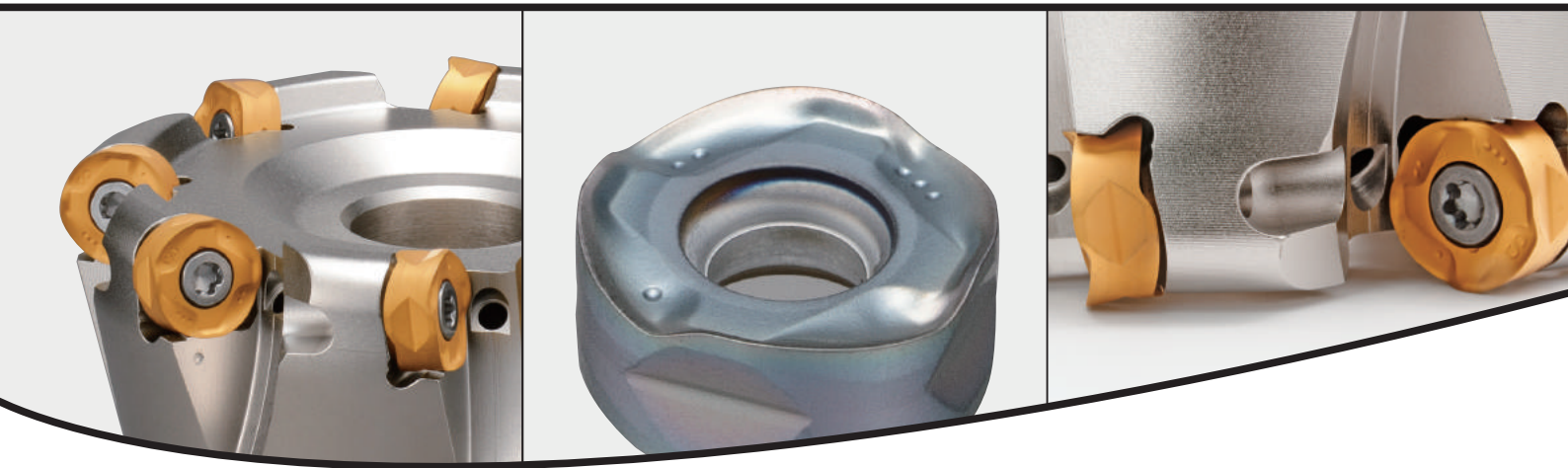


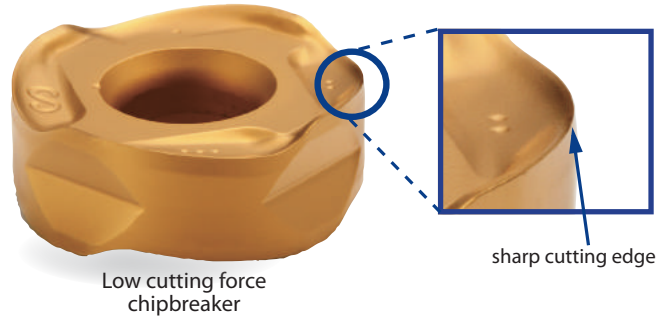
MRW Face Mill

High efficient cutter with double sided round insert



The MRW Radius Cutter lowers cutting costs

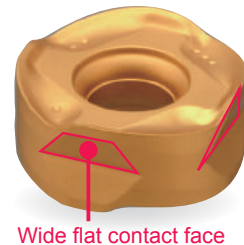
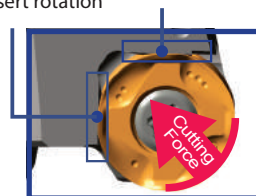
The new cutter lowers cutting costs and increases efficiency due to economical 8-edges per insert. Combining sharpness and cutting edge strength to this geometry makes it applicable to a wide variety of application by improving the milling performances. The double-sided inserts improve milling in a wide variety of materials.



Flat Lock Structure

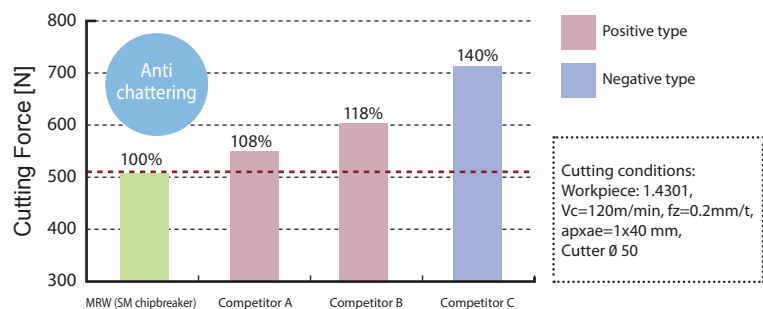
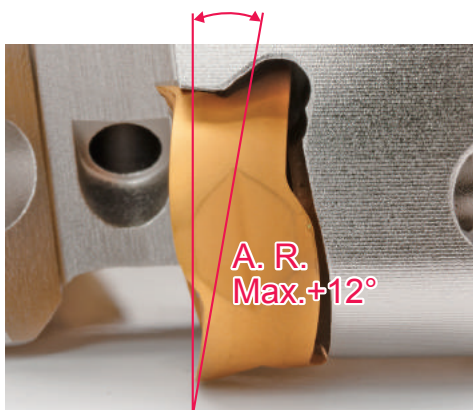
Holds the insert firmly and prevents rotation of the insert during machining and provides stable machining.

- Wide flat binding face
- Receives cutting forces evenly
 - Prevents insert rotation



Waved cutting edge design

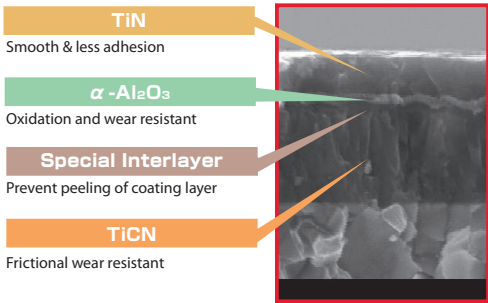
Maximum axial rake 12° lowers cutting forces equivalent to positive type inserts.



NEW

Wide range of applications from steel to difficult-to-cut materials

CA6535 for difficult-to-cut materials (CVD)
PR1535 for stainless steel (PVD)



High efficient machining of Ni-base heat resistant alloy and martensitic stainless steel can be done easily offering high heat resistance and wear resistance by CVD coating and improved stability due to the thin film coating technology.

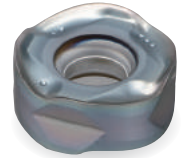


CA6535

Layer structure of MEGACOAT



For titanium alloy and precipitation hardened stainless steel. Stabilized milling operation and long tool life with MEGACOAT NANO coating technology.



PR1535

Longer tool life

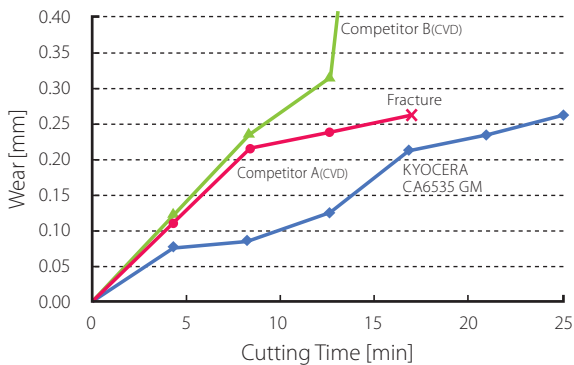
Longer tool life with a wide lineup including 4 grades and 3 chipbreakers! Available for steel, stainless steel, and heat resistant alloys

Workpiece		Insert Grade	Applicable Chipbreaker
P Carbon Steel / Alloy Steel / Die Steel		PR1525	GM/SM/GH Chipbreaker
K Gray Cast Iron / Nodular Cast Iron		PR1510	GH/GM Chipbreaker
S Ni-base Heat Resistant Alloy	M Martensitic Stainless Steel	CA6535	SM/GM Chipbreaker
S Titanium Alloy	M Austenitic Stainless Steel M Precipitation Hardened Stainless Steel	PR1535	SM/GM Chipbreaker

For Chipbreaker Selection and Recommended Cutting Conditions → P7

Comparison of tool life

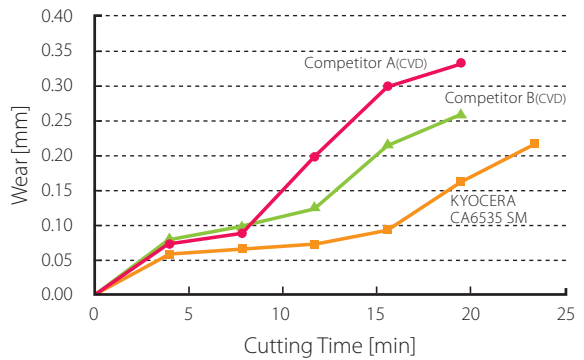
Ni-base Heat Resistant Alloy



Cutting Conditions: Vc=50m/min, ap=1.0mm, fz=0.15mm/t, WET

1st recommendation
GM chipbreaker

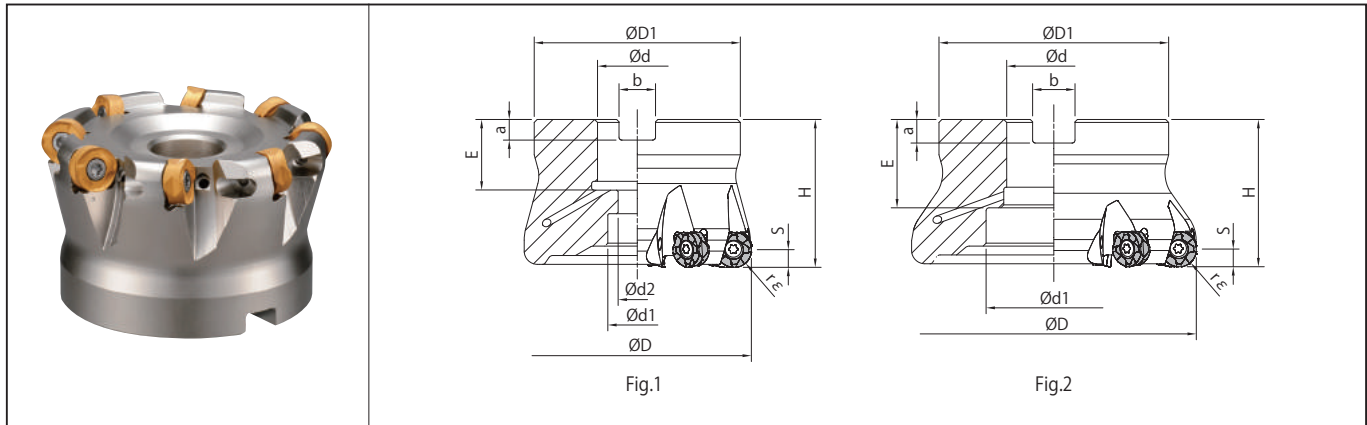
Martensitic Stainless Steel



Cutting Conditions: Vc=300m/min, ap=2.0mm, fz=0.2mm/t, WET

1st recommendation
SM chipbreaker

MRW Face Mill (with coolant hole)



Toolholder Dimension

Description	Standard	No. of Inserts	Dimension (mm)											Rake Angle (°)		Coolant Hole	Drawing	Weight(kg)	Max. Revolution (min ⁻¹)					
			rε	ØD	ØD1	Ød	Ød1	Ød2	H	E	a	b	S	A.R.	R.R.									
Metric	MRW 050R-12-5T-M	●	5	6	50	48	22	18	11	40	21	6.3	10.4	6.0	+12°	-15.5°	Yes	Fig.1	0.3	16,000				
	050R-12-6T-M	●	6																0.3					
	063R-12-6T-M	●	6		63	60	19	11	40	24	7	12.4	8.0	+11°	-16.5°	Fig.1			0.6		14,000			
	063R-12-7T-M	●	7																0.6					
	080R-12-6T-M	●	6		80	70	27	20	13	50	24	7	12.4	8.0	+11°	-16.5°			Fig.1		1.1	12,000		
	080R-12-8T-M	●	8																		1.1			
	100R-12-7T-M	●	7		100	78	32	46	-	50	30	8	14.4	8.0	+11°	-16.5°		Fig.2	1.5	10,600				
	100R-12-9T-M	●	9																1.4					
	MRW 063R-16-5T-M	●	5		8	63	60	22	19	11	40	21	6.3	10.4	8.0	+11°		-16.5°	Yes	Fig.1	0.5	12,800		
	063R-16-6T-M	●	6																		0.5			
	080R-16-6T-M	●	6			80	70	27	20	13	50	24	7	12.4	8.0	+11°		-16.5°			Fig.1		1.1	11,000
	080R-16-7T-M	●	7																				1.0	
	100R-16-6T-M	●	6			100	78	32	46	-	50	30	8	14.4	8.0	+11°		-16.5°		Fig.2	1.4	9,600		
	100R-16-8T-M	●	8																		1.3			
125R-16-8T-M	●	8	125	89		40	55	-	63	33	9	16.4	8.0	+11°	-16.5°	Fig.2	2.6	8,560						
125R-16-10T-M	●	10															2.5							
Inch	MRW 080R-12-6T	□	6	6		80	70	25.4	20	13	50	27	6	9.5	6.0	+12°	-15.5°	Yes		Fig.1	1.2	12,000		
	080R-12-8T	□	8																		1.1			
	100R-12-7T	□	7		100	78	31.75	46	-	50	34	8	12.7	8.0	+11°	-16.5°	Fig.2		1.5	10,600				
	100R-12-9T	□	9																1.4					
	MRW 080R-16-6T	□	6	8	80	70	25.4	20	13	50	27	6	9.5	8.0	+11°	-16.5°	Yes		Fig.1	1.1	11,000			
	080R-16-7T	□	7																	1.1				
	100R-16-6T	□	6		100	78	31.75	46	-	50	34	8	12.7	8.0	+11°	-16.5°			Fig.2	1.4	9,600			
	100R-16-8T	□	8																	1.4				
	125R-16-8T	□	8		125	89	38.1	55	-	63	38	10	15.9	8.0	+11°	-16.5°			Fig.2	2.6	8,560			
	125R-16-10T	□	10																	2.6				

●: Standard Item

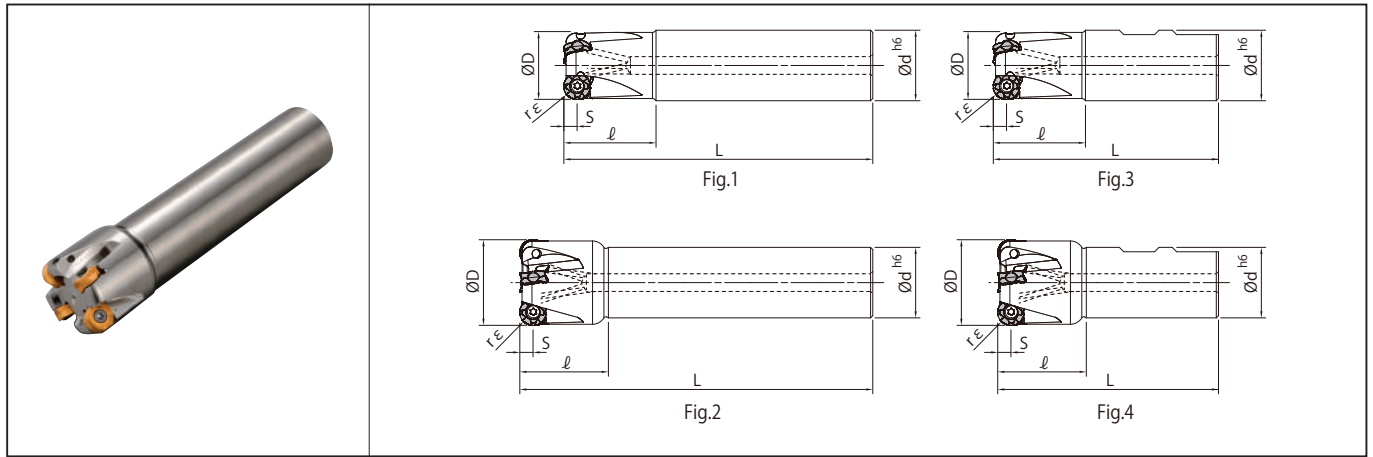
Spare Parts and Applicable Inserts

Description	Clamp Screw	Wrench		Anti-seize Compound	Mounting Bolt	Applicable Inserts
		DTPM-15	TTP-20			
MRW 050R-12... 063R-12... 080R-12... 100R-12...	SB-4085TRP	DTPM-15		MP-1	HH10x30	ROMU12...
	Recommended Torque for Insert Clamp 3.5Nm				HH12x35	
					-	
MRW 063R-16... 080R-16... 100R-16... 125R-16...	SB-50140TRP	TTP-20		MP-1	HH10x30	ROMU16...
	Recommended Torque for Insert Clamp 4.5Nm				HH12x35	
					-	

- Caution with Max. Revolution
When running an endmill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.
- Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed.
- S is Maximum ap. For more details, see page 7.

Recommended Cutting Conditions → P7

MRW End Mill (with coolant hole)



Toolholder Dimension

Description		Standard	No. of Inserts	Dimension (mm)						Rake Angle (°)		Coolant Hole	Drawing	Max. Revolution (min ⁻¹)
				rε	ØD	Ød	L	ℓ	S	A.R. (MAX)	R.R.			
Standard (Cylindrical)	MRW 32-S32-12-3T	●	3	6	32	32	140	40	6.0	+12°	-20°	Yes	Fig.1	22,000
	40-S32-12-4T	●	4		40	160	40	Fig.2			-16.5°			18,800
	50-S42-12-5T	●	5		50	170	40				-15.5°		16,000	
	MRW 40-S32-16-3T	●	3	8	40	32	160	40	8.0	+11°	-18°	Yes	Fig.2	17,200
	50-S42-16-4T	●	4		50	170	40	-16.5°			14,800			
	63-S42-16-5T	●	5		63	170	50	-16.5°			12,800			
Long Shank (Cylindrical)	MRW 32-S32-12-2T-200	●	2	6	32	32	200	40	6.0	+12°	-20°	Yes	Fig.1	22,000
	40-S32-12-3T-200	●	3		40	200	40	-16.5°			18,800			
	50-S42-12-4T-300	●	4		50	300	40	-15.5°			16,000			
	MRW 40-S32-16-2T-200	●	2	8	40	32	200	40	8.0	+11°	-18°	Yes	Fig.2	17,200
	50-S42-16-3T-300	●	3		50	300	40	-16.5°			14,800			
	63-S42-16-4T-300	●	4		63	300	50	-16.5°			12,800			
Standard (Weldon)	MRW 32-W32-12-3T	●	3	6	32	32	102	40	6.0	+12°	-20°	Yes	Fig.3	22,000
	40-W32-12-4T	●	4		40	100	40	-16.5°			18,800			
	50-W40-12-5T	●	5		50	110	40	-15.5°			16,000			
	MRW 40-W32-16-3T	●	3	8	40	32	100	40	8.0	+11°	-18°	Yes	Fig.4	17,200
	50-W40-16-4T	●	4		50	110	40	-16.5°			14,800			
	63-W40-16-5T	●	5		63	120	50	-16.5°			12,800			

● : Standard Item

Spare Parts and Applicable Inserts

Description	Clamp Screw	Wrench		Anti-seize Compound	Applicable Inserts
		DTPM-15 	TTP-20 	MP-1 	
MRW □□□-12...	SB-4085TRP	DTPM-15		MP-1	ROMU12...
	Recommended Torque for Insert Clamp 3.5Nm				
MRW □□□-16...	SB-50140TRP	TTP-20		MP-1	ROMU16...
	Recommended Torque for Insert Clamp 4.5Nm				

- Caution with Max. Revolution
When running an endmill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.
- Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed.
- S is Maximum ap. For more details, see page 7.

Recommended Cutting Conditions → P7

Recommended Cutting Conditions

Workpiece Material	Recommended Chipbreaker (fz mm/t) Recommended feed rate (standard value) for ROMU12: ap=3mm, ROMU16: ap=4mm			Recommended Insert Grade(Vc m/min)			
	GM	SM	GH	MEGACOAT NANO			CVD coated carbide
				PR1525	PR1510	PR1535	CA6535
Carbon Steel	★ 0.1~0.2~0.3	☆ 0.06~0.15~0.2	☆ 0.15~0.3~0.35	★ 120~180~250	-	-	-
Alloy Steel	★ 0.1~0.2~0.3	☆ 0.06~0.15~0.2	☆ 0.15~0.3~0.35	★ 100~160~220	-	-	-
Die Steel	★ 0.1~0.15~0.25	☆ 0.06~0.12~0.2	☆ 0.15~0.2~0.3	★ 80~140~180	-	-	-
Austenitic Stainless Steel	☆ 0.1~0.15~0.2	★ 0.06~0.12~0.2	-	☆ 100~160~200	-	★ 100~160~200	-
Martensitic Stainless Steel	★ 0.1~0.15~0.2	★ 0.06~0.12~0.2	-	-	-	☆ 150~200~250	★ 180~240~300
Precipitation Hardened Stainless Steel	★ 0.1~0.15~0.2	☆ 0.06~0.12~0.2	-	-	-	★ 90~120~150	-
Gray Cast Iron	★ 0.1~0.2~0.3	-	☆ 0.15~0.3~0.35	-	★ 120~180~250	-	-
Nodular Cast Iron	★ 0.1~0.15~0.25	-	☆ 0.15~0.2~0.3	-	★ 100~150~200	-	-
Ni-base Heat Resistant Alloy	★ 0.1~0.12~0.15	☆ 0.06~0.1~0.15	-	-	-	☆ 20~30~50	★ 20~30~50
Titanium Alloy	☆ 0.1~0.12~0.15	★ 0.06~0.1~0.15	-	-	☆ 30~50~70	★ 40~60~80	-

★: 1st recommendation ☆: 2nd recommendation

* Machining with coolant is recommended for Ni-base Heat Resistant Alloy and Titanium Alloy.

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

* Recommended feed rate is the reference value when ap is $r_e/2$ (3mm for ROMU12, 4mm for ROMU16).

For lower feed rates than the above conditions, the conversion factor in the following table is recommended.

Conversion factor for feed per tooth by depth of cut (ap)

Insert	ap (recommended)	ap (max)	Conversion factor for feed per tooth				
			ap=0.5mm	ap=1mm	ap=2mm	ap=3mm	ap=4mm
ROMU12 type	3mm or less	6mm	2.1	1.5	1.1	1.0 (Standard)	-
ROMU16 type	4mm or less	8mm	2.4	1.7	1.3	1.1	1.0 (Standard)

• Example (ROMU12 type, Carbon Steel, GM chipbreaker, ap=1mm)

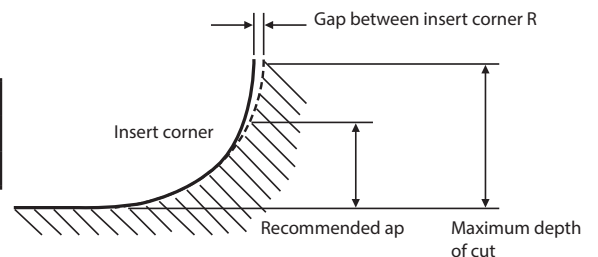
Recommended feed/tooth: 0.2mm/t (standard value for Carbon Steel / GM chipbreaker) x 1.5 (Conversion factor for ROMU12 / ap=1mm)=0.3mm/t

* Recommended ap: 3mm or less for ROMU12, 4mm or less for ROMU16

Corner R shape during processing

Corner R shape during processing with MRW (see Fig.)

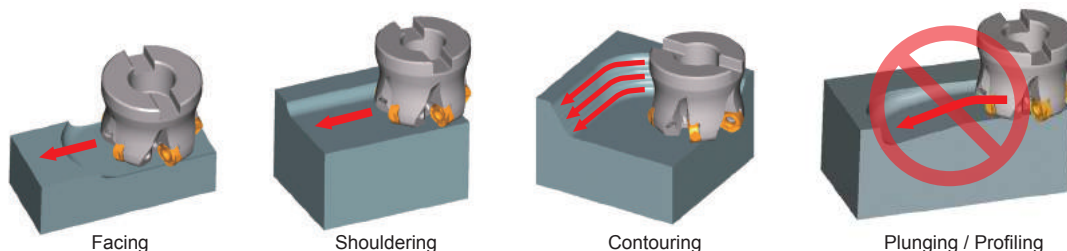
Insert	ap (max)	X	Y
ROMU12 type	6mm	3mm	0.1mm
ROMU16 type	8mm	4mm	0.1mm



* When machining with larger ap than recommended ap (X), there is a gap (Y) between the workpiece corner and insert corner R (r_e).

* The above figure is an estimation. There is a ± 0.2 mm variation depending on the cutting conditions.

Application



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