

GENERAL PURPOSE CARBIDE END MILL

3 FLUTE • GENERAL PURPOSE END MILLS

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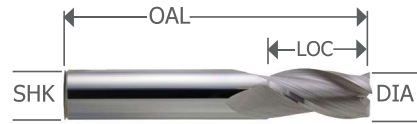
SERIES: EMG

DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	ALTIN EDP
1/32	1/8	1/16	1-1/2	stub	EMGS-401	17791	57791
1/32	1/8	3/32	1-1/2	std	EMG-401	17792	57792
3/64	1/8	3/32	1-1/2	stub	EMGS-401-1/2	17793	57793
3/64	1/8	1/8	1-1/2	std	EMG-401-1/2	17794	57794
1/16	1/8	1/8	1-1/2	stub	EMGS-402	17795	57795
1/16	1/8	3/16	1-1/2	std	EMG-402	17638	57638
1/16	1/8	1/4	1-1/2	med	EMG-402-M	19137	59137
5/64	1/8	3/16	1-1/2	std	EMG-402-1/2	17796	57796
5/64	1/8	1/4	1-1/2	med	EMG-402-1/2-M	19138	59138
3/32	1/8	3/16	1-1/2	stub	EMGS-403	17797	57797
3/32	1/8	3/8	1-1/2	std	EMG-403	17639	57639
7/64	1/8	3/8	1-1/2	std	EMG-403-1/2	17798	57798
1/8	1/8	1/4	1-1/2	stub	EMGS-404	17799	57799
1/8	1/8	1/2	1-1/2	std	EMG-404	17640	57640
1/8	1/8	3/4	2-1/4	med/long	EMG-404-ML	19730	59730
1/8	1/8	3/4	3	long	EMG-404-L	17800	57800
1/8	1/8	1	3	xl	EMG-404-E	19566	59566
9/64	3/16	1/2	2	std	EMG-604-1/2	14049	54049
5/32	3/16	9/16	2	std	EMG-605	17641	57641
3/16	3/16	3/8	1-1/2	stub	EMGS-606	17801	57801
3/16	3/16	5/8	2	std	EMG-606	17642	57642
3/16	3/16	3/4	2-1/2	med/long	EMG-606-ML	19731	59731
3/16	3/16	3/4	3	long	EMG-606-L	17802	57802
3/16	3/16	1-1/8	3	xl	EMG-606-E	19567	59567
13/64	1/4	5/8	2-1/2	std	EMG-806-1/2	10586	50586
7/32	1/4	5/8	2-1/2	std	EMG-807	13744	53744
15/64	1/4	3/4	2-1/2	std	EMG-807-1/2	14039	54039
1/4	1/4	1/2	2	stub	EMGS-808	17803	57803
1/4	1/4	3/4	2-1/2	std	EMG-808	17644	57644
1/4	1/4	1-1/8	3	long	EMG-808-L	17804	57804
1/4	1/4	1-1/2	4	xl	EMG-808-E	19568	59568
17/64	5/16	3/4	2-1/2	std	EMG-1008-1/2	13745	53745
9/32	5/16	3/4	2-1/2	std	EMG-1009	13746	53746
19/64	5/16	13/16	2-1/2	std	EMG-1009-1/2	13952	53952
5/16	5/16	1/2	2	stub	EMGS-1010	17805	57805
5/16	5/16	13/16	2-1/2	std	EMG-1010	17646	57646
5/16	5/16	1-1/8	3	long	EMG-1010-L	17806	57806
5/16	5/16	1-5/8	4	xl	EMG-1010-E	19569	59569
11/32	3/8	7/8	2-1/2	std	EMG-1211	12890	52890
3/8	3/8	5/8	2	stub	EMGS-1212	17807	57807
3/8	3/8	1	2-1/2	std	EMG-1212	17648	57648
3/8	3/8	1-1/8	3	long	EMG-1212-L	17808	57808
3/8	3/8	1-3/4	4	xl	EMG-1212-E	19570	59570
13/32	7/16	1	2-3/4	std	EMG-1413	12807	52807
7/16	7/16	1	2-3/4	std	EMG-1414	17650	57650
7/16	7/16	2	4	long	EMG-1414-L	19571	59571
1/2	1/2	5/8	2-1/2	stub	EMGS-1616	17809	57809
1/2	1/2	1	3	std	EMG-1616	17652	57652
1/2	1/2	2	4	long	EMG-1616-L	17810	57810
1/2	1/2	3	6	xl	EMG-1616-E	19572	59572
9/16	9/16	1-1/4	3-1/2	std	EMG-1818	11299	51299
5/8	5/8	3/4	3	stub	EMGS-2020	17811	57811
5/8	5/8	1-1/4	3-1/2	std	EMG-2020	17654	57654
5/8	5/8	2-1/4	5	long	EMG-2020-L	17812	57812
5/8	5/8	3	6	xl	EMG-2020-E	19573	59573

sizes continued on next page

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SERIES: EMG

DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	ALTIN EDP
11/16	3/4	1-3/8	4	std	EMG-2422	12795	52795
3/4	3/4	1-1/2	4	std	EMG-2424	17655	57655
3/4	3/4	2-1/4	5	long	EMG-2424-L	11189	51189
3/4	3/4	3	6	xl	EMG-2424-E	19574	59574
7/8	7/8	1-1/2	4	std	EMG-2828	14041	54041
1	1	1-1/2	4	std	EMG-3232	11191	51191

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Carbide	3	30°	Bright ATTIN	+0.013 -0.013 <3mm	+0.000 -0.050 ≥3mm	Square				HRC <48	P M N	K S N
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SERIES: EMG-M_M_

DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	ALTIN EDP
1mm	3mm	3mm	38mm	std	EMG-M3M1	16809	56809
1.5mm	3mm	6mm	38mm	std	EMG-M3M1.5	16810	56810
2mm	3mm	9mm	38mm	std	EMG-M3M2	16811	56811
2.5mm	3mm	12mm	38mm	std	EMG-M3M2.5	16812	56812
3mm	3mm	12mm	38mm	std	EMG-M3M3	16813	56813
3.5mm	4mm	12mm	51mm	std	EMG-M4M3.5	16814	56814
4mm	4mm	14mm	51mm	std	EMG-M4M4	16815	56815
4.5mm	5mm	14mm	51mm	std	EMG-M5M4.5	16816	56816
5mm	5mm	20mm	51mm	std	EMG-M5M5	16817	56817
6mm	6mm	20mm	63mm	std	EMG-M6M6	16818	56818
6mm	6mm	25mm	100mm	med	EMG-M6M6-ML	14787	54787
7mm	8mm	20mm	63mm	std	EMG-M8M7	16819	56819
8mm	8mm	20mm	63mm	std	EMG-M8M8	16820	56820
8mm	8mm	50mm	150mm	xl	EMG-M8M8-E	14788	54788
9mm	10mm	22mm	70mm	std	EMG-M10M9	16821	56821
10mm	10mm	25mm	70mm	std	EMG-M10M10	16822	56822
10mm	10mm	50mm	100mm	x long	EMG-M10M10-LL	14779	54779
10mm	10mm	75mm	150mm	xl	EMG-M10M10-E	14780	54780
12mm	12mm	25mm	76mm	std	EMG-M12M12	16823	56823
14mm	14mm	32mm	89mm	std	EMG-M14M14	16824	56824
14mm	14mm	50mm	100mm	med	EMG-M14M14-ML	14783	54783
16mm	16mm	32mm	89mm	std	EMG-M16M16	16825	56825
16mm	16mm	75mm	150mm	xl	EMG-M16M16-E	14784	54784
18mm	18mm	38mm	100mm	std	EMG-M18M18	16826	56826
20mm	20mm	38mm	100mm	std	EMG-M20M20	16827	56827
22mm	22mm	38mm	100mm	std	EMG-M22M22	16828	56828
25mm	25mm	38mm	100mm	std	EMG-M25M25	16829	56829

TECHNICAL INFORMATION

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

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

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