Roughing End Mills

SERIES: Cobalt/HSS Roughing End Mills

MATERIAL	CONDITIONS	STARTING SFM	STARTING SFM	CUTTING DIAMETER						
				1/4"	1/2"	3/4"	1.00"	1-1/4"	1-1/2"	2.00"
		UNCOATED	COATED	CHIP PER TOOTH						
STAINLESS STEELS ISO-M										
Precipitation										
13-8, 15-5, 17-4PH	Slotting Axial 1 x D	60-80	100-150	0.0015	0.0020	0.0026	0.0036	0.0046	0.0054	0.0070
	Heavy Profiling			0.0015	0.0020	0.0029	0.0040	0.0050	0.0060	0.0075
Austenitic										
302, 303, 304L, 316L	Slotting 1 x D	60-80	100-150	0.0015	0.0020	0.003	0.0045	0.0056	0.0067	0.0090
	Heavy Profiling			0.0019	0.0025	0.0034	0.0049	0.0061	0.0074	0.0098
Martensitic										
403, 410, 416	Slotting Axial 1 x D	60-100	100-170	0.0015	0.0020	0.0030	0.0045	0.0056	0.0067	0.0090
	Heavy Profiling			0.0019	0.0025	0.0034	0.0049	0.0061	0.0074	0.0098
HIGH TEMP ALLOYS ISO-S										
Cobalt Base										
Stellite, Haynes 25, 188, X-40, L-605	Slotting 1 x D	5-25	10-40	0.0011	0.0014	0.0018	0.0026	0.0033	0.0040	0.0053
	Heavy Profiling			0.0011	0.0014	0.0020	0.0029	0.0037	0.0045	0.0059
Nickel Base										
Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel,	Slotting Axial 1 x D	10-20	20-40	0.0011	0.0014	0.0018	0.0026	0.0033	0.0040	0.0053
PermaNickel 300, Incoly 600	Heavy Profiling			0.0011	0.0014	0.0020	0.0029	0.0037	0.0045	0.0059
Iron Base										
Incoloy 800-802, Multimet N-155,	Slotting 1 x D	15-35	30-60	0.0011	0.0014	0.0018	0.0026	0.0033	0.0040	0.0053
Timken 16-26-6	Heavy Profiling			0.0011	0.0014	0.0020	0.0029	0.0037	0.0045	0.0059
STEELS ISO-P										
High Strength Steels										
4140, 4340, 52100	Slotting Axial 1 x D	50-80	100-150	0.0015	0.0020	0.0025	0.0035	0.0045	0.0053	0.0071
	Heavy Profiling			0.0015	0.0020	0.0028	0.0039	0.0050	0.0059	0.0079
High Alloy Steels - Mold & Die										
A-2, P20, 01, 02, D2, H-13	Slotting 1 x D	40-65	80-115	0.0015	0.0020	0.0025	0.0035	0.0045	0.0053	0.0071
	Heavy Profiling			0.0015	0.0020	0.0028	0.0039	0.005	0.0059	0.0079
Medium Alloy Steels										
200, 250, 300	Slotting Axial 1 x D	60-120	100-180	0.0016	0.0023	0.0033	0.0050	0.0062	0.0075	0.0093
	Heavy Profiling			0.0020	0.0027	0.0040	0.0054	0.007	0.0082	0.0110
Low Alloy Steels-Maraging										
10XX, 11XX, 13XX	Slotting 1 x D	70-150	130-200	0.0018	0.0025	0.0037	0.0053	0.0068	0.0080	0.0100
	Heavy Profiling			0.0022	0.0029	0.0042	0.0059	0.0074	0.0090	0.0115
CAST IRONS ISO-K										
Ductile Iron										
Ductile Cast Iron	Slotting Axial 1 x D	40-80	70-130	0.0015	0.0019	0.0030	0.0042	0.0056	0.0065	0.0087
	Heavy Profiling			0.0018	0.0024	0.0034	0.0048	0.0061	0.0073	0.0093
Cast Iron										
Grey Cast Iron	Slotting 1 x D	60-150	120-200	0.0014	0.0018	0.0024	0.0034	0.0044	0.0053	0.0070
	Heavy Profiling			0.0014	0.0018	0.0027	0.0038	0.0050	0.0058	0.0078
TITANIUMS ISO-S										
Titanium Alloys										
6AL-4V, ASTM 1, 2, 3, 6AL-2S	Slotting Axial 1 x D	50-90	75-150	0.0015	0.0020	0.0028	0.0040	0.0052	0.0062	0.0080
For 5553, decrease SFM and IPM by 25%	Heavy Profiling			0.0017	0.0022	0.0032	0.0045	0.0057	0.0067	0.0090
ALUMINUM ISO-N										
Aluminum Alloys										
6061-T6, 7075	Slotting Axial 1 x D	400-650	650-950	0.0024	0.0058	0.0067	0.0103	0.0112	0.0180	0.0210
	Heavy Profiling			0.0027	0.0058	0.0076	0.0110	0.0120	0.0205	0.0260
		For Light Periphery Profiling increase above profiling chip load by 25 - 35 %								

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.

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

RPM = Revolutions Per Minute
3.82 x SFM / Tool Dia

SFM = Surface Foot Per Minute
.262 x RPM x Tool Dia

CPT or IPT = Chip-Load Per Tooth
IPM / RPM / No. Of Flutes

IPM = Inches Per Minute
CPT x RPM x No. Of Flutes

MRRCI = Metal Removal Rate Cubic Inches
IPM x Axial Doc x Radial Woc

IPR = Inches Per Revolution
IPM / RPM

METRIC

RPM = Revolutions Per Minute
1000 x M/MIN / (3.14 x D)

M/MIN = Meters Per Minute
(3.14 x D x RPM) / 1000

Fz OR CPT = Chip-Load Per Tooth
Feedrate (mm) per MIN / (Z x RPM)

VF OR FPM = Feedrate (mm) Per Minute
Feerate (mm) per Tooth x Z x 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 or Min^{-1} = RPM
Vc or M/MIN = SFM
Fz or mm/TOOTH = CPT
V_f or mm/MIN = IPM

SFM / 3.281 = M/MIN
M/MIN x 3.281 = SFM
mm/MIN / 25.4 = IPM
mm/TOOTH /25.4 = CPT

IMPERIAL ⟷ METRIC
Inch x 25.4 = Millimeter
Millimeter x .03937 = Inch

Cobalt & HSS Roughing End Mills

Multi Flute • Fine Pitch Center Cutting Roughing End Mills

HSSCo M42 | MULTI FLUTES | 30° | Bright TiCN | +.005 -.005 | Chamfer | Fine Pitch | HRc <44 | P K M S

Series: CCFP

DIA	SHK	LOC	OAL	FLUTE	LENGTH	TOOL	BRIGHT EDP	TICN EDP
3/16	3/8	1/2	2-3/8	4	std	**CCFP-1206**	17672	47672
1/4	3/8	5/8	2-7/16	4	std	**CCFP-1208**	17673	47673
1/4	3/8	1-1/8	3-1/16	4	long	**CCFP-1208-L**	17674	47674
5/16	3/8	3/4	2-1/2	4	std	**CCFP-1210**	17675	47675
5/16	3/8	1-3/8	3-1/8	4	long	**CCFP-1210-L**	17676	47676
3/8	3/8	3/8	2-1/8	4	stub	**CCFPS-1212**	16453	46453
3/8	3/8	3/4	2-1/2	4	std	**CCFP-1212**	17677	47677
3/8	3/8	1-1/2	3-1/4	4	long	**CCFP-1212-L**	17678	47678
7/16	3/8	1	2-11/16	4	std	**CCFP-1214**	17679	47679
1/2	1/2	1/2	2-1/2	4	stub	**CCFPS-1616**	16454	46454
1/2	1/2	5/8	2-5/8	4	stub	**CCFP-1616-2**	17680	47680
1/2	1/2	1	3	4	std	**CFPS-1616**	15536	45536
1/2	1/2	1-1/4	3-1/4	4	std	**CCFP-1616**	17681	47681
1/2	1/2	1-5/8	3-5/8	4	med	**CCFP-1616-M**	17682	47682
1/2	1/2	2	4	4	long	**CCFP-1616-L**	16031	46031
1/2	1/2	2-1/2	4-1/2	4	long	**CFP-1616-LL**	15682	45682
1/2	1/2	3	5	4	xl	**CFP-1616-E**	15684	45684
9/16	1/2	1-3/8	3-3/8	4	std	**CFP-1618**	15540	45540
5/8	5/8	5/8	2-3/4	4	stub	**CCFPS-2020**	16455	46455
5/8	5/8	3/4	2-7/8	4	stub	**CFPS-2020**	15544	45544
5/8	5/8	1-1/4	3-3/4	4	std	**CFP-2020-2**	15686	45686
5/8	5/8	1-5/8	3-3/4	4	std	**CCFP-2020**	17683	47683
5/8	5/8	2-1/8	4-1/4	4	med	**CFP-2020-M**	15688	45688
5/8	5/8	2-1/2	4-5/8	4	long	**CCFP-2020-L**	16032	46032
5/8	5/8	3-1/8	5-1/4	4	xl	**CFP-2020-E**	15692	45692
3/4	5/8	1-5/8	3-3/4	4	std	**CCFP-2024**	17684	47684
3/4	3/4	3/4	3	4	stub	**CCFPS-2424**	16456	46456
3/4	3/4	1-5/8	3-7/8	4	std	**CCFP-2424**	17685	47685
3/4	3/4	2-1/4	4-1/2	4	med	**CCFP-2424-M**	17686	47686
3/4	3/4	3	5-1/4	4	long	**CCFP-2424-L**	16033	46033
7/8	3/4	1-7/8	4-1/8	5	std	**CCFP-2428**	12324	42324
1	3/4	2	4-1/4	5	med	**CCFP-2432-M**	17687	47687
1	1	2	4-1/2	5	std	**CCFP-3232**	17688	47688
1	1	3	5-1/2	5	med	**CCFP-3232-M**	17689	47689
1	1	4	6-1/2	5	long	**CCFP-3232-L**	16034	46034
1-1/4	1-1/4	1-3/8	3-7/8	6	stub	**CCFPS-4040**	11319	41319
1-1/4	1-1/4	2	4-1/2	6	std	**CCFP-4040**	10733	40733
1-1/4	1-1/4	3	5-1/2	6	med	**CCFP-4040-M**	16035	46035
1-1/4	1-1/4	4	6-1/2	6	long	**CCFP-4040-L**	16036	46036
1-1/2	1-1/4	2	4-1/2	6	std	**CCFP-4048**	12568	42568
1-1/2	1-1/4	3	5-1/2	6	med	**CCFP-4048-M**	12781	42781
1-1/2	1-1/4	4	6-1/2	6	long	**CCFP-4048-L**	12323	42323