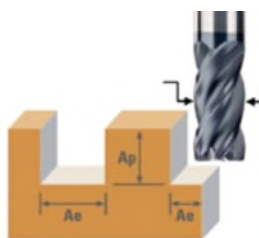


End Mill Matrix

SGS End Mill Matrix							Preferred Cut Type for Series					Toolpath Preference* 1st 2nd	Flute Count				
Name	Series	Page	Material				• Good	•• Better	••• Best	Not Recommended							
			Steel P0 to P6	Stainless Steel M1 to M3	Cast Iron K1 to K3	High Temp Alloy S1 to S3	Titanium Alloy S4	Hardened Steel H1 to H4	Non Ferrous N1 to N4	Non Ferrous N5 to N7	Heavy	Moderate	Light	Fine	Finish		
Series 33	33	97	■	■	■	■	■	■	■	■	•••	•••	••	••	•	Standard HEM	3
Z-Carb	Z1	49	■	■	■	■	■	■	■	■	•••	•••	••	••	•	Standard HEM	4
Z-Carb-AP	Z1P	39	■	■	■	■	■	■	■	■	•••	•••	••	••	•	Standard HEM	4
Z-Carb-HTA	ZH1	57	■	■	■	■	■	■	■	■	•••	•••	••	••	•	Standard HEM	4
Series 7	7	103	■	■	■	■	■	■	■	■	•	•	•	•••	•••	HEM Standard	4
Z-Carb HPR	Z5	28	■	■	■	■	■	■	■	■	••	•••	•••	••	•	HEM Standard	5
V-Carb	55	63	■	■	■	■	■	■	■	■	•	••	•••	•••	•••	HEM Standard	5
T-Carb®	51	74	■	■	■	■	■	■	■	■	•	•	••	•••	•••	HEM Standard	6
H-Carb	77	82	■	■	■	■	■	■	■	■	•	•	•	•••	•••	HEM Standard	7
Multi Carb	66	90	■	■	■	■	■	■	■	■	•	•	•	••	•••	HEM Standard	7, 9, 11
Turbo Carb	56B	107	■	■	■	■	■	■	■	■	•	•	••	•••	•••	HEM Standard	2
Z-Carb-MD	ZD1	61	■	■	■	■	■	■	■	■	•••	•••	••	••	••	Standard HEM	4
Power-Carb®	57	110	■	■	■	■	■	■	■	■	•	•	••	•••	•••	HEM Standard	6
Ski-Carb	44	163	■	■	■	■	■	■	■	■	••	••	••	•••	•••	Standard HEM	2
S-Carb® 2 Flute	47	157	■	■	■	■	■	■	■	■	•••	•••	••	••	•	Standard HEM	2
S-Carb® 3 Flute	43	136	■	■	■	■	■	■	■	■	•••	•••	••	••	•	Standard HEM	3
S-Carb® Chipbreaker	43CB	146	■	■	■	■	■	■	■	■	•••	•••	••	••	NR	Standard HEM	3
S-Carb® APR-3®	43APR-3	127	■	■	■	■	■	■	■	■	•••	•••	••	••	NR	Standard HEM	3
S-Carb APR-4®	43APR-4	130	■	■	■	■	■	■	■	■	•••	•••	••	••	NR	Standard HEM	4
S-Carb APF®	43APF	132	■	■	■	■	■	■	■	■	•	•	••	•••	•••	Standard HEM	4
Slow Helix	27	113	■	■	■	■	■	■	■	■	•	•	••	•••	•••	Standard HEM	4
CCR	20-CCR	338	■	■	■	■	■	■	■	■	•••	•••	••	••	NR	Standard HEM	5, 8, 10, 12
CCR	31-CCR	342	■	■	■	■	■	■	■	■	•••	•••	••	••	NR	Standard HEM	5, 7, 8, 10
Compression Router	25	345	■	■	■	■	■	■	■	■	•	•	••	••	•••	Standard HEM	4, 6, 8
Up Cut Router	21	348	■	■	■	■	■	■	■	■	•••	•••	••	••	•	Standard HEM	2
Down Cut Router	22	349	■	■	■	■	■	■	■	■	•	•	••	••	•••	Standard HEM	2

Preferred materials for each Series are highlighted above

Cut depths (Ae & Ap) are based on a percentage of the cutter diameter (DC)



Material	Heavy 100%~40% Ae ≤ 100% Ap	Moderate 100%~40% Ae ≤ 150% Ap	Light 25%~10% Ae ≤ 250% Ap	Fine 10%~2% Ae ≤ 450% Ap	Finish 2%~0% Ae any Ap
Steel P0 to P6	■	■	■	■	■
Stainless Steel M1 to M3	■	■	■	■	■
Cast Iron K1 to K3	■	■	■	■	■
High Temp Alloy S1 to S3	■	■	■	■	■
Titanium Alloy S4	■	■	■	■	■
Hardened Steel H1 to H4	■	■	■	■	■
Non Ferrous N1 to N4	■	■	■	■	■
Non Ferrous N5 to N7	■	■	■	■	■

■ Coolant required in these materials
 ❌ Plunging not recommended in these materials

Material hardness and machinability affect speed, feed, and cut depths

Long flute or long reach tools require reduced rates and cut depth

Unless marked "NR", a high quality finish can be achieved with any Series tool with adjustments to speed and feed

End Mill Matrix

Cut Diameter Range inch mm	Cut Length Availability (x DC)**	Reach Option (x DC)**	End Styles Square Radius Ball	Chipbreaker Option	Shank Option Solid Round, Weldon Flat, Jet Stream, Coolant Hole	Center Cutting	Maximum Recommended Ramp Angle ***	Helix Angle	Flute Index	Coating
0.125 to 1 3 to 20	2.25 to 3	–	R	By Request	SR, WF	Yes	90	32 / 48	Unequal	Ti-Namite-A
0.125 to 1 3 to 25	1.25 to 3	–	R, B	By Request	SR, WF, JS	Yes	90	35 / 38	Unequal	Ti-Namite-A
0.0156 to 1 1 to 25	1 to 3.25	2.5 to 8.5	S, R, B	By Request	SR, WF, JS	Yes	90	35 / 38	Unequal	Ti-Namite-X
0.250 to 1 6 to 20	1.25 to 3	–	R	By Request	SR, WF	Yes	20	38 / 41	Unequal	Ti-Namite-A
0.125 to 1 3 to 25	2.25 to 8.25	–	S, B	By Request	SR	Yes	1	38	Unequal	Ti-Namite-A
0.125 - 1 6 - 25	1 to 3	–	S, R	By Request	SR, WF, CH	No	7	37	Unequal	Ti-Namite-M Ti-Namite-A
0.125 - 1 6 - 20	1.25 to 5	–	S, R, B	By Request	SR, WF	Yes	5	45	Unequal	Ti-Namite-A
0.250 to 1 6 to 20	1.25 to 3	3.25 to 5.5	S, R	By Request	SR	Yes	3	41	Unequal	Ti-Namite-X
0.250 to 1 6 to 25	2.5 to 4	–	S, R	In Stock Available	SR	No	1	37	Unequal	Ti-Namite-M Ti-Namite-A
0.188 to 1 6 to 25	1.5 to 3.25	–	S, R	By Request	SR	No	1	35	Equal	Ti-Namite-A
0.031 to 0.750 1 to 20	1	2 to 2.25	B	By Request	SR	Yes	25	30	Equal	Ti-Namite-A
0.118 to 0.750 5 to 20	1 to 1.25	2.25 to 5	R	By Request	SR	Yes	2	42 / 45	Unequal	Ti-Namite-A
0.250 to 0.500 6 to 20	2 to 2.25	–	S	By Request	SR	Yes	1	45	Equal	Ti-Namite-A
0.250 to 1 3 to 20	1.25 to 7	–	S, R	By Request	SR, WF	Yes	90	45	Equal	Ti-Namite-B
0.125 to 1 3 to 25	1 to 3	3 to 9	S, B	By Request	SR	Yes	90	35	Equal	Ti-Namite-B
0.125 to 1 3 to 25	1 to 7	2.25 to 8.5	S, R, B	By Request	SR	Yes	90	38	Equal	Ti-Namite-B
0.250 to 1 6 to 20	1 to 7	2.5 to 8.5	R	Standard	SR	Yes	90	38	Equal	Ti-Namite-B
0.750 to 1 12 to 26	1.25 to 1.75	3 to 4	S, R	Standard	CH	Yes	90	38	Unequal	Ti-Namite-B
20 to 25	1.25 to 1.75	2.25 to 3.5	S, R	Standard	CH	Yes	90	38 / 41	Unequal	Ti-Namite-B
0.500 to 0.750 6 to 25	2.5 to 4	3 to 5	S, R	By Request	CH	Yes	25	38 / 41	Unequal	Ti-Namite-B
0.250 to 0.750 6 to 16	1.75 to 4	–	S	By Request	SR	Yes	5	10, 12	Unequal	Di-Namite (optional)
0.250 to 0.500 2 to 12	2.75 to 4	–	S	Standard	SR	Based upon end style	5 (for end cut styles)	15	Equal	Di-Namite (optional)
0.250 to 0.500 6 to 12	2.75 to 4	–	S	Standard	SR	Based upon end style	5 (for end cut styles)	15	Equal	Di-Namite (optional)
0.250 to 0.500 6 to 12	2.75 to 4	–	S	By Request	SR	Yes	5	30	Equal	Di-Namite (optional)
0.125 to 0.750 3 to 12	2.5 to 4.25	–	S	By Request	SR	Yes	90	35	Equal	various optional
0.125 to 0.750 3 to 12	2.5 to 4.25	–	S	By Request	SR	Yes	–	35	Equal	various optional



Standard Toolpath



HEM Toolpath

* HEM toolpaths are usually preferred in most situations. However, standard paths may be more efficient with moderate to heavy cut types

** some variations of Cut Length and Reach are based upon Cut Diameter

*** shown is general recommendation for most materials, lower ramp angles are required for materials with lower machinability

For complete application recommendations refer to the SGS Tool Wizard®

