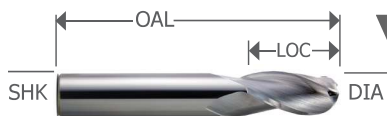


GENERAL PURPOSE CARBIDE END MILL



3 FLUTE • GENERAL PURPOSE BALL NOSE END MILLS

Carbide	3	30°	Bright ALTiN	+0.0005 -0.0005 <1/8	+0.0000 -0.0020 ≥1/8	Ball					HRC <48	P M N	K S N
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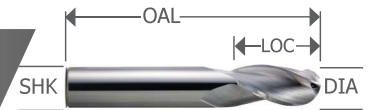
SERIES: EMG-__-B

DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	ALTiN EDP
1/64	1/8	3/64	1-1/2	std	EMG-400-1/2-B	19577	59577
1/32	1/8	1/16	1-1/2	stub	EMGS-401-B	17814	57814
1/32	1/8	3/32	1-1/2	std	EMG-401-B	17815	57815
3/64	1/8	3/32	1-1/2	stub	EMGS-401-1/2-B	17816	57816
3/64	1/8	1/8	1-1/2	std	EMG-401-1/2-B	17817	57817
1/16	1/8	1/8	1-1/2	stub	EMGS-402-B	17818	57818
1/16	1/8	3/16	1-1/2	std	EMG-402-B	17819	57819
5/64	1/8	3/16	1-1/2	std	EMG-402-1/2-B	17820	57820
3/32	1/8	3/16	1-1/2	stub	EMGS-403-B	17821	57821
3/32	1/8	3/8	1-1/2	std	EMG-403-B	17822	57822
7/64	1/8	3/8	1-1/2	std	EMG-403-1/2-B	17823	57823
1/8	1/8	1/4	1-1/2	stub	EMGS-404-B	17824	57824
1/8	1/8	1/2	1-1/2	std	EMG-404-B	17825	57825
1/8	1/8	3/4	2-1/4	med	EMG-404-MB	19557	59557
1/8	1/8	3/4	3	long	EMG-404-LB	17826	57826
1/8	1/8	1	3	xl	EMG-404-EB	19578	59578
9/64	3/16	1/2	2	std	EMG-604-1/2-B	10322	50322
5/32	3/16	9/16	2	std	EMG-605-B	17827	57827
11/64	3/16	9/16	2	std	EMG-605-1/2-B	10288	50288
3/16	3/16	5/16	1-1/2	stub	EMGS-606-B	17828	57828
3/16	3/16	5/8	2	std	EMG-606-B	17829	57829
3/16	3/16	3/4	2-1/2	med	EMG-606-MB	19558	59558
3/16	3/16	3/4	3	long	EMG-606-LB	17830	57830
3/16	3/16	1-1/8	3	xl	EMG-606-EB	19581	59581
13/64	1/4	5/8	2-1/2	std	EMG-806-1/2-B	10348	50348
7/32	1/4	5/8	2-1/2	std	EMG-807-B	14061	54061
15/64	1/4	3/4	2-1/2	std	EMG-807-1/2-B	19584	59584
1/4	1/4	1/2	2	stub	EMGS-808-B	17831	57831
1/4	1/4	3/4	2-1/2	std	EMG-808-B	17832	57832
1/4	1/4	1-1/8	3	long	EMG-808-LB	17833	57833
1/4	1/4	1-1/2	4	xl	EMG-808-EB	19585	59585
17/64	5/16	3/4	2-1/2	std	EMG-1008-1/2-B	19586	59586
9/32	5/16	3/4	2-1/2	std	EMG-1009-B	19587	59587
19/64	5/16	13/16	2-1/2	std	EMG-1009-1/2-B	19588	59588
5/16	5/16	1/2	2	stub	EMGS-1010-B	17834	57834
5/16	5/16	13/16	2-1/2	std	EMG-1010-B	17835	57835
5/16	5/16	1-1/8	3	long	EMG-1010-LB	17836	57836
5/16	5/16	1-5/8	4	xl	EMG-1010-EB	19589	59589
21/64	3/8	7/8	2-1/2	std	EMG-1210-1/2-B	19590	59590
11/32	3/8	7/8	2-1/2	std	EMG-1211-B	19591	59591
23/64	3/8	7/8	2-1/2	std	EMG-1211-1/2-B	19592	59592
3/8	3/8	5/8	2	stub	EMGS-1212-B	17837	57837
3/8	3/8	1	2-1/2	std	EMG-1212-B	17838	57838
3/8	3/8	1-1/8	3	long	EMG-1212-LB	17839	57839
3/8	3/8	1-3/4	4	xl	EMG-1212-EB	19593	59593
13/32	7/16	1	2-3/4	std	EMG-1413-B	19594	59594
27/64	7/16	1	2-3/4	std	EMG-1413-1/2-B	19595	59595
7/16	7/16	1	2-3/4	std	EMG-1414-B	17840	57840
7/16	7/16	2	4	long	EMG-1414-LB	19596	59596
29/64	1/2	1	3	std	EMG-1614-1/2-B	19597	59597

sizes continued on next page

GENERAL PURPOSE CARBIDE END MILL

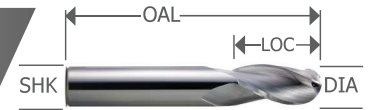
3 FLUTE • GENERAL PURPOSE BALL NOSE END MILLS



SERIES: EMG-__-B

DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	ALTIN EDP
15/32	1/2	1	3	std	EMG-1615-B	19598	59598
31/64	1/2	1	3	std	EMG-1615-1/2-B	19599	59599
1/2	1/2	5/8	2-1/2	stub	EMGS-1616-B	17841	57841
1/2	1/2	1	3	std	EMG-1616-B	17842	57842
1/2	1/2	2	4	long	EMG-1616-LB	17843	57843
1/2	1/2	3	6	xl	EMG-1616-EB	19559	59559
9/16	9/16	1-1/8	3-1/2	std	EMG-1818-B	19560	59560
5/8	5/8	3/4	3	stub	EMGS-2020-B	17844	57844
5/8	5/8	1-1/4	3-1/2	std	EMG-2020-B	17845	57845
5/8	5/8	2-1/4	5	long	EMG-2020-LB	17846	57846
5/8	5/8	3	6	xl	EMG-2020-EB	19561	59561
11/16	3/4	1-3/8	4	std	EMG-2422-B	19562	59562
3/4	3/4	1-1/2	4	std	EMG-2424-B	17847	57847
3/4	3/4	2-1/4	5	long	EMG-2424-LB	19563	59563
3/4	3/4	3	6	xl	EMG-2424-EB	19564	59564
7/8	7/8	1-1/2	4	std	EMG-2828-B	19565	59565
1	1	1-1/2	4	std	EMG-3232-B	11397	51397

3 FLUTE • GENERAL PURPOSE BALL NOSE END MILLS



Carbide
3
30°
Bright ALTiN
+0.013
-.013
<3mm
+0.000
-.050
≥3mm
Ball

HRC <48
P M K Y N
S

SERIES: EMG-M_M_-B

DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	ALTIN EDP
1mm	3mm	3mm	38mm	std	EMG-M3M1-B	16830	56830
1.5mm	3mm	6mm	38mm	std	EMG-M3M1.5-B	16831	56831
2mm	3mm	9mm	38mm	std	EMG-M3M2-B	16832	56832
2.5mm	3mm	12mm	38mm	std	EMG-M3M2.5-B	16833	56833
3mm	3mm	12mm	38mm	std	EMG-M3M3-B	16834	56834
3.5mm	4mm	12mm	51mm	std	EMG-M4M3.5-B	16835	56835
4mm	4mm	14mm	51mm	std	EMG-M4M4-B	16836	56836
4.5mm	5mm	14mm	51mm	std	EMG-M5M4.5-B	16837	56837
5mm	5mm	20mm	51mm	std	EMG-M5M5-B	16838	56838
6mm	6mm	20mm	63mm	std	EMG-M6M6-B	16839	56839
7mm	8mm	20mm	63mm	std	EMG-M8M7-B	16840	56840
8mm	8mm	20mm	63mm	std	EMG-M8M8-B	16841	56841
9mm	10mm	22mm	70mm	std	EMG-M10M9-B	16842	56842
10mm	10mm	25mm	70mm	std	EMG-M10M10-B	16843	56843
12mm	12mm	25mm	76mm	std	EMG-M12M12-B	16844	56844
14mm	14mm	32mm	89mm	std	EMG-M14M14-B	16845	56845
16mm	16mm	32mm	89mm	std	EMG-M16M16-B	16846	56846
18mm	18mm	38mm	100mm	std	EMG-M18M18-B	16847	56847
20mm	20mm	38mm	100mm	std	EMG-M20M20-B	16848	56848
22mm	22mm	38mm	100mm	std	EMG-M22M22-B	16849	56849
25mm	25mm	38mm	100mm	std	EMG-M25M25-B	16850	56850

General Purpose Carbide End Mills

SERIES: General Purpose Carbide End Mills

MATERIAL	CONDITIONS	CUTTING DIAMETER											
		1/8"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"	CHIP PER TOOTH			
		Under 32 HRc	Over 32 HRc										
STAINLESS STEELS ISO-M													
Precipitation 13-8, 15-5, 17-4PH	Slotting .5 x Dia.	110-200	80-115	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.0040		
	Profiling ≤ .5 x Dia.	110-200	80-115	0.0006	0.0012	0.0015	0.0018	0.0025	0.0031	0.0038	0.0050		
Austenitic 302, 303, 304L, 316L	Slotting .5 x Dia.	150-275	80-180	0.0005	0.0011	0.0014	0.0016	0.0023	0.0029	0.0035	0.0046		
	Profiling ≤ .5 x Dia.	150-275	80-180	0.0007	0.0014	0.0018	0.0021	0.0030	0.0038	0.0045	0.0060		
Martensitic 403, 410, 416	Slotting .5 x Dia.	200-400	80-160	0.0005	0.0011	0.0014	0.0016	0.0023	0.0029	0.0035	0.0046		
	Profiling ≤ .5 x Dia.	200-400	80-160	0.0007	0.0014	0.0018	0.0021	0.0030	0.0038	0.0045	0.0060		
HIGH TEMP ALLOYS ISO-S													
Cobalt Base Stellite, Haynes 25, 188, X-40, L-605	Slotting .5 x Dia.	60-125	60-125	0.0004	0.0007	0.0009	0.0011	0.0015	0.0019	0.0023	0.0030		
	Profiling ≤ .5 x Dia.	60-125	60-125	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.0040		
Nickel Base Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Incoly 600	Slotting .5 x Dia.	60-125	60-125	0.0004	0.0007	0.0009	0.0011	0.0015	0.0019	0.0023	0.0030		
	Profiling ≤ .5 x Dia.	60-125	60-125	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.0040		
Iron Base Incoloy 800-802, Multimet N-155, Timken 16-26-6	Slotting .5 x Dia.	60-125	60-125	0.0004	0.0007	0.0009	0.0011	0.0015	0.0019	0.0023	0.0030		
	Profiling ≤ .5 x Dia.	60-125	60-125	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.0040		
STEELS ISO-P													
High Strength Steels 4140, 4340, 52100	Slotting .5 x Dia.	150-300	80-180	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.004		
	Profiling ≤ .5 x Dia.	150-300	80-180	0.0006	0.0010	0.0012	0.0018	0.0025	0.0031	0.0038	0.005		
High Alloy Steels - Mold & Die A-2, P20, 01, 02, D2, H-13	Slotting .5 x Dia.	150-275	80-185	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.004		
	Profiling ≤ .5 x Dia.	150-275	80-185	0.0006	0.0010	0.0012	0.0018	0.0025	0.0031	0.0038	0.005		
Medium Alloy Steels 200, 250, 300	Slotting .5 x Dia.	175-350	100-225	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.004		
	Profiling ≤ .5 x Dia.	175-350	100-225	0.0006	0.0010	0.0012	0.0018	0.0025	0.0031	0.0038	0.005		
Low Alloy Steels-Maraging 10XX, 11XX, 13XX	Slotting .5 x Dia.	200-450	100-250	0.0006	0.0012	0.0015	0.0018	0.0025	0.0031	0.0038	0.005		
	Profiling ≤ .5 x Dia.	200-450	100-250	0.0007	0.0014	0.0018	0.0021	0.0030	0.0038	0.0045	0.006		
CAST IRONS ISO-K													
Ductile Iron Ductile Cast Iron	Slotting .5 x Dia.	120-325	80-140	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.0040		
	Profiling ≤ .5 x Dia.	120-325	80-140	0.0006	0.0012	0.0015	0.0018	0.0025	0.0031	0.0038	0.0050		
Cast Iron Grey Cast Iron	Slotting .5 x Dia.	250-425	125-285	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.0040		
	Profiling ≤ .5 x Dia.	250-425	125-285	0.0006	0.0012	0.0015	0.0018	0.0025	0.0031	0.0038	0.0050		
TITANIUMS ISO-S													
Titanium Alloys 6AL-4V, ASTM 1, 2, 3, 6AL-2S For 5553, decrease SFM and IPM by 25%	Slotting .5 x Dia.	140-200	90-145	0.0005	0.0010	0.0012	0.0014	0.0020	0.0025	0.0030	0.0040		
	Profiling ≤ .5 x Dia.	140-200	90-145	0.0006	0.0012	0.0015	0.0018	0.0025	0.0031	0.0038	0.0050		
ALUMINUM ISO-N													
Aluminum Alloys 6061-T6, 7075	Slotting .5 x Dia.	600-1000	NA	0.0006	0.0012	0.0015	0.0018	0.003	0.005	0.006	0.0080		
	Profiling ≤ .5 x Dia.	600-1000	NA	0.0007	0.0014	0.0018	0.0025	0.0035	0.006	0.0068	0.0100		

All technical data provided are suggested starting points. They may be increased or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE TEAM with questions.

SPEED & FEED INFORMATION

Calculations

End mill speed & feed formulas are the various individual equations that determine the proper overall machining setup or more specifically the speed of the cutting tool and the rate which it is fed into the work piece. Each individual formula is distinct in what it determines but coordinates with the others to ensure successful cutting tool application. You can visit the TECHNICAL section on www.melintool.com for more information.

INCH

$$\text{RPM} = \frac{\text{Revolutions Per Minute}}{3.82 \times \text{SFM} / \text{Tool Dia}}$$

$$\text{SFM} = \frac{\text{Surface Foot Per Minute}}{.262 \times \text{RPM} \times \text{Tool Dia}}$$

$$\text{CPT or IPT} = \frac{\text{Chip-Load Per Tooth}}{\text{IPM} / \text{RPM} / \text{No. Of Flutes}}$$

$$\text{IPM} = \frac{\text{Inches Per Minute}}{\text{CPT} \times \text{RPM} \times \text{No. Of Flutes}}$$

$$\text{MRRCI} = \frac{\text{Metal Removal Rate Cubic Inches}}{\text{IPM} \times \text{Axial Doc} \times \text{Radial Woc}}$$

$$\text{IPR} = \frac{\text{Inches Per Revolution}}{\text{IPM} / \text{RPM}}$$

METRIC

$$\text{RPM} = \frac{\text{Revolutions Per Minute}}{1000 \times \text{M/MIN} / (3.14 \times \text{D})}$$

$$\text{M/MIN} = \frac{\text{Meters Per Minute}}{(3.14 \times \text{D} \times \text{RPM}) / 1000}$$

$$\text{Fz OR CPT} = \frac{\text{Chip-Load Per Tooth}}{\text{Feedrate (mm) per MIN} / (\text{Z} \times \text{RPM})}$$

$$\text{VF OR FPM} = \frac{\text{Feedrate (mm) Per Minute}}{\text{Feedrate (mm) per Tooth} \times \text{Z} \times \text{RPM}}$$

D = Cutter Dia.
Z = No. Of Teeth.

EQUIVALENTS & CONVERSIONS:

ABBREVIATIONS

RPM	Revolutions Per Minute
SFM	Surface Feet Per Minute
CPT	Chip Load Per Tooth
IPM	Inches Per Minute
V_f	Millimeters Per Minute
ae	Radial Width of Cut
ap	Axial Depth of Cut
Vc	Surface Meters Per Minute
Fz	Metric Chip Load Per Tooth

$$N, n \text{ or } \text{Min}^{-1} = \text{RPM}$$

$$Vc \text{ or } \text{M/MIN} = \text{SFM}$$

$$Fz \text{ or } \text{mm/TOOTH} = \text{CPT}$$

$$V_f \text{ or } \text{mm/MIN} = \text{IPM}$$

$$\text{SFM} / 3.281 = \text{M/MIN}$$

$$\text{M/MIN} \times 3.281 = \text{SFM}$$

$$\text{mm/MIN} / 25.4 = \text{IPM}$$

$$\text{mm/TOOTH} / 25.4 = \text{CPT}$$



IMPERIAL METRIC

$$\text{Inch} \times 25.4 = \text{Millimeter}$$

$$\text{Millimeter} \times .03937 = \text{Inch}$$