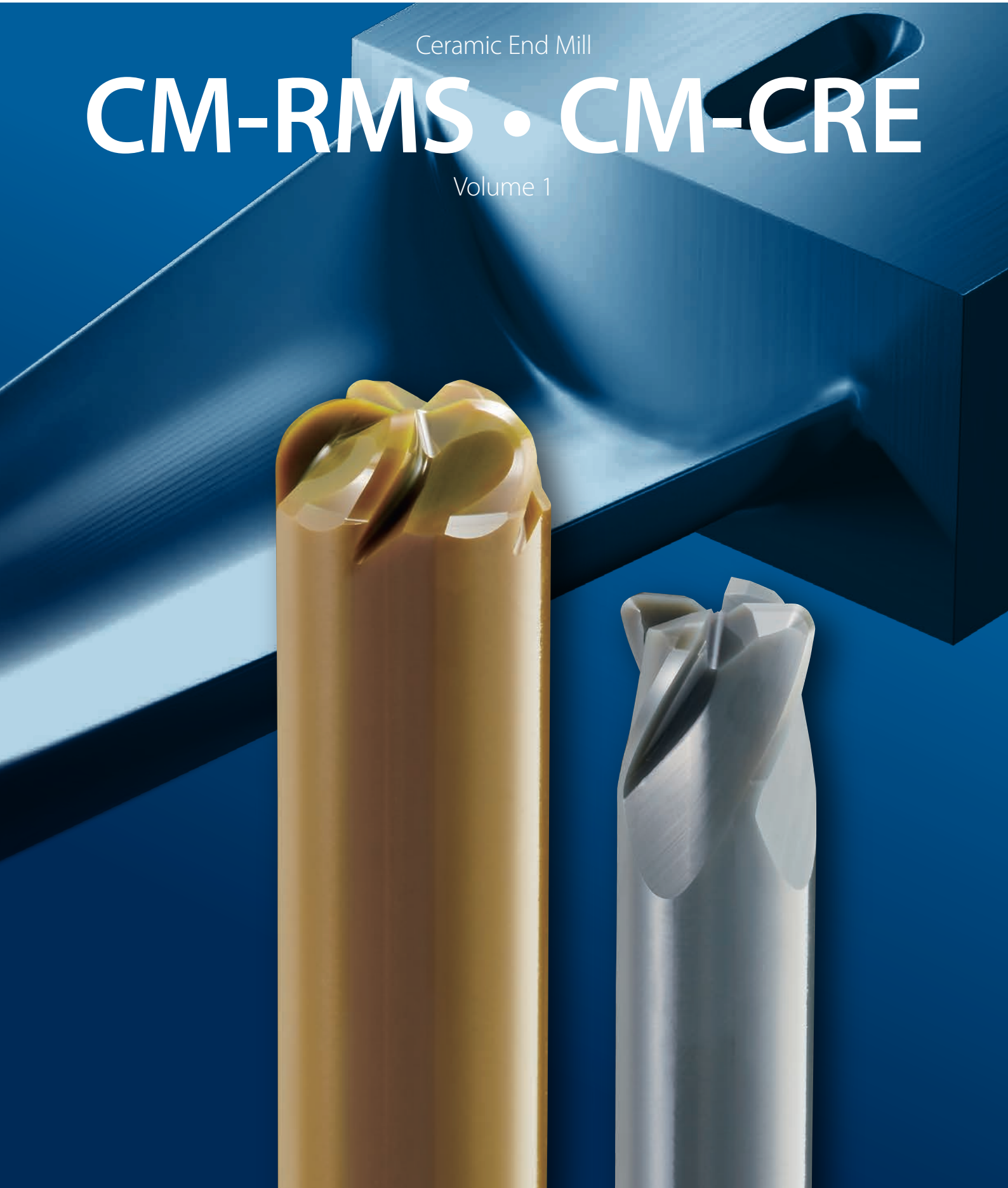
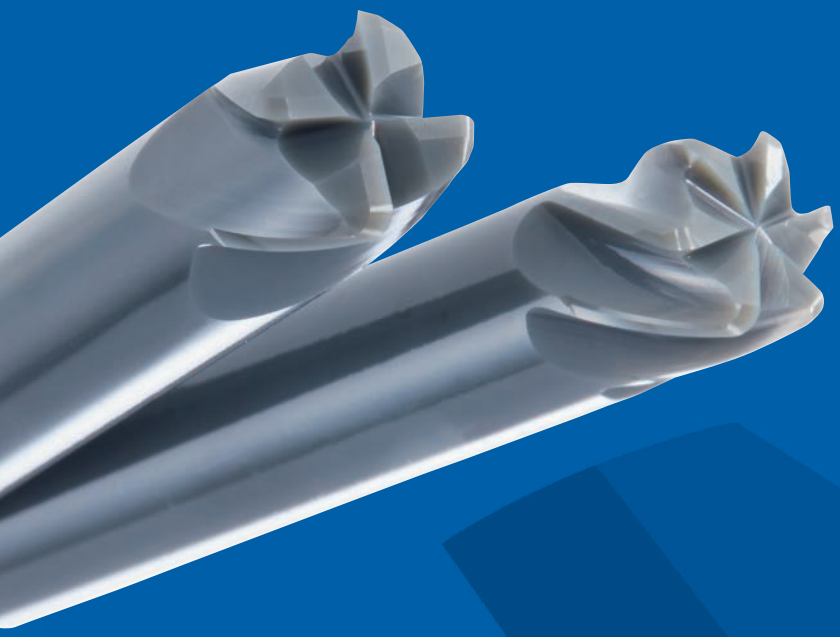
Ceramic End Mill

CM-RMS • CM-CRE

Volume 1



KEY FEATURES: CM SERIES



CM-RMS

Peripheral cutting edge type

- **Optimal flute geometry**

  Enables smooth chip evacuation

- **Variety of lineup**

  4 or 6 cutting edges

- **Negative cutter form**

  Increases cutting edge rigidity

Optimal ceramic grade selected for high-speed machining at high temperatures, with roughing efficiency surpassing carbide end mills.

CM-CRE

End cutting edge type

- **Suitable for 3D machining**

  Not only excels in flat surface milling, but also in the machining of blades

- **Large-diameter specification**

  Reduces risk of breakage during machining
  Achieves optimum cutting speed without being restricted by the capability of the machining center

- **Regrindable**

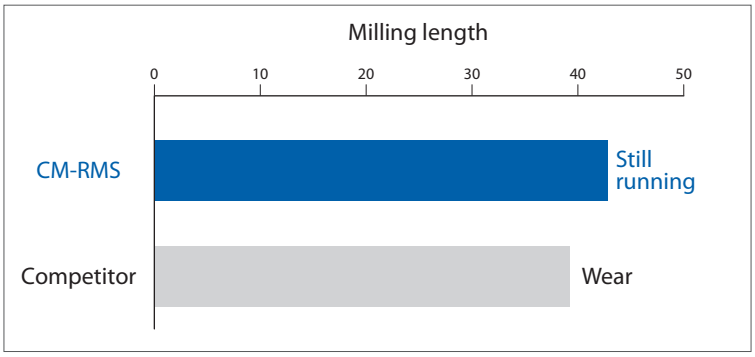
  Can be regrinded by cutting away the used portion

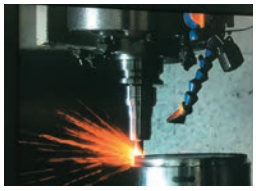
CUTTING DATA

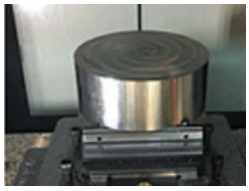
4-flute peripheral cutting edge type

Continuous use is possible with low level of cutting chip welding

Tool	CM-RMS	Competitor
Size	Ø 12 X R1,5 X 4 flute	4 flute
Work Material	Inconel 718 (45 HRC)	
Cutting Speed	500 m/min (13,260 min^{-1})	
Feed Rate	3,182 mm/min (0,06 mm/t)	
Milling Method	Milling spirally inward from the outer periphery	
Depth of Cut	ap=7,2 mm ae=1,2 mm	
Coolant	Air blow	
Machine	Vertical Machining Center	







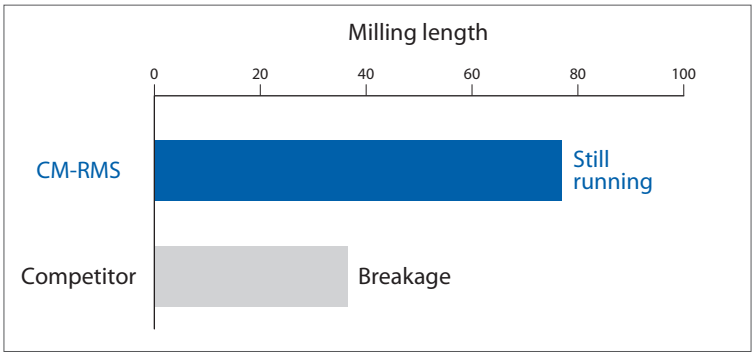
φ153 × 100

Cutter path

6-flute peripheral cutting edge type

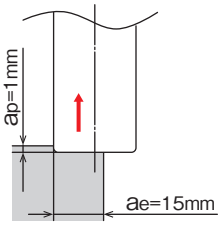
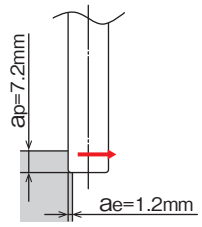
Stable machining free of breakage

Tool	CM-RMS	Competitor
Size	Ø 12 X R1,5 X 6 flute	6 flute
Work Material	Inconel 718 (45 HRC)	
Cutting Speed	500 m/min (13,260 min^{-1})	
Feed Rate	4,774 mm/min (0,06 mm/t)	
Milling Method	Milling spirally inward from the outer periphery	
Depth of Cut	ap=7,2 mm ae=1,2 mm	
Coolant	Air blow	
Machine	Vertical Machining Center	



Long Tool Life of UVX-TI-5FL

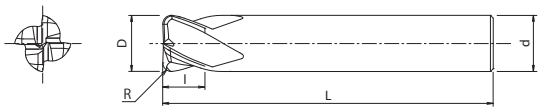
Tool	CM-CRE	Competitor
Size	7 flute	4 flute
Work Material	Inconel 718 (45 HRC)	
Cutting Speed	600 m/min (7,600 min^{-1})	500 m/min (13,260 min^{-1})
Feed Rate	2,660 mm/min (0,05 mm/t)	3,182 mm/min (0,06 mm/t)
Milling Method	Milling spirally inward from the outer periphery	
Chip removal volume	39,9 cc/min	27,5 cc/min
Coolant	Air blow	
Machine	Vertical Machining Center	

CM-CRE φ25×R4		Stable machining up to 16mm in depth
Competitor φ12×R1.5		Machining up to 14.4 mm in depth

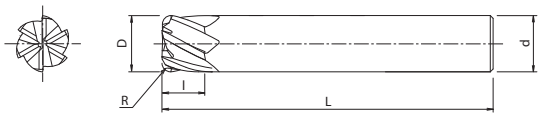
CM-RMS

Milling | Ceramic

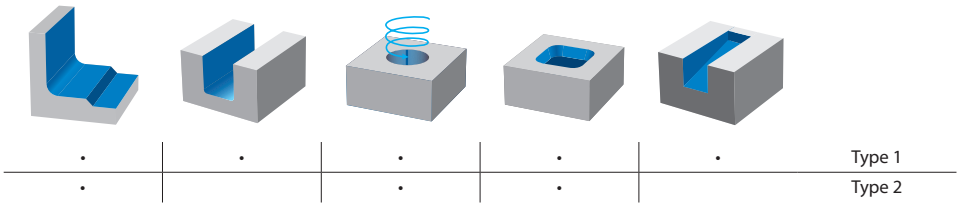
Type 1



Type 2



- Optimum flute geometry
- Ceramic end mill, peripheral cutting edge type
- Negative cutter form
- 4 or 6 flute specification based on your application needs



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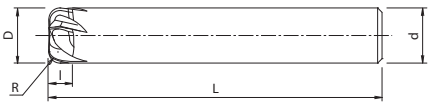
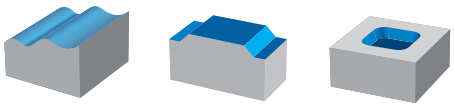
EDP	Z	D	R	L	l	d	Type	Price
8557100	4	6	0,75	60	4,5	6	1	
8557110	4	8	1	60	6	8	1	
8557120	4	10	1,25	65	7,5	10	1	
8557130	4	12	1,5	70	9	12	1	
8557200	6	6	0,75	60	4,5	6	2	
8557210	6	8	1	60	6	8	2	
8557220	6	10	1,25	65	7,5	10	2	
8557230	6	12	1,5	70	9	12	2	

CM-CRE

Milling | Ceramic



- Suitable for 3D machining
- Ceramic end mill, end cutting edge type
- Large-diameter specification
- Regrindable



CERAMIC | ± 0.03 | 0~-0.05 | h6

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EDP	Z	D	R	L	l	d	Price
8557016	5	16	4	120	5	16	
8557020	6	20	4	120	5	20	
8557025	7	25	4	120	5	25	

CUTTING CONDITIONS

CM-RMS

Peripheral cutting edge type

4 flute type

	Heat resistant alloys Inconel 718						
	Side milling				Slotting		
Ø	Cutting Speed (m/min)	Feed per tooth (mm/t)	Depth of cut (mm)		Cutting Speed (m/min)	Feed per tooth (mm/t)	Depth of cut (mm)
			ap	ae			ap
6	400-800	0,02-0,04	≤4,5 (0,75D)	≤0,6 (0,1D)	400-800	0,02-0,04	≤1,2 (0,2D)
8	400-800	0,02-0,04	≤6,0 (0,75D)	≤0,8 (0,1D)	400-800	0,02-0,04	≤1,6 (0,2D)
10	400-800	0,02-0,07	≤7,5 (0,75D)	≤1,0 (0,1D)	400-800	0,02-0,07	≤2,0 (0,2D)
12	400-800	0,02-0,07	≤9,0 (0,75D)	≤1,2 (0,1D)	400-800	0,02-0,07	≤2,4 (0,2D)

6 flute type

	Heat resistant alloys Inconel 718			
	Side milling			
Ø	Cutting Speed (m/min)	Feed per tooth (mm/t)	Depth of cut (mm)	
			ap	ae
6	400-800	0,02-0,04	≤4,5 (0,75D)	≤0,6 (0,1D)
8	400-800	0,02-0,04	≤6,0 (0,75D)	≤0,8 (0,1D)
10	400-800	0,02-0,07	≤7,5 (0,75D)	≤1,0 (0,1D)
12	400-800	0,02-0,07	≤9,5 (0,75D)	≤1,2 (0,1D)

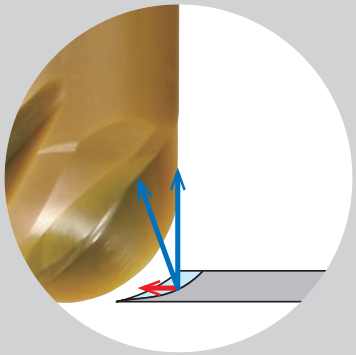
CM-CRE

End cutting edge type

Specify a draft (at least 3°) in the milling program to avoid neck interferences

	Heat resistant alloys Inconel 718			
	Side milling			
Ø	Cutting Speed (m/min)	Feed per tooth (mm/t)	Depth of cut (mm)	
			ap	ae
16	400-800	0,03-0,05	1	≤9,6 (0,6D)
20	400-800	0,04-0,06	1	≤12,0 (0,6D)
25	400-800	0,05-0,08	1	≤15,0 (0,6D)

Highly resistance against sporadic breakage



When cutting in flat surfaces, the cutting resistance is low in the radial direction due to the small cutting edge angle, thereby minimizes vibration and sporadic breakage.

CUTTING CONDITIONS

Caution

Heat-resistant alloys such as Inconel 718 have a tendency to soften when temperature exceeds 700°C enabling easier machining. Ceramic end mills are ideal for these materials as they excel under high temperatures and can generate the heat required to soften the machined materials.

⚠ Use of air blow recommended.
Use air blow to cool the holder and remove chips. Cooling the holder helps maintain holder accuracy. Use a heat-resistant holder.

⚠ Continuous machining recommended.
Intermittent machining is likely to cause chipping, resulting in shorter tool life.
Reduce the feed by 50% or more at the entry (chamfer) in the initial cutting stage. Then, raise the feed gradually.
Excessively high cutting speeds raise the temperature of the workpiece and may melt it. To avoid this, lower the cutting speed.

⚠ After a cutting cycle, use the cutting edges as they are, without removing any fused deposits on them.
Forcibly removing fused deposits can result in cutting edge chipping and shortened tool life.
Fused deposits may be found on the flute end and back of the cutting edge. Remove them when necessary.

⚠ Use fully covered machines.
During machining, high temperature cutting chips may scatter, which can create fire hazards and potential injury to the operator.
Ensure that the workpiece area is clear of any inflammable objects.

⚠ High temperatures produced during machining can form altered layers on workpiece surfaces.
When making path settings, ensure that a machining allowance for removing the altered layers is taken into account.

⚠ When using CM-CRE to perform vertical wall or pocket milling, always specify a draft (at least 3°).
Neck interference may occur, resulting in tool breakage.

shaping your dreams

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