

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	Carbon Steels	1000-1200 SERIES, A36	30 Rc+	600	900	10.00%	0.0020	0.0030	0.0043	0.0063	0.0078	0.0108
P2	Low Alloy Steel	1300-9300 SERIES	30 Rc+	400	900	9.00%	0.0018	0.0030	0.0043	0.0052	0.0065	0.0086
P3	Tool Steel	A2, P20, S7, H13, L6	28-32 Rc	450	650	7.00%	0.0020	0.0031	0.0042	0.0055	0.0065	0.0080
P4	Ferritic, Martensitic & PH Stainless Steels	400's, 15-5, 17-4 Custom 400's	33 Rc +	300	500	7.00%	0.0020	0.0029	0.0041	0.0053	0.0063	0.0080
M1	Austenitic Stainless Steels	Inox, 200 Series, 300 Series and 304L	N/A	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	220 HB	350	500	8.00%	0.0022	0.0035	0.0046	0.0057	0.0066	0.0088
M3	Duplex Steels (Austenitic & Ferritic) & PH Stainless Steels	2202, 2304, 255,323, 329, 2205	280 HB	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	N/A	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	N/A	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 Hb +	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	310-350 HB	325	450	8.00%	0.0020	0.0031	0.0042	0.0052	0.0059	0.0076
S2	Cobalt-Based, Heat-Resistant Alloys	Haynes 25, Haynes 188, Stellite, MAR-M302	40 Rc	250	400	6.00%	0.0023	0.0036	0.0048	0.0059	0.0069	0.0093
S3	Nickel-Based, Heat-Resistant Alloys	HAST-C, Rene 41, Waspalloy, Monel, Ni-monic, UDIMET, 718, 625	240 HB	100	225	6.00%	0.0023	0.0036	0.0048	0.0059	0.0067	0.0091
S4	Nickel & Cobalt Super Alloys	HAST-X	180 HB	65	150	6.00%	0.0013	0.0023	0.0033	0.0046	0.0057	0.0074
S5	Ferrous Super Alloys	NITRONIC 60	255 HB	200	425	7.00%	0.0022	0.0033	0.0046	0.0053	0.0059	0.0069
H1	Hardened Tool Steels	D2, H13, S7	40 Rc	325	525	6.00%	0.0017	0.0027	0.0036	0.0048	0.0055	0.0074
H2	Hardened Tool Steels	D2, H13, S7	45 Rc	300	400	6.00%	0.0015	0.0023	0.0032	0.0040	0.0051	0.0065
H2	Hardened Tool Steels	D2, H13, S7	50 Rc	225	300	5.00%	0.0011	0.0021	0.0028	0.0039	0.0048	0.0067
H2	Hardened Tool Steels	D2, H13, S7	55 Rc	180	275	6.00%	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: $RPM = SFM \times 3.82 / \text{of the Tool}$ | $RPM = 750 \times 3.82 / 0.5$ | $RPM = 5730$ **FEEDRATE = RPM x CT IPT x # FLUTES** | $FEEDRATE = 5730 \times 0.0043 \times 6$ | **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.

