



Double-sided 4-edge Insert, Newly Developed End Mill

MEW

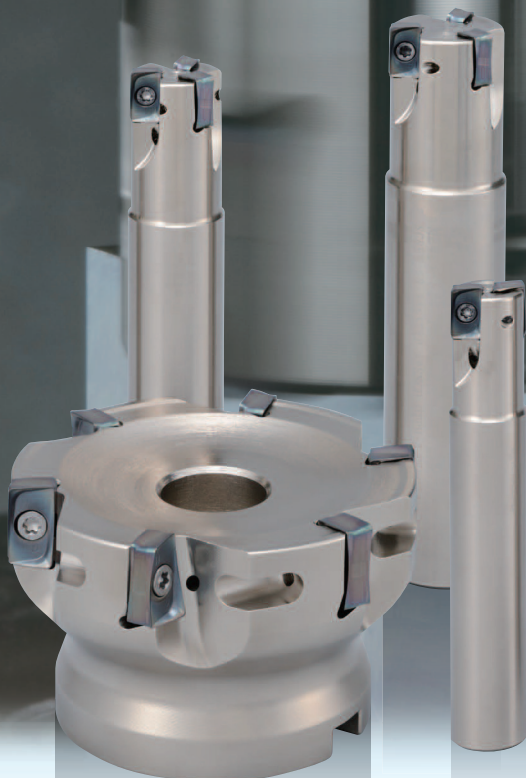
Newly Developed Mold Technology End Mill

Milling Solutions

- KYOCERA's Unique Mold Technology **Reduces Cutting Force Equivalent to Positive Inserts**
- Extend Tool Life with New **MEGACOAT NANO** Technology



Economical **4-edge Insert**
3 Chipbreakers for Various Applications



ADVANCING PRODUCTIVITY

- KYOCERA, Contributing To Advancing Productivity -

Double-sided 4-edge Insert, Newly Developed End Mill KYOCERA's Unique Mold Technology Reduces Cutting Force Equivalent to Positive Inserts

A.R. Max +10°
(LOMU15...type)

Cutting Edge
Angle 90°

Obtuse Edge enhances cutting edge toughness

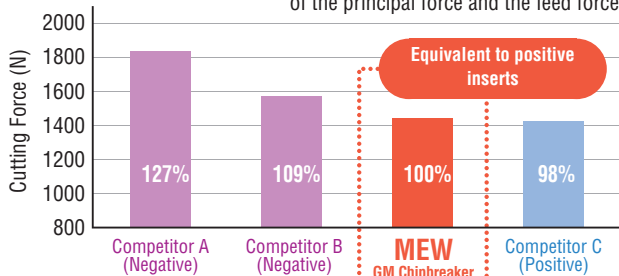
Cutting Edge

Obtuse Edge

Low cutting force equivalent to positive inserts

● Cutting Force Comparison

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

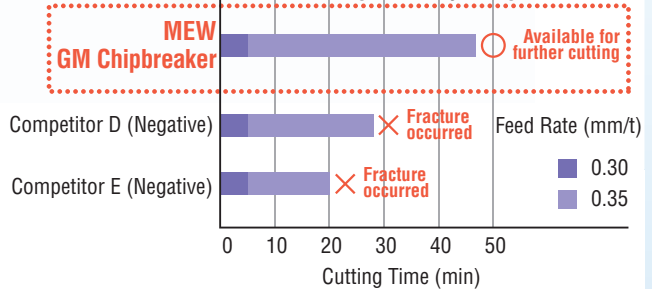


Vc=150m/min apxae=3x15mm fz=0.15mm/t S50C Cutter ø20

(Internal Evaluation)

● Fracture Resistance Comparison

High stability at high feed rates



Vc=120m/min apxae=3x10mm fz=0.3-0.35mm/t SCM440H (37-39Hs) Cutter ø20

(Internal Evaluation)

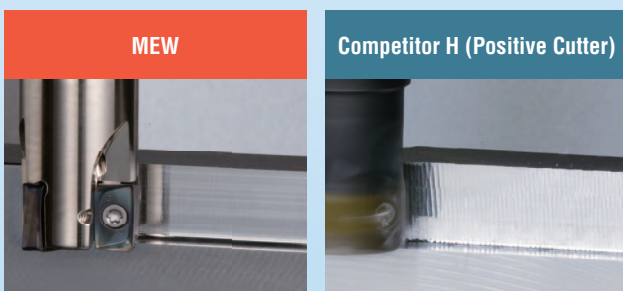
Improved Surface Finish, Minimizing Chattering

The helical cutting edge and optimum axial rake design delivers sharp cutting and superior chattering resistance

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

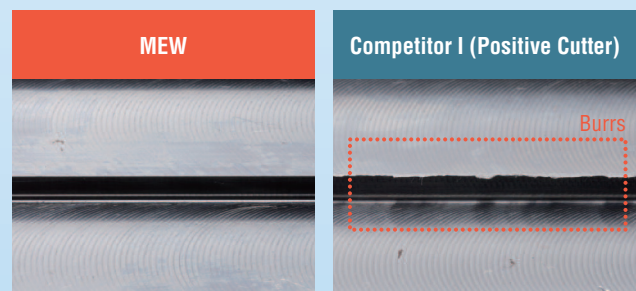
Large actual rake angle lowers cutting force

Surface of Shoulder Wall

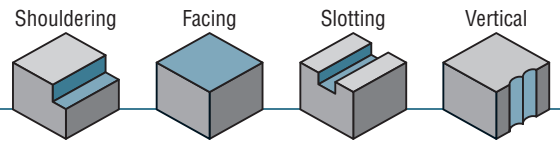


Smooth surface of MEW without chattering

Burr Comparison with Positive Cutters

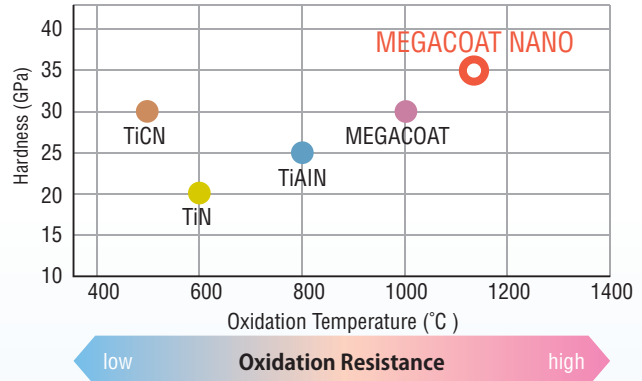
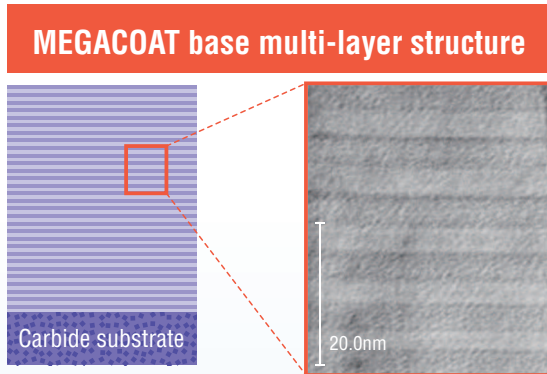


Less burrs than positive cutters due to sharp cutting



Extend Tool Life with New **MEGACOAT NANO** Technology

Special multi-layer nano coating "MEGACOAT" ensures stable milling and extends tool life
PR1525 for steel and stainless steel, and **PR1510** for cast iron

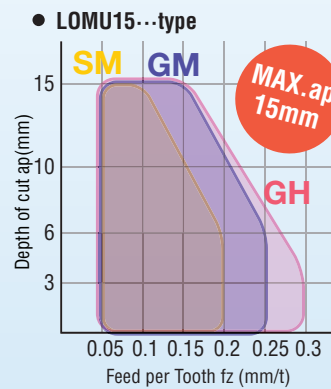
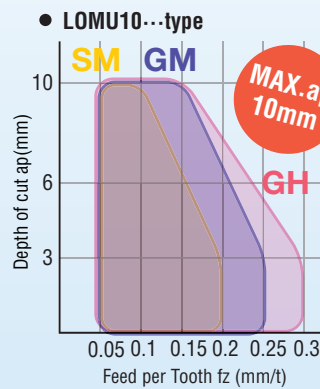


Prevents wear and fractures with high hardness (35GPa) and superior oxidation resistance (oxidation temperature: 1,150°C)

Various Chipbreaker Lineup

Newly developed 3 chipbreakers for various applications
 Can be used for a wide range of applications

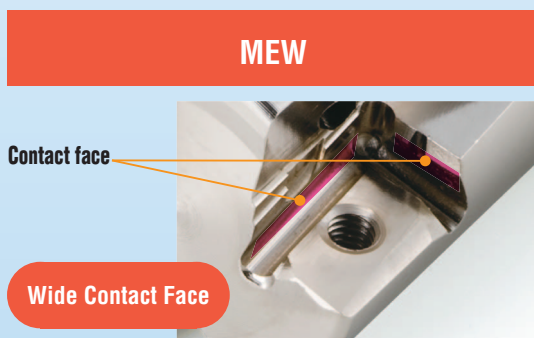
Chipbreaker	Application	Shape
GM	General Purpose	
SM	Low Cutting Force	
GH	Heavy Milling	



<Cutting Condition> Vc=150m/min ae=ØD/2 Workpiece : S50C

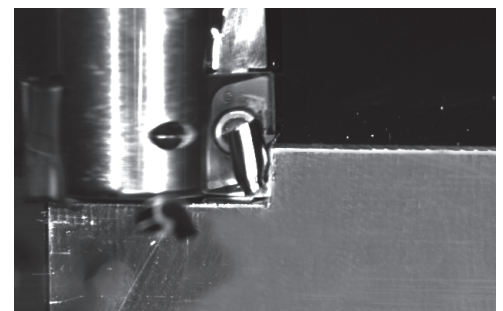


Improved Toolholder Durability and Precision



Extended contact face

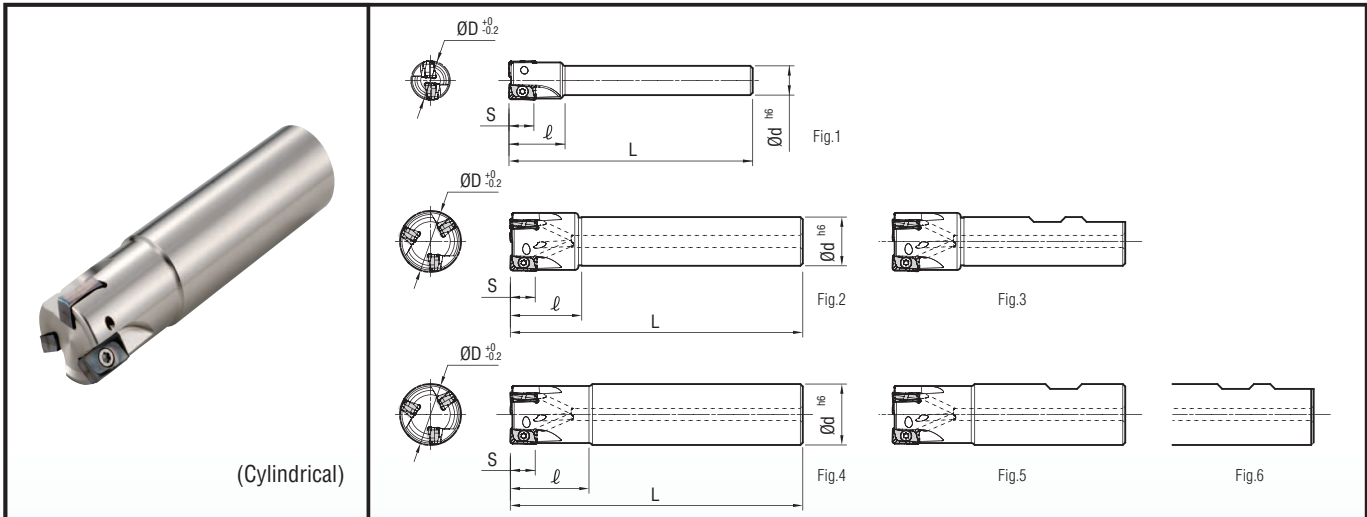
Smooth Chip Evacuation



Properly curled chips

(photo taken by a high speed camera)

MEW End Mill



(Cylindrical)

Toolholder Dimensions

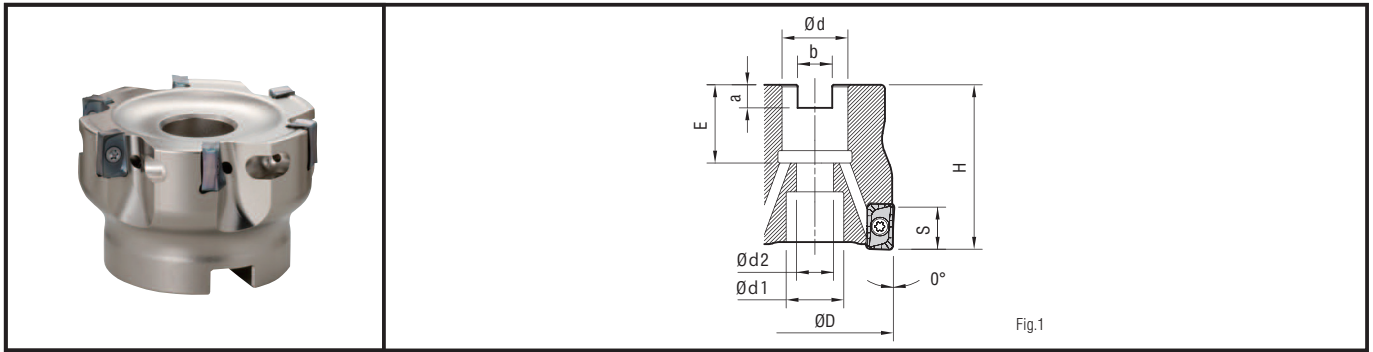
Description	Stock	No. of Inserts	Dimension (mm)					Rake Angle (°)		Coolant Hole	Drawing	Max. Revolution (min ⁻¹)						
			ØD	Ød	L	ℓ	S	A.R. (MAX)	R.R.									
Cylindrical	Standard Shank	MEW 16-S12-10-2T	●	2	16	12	100	23	10	+7°	-22°	No	Fig.1	43,750				
		18-S16-10-2T	●		18	16	100	25						43,000				
		20-S16-10-2T	●	20	110	26	41,000											
		22-S20-10-3T	●	3	22	20	110	26						39,600				
		25-S20-10-3T	●		25		120	29						37,500				
		28-S25-10-3T	●		28		120	29						35,800				
		30-S25-10-4T	●	4	30	25	130	32						34,800				
		32-S25-10-4T	●		32		130	32						33,900				
		40-S32-10-5T	●	5	40	32	150	50						30,000				
		50-S32-10-5T	●		50		120	40						22,500				
	Same Shank Size	MEW 16-S16-10-2T	●	2	16	16	100	26	10	+7°	-21°	Yes	Fig.4	43,750				
		20-S20-10-2T	●		20	20	110	30						41,000				
		20-S20-10-3T	●	3	20	110	30	41,000										
		25-S25-10-2T	●	2	25	25	120	32						37,500				
		25-S25-10-3T	●		120		32	37,500										
		32-S32-10-3T	●	3	32	32	130	40						33,900				
		32-S32-10-4T	●				130	40						33,900				
		Long	MEW 20-S20-10-150-2T	●	2	20	20	150						40	10	+7°	-20°	Yes
	25-S25-10-170-2T		●	25		25	170	50	37,500									
	Standard Shank	MEW 25-S20-15-2T	●	2	25	20	120	29	15	+10°	-22°	Yes	Fig.2	35,000				
32-S25-15-2T		●	32		25	130	32	30,000										
40-S32-15-3T		●	3	40	32	150	50	25,000										
40-S32-15-4T		●				150	50	25,000										
50-S32-15-4T		●	4	50	120	40	17,000											
Same Shank Size	MEW 25-S25-15-2T	●	2	25	25	120	32	15	+10°	-22°	Yes	Fig.4	35,000					
	32-S32-15-2T	●		32	32	130	40						30,000					
	32-S32-15-3T	●	130			40	30,000											
Weldon	Standard Shank	MEW 40-W32-10-5T	○	5	40	32	111	50	10	+7°	-19°	Yes	Fig.3	30,000				
		MEW 40-W32-15-4T	○	4	40	32	111	50	15	+10°	-21°			25,000				
	Same Shank Size	MEW 16-W16-10-2T	○	2	16	16	75	25	10	+7°	-22°	Yes	Fig.5	43,750				
		20-W20-10-2T	○		20	20	77	25						41,000				
		20-W20-10-3T	○	3			77	25						41,000				
		25-W25-10-2T	○	2	25	25	90	32						37,500				
		25-W25-10-3T	○				3	90					32	37,500				
		32-W32-10-4T	○	4	32	32	102	40					33,900					
		MEW 25-W25-15-2T	○	2	25	25	90	32					15	+10°	-22°	Yes	Fig.6	35,000
		32-W32-15-3T	○															3

Max. Revolution Precautions

The insert or cutter may be damaged by centrifugal force when an end mill or a cutter is run at the max revolution speed.

● : Std. Stock ○ : Check Availability

MEW Face Mill



Face Mill Dimensions

Description	Stock	No. of Inserts	Dimension (mm)								Rake Angle (°)		Coolant Hole	Shape	Weight (kg)	Max.Revolution (min ⁻¹)	
			ØD	Ød	Ød1	Ød2	H	E	a	b	S	A.R. (MAX)					R.R.
MEW 032R-10-4T-M	●	4	32	16	14	9	35	19	5.6	8.4	10	+7°	-20°	Yes	Fig.1	0.1	33,900
MEW 040R-10-5T-M	●	5	40													0.2	30,000
MEW 050R-10-5T-M	●	6	50	22	18	11	40	21	6.3	10.4	15	+10°	-19°	Yes	Fig.1	0.4	22,500
MEW 063R-10-6T-M	●		63													0.5	20,500
MEW 040R-15-4T-M	●	4	40	16	14	9	40	19	5.6	8.4	15	+10°	-21°	Yes	Fig.1	0.2	25,000
MEW 050R-15-4T-M	●	50	0.3													17,000	
MEW 063R-15-5T-M	●	5	63	22	18	11	40	21	6.3	10.4	15	+10°	-20°	Yes	Fig.1	0.5	14,500
MEW 080R-15-6T-M	●	27	1.0													12,000	
MEW 080R-15-6T	●	6	80	25.4	20	13	50	27	6	9.5	15	+10°	-20°	Yes	Fig.1	1.0	12,000

Max. Revolution Precautions

The insert or cutter may be damaged by centrifugal force when an end mill or a cutter is run at the max revolution speed.

●: Std. Stock

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

Description	Spare Parts				Applicable Inserts		
	Clamp Screw	Wrench	Anti-Seize Compound	Mounting bolt			
MEW ... -10- <u>T</u>					General Purpose	Low Cutting Force	Tough Edge (Heavy Milling)
MEW 032R-10- <u>M</u>	SB-3065TRP	DTPM-8	MP-1	HH8×25	LOMU 100408ER-GM	LOMU 100408ER-SM	LOMU 100408ER-GH
MEW 040R-10- <u>M</u>	Recommended torque for insert clamp 1.2N · m			HH10×30			
MEW 050R-10- <u>M</u>							
MEW 063R-10- <u>M</u>							
MEW ... -15- <u>T</u>					General Purpose	Low Cutting Force	Tough Edge (Heavy Milling)
MEW 040R-15- <u>M</u>	SB-4090TRP	DTPM-15	MP-1	HH8×25	LOMU 150508ER-GM	LOMU 150508ER-SM	LOMU 150508ER-GH
MEW 050R-15- <u>M</u>	Recommended torque for insert clamp 3.5N · m			HH10×30			
MEW 063R-15- <u>M</u>							
MEW 080R-15- <u>(M)</u>				HH12×40			

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

Recommended Cutting Conditions → P6

Wrenches and clamp screws are "Torx Plus".

1) See Fig. 1 for "Torx Plus" Wrench. (Blue grip)

2) See Fig. 2 for "Torx" Wrench. (Black grip)

The "Torx Plus" Wrench and "Torx" Wrench have different top shapes.

Please use the "Torx Plus" Wrench.

※ If tightening is done with a "Torx" Wrench, it could damage the screw head and prevent screw removal.

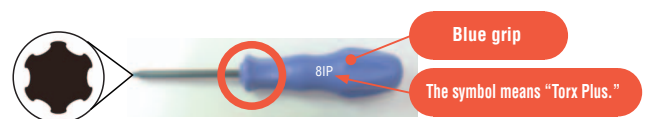


Fig. 1 "Torx Plus" Wrench (For MEW)

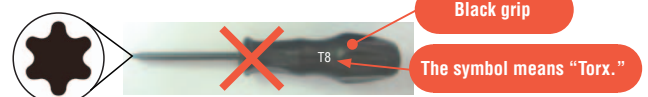


Fig. 2 "Torx" Wrench (Do NOT use it for MEW)

How to mount an insert

1. Make sure to remove dust and chips from the insert mounting pocket.
2. Apply anti-seize compound on a portion of taper and thread of clamp screw.
 - ① Attach the screw (magnetic head) to the front end of the wrench.
 - ② Put the screw into the hole of the insert and tighten while lightly pressing the insert against the constraint surfaces. (see Fig. 1.)

Tighten the M3 screws (SB-3065TRP) slightly inclined from the insert surface. (See Fig. 2.) surface of the insert.
3. Make sure that the wrench is parallel to the screw when tightening it down. See Table 1 for recommended torque.
4. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the holder or between the insert side surfaces and the constraint surface of the holder. If there is any clearance, remove the insert and mount it again by following the above steps.

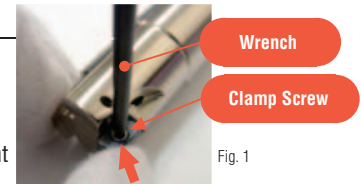


Fig. 1

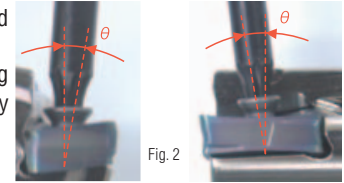


Fig. 2

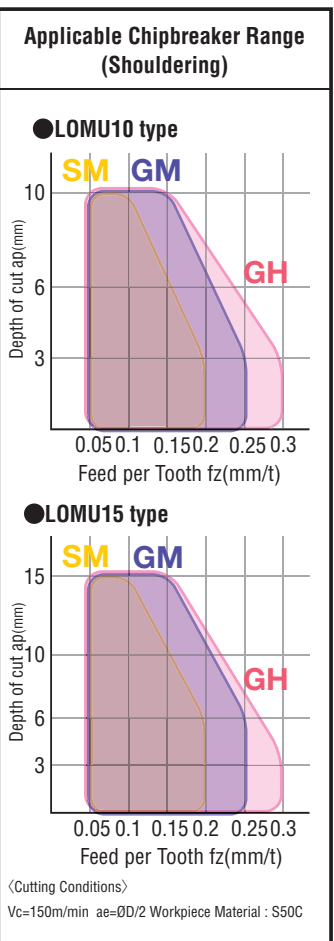
Applicable Inserts

Usage Classification	P	Carbon Steel / Alloy Steel	★	
		Mold Steel	★	
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (For hardness under 45HRC)	M	Stainless Steel	★	
	K	Gray Cast Iron		★
		Nodular Cast Iron		★
	N	Non-ferrous Metals		
	S	Heat-resistant Alloys	★	
		Titanium Alloys		★
	H	Hard Materials	□	
Insert	Description	MEGACOAT NANO		
		PR1525	PR1510	
 General Purpose		LOMU 100408ER-GM	●	●
 Low Cutting Force		LOMU 100408ER-SM	●	●
 Tough Edge (Heavy Milling)		LOMU 100408ER-GH	●	●
 General Purpose		LOMU 150508ER-GM	●	●
 Low Cutting Force		LOMU 150508ER-SM	●	●
 Tough Edge (Heavy Milling)		LOMU 150508ER-GH	●	●

● : Std. Stock

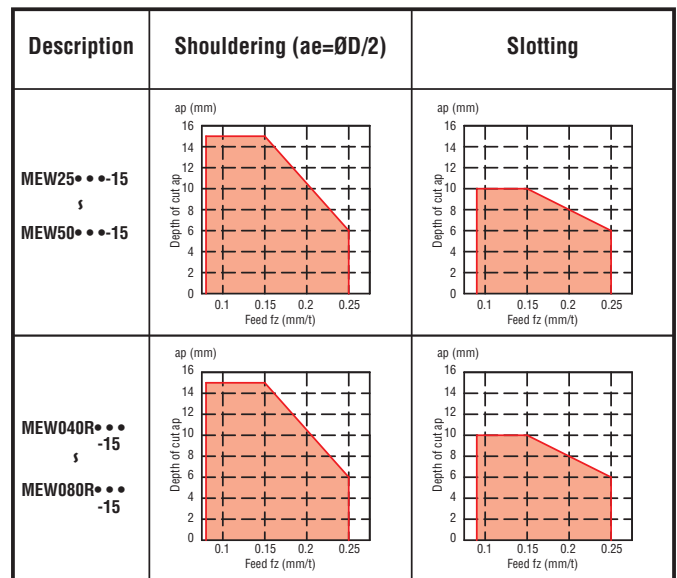
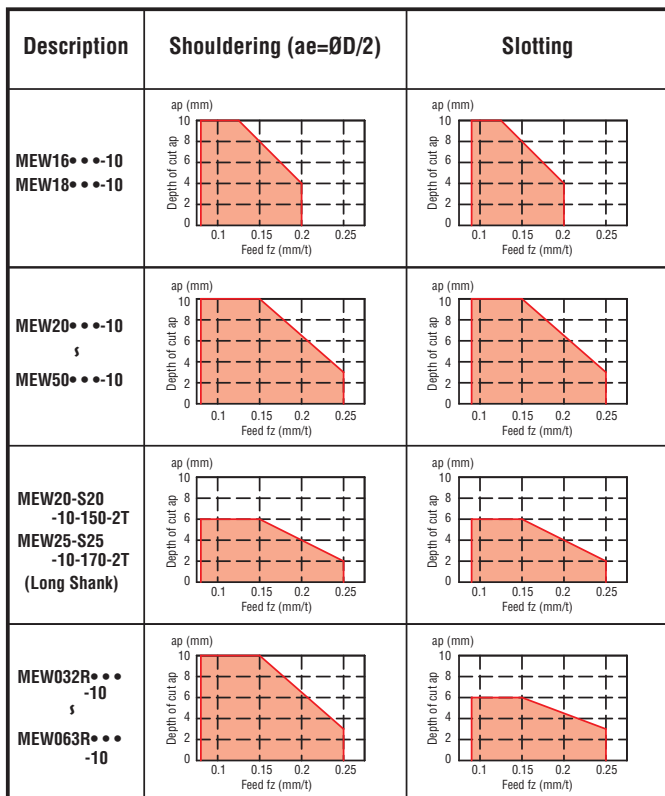
Recommended Cutting Conditions

Chipbreaker	Workpiece Material	Feed fz (mm/t)		Recommended Insert Grade Vc (Cutting speed m/min)	
		Toolholder Descriptions		MEGACOAT NANO	
		MEW16-MEW18	MEW20-MEW50 MEW032R-MEW080R	PR1525	PR1510
GM	Carbon Steel S _{xx} C	0.06-0.1-0.2	0.08-0.15-0.25	★ 120-180-250	-
	Alloy Steel SCM etc	0.06-0.1-0.14	0.08-0.15-0.2	★ 100-160-220	-
	Mold Steel SKD/NAK etc	0.06-0.08-0.12	0.08-0.12-0.2	★ 80-140-180	-
	Stainless Steel SUS304 etc	0.06-0.08-0.12	0.08-0.12-0.15	☆ 100-160-200	-
	Gray Cast Iron FC	0.06-0.1-0.17	0.08-0.18-0.25	-	★ 120-180-250
	Nodular Cast Iron FCD	0.06-0.08-0.12	0.08-0.15-0.2	-	★ 100-150-200
	Titanium Alloys Ti-6Al-4V	0.06-0.08-0.12	0.08-0.15-0.2	-	★ 30-50-70
SM	Carbon Steel S _{xx} C	0.06-0.1-0.17	0.08-0.15-0.2	★ 120-180-250	-
	Alloy Steel SCM etc	0.06-0.08-0.12	0.08-0.12-0.18	★ 100-160-220	-
	Mold Steel SKD/NAK etc	0.06-0.08-0.12	0.08-0.1-0.15	★ 80-140-180	-
	Stainless Steel SUS304 etc	0.06-0.08-0.12	0.08-0.1-0.15	★ 100-160-200	-
	Titanium Alloys Ti-6Al-4V	0.06-0.08-0.12	0.08-0.12-0.18	-	★ 30-50-70
GH	Carbon Steel S _{xx} C	0.06-0.1-0.2	0.08-0.2-0.3	★ 120-180-250	-
	Alloy Steel SCM etc	0.06-0.1-0.14	0.08-0.2-0.25	★ 100-160-220	-
	Mold Steel SKD/NAK etc	0.06-0.08-0.12	0.08-0.15-0.22	★ 80-140-180	-
	Stainless Steel SUS304 etc	0.06-0.08-0.12	0.08-0.12-0.15	☆ 100-150-200	-
	Gray Cast Iron FC	0.06-0.1-0.2	0.08-0.22-0.3	-	★ 120-180-250
	Nodular Cast Iron FCD	0.06-0.08-0.15	0.08-0.18-0.25	-	★ 100-150-200
	Titanium Alloys Ti-6Al-4V	0.06-0.08-0.12	0.08-0.15-0.2	-	★ 30-50-70



※Machining with coolant is recommended for titanium alloys. ★ : 1st recommendation ☆ : 2nd recommendation

Cutting Performance



<Cutting Condition>

•Vc=180m/min

•GM Chipbreaker

•Workpiece : S50C

•Overhang Length

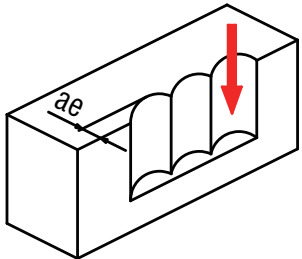
1.End mill: Overhang length is "L" on the dimension list

2.Face mill: Overhang length is "H" on the dimension list + minimum arbor overhang

■ Ramping, Helical Milling and Vertical Milling

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

Vertical Milling




Insert Description	Maximum Width of Cut (ae)
LOMU10 type	5mm
LOMU15 type	7mm

■ Case Studies

SS400

- Construction equipment part
- $V_c=250\text{m/min}$
- $ap \times ae=4 \times 20\text{mm}$
- $fz=0.14\text{mm/t}$ ($V_f=1,350\text{mm/min}$)
- Wet
- MEW32-S32-10-4T (4 inserts)
- LOMU100408ER-GM (PR1525)



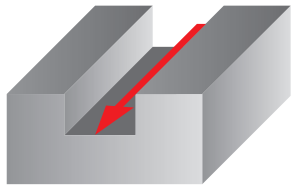
PR1525	Chip Removal Rate = 108cc/min
Competitor A <small>(Positive cutter)</small>	Chip Removal Rate = 72cc/min

MEW showed stable milling without chattering at higher feed rates, cutting efficiency improved by 150%. Prevents burring and achieves excellent surface finish.

(Evaluated by user)

SS400

- Machine part
- $V_c=250\text{m/min}$
- $ap \times ae=3 \times 20\text{mm}$ (Grooving)
- $fz=0.2\text{mm/t}$ ($V_f=2,390\text{mm/min}$)
- Dry
- MEW20-S20-10-3T (3 inserts)
- LOMU100408ER-GM (PR1525)



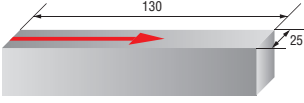
PR1525	Chip Removal Rate = 144cc/min (Stable milling)
Competitor B <small>(Positive cutter)</small>	Chip Removal Rate = 114cc/min (Unstable)

No chattering with MEW. Competitor B chattered when same cutting conditions were used. No burrs with MEW and excellent surface finish is obtained.

(Evaluated by user)

15-5PH(42HRC)

- Aircraft Part
- $V_c=180\text{m/min}$
- $ap \times ae=2 \times 25\text{mm}$
- $fz=0.1\text{mm/t}$ ($V_f=716\text{mm/min}$)
- Wet
- MEW32-S32-10-4T (4 inserts)
- LOMU150508ER-GM (PR1525)



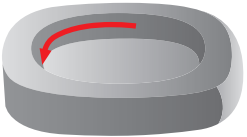
PR1525	Chip Removal Rate = 35.8cc/min (Further Milling Possible)
Competitor C <small>(Positive cutter)</small>	Chip Removal Rate = 26.8cc/min (Unable to continue cutting)

It is possible to eliminate chattering and achieve more stable milling with MEW. Good cutting form is maintained, wear and adhesion is minimal with PR1525 even when there is milling difficulty because of the properties of the material.

(Evaluated by user)

SKD61(45HRC)

- Mold Part
- $V_c=100\text{m/min}$
- $ap \times ae=3.5 \times 30\text{mm}$
- $fz=0.1\text{mm/t}$ ($V_f=400\text{mm/min}$)
- Dry
- MEW32-S32-10-4T (4 inserts)
- LOMU100408ER-GH (PR1525)



PR1525	Chip Removal Rate = 42cc/min (Further Milling Possible)
Competitor D <small>(Positive cutter)</small>	Chip Removal Rate = 21cc/min (Unable to continue cutting)

MEW doubled cutting efficiency. Furthermore, MEW inserts have double number of edges (4-edge), which drastically reduced cost.

(Evaluated by user)

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