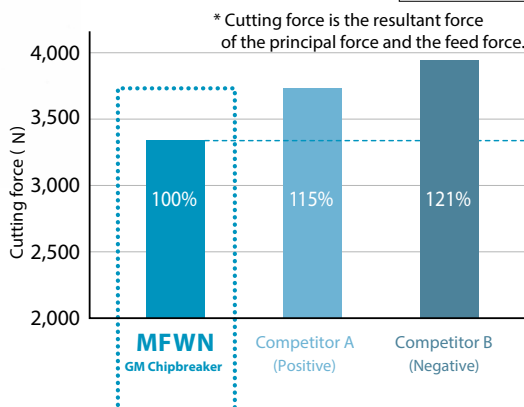


"Large slant edge" design reduces shock when cutting edge enters the workpiece

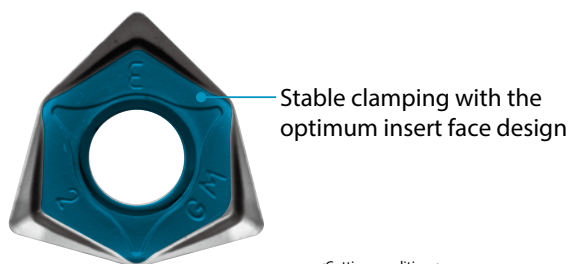
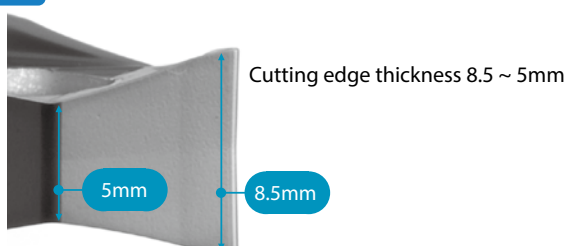


Cutting force comparison (Internal evaluation)

<Cutting conditions>
Vc = 180m/min
apxae = 7×110mm
fz = 0.2mm/t
Workpiece material: S50C
ø125mm Cutter



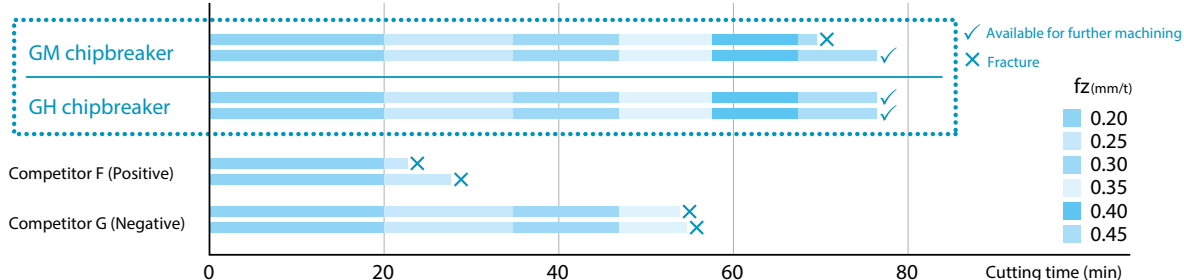
2 Superior fracture resistance with thick edge design



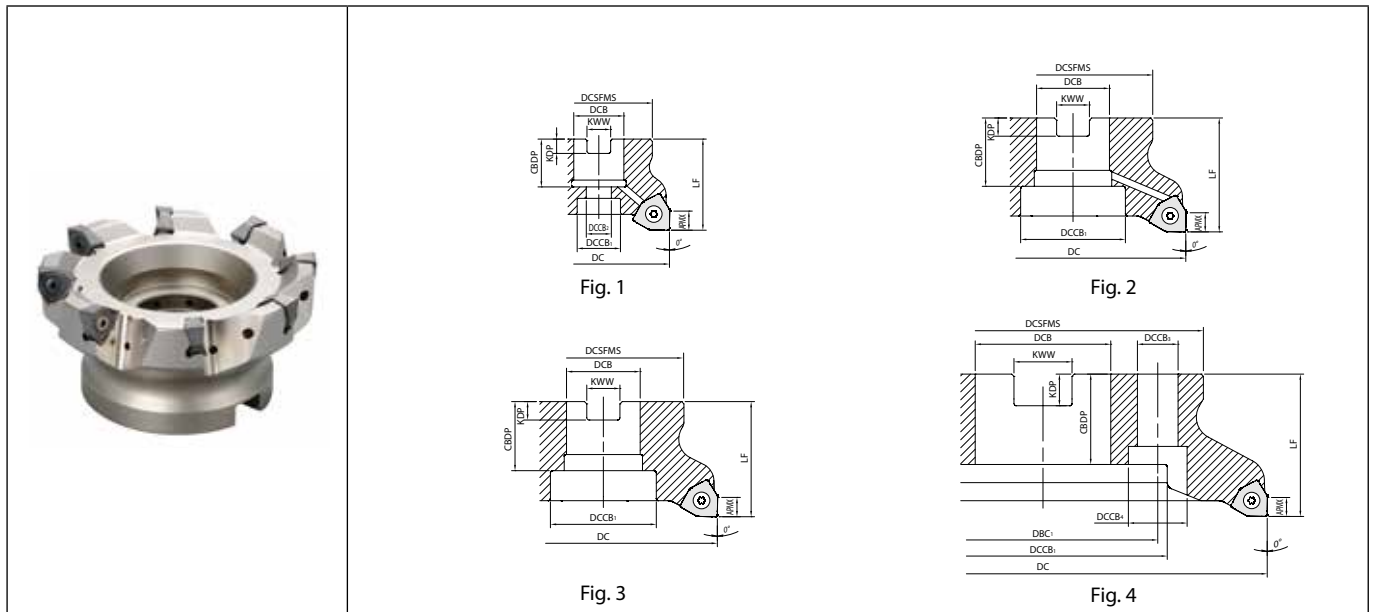
<Cutting conditions>

Workpiece material: SCM440H(38~42H5) Interruption with a slot on the workpiece
Vc = 100m/min apxae = 2×100mm fz = 0.2~0.45 mm/t Dry

Fracture resistance comparison (Internal evaluation)



MFWN (Face mill)



Toolholder dimensions

Description				Availability	Inserts	Dimension (mm)														A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts ➔ M135	
						R	DC	DCSFM5	DCB	DCCB ₁	DCCB ₂	DCCB ₃	DCCB ₄	DBC ₁	LF	CBDP	KDP	KWW	APMX								
Metric	Coarse pitch	MFWN	90063R-3T-M	●	3	63	47	22	19	11					40	21	6.3	10.4	8	+13	-10		14000	0.5	1	WNEU0806... WNGT0806... WNMU0806...	
			90080R-4T-M	●	4	80	60	27	20	13					50	24	7	12.4			-9	Yes	12000	1	1		
			90100R-5T-M	●	5	100	70	32	46			-	-	-	50	30	8	14.4			-8	Yes	10500	1.3	2		
			90125R-6T-M	●	6	125	87		55						63	33					-7.5	Yes	9500	2.5	2		
			90160R-8T-M	●	8	160	102	40	68	-	14	20	66.7		63	32	9	16.4				No	8000	3.8	4		
			90200R-10T-M	●	10	200										40	14	25.7					7500	6	4		
			90250R-12T-M	●	12	250	142	60	110		18	26	101.6									6500	8.4	4			
	Fine pitch	MFWN	90063R-4T-M	●	4	63	47	22	19	11					40	21	6.3	10.4	8	+13	-10		16000	0.5	1	WNEU0806... WNGT0806... WNMU0806...	
			90080R-5T-M	●	5	80	60	27	20	13			-	-	-	50	24	7			12.4	-9	Yes	13500	1		1
			90100R-7T-M	●	7	100	70	32	46						50	30	8	14.4			-8	Yes	12000	1.3	2		
			90125R-8T-M	●	8	125	87		55						63	33					-7.5	Yes	10500	2.6	2		
			90160R-10T-M	●	10	160	102		68	-	14	20	66.7		63	32	9	16.4				No	9000	3.9	4		
			90200R-12T-M	●	12	200										40	14	25.7					8000	6.3	4		
			90250R-14T-M	●	14	250	142	60	110		18	26	101.6									7000	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		16000	0.5	1	WNEU0806... WNGT0806... WNMU0806...	
			90080R-7T-M	●	7	80	60	27	20	13			-	-	-	50	24	7			12.4	-9	Yes	10500	1.1		1
			90100R-9T-M	●	9	100	70	32	46						50	30	8	14.4			-8	Yes	9500	1.3	2		
			90125R-12T-M	●	12	125	87		55	-					63	33					-7.5	Yes	8000	2.6	2		
			90160R-14T-M	●	14	160	102	40	68		14	20	66.7		63	32	9	16.4				No	7000	3.9	4		
			90160R-14T-M	●	14	160	102	40	68		14	20	66.7														

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.

● : Standard item

Toolholder dimensions

Description				Availability	Inserts	Dimension (mm)														A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts ➔ M135
				R		DC	DCSfMS	DCB	DCCB ₁	DCCB ₂	DCCB ₃	DCCB ₄	DBC ₁	LF	CBDP	KDP	KWW	APMX								
Bore dia. inch spec	Coarse pitch	MFWN	90080R-4T	● 4	80	60	25.4	20	13					27	6	9.5		+13	-9		12000	1	1	WNEU0806... WNGT0806... WNMU0806...		
			90100R-5T	● 5	100	70	31.75	46				50	34	8	12.7		-8		Yes	10500	1.3	2				
			90125R-6T	● 6	125	87	38.1	55		-	-	-		10	15.9		-7.5			9500	2.6	2				
			90160R-8T	● 8	160	102	50.8	72	-				38	11	19.1				8000	3.9	3					
			90200R-10T	● 10	200												-7		No	7500	6.3	4				
			90250R-12T	● 12	250	142	47.625	110		18	26	101.6	40	14	25.4				6500	8.7	4					
	Fine pitch	MFWN	90080R-5T	● 5	80	60	25.4	20	13					27	6	9.5		+13	-9		13500	1	1	WNEU0806... WNGT0806... WNMU0806...		
			90100R-7T	● 7	100	70	31.75	46				50	34	8	12.7		-8		Yes	12000	1.4	2				
			90125R-8T	● 8	125	87	38.1	55		-	-	-		10	15.9		-7.5			10500	2.7	2				
			90160R-10T	● 10	160	102	50.8	72	-				38	11	19.1				9000	4	3					
			90200R-12T	● 12	200												-7		No	8000	6.6	4				
			90250R-14T	● 14	250	142	47.625	110		18	26	101.6	40	14	25.4				7000	8.9	4					
	Extra fine pitch	MFWN	90080R-7T	● 7	80	60	25.4	20	13					27	6	9.5		+13	-9		10500	1.1	1	WNEU0806... WNGT0806... WNMU0806...		
			90100R-9T	● 9	100	70	31.75	46				50	34	8	12.7		-8		Yes	9500	1.3	2				
			90125R-12T	● 12	125	87	38.1	55		-	-	-		10	15.9		-7.5			8000	2.7	2				
			90160R-14T	● 14	160	102	50.8	72	-				38	11	19.1				7000	4.1	3					
			90200R-16T	● 16	200												-7		No	6500	6.7	4				
			90250R-18T	● 18	250	142	47.625	110		18	26	101.6	40	14	25.4				5500	9.1	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.

M



Milling

Cutting edge angle
45°~70°Cutting edge angle
75°Cutting edge angle
88°/90°Cutter for
FinishingHigh Feed
CutterMulti-
Function

Slot Mill

Ball-nose
Radius

Others

● : Standard item

M132

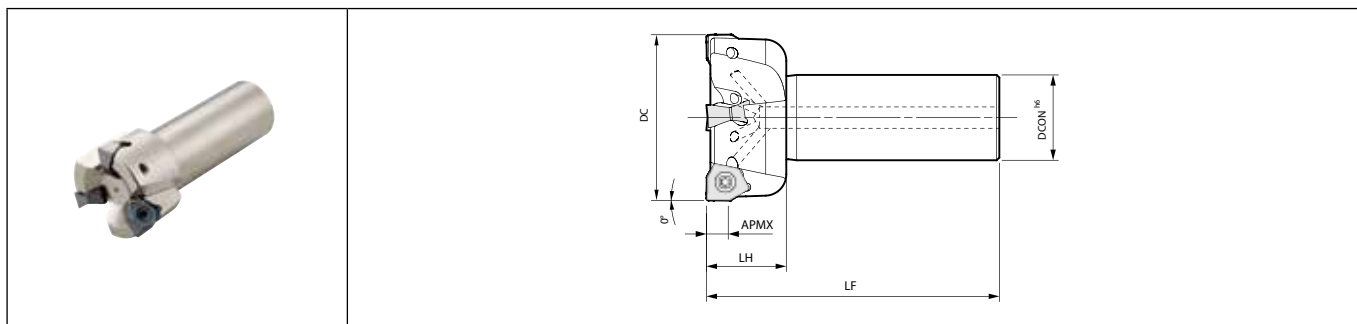
Spare parts

Description			Spare parts									
			Clamp screw	Wrench		Shim	Shim screw	Wrench	Anti-seize compound	Mounting bolt		
				TTW	DTM							
												
Coarse pitch	MFWN 90063R-3T-M	SB-50140TR	TTW-15	-	MFWN-90	SPW-7050	LW-5	P-37	HH10X30			
	MFWN 90080R-4T(-M)								HH12X35			
	MFWN 90100R-5T(-M)	Recommended tightening torque for insert clamp 4.2N·m			Recommended tightening torque for shim clamp 6.0N·m				-			
	90250R-12T(-M)											
Fine pitch	MFWN 90063R-4T-M	SB-50140TR	TTW-15	-	-	-	-	P-37	HH10X30			
	MFWN 90080R-5T(-M)								HH12X35			
	MFWN 90100R-7T(-M)	Recommended tightening torque for insert clamp 4.2N·m									-	
	90250R-14T(-M)											
Extra fine pitch	MFWN 90063R-5T-M	SB-50140TR	TTW-15	-	-	-	-	P-37	HH10X30			
	MFWN 90080R-7T(-M)	SB-40140TRN	-						DTM-15	HH12X35		
	MFWN 90100R-9T(-M)	Recommended tightening torque for insert clamp 3.5N·m				-	-					
	90250R-18T											



Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

MFWN (End mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)						A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Spare parts			Applicable inserts ➡ M135
			DC	DCON	LF	LH	APMX	Screw					Wrench	Anti-seize compound		
MFWN	90050R-S32-3T	●	3	50						-12		18500	SB-50140TR	TTW-15		WNEU0806...
	90063R-S32-4T	●	4	63	32	110	30	8	+13	-10	Yes	16000	Recommended tightening torque for insert clamp 4.2N·m		P-37	WNGT0806...
	90080R-S32-5T	●	5	80						-9		13500				WNMU0806...

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 when insert is fixed.

How to mount an insert

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



Fig. 1

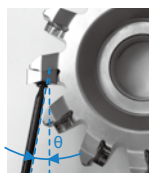


Fig. 2

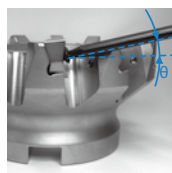


Fig. 3

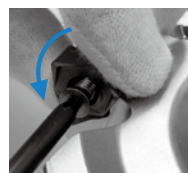


Fig. 4

How to replace a shim (For coarse pitch)

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

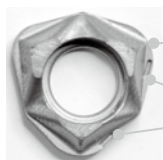


Fig. 1

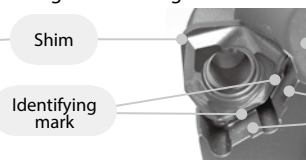


Fig. 2

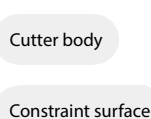
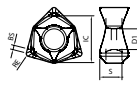
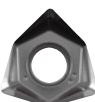
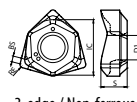
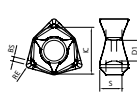
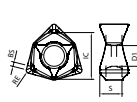
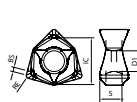


Fig. 3

● : Standard item

WNEU/WNMU/WNGT

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

Insert		Description	No. of edges	Dimension (mm)					Carbide										Cermat	Applicable toolholder ➡ M131 M132 M134		
				IC	S	D1	RE	BS	CVD	DLC	PVD											
											CA6535	PD1025	PR0155	PR1510	PR1525	PR1535	PR1810	PR1825			PR1835	GW25
	 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 ➡ M136

Recommended cutting conditions

Chipbreaker	Workpiece material	fz (mm/t) ():TN620M	Recommended insert grades (Vc: m/min)							
			Cermet	MEGACOAT (PVD coated carbide)				CVD coated carbide	DLC coated carbide	Carbide
			TN620M	PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	PR015S	CA6535	PDL025	GW25
GM	Carbon steel	0.1~ 0.2 ~0.3 (0.06~ 0.10 ~0.15)	★ 200~ 250 ~300	☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-	-	-	-
	Alloy steel	0.1~ 0.2 ~0.3 (0.06~ 0.10 ~0.15)	★ 180~ 220 ~250	☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-	-	-	-
	Mold steel	0.1~ 0.15 ~0.25 (0.06~ 0.10 ~0.13)	★ 150~ 180 ~220	☆ 80~ 140 ~180	☆ 80~ 140 ~180	-	-	-	-	-
	Stainless steel (Austenitic related)	0.1~ 0.15 ~0.25	-	☆ 100~ 160 ~200	☆ 100~ 160 ~200	-	-	-	-	-
	Stainless steel (Martensitic related)	0.1~ 0.15 ~0.25	-	☆ 150~ 200 ~250	-	-	-	☆ 180~ 240 ~300	-	-
	Stainless steel (Precipitation hardening)	0.1~ 0.15 ~0.25	-	★ 90~ 120 ~150	-	-	-	-	-	-
	Gray cast iron	0.1~ 0.2 ~0.3	-	-	-	★ 120~ 180 ~250	-	-	-	-
	Nodular cast iron	0.1~ 0.15 ~0.25	-	-	-	★ 100~ 150 ~200	-	-	-	-
	Ni-base heat-resistant alloys	0.1~ 0.12 ~0.2	-	☆ 20~ 30 ~50	-	-	-	★ 20~ 30 ~50	-	-
SM *1GL	Carbon steel	0.06~ 0.12 ~0.2 (0.06~0.08~0.12)	★ 200~ 250 ~300	☆ 120~ 180 ~250	☆ 120~ 180 ~250	-	-	-	-	-
	Alloy steel	0.06~ 0.12 ~0.2 (0.06~ 0.08 ~0.12)	★ 180~ 220 ~250	☆ 100~ 160 ~220	☆ 100~ 160 ~220	-	-	-	-	-
	Mold steel	0.06~ 0.08 ~0.15 (0.06~ 0.08 ~0.10)	★ 150~ 180 ~220	☆ 80~ 140 ~180	☆ 80~ 140 ~180	-	-	-	-	-
	Stainless steel (Austenitic related)	0.06~ 0.12 ~0.2	-	☆ 100~ 160 ~200	☆ 100~ 160 ~200	-	-	-	-	-
	Stainless steel (Martensitic related)	0.06~ 0.12 ~0.2	-	☆ 150~ 200 ~250	-	-	-	☆ 180~ 240 ~300	-	-
	Stainless steel (Precipitation hardening)	0.06~ 0.12 ~0.2	-	☆ 90~ 120 ~150	-	-	-	-	-	-
	Gray cast iron	0.06~ 0.12 ~0.2	-	-	-	☆ 120~ 180 ~250	-	-	-	-
	Nodular cast iron	0.06~ 0.08 ~0.15	-	-	-	☆ 100~ 150 ~200	-	-	-	-
	Ni-base heat-resistant alloys	0.06~ 0.1 ~0.15	-	☆ 20~ 30 ~50	-	-	-	☆ 20~ 30 ~50	-	-
	Titanium alloys	0.06~ 0.08 ~0.15	-	★ 40~ 60 ~80	-	-	-	-	-	-
*2GH	Carbon steel	0.2~ 0.3 ~0.4	-	☆ 120~ 180 ~250	☆ 120~ 180 ~250	-	-	-	-	-
	Alloy steel	0.2~ 0.3 ~0.4	-	☆ 100~ 160 ~220	☆ 100~ 160 ~220	-	-	-	-	-
	Mold steel	0.15~ 0.2 ~0.3	-	☆ 80~ 140 ~180	☆ 80~ 140 ~180	-	-	-	-	-
	Stainless steel (Austenitic related)	0.2~ 0.25 ~0.3	-	☆ 100~ 160 ~200	☆ 100~ 160 ~200	-	-	-	-	-
	Stainless steel (Martensitic related)	0.2~ 0.25 ~0.3	-	☆ 150~ 200 ~250	-	-	-	☆ 180~ 240 ~300	-	-
	Stainless steel (Precipitation hardening)	0.2~ 0.25 ~0.3	-	☆ 90~ 120 ~150	-	-	-	-	-	-
	Gray cast iron	0.2~ 0.3 ~0.4	-	-	-	☆ 120~ 180 ~250	-	-	-	-
	Nodular cast iron	0.15~ 0.2 ~0.3	-	-	-	☆ 100~ 150 ~200	-	-	-	-
	Ni-base heat-resistant alloys	0.15~ 0.2 ~0.25	-	☆ 20~ 30 ~50	-	-	-	☆ 20~ 30 ~50	-	-
	Hard materials (60HRC or less)	0.05~ 0.1 ~0.2	-	-	-	-	★ 80~ 100 ~120	-	-	-
AM	Non-ferrous metals	0.1~ 0.2 ~0.3	-	-	-	-	-	-	★ 200~ 600 ~900	☆ 200~ 500 ~800

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

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

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

*2. GH Chipbreaker: Fine pitch → fz≤0.3 (mm/t)
Extra fine pitch → Not recommended

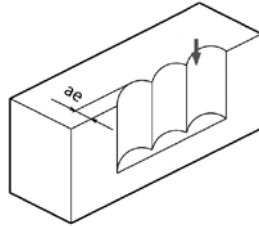
★ : 1st Recommendation

☆ : 2nd Recommendation

Applicable chipbreaker

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

Vertical milling (Plunging)



Cutting dia.	Max. width of cut (ae)
All items	8mm

Cutter type and chipbreaker selection

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

Case studies

FC300	
Machine part Vc=170m/min apxae=2.5x130mm fz=0.183mm/t (Vf=500mm/min) 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=150m/min apxae=1x100mm fz=0.2mm/t (Vf=668mm/min) 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 cutter

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 5 mm depth of cut.

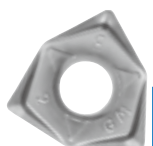
Smaller insert size

MFWN Mini
05 size



D.O.C. ~5 mm

MFWN
08 size



D.O.C. ~8 mm

Increased versatility

Large small-diameter lineup

High-efficiency machining with
fine pitch styles

1 ~ 3 additional flutes



Expanded lineup of smaller
diameters

Face Mill $\phi 50$
End Mill $\phi 25 \sim \phi 40$



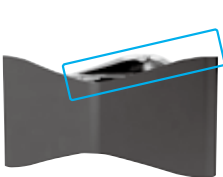
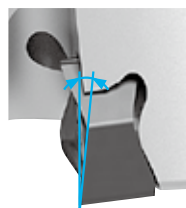
2 Inherits previous MFWN series design elements and features

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

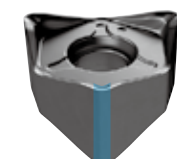
A.R. Max +11°

"Large slant edge" design

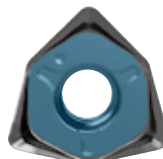


Superior fracture resistance
with thick edge design

Stable clamping strength with unique insert face
Design



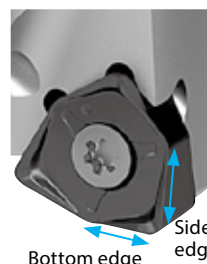
Cutting edge thickness: 5.2 mm
(3.1 mm at the thinnest point)



Optimized seating
surface

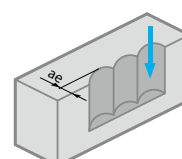
Neutral inserts for various uses

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



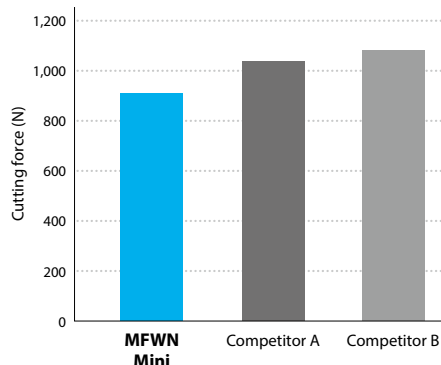
Bottom edge
Side edge

Plunging possible



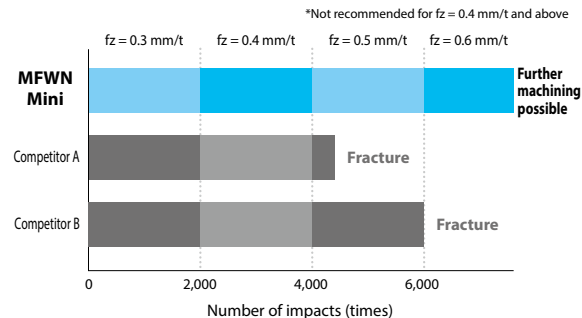
Left-handed toolholders
are also available
(Custom order)

Cutting force comparison (Internal evaluation)



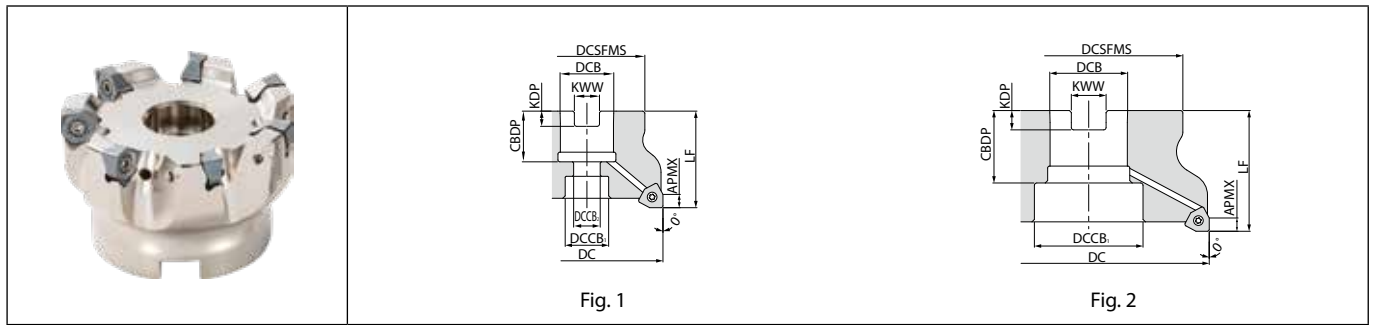
Cutting conditions : $V_c = 150$ m/min, $f_z = 0.15$ mm/t,
 $a_p \times a_e = 1.5 \times 35$ mm, Dry, Cutting dia. $\phi 63$, Workpiece material: SCM440

Fracture resistance comparison (Internal evaluation)



Cutting conditions : $V_c = 120$ m/min, $a_p \times a_e = 1.5 \times 30$ mm,
Dry, Cutting dia. $\phi 63$, Workpiece material: Mold steel 37~43HRC

MFWN Mini (Face mill)



Toolholder dimensions

Description			Availability		Dimension (mm)										A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts M141
			R	Inserts	DC	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CDBP	KDP	KWW	APMX							
Metric	Fine pitch	MFWN 90050R-05-5T-M	●	5	50	48	22	17.5	11	40	21	6.3	10.4	5	+11	-9	Yes	13800	0.4	1	WNMU0504...
		90063R-05-6T-M	●	6	63			18		40	21	7	12.4	5	+11	-8	Yes	12300	0.5	1	
		90080R-05-7T-M	●	7	80	70	27	20	13	50	24	7	12.4	5	+11	-7	Yes	10900	1.2	1	
		90100R-05-8T-M	●	8	100	78	32	45	-	50	30	8	14.4	5	+11	-7	Yes	9700	1.6	2	
		90125R-05-11T-M	●	11	125	89	40	55	-	63	33	9	16.4	5	+11	-7	Yes	8700	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	13800	0.4	1	WNMU0504...
		90063R-05-7T-M	●	7	63			18		40	21	7	12.4	5	+11	-8	Yes	12300	0.5	1	
		90080R-05-9T-M	●	9	80	70	27	20	13	50	24	7	12.4	5	+11	-7	Yes	10900	1.2	1	
		90100R-05-11T-M	●	11	100	78	32	45	-	50	30	8	14.4	5	+11	-7	Yes	9700	1.5	2	
		90125R-05-14T-M	●	14	125	89	40	55	-	63	33	9	16.4	5	+11	-7	Yes	8700	2.7	2	
Bore dia. inch spec	Fine pitch	MFWN 90080R-05-7T	●	7	80	70	25.4	20	13	50	27	6	9.5	5	+11	-7	Yes	10900	1.3	1	WNMU0504...
		90100R-05-8T	●	8	100	78	31.75	45	-	50	34	8	12.7	5	+11	-7	Yes	9700	1.6	2	
		90125R-05-11T	●	11	125	89	38.1	55	-	63	38	10	15.9	5	+11	-7	Yes	8700	2.9	2	
	Extra fine pitch	MFWN 90080R-05-9T	●	9	80	70	25.4	20	13	50	27	6	9.5	5	+11	-7	Yes	10900	1.2	1	WNMU0504...
		90100R-05-11T	●	11	100	78	31.75	45	-	50	34	8	12.7	5	+11	-7	Yes	9700	1.6	2	
		90125R-05-14T	●	14	125	89	38.1	55	-	63	38	10	15.9	5	+11	-7	Yes	8700	2.8	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.

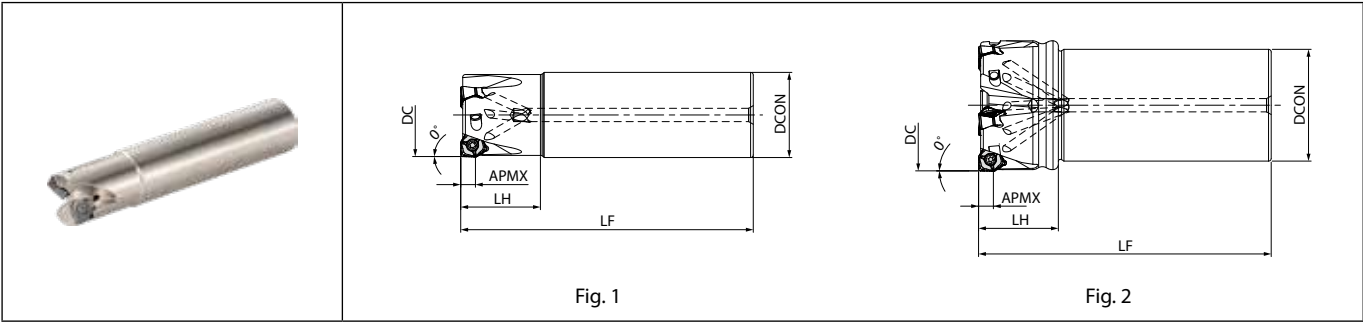
Spare parts

Description			Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt
Fine pitch	MFWN	90050R-05-5T-M	SB-306STRP	DTPM-8	P-37	HH10X30
		90063R-05-6T-M				HH10X30
		90080R-05-7T(-M)				HH12X35
		90100R-05-8T(-M)				-
		90125R-05-11T(-M)				-
Extra fine pitch	MFWN	90050R-05-6T-M	SB-306STRP	DTPM-8	P-37	HH10X30
		90063R-05-7T-M				HH10X30
		90080R-05-9T(-M)				HH12X35
		90100R-05-11T(-M)				-
		90125R-05-14T(-M)				-

Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

● : Standard item

MFWN Mini (End mill)



Toolholder dimensions

Description		Availability		Dimension (mm)						A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (mm ⁻¹)	Fig.	Spare parts			Applicable inserts ➡ M141
		R	Inserts												DC	DCON	LF	
																		
MFWN	90025R-S25-05-2T	●	2	25	25	120	32	5	+11	-14.5	Yes	19500	1	SB-3065TRP	DTPM-8	P-37	WNMU0504...	
	90032R-S32-05-3T	●	3	32		130	40			-12			17200					1
	90040R-S32-05-4T	●	4	40		150	50			-10			15400					2
	90050R-S32-05-5T	●	5	50	32					-9			13800					2
	90063R-S32-05-6T	●	6	63		110	30			-8			12300					2
	90080R-S32-05-7T	●	7	80						-7			10900					2
	Recommended tightening torque for insert clamp 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 when insert is fixed.

M



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

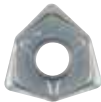
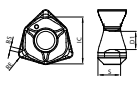
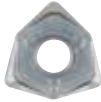
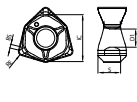
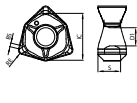
Slot Mill

Ball-nose
Radius

Others

● : Standard item

WNMU

Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)		Carbon steel / Alloy steel						☆			★	☆	P			
		Mold and die steel						☆			★	☆				
		Austenitic stainless steel								☆		☆	★	M		
		Martensitic stainless steel										☆				
		Precipitation hardening stainless steel							☆			★				
		Gray cast iron						☆			★			K		
		Nodular cast iron						☆			★					
		Non-ferrous metals												N		
		Heat-resistant alloy											☆	S		
		Titanium alloy								☆		★				
Hard materials						★							H			
Insert		Description		No. of edges	Dimension (mm)					Carbide						Applicable toolholder ➡ M139 M140
					IC	S	D1	RE	BS	PVD						
										PR0155	PR1510	PR1525	PR1535	PR1810	PR1825	
	 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 ● M142

Recommended cutting conditions

Chipbreaker	Workpiece material	fz (mm/t)	Recommended insert grades (Vc : m/min)			
			MEGACOAT NANO EX (MEGACOAT NANO)			MEGACOAT HARD
			PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	PR015S
GM	Carbon steel	0.1 – 0.2 – 0.25	☆ 120 – 180 – 250	★ 120 – 180 – 250	–	–
	Alloy steel		☆ 100 – 160 – 220	★ 100 – 160 – 220	–	–
	Mold steel	0.1 – 0.15 – 0.2	☆ 80 – 140 – 180	★ 80 – 140 – 180	–	–
	Stainless steel (Austenitic related)	0.1 – 0.15 – 0.2	☆ 100 – 160 – 200	☆ 100 – 160 – 200	–	–
	Stainless steel (Martensitic related)		☆ 150 – 200 – 250	–	–	–
	Stainless steel (Precipitation Hardening)		★ 90 – 120 – 150	–	–	–
	Gray cast iron	0.1 – 0.2 – 0.25	–	–	★ 120 – 180 – 250	–
	Nodular cast iron	0.1 – 0.15 – 0.2	–	–	★ 100 – 150 – 200	–
	Ni-base heat-resistant alloys	0.1 – 0.12 – 0.16	☆ 20 – 30 – 50	–	–	–
SM	Carbon steel	0.06 – 0.12 – 0.2	☆ 120 – 180 – 250	☆ 120 – 180 – 250	–	–
	Alloy steel		☆ 100 – 160 – 220	☆ 100 – 160 – 220	–	–
	Mold steel	0.06 – 0.08 – 0.15	☆ 80 – 140 – 180	☆ 80 – 140 – 180	–	–
	Stainless steel (Austenitic related)	0.06 – 0.12 – 0.2	★ 100 – 160 – 200	☆ 100 – 160 – 200	–	–
	Stainless steel (Martensitic related)		☆ 150 – 200 – 250	–	–	–
	Stainless steel (Precipitation Hardening)		☆ 90 – 120 – 150	–	–	–
	Gray cast iron	0.06 – 0.12 – 0.2	–	–	☆ 120 – 180 – 250	–
	Nodular cast iron	0.06 – 0.08 – 0.15	–	–	☆ 100 – 150 – 200	–
	Ni-base heat-resistant alloys	0.06 – 0.08 – 0.15	★ 20 – 30 – 50	–	–	–
GH	Carbon steel	0.15 – 0.2 – 0.3	☆ 120 – 180 – 250	☆ 120 – 180 – 250	–	–
	Alloy steel		☆ 100 – 160 – 220	☆ 120 – 160 – 220	–	–
	Mold steel	0.15 – 0.2 – 0.25	☆ 80 – 140 – 180	☆ 80 – 140 – 180	–	–
	Stainless steel (Austenitic related)	0.15 – 0.2 – 0.25	☆ 100 – 160 – 200	☆ 100 – 160 – 200	–	–
	Stainless steel (Martensitic related)		☆ 150 – 200 – 250	–	–	–
	Stainless steel (Precipitation Hardening)		☆ 90 – 120 – 150	–	–	–
	Gray cast iron	0.15 – 0.2 – 0.3	–	☆ 120 – 180 – 250	☆ 120 – 180 – 250	–
	Nodular cast iron	0.15 – 0.2 – 0.25	–	☆ 100 – 150 – 200	☆ 100 – 150 – 200	–
	Ni-base heat-resistant alloys	0.1 – 0.15 – 0.2	☆ 20 – 30 – 50	–	–	–
	Hardened Material (60 HRC or less)	0.05 – 0.08 – 0.16	–	–	–	★ 50 – 80 – 100

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

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

When using GH chipbreaker in fine pitch cutters, recommended feed is fz≤0.2 (mm/t).

GH chipbreaker is not recommended for extra fine pitch cutters.

★ : 1st Recommendation

☆ : 2nd Recommendation

M



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

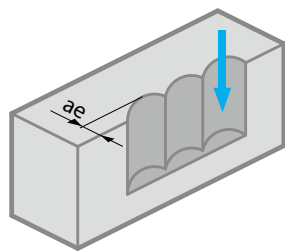
Multi-
Function

Slot Mill

Ball-nose
Radius

Others

Vertical milling (Plunging)



Available for vertical milling (Plunging)

Cutting Dia.	Maximum width of cut (ae)
All Description	5 mm

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=0.2 mm/t or under)

How to mount an insert

- 1. Completely eliminate chips and dust from the insert mounting side.
- 2. Clamp Screw
 - Apply anti-seize compound on portion of taper and thread of clamp screw.
 - 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)
- 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.

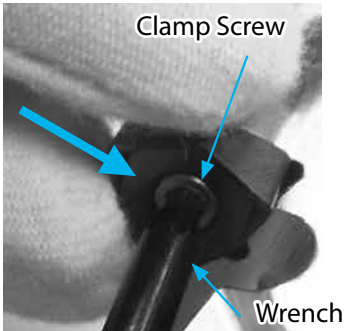


Fig. 1



Fig. 2

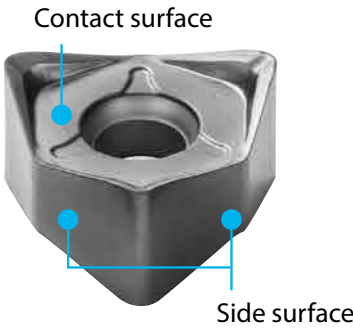


Fig. 3

Cutting edge angle 88°, high efficiency cutter

MFSN88

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

Reduces chattering with a low cutting force design

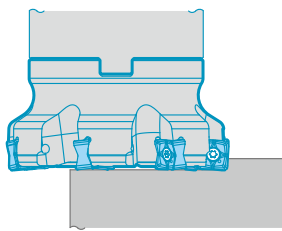
Applicable to various types of machining with product lineup from ø32

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

Cost reduction in approximately 90° corner cutting

Shoulder roughing

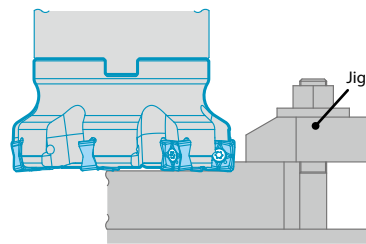
Cost reduction by switching from 90° cutter with positive inserts



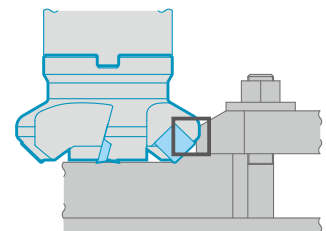
See page M149 for unmachined corner portion

Facing without interfering with fixtures

MFSN88



Conventional 45° cutter



M

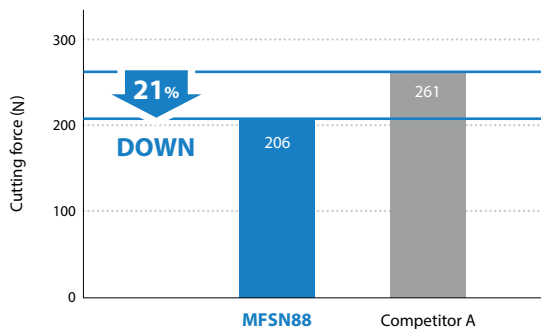
2 Reduces chattering with a low cutting force design

Chatter resistant medium to roughing machining range

3 Extended tool life by MEGACOAT NANO EX

Insert grade and chipbreaker lineup for various machining application

Cutting force comparison (Internal evaluation)



Cutting force is thrust force



1st Recommendation
(General purpose)
GM chipbreaker



Tough edge
GH chipbreaker



For stainless steel
SM chipbreaker

Cutting conditions: $V_c = 200$ m/min, $a_p = 3$ mm, $f_z = 0.15$ mm/t
Cutter dia. ø63: Workpiece material: S50C

MFSN88 (Face mill)

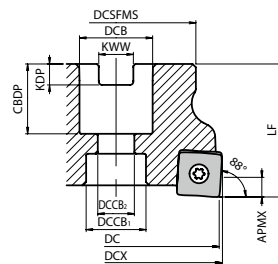


Fig. 1

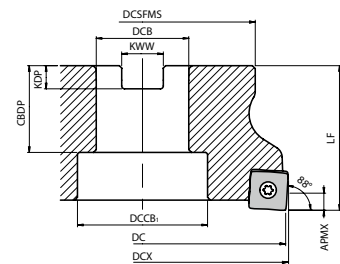


Fig. 2

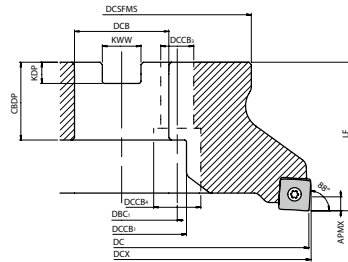


Fig. 3

Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)														A.R. max. (°)	R.R. (°)	Coolant hole	Weight (kg)	Fig.	Applicable inserts ➡ M148
					R	DC	DCX	DCSFMS	DCB	DCCB ₁	DCCB ₂	DCCB ₃	DCCB ₄	DBC ₁	LF	CBDP	KDP	KWW						
Metric	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		
Bore dia. inch spec	Fine pitch	MFSN 88080R-6T-G	●	6	80	82	70	25.4	20	13				50	27	6	9.5	+10	-9	No	1.1	1	SNMU1305...	
		88100R-7T-G	●	7	100	102	78	31.75	45					34	8	12.7	-8		1.5		2			
		88125R-9T-G	●	9	125	127	89	38.1	55	-					10	15.9	-7.5		2.5		2			
		88160R-11T-G	●	11	160	162	110	50.8	70					63	38	11	19.1		-7		4.1	2		
	Extra fine pitch	MFSN 88080R-9T-G	●	9	80	82	70	25.4	20	13				50	27	6	9.5	+10	-9	No	1.1	1	SNMU1305...	
		88100R-11T-G	●	11	100	102	78	31.75	45					34	8	12.7	-8		1.5		2			
		88125R-13T-G	●	13	125	127	89	38.1	55	-					10	15.9	-7.5		2.6		2			
		88160R-15T-G	●	15	160	162	110	50.8	70					63	38	11	19.1		-7		4.3	2		

APMX : 5 mm (GM, SM, GH chipbreakers, Coated cabide), 3 mm (GM chipbreaker, Cermet)

● : Standard item

Spare parts (common to Metric / Inch spec)

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

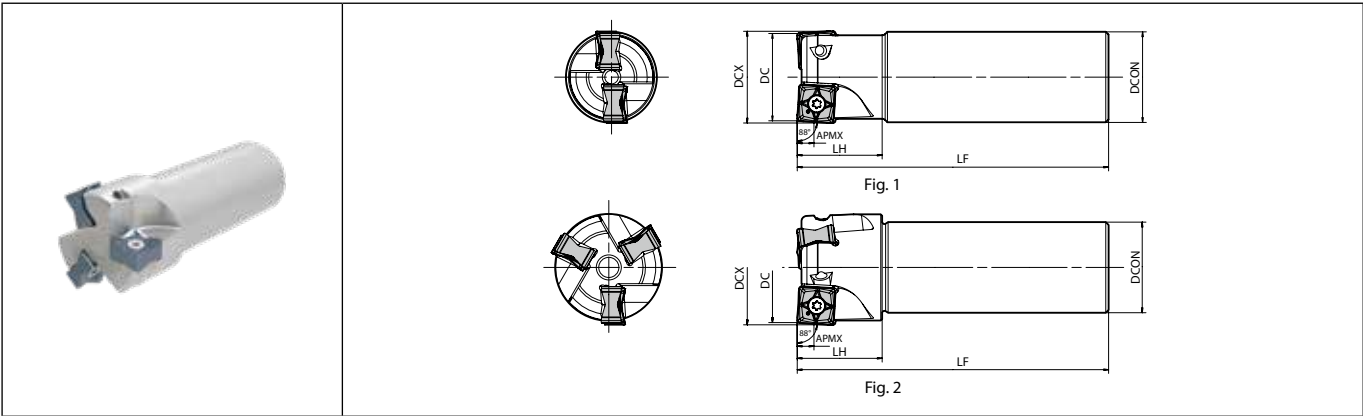
 Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

M


Milling

Cutting edge angle 45°~70°
Cutting edge angle 75°
Cutting edge angle 88°/90°
Cutter for Finishing
High Feed Cutter
Multi- Function
Slot Mill
Ball-nose Radius
Others

MFSN88 (End mill)



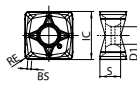
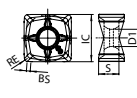
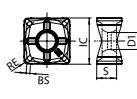
Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts			Applicable inserts 🔧 M148
			DC	DCX	DCON	LF	LH					Screw	Wrench	Anti-seize compound	
MFSN 88032R-S32-2T-G	●	2	32	34	32	110	30	+10	-15.5	No	1				SNMU1305...
88040R-S32-3T-G	●	3	40	42	32	110	30	+10	-13	No	2	SB-4090TRP	DTPM-15	P-37	SNMU1305...

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 when insert is fixed.
Recommended tightening torque for insert clamp : 3.5N-m

● : Standard item

SNMU

Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)		Carbon steel / Alloy steel			☆		★	☆	■	P				
		Mold and die steel			☆		★	☆	■					
		Austenitic stainless steel				☆		★		M				
		Martensitic stainless steel						☆						
		Precipitation hardening stainless steel				☆		★						
		Gray cast iron		☆		★				K				
		Nodular cast iron		☆		★								
		Non-ferrous metals								N				
		Heat-resistant alloy						☆		S				
		Titanium alloy					☆	★						
Hard materials	★								H					
Insert	Description	Dimension (mm)					Carbide						Cemet	Applicable toolholder ➡ M145 M147
		IC	S	D1	RE	BS	PVD							
							PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	
	 General purpose	13	5.51	4.7	0.8	1	□	○	●	●	●	●	●	MFSN88...
	 Low cutting force	13	5.51	4.7	0.8	1	□	○	●	●	●	●	●	MFSN88...
	 Tough edge	13	5.51	4.7	0.8	1	●	□	○	●	●	●	●	MFSN88...

Recommended cutting conditions ➡ M149

M

Milling

Cutting edge angle
45°~70°Cutting edge angle
75°Cutting edge angle
88°/90°Cutter for
FinishingHigh Feed
CutterMulti-
Function

Slot Mill

Ball-nose
Radius

Others

● : Standard item ○ : Will be replaced with a new product □ : Expected to be discontinued in September 2026

M148

Recommended cutting conditions

Coated carbide

Chipbreaker	Workpiece material	Feed (fz: mm/t)	Recommended insert grades (Vc: m/min)			
			MEGACOAT (PVD Coated carbide)			
			PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	PR0155
GM	Carbon steel	0.1~ 0.2 ~0.3	☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-
	Alloy steel	0.1~ 0.2 ~0.3	☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-
	Mold steel	0.1~ 0.15 ~0.25	★ 80~ 140 ~180	★ 80~ 140 ~180	-	-
	Stainless steel (Austenitic related)	0.1~ 0.15 ~0.25	☆ 100~ 150 ~200	☆ 100~ 150 ~200	-	-
	Stainless steel (Martensitic related)	0.1~ 0.15 ~0.25	☆ 100~ 150 ~200	-	-	-
	Stainless steel (Precipitation hardening)	0.1~ 0.15 ~0.25	★ 90~ 120 ~150	-	-	-
	Gray cast iron	0.1~ 0.2 ~0.3	-	-	★ 120~ 180 ~250	-
	Nodular cast iron	0.1~ 0.15 ~0.25	-	-	★ 100~ 150 ~200	-
	Ni-base heat-resistant alloys	0.1~ 0.12 ~0.2	☆ 20~ 30 ~50	-	-	-
SM	Carbon steel	0.06~ 0.12 ~0.2	-	☆ 120~ 180 ~250	-	-
	Alloy steel	0.06~ 0.12 ~0.2	-	☆ 100~ 160 ~220	-	-
	Mold steel	0.06~ 0.08 ~0.15	-	☆ 80~ 140 ~180	-	-
	Stainless steel (Austenitic related)	0.06~ 0.12 ~0.2	★ 100~ 150 ~200	☆ 100~ 150 ~200	-	-
	Stainless steel (Martensitic related)	0.06~ 0.12 ~0.2	★ 100~ 150 ~200	-	-	-
	Stainless steel (Precipitation hardening)	0.06~ 0.12 ~0.2	☆ 90~ 120 ~150	-	-	-
	Gray cast iron	0.06~ 0.12 ~0.2	-	-	☆ 120~ 180 ~250	-
	Nodular cast iron	0.06~ 0.1 ~0.15	-	-	☆ 100~ 150 ~200	-
	Ni-base heat-resistant alloys	0.06~ 0.08 ~0.15	★ 20~ 30 ~50	-	-	-
	Titanium alloys	0.06~ 0.08 ~0.15	★ 40~ 60 ~80	-	-	-
	Carbon steel	0.15~ 0.25 ~0.35	-	☆ 120~ 180 ~250	-	-
GH	Alloy steel	0.15~ 0.25 ~0.35	-	☆ 100~ 160 ~220	-	-
	Mold steel	0.1~ 0.2 ~0.3	-	☆ 80~ 140 ~180	-	-
	Gray cast iron	0.15~ 0.25 ~0.35	-	-	☆ 120~ 180 ~250	-
	Nodular cast iron	0.1~ 0.2 ~0.3	-	-	☆ 100~ 150 ~200	-
	Hard materials (60HRC or less)	0.1~ 0.2 ~0.3	-	-	-	★ 50~ 80 ~100

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

★: 1st Recommendation
☆: 2nd Recommendation

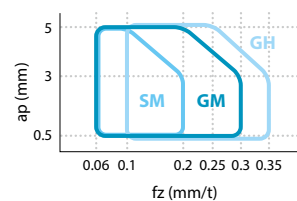
Cermet

Chipbreaker	Workpiece material	Feed (fz: mm/t)	Recommended insert grades (Vc: m/min)
			Cermet
			TN620M
GM	Carbon steel	0.06~ 0.12 ~0.15	★ 200~ 250 ~300
	Alloy steel	0.06~ 0.12 ~0.15	★ 180~ 220 ~250
	Mold steel	0.06~ 0.1 ~0.13	★ 150~ 180 ~220

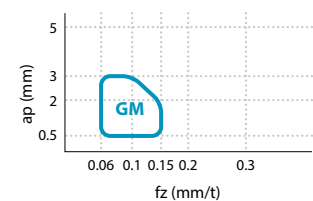
★: 1st Recommendation

Applicable chipbreaker range

Coated carbide



Cermet



Applicable chipbreaker

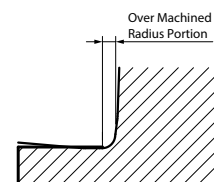
Cutter type	Chipbreaker		
	GM	SM	GH
Fine pitch	✓	✓	✓
Extra fine pitch	✓	✓	△ (Feed rate is recommended fz=0.2mm/t or under)

Not available for vertical milling (plunging).

Reference data of Over Machined Radius Portion

ap	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 provide high reliability on heavy milling at large depths of cut and high feed rates.

Three cutting edge angles (incl. MFLN45 and MFLN70) optimized for various machining applications.

1 Tough and reliable inserts for stable heavy milling

22 mm long inserts offer increased rigidity

Tangentially mounted inserts provide

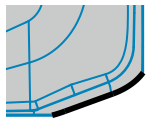
2 cutting edges on both sides

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

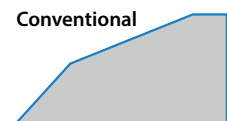
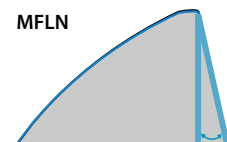
Reduced impact forces when entering the workpiece



Obtuse edge design

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

Cross-section view of cutting edge



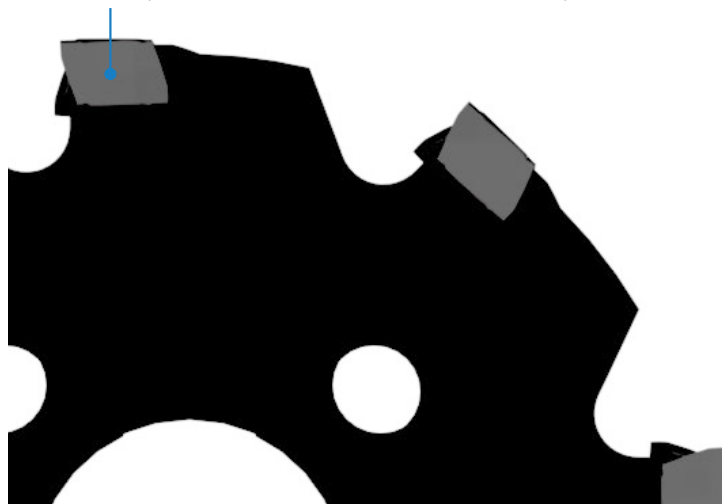
Wide flat mounting surface

Hold an insert firmly in heavy milling

M

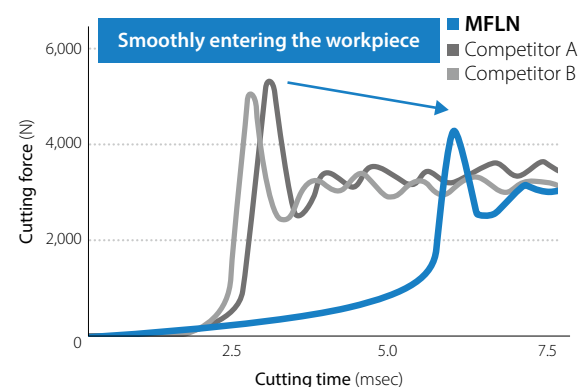
Milling

Tangentially mounted inserts increase rigidity



Cutting forces when entering the workpiece (internal evaluation)

MFLN90: Insert - chamfered corner type



Cutting conditions: $V_c = 150$ m/min, $a_p \times a_e = 5 \times 75$ mm, $f_z = 0.3$ mm/t, $\phi 125$ (1 insert), dry, workpiece: S50C