

GENERAL PURPOSE CARBIDE END MILL

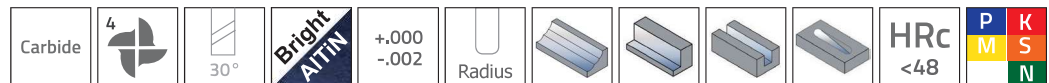
4 FLUTE • GENERAL PURPOSE END MILLS

SERIES: CCMG-M_M_

DIA	SHK	LOC	OAL	LENGTH	TOOL	BRIGHT EDP	ALTIN EDP
13mm	13mm	26mm	76mm	std	CCMG-M13M13	12762	52762
14mm	14mm	32mm	89mm	std	CCMG-M14M14	16795	56795
14mm	14mm	51mm	127mm	long	CCMG-M14M14-L	13749	53749
14mm	14mm	75mm	150mm	xl	CCMG-M14M14-E	14769	5476914768
16mm	16mm	32mm	89mm	std	CCMG-M16M16	16796	56796
16mm	16mm	57mm	127mm	long	CCMG-M16M16-L	19754	59754
16mm	16mm	50mm	150mm	x long	CCMG-M16M16-LL	14776	54776
16mm	16mm	75mm	150mm	xl	CCMG-M16M16-E	14777	54777
18mm	18mm	38mm	100mm	std	CCMG-M18M18	16797	56797
18mm	18mm	57mm	127mm	long	CCMG-M18M18-L	14869	54869
20mm	20mm	38mm	100mm	std	CCMG-M20M20	16798	56798
20mm	20mm	57mm	127mm	long	CCMG-M20M20-L	13990	53990
20mm	20mm	75mm	150mm	xl	CCMG-M20M20-E	14781	54781
22mm	22mm	38mm	100mm	std	CCMG-M22M22	16799	56799
25mm	25mm	38mm	100mm	std	CCMG-M25M25	16800	56800



4 FLUTE • CORNER RADIUS END MILLS



SERIES: CCMG-__-R__

DIA	SHK	LOC	OAL	RADIUS	LENGTH	TOOL	BRIGHT EDP	ALTIN EDP
3/32	1/8	3/8	1-1/2	0.010	std	CCMG-403-R010	11061	51061
3/32	1/8	3/8	1-1/2	0.015	std	CCMG-403-R015	11063	51063
3/32	1/8	3/8	1-1/2	0.020	std	CCMG-403-R020	11065	51065
1/8	1/8	1/4	1-1/2	0.010	stub	CCMGS-404-R010	16904	56904
1/8	1/8	1/2	1-1/2	0.005	std	CCMG-404-R005	H1906	H1907
1/8	1/8	1/2	1-1/2	0.010	std	CCMG-404-R010	11067	51067
1/8	1/8	1/2	1-1/2	0.015	std	CCMG-404-R015	15422	55422
1/8	1/8	1/2	1-1/2	0.020	std	CCMG-404-R020	11069	51069
1/8	1/8	1/2	1-1/2	0.030	std	CCMG-404-R030	11071	51071
5/32	3/16	5/16	2	0.010	stub	CCMGS-605-R010	16905	56905
5/32	3/16	5/16	2	0.010	std	CCMG-605-R010	H2076	H1910
5/32	3/16	5/16	2	0.015	std	CCMG-605-R015	H1911	H1912
5/32	3/16	5/16	2	0.030	std	CCMG-605-R030	H1913	H1914
3/16	3/16	5/16	2	0.010	stub	CCMGS-606-R010	16906	56906
3/16	3/16	5/8	2	0.010	std	CCMG-606-R010	11073	51073
3/16	3/16	5/8	2	0.015	std	CCMG-606-R015	11075	51075
3/16	3/16	5/8	2	0.020	std	CCMG-606-R020	15424	55424
3/16	3/16	5/8	2	0.030	std	CCMG-606-R030	15426	55426
3/16	3/16	5/8	2	0.045	std	CCMG-606-R045	H1915	H1916
7/32	1/4	3/8	2	0.020	stub	CCMGS-807-R020	16907	56907
1/4	1/4	1/2	2	0.020	stub	CCMGS-808-R020	16463	56463
1/4	1/4	3/4	2-1/2	0.010	std	CCMG-808-R010	H1918	H1919
1/4	1/4	3/4	2-1/2	0.015	std	CCMG-808-R015	15360	55360
1/4	1/4	3/4	2-1/2	0.020	std	CCMG-808-R020	15362	55362
1/4	1/4	3/4	2-1/2	0.030	std	CCMG-808-R030	15364	55364
1/4	1/4	3/4	2-1/2	0.045	std	CCMG-808-R045	15366	55366
1/4	1/4	3/4	2-1/2	0.060	std	CCMG-808-R060	H1921	H1922

sizes continued on next page

GENERAL PURPOSE CARBIDE END MILL

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SERIES: CCMG-__-R__

DIA	SHK	LOC	OAL	RADIUS	LENGTH	TOOL	BRIGHT EDP	ALTIN EDP
5/16	5/16	7/16	2	0.020	stub	CCMGS-1010-R020	16909	56909
5/16	5/16	1/2	2	0.030	stub	CCMGS-1010-R030	16338	56338
5/16	5/16	13/16	2-1/2	0.015	std	CCMG-1010-R015	11077	51077
5/16	5/16	13/16	2-1/2	0.020	std	CCMG-1010-R020	15368	55368
5/16	5/16	13/16	2-1/2	0.030	std	CCMG-1010-R030	15370	55370
5/16	5/16	13/16	2-1/2	0.045	std	CCMG-1010-R045	15372	55372
5/16	5/16	13/16	2-1/2	0.060	std	CCMG-1010-R060	11079	51079
3/8	3/8	1/2	2	0.020	stub	CCMGS-1212-R020	16910	56910
3/8	3/8	1	2-1/2	0.015	std	CCMG-1212-R015	11081	51081
3/8	3/8	1	2-1/2	0.020	std	CCMG-1212-R020	15374	55374
3/8	3/8	1	2-1/2	0.030	std	CCMG-1212-R030	15376	55376
3/8	3/8	1	2-1/2	0.045	std	CCMG-1212-R045	15378	55378
3/8	3/8	1	2-1/2	0.060	std	CCMG-1212-R060	11083	51083
7/16	7/16	9/16	2-1/2	0.020	stub	CCMGS-1414-R020	16911	56911
1/2	1/2	5/8	2-1/2	0.030	stub	CCMGS-1616-R030	16912	56912
1/2	1/2	1	3	0.015	std	CCMG-1616-R015	11085	51085
1/2	1/2	1	3	0.020	std	CCMG-1616-R020	15380	55380
1/2	1/2	1	3	0.030	std	CCMG-1616-R030	15382	55382
1/2	1/2	1	3	0.045	std	CCMG-1616-R045	15384	55384
1/2	1/2	1	3	0.060	std	CCMG-1616-R060	15386	55386
1/2	1/2	1	3	0.090	std	CCMG-1616-R090	11087	51087
1/2	1/2	1	3	0.125	std	CCMG-1616-R125	11089	51089
5/8	5/8	3/4	3	0.030	stub	CCMGS-2020-R030	16913	56913
5/8	5/8	1-1/4	3-1/2	0.015	std	CCMG-2020-R015	11091	51091
5/8	5/8	1-1/4	3-1/2	0.020	std	CCMG-2020-R020	15388	55388
5/8	5/8	1-1/4	3-1/2	0.030	std	CCMG-2020-R030	15390	55390
5/8	5/8	1-1/4	3-1/2	0.045	std	CCMG-2020-R045	15392	55392
5/8	5/8	1-1/4	3-1/2	0.060	std	CCMG-2020-R060	15394	55394
5/8	5/8	1-1/4	3-1/2	0.090	std	CCMG-2020-R090	15396	55396
3/4	3/4	1	3	0.030	stub	CCMGS-2424-R030	16914	56914
3/4	3/4	1-1/2	4	0.015	std	CCMG-2424-R015	11093	51093
3/4	3/4	1-1/2	4	0.020	std	CCMG-2424-R020	15398	55398
3/4	3/4	1-1/2	4	0.030	std	CCMG-2424-R030	15400	55400
3/4	3/4	1-1/2	4	0.045	std	CCMG-2424-R045	15402	55402
3/4	3/4	1-1/2	4	0.060	std	CCMG-2424-R060	15404	55404
3/4	3/4	1-1/2	4	0.090	std	CCMG-2424-R090	15406	55406
3/4	3/4	1-1/2	4	0.125	std	CCMG-2424-R125	15408	55408
1	1	1-1/2	4	0.015	std	CCMG-3232-R015	11095	51095
1	1	1-1/2	4	0.020	std	CCMG-3232-R020	15410	55410
1	1	1-1/2	4	0.030	std	CCMG-3232-R030	15412	55412
1	1	1-1/2	4	0.045	std	CCMG-3232-R045	15414	55414
1	1	1-1/2	4	0.060	std	CCMG-3232-R060	15416	55416
1	1	1-1/2	4	0.090	std	CCMG-3232-R090	15418	55418
1	1	1-1/2	4	0.125	std	CCMG-3232-R125	15420	55420

GENERAL PURPOSE CARBIDE END MILL



4 FLUTE • CORNER RADIUS END MILLS



SERIES: CCMG-M_M_-R_ _

DIA	SHK	LOC	OAL	RADIUS	LENGTH	TOOL	BRIGHT EDP	ALTiN EDP
2mm	3mm	9mm	38mm	0.4mm	std	CCMG-M3M2-R0.4	16870	56870
2.5mm	3mm	12mm	38mm	0.4mm	std	CCMG-M3M2.5-R0.4	16871	56871
3mm	3mm	12mm	38mm	0.2mm	std	CCMG-M3M3-R0.2	14728	54728
3mm	3mm	12mm	38mm	0.4mm	std	CCMG-M3M3-R0.4	16872	56872
3.5mm	4mm	12mm	50mm	0.4mm	std	CCMG-M4M3.5-R0.4	16873	56873
4mm	4mm	14mm	50mm	0.4mm	std	CCMG-M4M4-R0.4	16874	56874
4.5mm	5mm	14mm	50mm	0.4mm	std	CCMG-M5M4.5-R0.4	16875	56875
5mm	5mm	16mm	50mm	0.3mm	std	CCMG-M5M5-R0.3	14733	54733
5mm	5mm	16mm	50mm	0.4mm	std	CCMG-M5M5-R0.4	16876	56876
5mm	5mm	16mm	65mm	0.5mm	med	CCMG-M5M5-MR0.5	14734	54734
6mm	6mm	20mm	63mm	0.5mm	std	CCMG-M6M6-R0.5	16877	56877
6mm	6mm	20mm	63mm	0.8mm	std	CCMG-M6M6-R0.8	14736	54736
6mm	6mm	20mm	63mm	1.0mm	std	CCMG-M6M6-R1.0	14737	54737
6mm	6mm	20mm	63mm	1.5mm	std	CCMG-M6M6-R1.5	14738	54738
6mm	6mm	20mm	63mm	2.0mm	std	CCMG-M6M6-R2.0	14739	54739
7mm	8mm	22mm	63mm	0.5mm	std	CCMG-M8M7-R0.5	16878	56878
8mm	8mm	22mm	63mm	0.5mm	std	CCMG-M8M8-R0.5	16879	56879
8mm	8mm	22mm	63mm	0.8mm	std	CCMG-M8M8-R0.8	14745	54745
8mm	8mm	22mm	63mm	1.0mm	std	CCMG-M8M8-R1.0	14746	54746
8mm	8mm	22mm	63mm	1.5mm	std	CCMG-M8M8-R1.5	14747	54747
8mm	8mm	22mm	63mm	2.0mm	std	CCMG-M8M8-R2.0	14748	54748
8mm	8mm	22mm	63mm	2.5mm	std	CCMG-M8M8-R2.5	14749	54749
8mm	8mm	22mm	63mm	3.0mm	std	CCMG-M8M8-R3.0	14750	54750
9mm	10mm	22mm	70mm	0.7mm	std	CCMG-M10M9-R0.7	16880	56880
10mm	10mm	25mm	70mm	0.5mm	std	CCMG-M10M10-R0.5	14753	54753
10mm	10mm	25mm	70mm	0.7mm	std	CCMG-M10M10-R0.7	16881	56881
10mm	10mm	25mm	70mm	0.8mm	std	CCMG-M10M10-R0.8	14759	54759
10mm	10mm	25mm	70mm	1.0mm	std	CCMG-M10M10-R1.0	14754	54754
10mm	10mm	25mm	70mm	1.5mm	std	CCMG-M10M10-R1.5	14755	54755
10mm	10mm	25mm	70mm	2.0mm	std	CCMG-M10M10-R2.0	14756	54756
10mm	10mm	25mm	70mm	2.5mm	std	CCMG-M10M10-R2.5	14757	54757
10mm	10mm	25mm	70mm	3.0mm	std	CCMG-M10M10-R3.0	14758	54758
12mm	12mm	25mm	76mm	0.5mm	std	CCMG-M12M12-R0.5	14762	54762
12mm	12mm	25mm	76mm	0.7mm	std	CCMG-M12M12-R0.7	16882	56882
12mm	12mm	25mm	76mm	1.0mm	std	CCMG-M12M12-R1.0	14763	54763
12mm	12mm	25mm	76mm	1.5mm	std	CCMG-M12M12-R1.5	14764	54764
12mm	12mm	25mm	76mm	2.0mm	std	CCMG-M12M12-R2.0	14765	54765
12mm	12mm	25mm	76mm	2.5mm	std	CCMG-M12M12-R2.5	14766	54766
12mm	12mm	25mm	76mm	3.0mm	std	CCMG-M12M12-R3.0	14767	54767
14mm	14mm	32mm	89mm	0.8mm	std	CCMG-M14M14-R0.8	16883	56883
16mm	16mm	38mm	89mm	0.5mm	std	CCMG-M16M16-R0.5	14771	54771
16mm	16mm	38mm	89mm	0.8mm	std	CCMG-M16M16-R0.8	16884	56884
16mm	16mm	38mm	89mm	1.0mm	std	CCMG-M16M16-R1.0	14772	54772
16mm	16mm	38mm	89mm	2.0mm	std	CCMG-M16M16-R2.0	14773	54773
16mm	16mm	38mm	89mm	2.5mm	std	CCMG-M16M16-R2.5	14770	54770
16mm	16mm	38mm	89mm	3.0mm	std	CCMG-M16M16-R3.0	14774	54774
16mm	16mm	38mm	89mm	4.0mm	std	CCMG-M16M16-R4.0	14775	54775
20mm	20mm	38mm	100mm	1.0mm	std	CCMG-M20M20-R1.0	16886	56886
20mm	20mm	38mm	100mm	2.0mm	std	CCMG-M20M20-R2.0	14778	54778

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"
		Under 32 HRc	Over 32 HRc	CHIP PER TOOTH							
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

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

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

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

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

$$\begin{aligned} \text{D} &= \text{Cutter Dia.} \\ \text{Z} &= \text{No. Of Teeth.} \end{aligned}$$

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

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

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

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

$$\text{V}_f \text{ or mm/MIN} = \text{IPM}$$

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

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

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

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



IMPERIAL

METRIC

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

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