



SUMITOMO

CARBIDE - CBN - DIAMOND

Radius Endmills for Exotic Alloys

EPMS - High Efficiency Endmill Type



EPMS Type

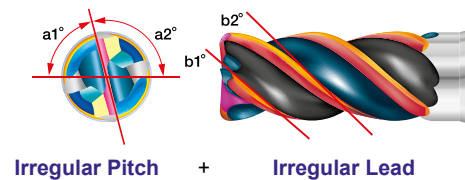
■ Features



- Solid endmill EPMS-Series (European Performance Mill) for high-performance milling applications
- Higher efficiency and tool life due to new technology of latest developed carbide substrate and coating combined with the new optimized tool design
- Available with 4/5/6 and 9 flutes, different diameters and edge radii
- Excellent performance in machining of exotic alloys like Ti-alloys, super alloys and heat resistant steels
- Suitable for Titanium structure parts for airplane
- Anti-vibration design for reliable and efficient machining in a wide application range

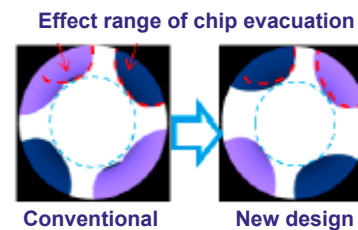
Anti-Vibration design

Reduce the vibration dramatically, especially for poor clamping and thin wall work geometry, increase the parts accuracy and parts surface quality for customers.



Optimized flute geometry

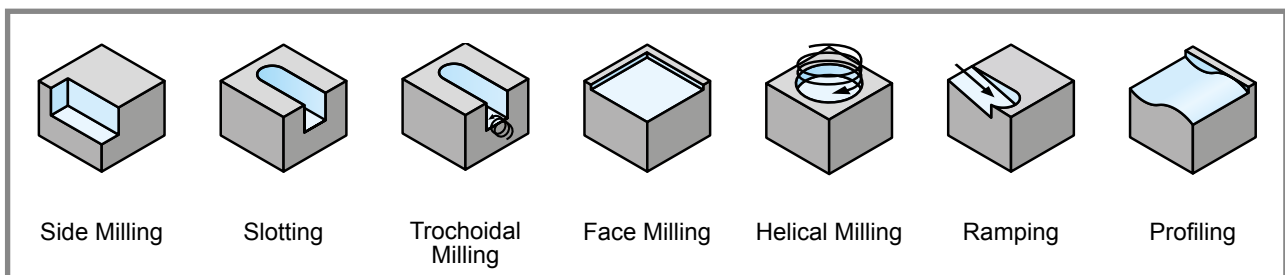
Smooth chip evacuation and high rigidity are realized to ensure stable and efficient milling process.



■ Comparison with other Milling Cutters

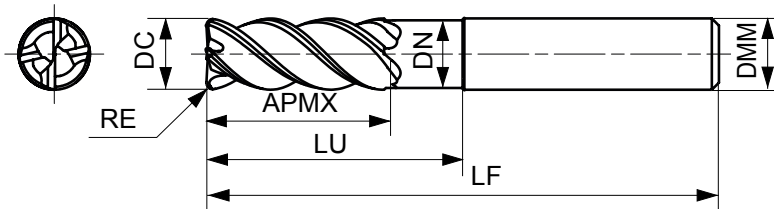
Description	Coating	Diameter	Peripheral Rake	Peripheral Relief	Helix Angle	Core Diameter	No. Edge	Radius Tolerance
GSXVL4000-R	GSX (TiAlCrN)	1–25	3–5	16	40/43	0,6D	4	-0,01/0,01
SSEHVL4000-R	GS Hard (TiAlCrSiCN)	4,5–25	5–7	17	42/45	0,65D	4	-0,01/0,01
EPMS4000-R	TiAlSiN	10–26	5–7	14	42/45	0,7D	4	-0,01/0,01

■ Suitable Applications



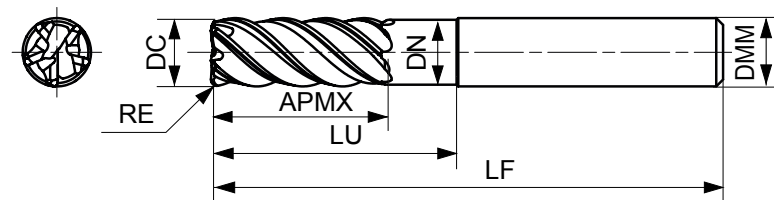
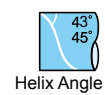
■ Body

EPMS 4000 Type (Shank DIN 6535 HA)



	Cat. No.	Stock	DC	RE	APMX	LU	DN	LF	DMM
EPMS	4100U2.5R10	▲	10	1,0	25	32	9,5	72	10
	4100U2.5R30	▲	10	3,0	25	32	9,5	72	10
EPMS	4120U2.5R10	▲	12	1,0	30	38	11,5	83	12
	4120U2.5R30	▲	12	3,0	30	38	11,5	83	12
	4120U2.5R40	▲	12	4,0	30	38	11,5	83	12
EPMS	4160U2.5R30	▲	16	3,0	40	50	15,5	100	16
	4160U2.5R40	▲	16	4,0	40	50	15,5	100	16

EPMS 5000 Type (Shank DIN 6535 HA)



	Cat. No.	Stock	DC	RE	APMX	LU	DN	LF	DMM
EPMS	5100U2.5R025	▲	10	0,25	25	32	9,5	72	10
	5100U2.5R15	▲	10	1,5	25	32	9,5	72	10
	5100U2.5R25	▲	10	2,5	25	32	9,5	72	10
EPMS	5120U2.5R025	▲	12	0,25	30	38	11,5	83	12
	5120U2.5R05	▲	12	0,5	30	38	11,5	83	12
	5120U2.5R15	▲	12	1,5	30	38	11,5	83	12
	5120U2.5R20	▲	12	2,0	30	38	11,5	83	12
	5120U2.5R25	▲	12	2,5	30	38	11,5	83	12
EPMS	5160U2.5R30	▲	16	3,0	40	50	15,5	100	16
	5160U2.5R40	▲	16	4,0	40	50	15,5	100	16
EPMS	5200U2.5R30	▲	20	3,0	50	62	19,5	125	20
	5200U2.5R40	▲	20	4,0	50	62	19,5	125	20

Grade: ECS300

▲ To be replaced by a new product (please confirm stock availability)

EPMS Type

■ Body

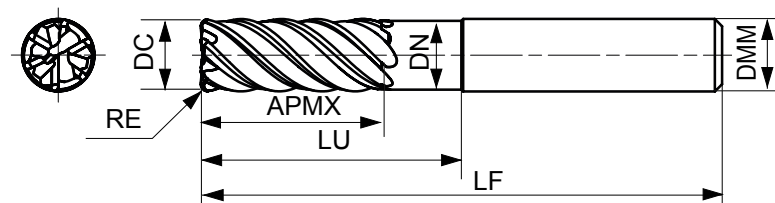
EPMS 6000 Type (Shank DIN 6535 HA)



Flutes



Helix Angle



Cat. No.	Stock	DC	RE	APMX	LU	DN	LF	DMM
EPMS 6100U2.5R10	▲	10	1,0	25	32	9,5	72	10
6100U2.5R30	▲	10	3,0	25	32	9,5	72	10
EPMS 6120U2.5R10	▲	12	1,0	30	38	11,5	83	12
6120U2.5R30	▲	12	3,0	30	38	11,5	83	12
6120U2.5R40	▲	12	4,0	30	38	11,5	83	12
EPMS 6160U2.5R15	▲	16	1,5	40	50	15,5	100	16
6160U2.5R30	▲	16	3,0	40	50	15,5	100	16
6160U2.5R40	▲	16	4,0	40	50	15,5	100	16
EPMS 6200U2.5R30	▲	20	3,0	50	62	19,5	125	20
6200U2.5R40	▲	20	4,0	50	62	19,5	125	20

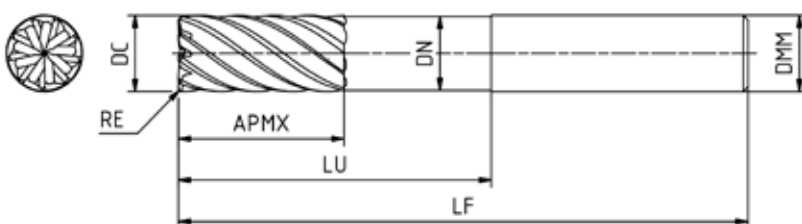
EPMS 9000 Type U (Shank DIN 6535 HA)



Flutes



Helix Angle

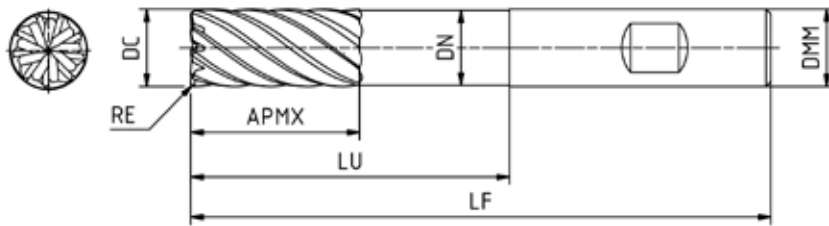


Cat. No.	Stock	DC	RE	APMX	LU	DN	LF	DMM
EPMS 9120U2.5R05	▲	12	0,5	30	38	11,5	83	12
9120U2.5R10	▲	12	1,0	30	38	11,5	83	12
EPMS 9160U2.2R10	▲	16	1,0	35	66	15,5	120	16
9160U2.2R20	▲	16	2,0	35	66	15,5	120	16
9160U2.2R30	▲	16	3,0	35	66	15,5	120	16

Grade: ECS300 ▲ To be replaced by a new product (please confirm stock availability)

■ Body

EPMS 9000 Type U (Shank DIN 6535 HB WELDON)



Flutes

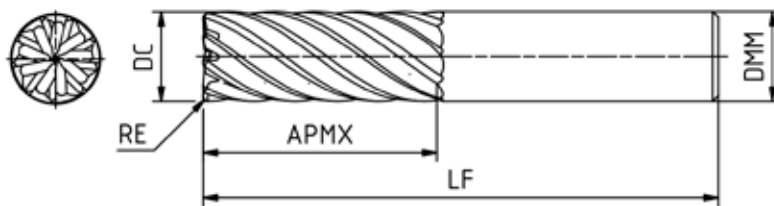


Helix Angle



Cat. No.	Stock	DC	RE	APMX	LU	DN	LF	DMM
EPMS 9120U2.5WR05	▲	12	0,5	30	38	11,5	83	12
9120U2.5WR10	▲	12	1,0	30	38	11,5	83	12
EPMS 9160U2.2WR10	▲	16	1,0	35	66	15,5	120	16
9160U2.2WR20	▲	16	2,0	35	66	15,5	120	16
9160U2.2WR30	▲	16	3,0	35	66	15,5	120	16

EPMS 9000 Type S (Shank DIN 6535 HA)



Flutes

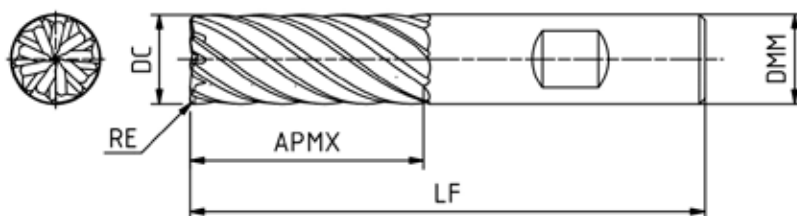


Helix Angle



Cat. No.	Stock	DC	RE	APMX	LU	DN	LF	DMM
EPMS 9160S2.6R10	▲	16	1,0	42	-	-	92	16
9160S2.6R20	▲	16	2,0	42	-	-	92	16
9160S2.6R30	▲	16	3,0	42	-	-	92	16
EPMS 9160S4.0R10	▲	16	1,0	66	-	-	120	16

EPMS 9000 Type S (Shank DIN 6535 HB WELDON)



Flutes



Helix Angle



Cat. No.	Stock	DC	RE	APMX	LU	DN	LF	DMM
EPMS 9160S2.6WR10	▲	16	1,0	42	-	-	92	16
9160S2.6WR20	▲	16	2,0	42	-	-	92	16
9160S2.6WR30	▲	16	3,0	42	-	-	92	16
EPMS 9160S4.0WR10	▲	16	1,0	66	-	-	120	16

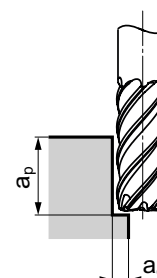
EPMS Type

Cutting Conditions

Side Milling

Work Material	Titanium Alloy, Stainless Steel				
Cond.	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)			
DC (mm)		EPMS4000	EPMS5000	EPMS6000	EPMS9000
10,0	3.200	1.280	1.920	3.840	4.320
12,0	2.700	1.080	1.620	3.240	3.645
16,0	2.000	800	1.200	2.400	2.700
20,0	1.600	640	960	1.920	2.160
ae (mm), Standard –Max.		0,2–0,4 DC	0,1–0,3 DC	0,06–0,1 DC	0,05–0,1 DC
ap (mm), Standard –Max.		2,0–2,5 DC			

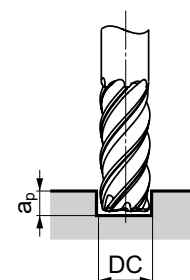
Work Material	Heat-resistant Alloy				
Cond.	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)			
DC (mm)		EPMS4000	EPMS5000	EPMS6000	EPMS9000
10,0	1.600	384	640	960	1.296
12,0	1.300	312	520	780	1.053
16,0	1.000	240	400	600	810
20,0	800	192	320	480	648
ae (mm), Standard –Max.		0,2–0,4 DC	0,1–0,3 DC	0,06–0,1 DC	0,05–0,1 DC
ap (mm), Standard –Max.		2,0–2,5 DC			



Slotting

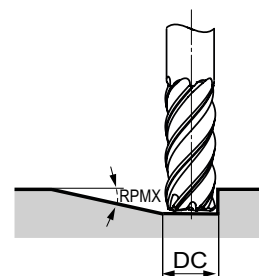
Work Material	Titanium Alloy, Stainless Steel				
Cond.	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)			
DC (mm)		EPMS4000	EPMS5000	EPMS6000	EPMS9000
10,0	1.900	460	570	Not recommended	Not recommended
12,0	1.600	380	480		
16,0	1.200	290	360		
20,0	960	230	290		
ap (mm), Standard –Max.		1,0–1,5 DC	0,5–1,0 DC		

Work Material	Heat-resistant Alloy				
Cond.	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)			
DC (mm)		EPMS4000	EPMS5000	EPMS6000	EPMS9000
10,0	960	230	290	Not recommended	Not recommended
12,0	800	190	240		
16,0	600	140	180		
20,0	480	120	140		
ap (mm), Standard –Max.		0,3–0,5 DC	0,2–0,4 DC		

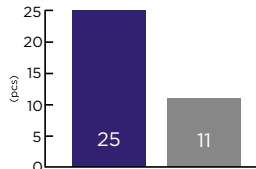
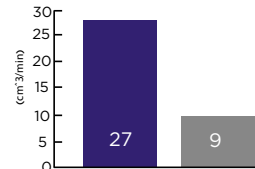


Ramping / Helical Milling

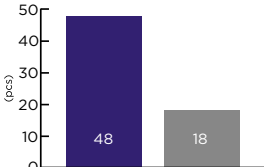
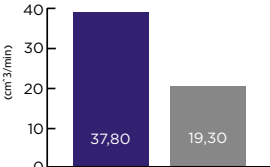
Body Type	EPMS4000	EPMS5000	EPMS6000	EPMS9000
RPMX, Standard –Max.	2,0°–3,0°	2,0°–3,0°	0,5°–2,0°	0,5°–2,0°



Application Examples

Work Piece	Recess Plate	Parameter	Sumitomo	Competitor
Material description	125 Titanium	Cutter Description	EPMS5120U2.5R025	(4 Teeth)
Material Group	–	Approach Angle	–	–
Customer Target	–	Tool Diameter	12	12
		Number of Teeth	5	4
		Insert Geometry	–	–
		Insert Size	–	–
		Chip Breaker	–	–
		Substrate	ECS300	CARBIDE
		RPM $n = [\text{min}^{-1}]$	3184	1000
		Cutting Speed $V_c = [\text{m/min}]$	120	38
		Feed Rate (max) $f_z = [\text{mm/teeth}]$	0,17	0,05
		Feed (average) $v_f = [\text{mm/min}]$	2706	200
		Depth of Cut (max) $a_p = [\text{mm}]$	10,00	10,00
		Width of Cut (max) $a_e = [\text{mm}]$	1,00	4,50
		Chip Volume Rate $Q = [\text{cm}^3/\text{min}]$	27,10	9,00
		Output Pc/Edge [psc]	25,00	11,00
		Tool Life $th = [\text{min}]$	1692,14	2236,30
127% More Tool Life	Output Pc/Edge 		Chip Volume Rate 	

● Sumitomo ● competitor

Work Piece	End Plates	Parameter	Sumitomo	Competitor						
Material description	1.4112	Cutter Description	EPMS 4000	(4 Teeth)						
Material Group	ISO P / Martensitic Steel	Approach Angle	90	90						
Customer Target	Increased tool life	Tool Diameter	10	10						
		Number of Teeth	4	4						
		Insert Geometry	–	–						
		Insert Size	–	–						
		Chip Breaker	–	–						
		Substrate	ECS300	CARBIDE						
		RPM $n = [\text{min}^{-1}]$	2865	2400						
		Cutting Speed $V_c = [\text{m/min}]$	90	76						
		Feed Rate (max) $f_z = [\text{mm/teeth}]$	0,07	0,05						
		Feed (average) $v_f = [\text{mm/min}]$	688	500						
		Depth of Cut (max) $a_p = [\text{mm}]$	22,00	22,00						
		Width of Cut (max) $a_e = [\text{mm}]$	2,50	2,50						
		Chip Volume Rate $Q = [\text{cm}^3/\text{min}]$	37,80	19,30						
		Output Pc/Edge [psc]	48,00	18,00						
		Tool Life $th = [\text{min}]$	230,23	237,60						
167% More Tool Life		Output Pc/Edge  <table><tr><th>Tool</th><th>Output Pc/Edge [psc]</th></tr><tr><td>Sumitomo</td><td>48</td></tr><tr><td>Competitor</td><td>18</td></tr></table>			Tool	Output Pc/Edge [psc]	Sumitomo	48	Competitor	18
		Tool	Output Pc/Edge [psc]							
Sumitomo	48									
Competitor	18									
Chip Volume Rate  <table><tr><th>Tool</th><th>Chip Volume Rate [cm³/min]</th></tr><tr><td>Sumitomo</td><td>37,80</td></tr><tr><td>Competitor</td><td>19,30</td></tr></table>			Tool	Chip Volume Rate [cm³/min]	Sumitomo	37,80	Competitor	19,30		
Tool	Chip Volume Rate [cm³/min]									
Sumitomo	37,80									
Competitor	19,30									

● Sumitomo ● competitor

EPMS Type

■ Identification Details

EPMS 4 100 U2.5 R10 ECS300

Series Code	Number of Teeth	Diameter	Neck Type	Other Options*	Corner Radius	Grade
			U: Underneck type S: Straigh +L/D 2.5:Length of cutting edge, 2,5 x DC	W: Weldon B: Chip Breaker	R10: = 1 mm	

* On request

Shank diameter tolerance h_5 / Radius tolerance RE: $\pm 0,01$ mm



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