677 SERIES

PRECISION CUTTING TOOLS
Member IMC Group

GROUP #	MATERIAL CARBON STEEL	MATERIAL EXAMPLES	HARDNESS	LOW SFM	HIGH SFM	RECOMMENDED MAX% STEPOVER 2@ XD IA LOC	CT IPT Ø 0.250	CT IPT Ø 0.375	CT IPT Ø 0.500	CT IPT Ø 0.625	CT IPT Ø 0.750	CT IPT 1.000
P1	Low-Carbon Steels	1018, 1108, 1117, A36 12L14, 1200's, 1500's	<300	600	900	10.00%	0.0020	0.0030	0.0043	0.0063	0.0078	0.0108
P2	Medium & High Carbon Steels	1000-1200 SERIES	>285	500	800	9.00%	0.0018	0.0030	0.0043	0.0052	0.0065	0.0086
P3	Alloy Steels	4130, 4140, 5140, 6150, 8620,	<330	400	900	9.00%	0.0018	0.0030	0.0043	0.0052	0.0065	0.0086
P4	Tool Steels	A2, P20, S7, H13, L6	<300	450	650	7.00%	0.0020	0.0031	0.0042	0.0055	0.0063	0.0080
P5	Ferritic, Martensitic & PH Stainless Steels	A2, P20, S7, H13, L6	>300	300	500	7.00%	0.0020	0.0029	0.0041	0.0053	0.0065	0.0080
M1	Austenitic Stainless Steels	Inox, 200 Series, 300 Series and 304L	<300	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M2	Austenitic Stainless Steels & Cast Stainless Steels	310, 314, 316	<300	350	500	8.00%	0.0022	0.0035	0.0046	0.0057	0.0066	0.0088
M3	Duplex Steels (Austenitic & Ferritic)	255, 323, 329, 2202, 2205, 2304	<310	350	500	7.00%	0.0024	0.0037	0.0049	0.0063	0.0074	0.0102
K1	Cast Iron - Gray Low Strength	Class 20, 25, 30, 35 Grade G1800	<270	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
K2	Cast Iron - Malleable Medium Strength	60-14-18, 65-45-12, M3210, M4504	<320	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
K3	Cast Iron - Nodular High Strength	32510, 40010, 5005, 70003, 90001	>300	300	400	7.00%	0.0006	0.0010	0.0022	0.0029	0.0035	0.0049
S1	Iron-Based, Heat-Resistant Alloys	A-286, INVAR, Discaloy, INCOLOY 800-802,Nitronic	>200	200	425	7.00%	0.0022	0.0033	0.0046	0.0053	0.0059	0.0069
S2	Cobalt-Based, Heat-Resistant Alloys	Haynes 25, Haynes 188, Stellite, MAR-M302	>180	65	150	6.00%	0.0013	0.0023	0.0033	0.0046	0.0057	0.0074
S3	Nickel-Based, Heat-Resistant Alloys	HAST-C, Rene 41, Waspalloy, Monel, Ni-monic, UDIMET	>180	100	225	6.00%	0.0023	0.0036	0.0048	0.0059	0.0067	0.0091
S4	Titanium	TI6AL4V	>270	325	450	8.00%	0.0020	0.0031	0.0042	0.0052	0.0059	0.0076
S4.2	Titanium	TITANIUM 10-2-3	<390	250	400	6.00%	0.0023	0.0036	0.0048	0.0059	0.0069	0.0093
H1	Hardened Tool Steels	D2, H13, S7	<390	325	525	6.00%	0.0017	0.0027	0.0036	0.0048	0.0055	0.0074
H2	Hardened Tool Steels	D2, H13, S7	>420	300	400	6.00%	0.0015	0.0023	0.0032	0.0040	0.0051	0.0065
H2	Hardened Tool Steels	D2, H13, S7	>485	225	300	5.00%	0.0011	0.0021	0.0028	0.0039	0.0048	0.0067
H2	Hardened Tool Steels	D2, H13, S7	>560	180	275	5.00%	0.0011	0.0021	0.0028	0.0037	0.0046	0.0057

NOTES:
Speed (SFM) and feed (CT IPT) numbers shown have been calculated based upon chip thinning practices. The CT IPT has been calculated based upon the mid range value between the LOW SFM and HIGH SFM. The values shown also are based upon the Length of Cut (AP) value of 2x.

Example: Group P1 being cut with a standard 0.500 endmill with a 1.00" flute length can safely handle a 10% step over or 0.050" stepover (AE) at 1.00" depth of cut. The tool can safely run at 750 SFM and 0.0043" ipt.

Formula: RPM = SFM x 3.82 / of the Tool | RPM = 750 x 3.82 / 0.5 | RPM = 5730 FEEDRATE = RPM x CT IPT x # FLUTES | FEEDRATE =5730 x 0.0043 x 6 | FEEDRATE = 147.8" ipm

Results: 677 Series endmill EDP 67708223, 1/2 x 1/2 x 1-1/4 x 3-6F RH w/0.030R can safely run 5730 RPM & 147.8 ipm while cutting 1.00" depth of cut & 0.050" stepover.