



ISO	MATERIAL	HARDNESS	Vc (SFM)*	END MILL DIAMETER									
				1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 BHN or ≤ 28 HRC	320-750	.0009 - .0017	.0011 - .0019	.0020 - .0028	.0024 - .0033	.0025 - .0038	.0025 - .0041	.0027 - .0046	.0035 - .0052	.0040 - .0066	.0042 - .0090
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 17-4 PH	≤ 375 BHN or ≤ 40 HRC	230-670	.0006 - .0013	.0011 - .0017	.0014 - .0022	.0017 - .0024	.0019 - .0028	.0020 - .0035	.0023 - .0040	.0030 - .0050	.0038 - .0057	.0040 - .0085
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 BHN or ≤ 28 HRC	250-600	.0004 - .0013	.0008 - .0017	.0013 - .0020	.0016 - .0023	.0020 - .0026	.0022 - .0030	.0026 - .0034	.0032 - .0039	.0035 - .0047	.0035 - .0068
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 BHN or ≤ 28 HRC	180-520	.0005 - .0017	.0010 - .0020	.0013 - .0023	.0017 - .0027	.0021 - .0030	.0025 - .0035	.0028 - .0040	.0030 - .0048	.0033 - .0060	.0033 - .0078
K	GRAY IRONS Class 20, 30, 40, 50, 60, G3000, G3500	≤ 220 BHN or ≤ 19 HRC	320-830	.0007 - .0020	.0011 - .0032	.0014 - .0041	.0019 - .0052	.0022 - .0061	.0025 - .0070	.0028 - .0080	.0031 - .0086	.0032 - .0095	.0036 - .0110
	DUCTILE IRONS D&M series, 250, 300, 350, 400, 60-40-18, 65-45-12	≤ 260 BHN or ≤ 26 HRC	220-670	.0005 - .0014	.0009 - .0023	.0012 - .0032	.0016 - .0038	.0018 - .0041	.0020 - .0047	.0022 - .0053	.0024 - .0062	.0028 - .0070	.0030 - .0090
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 555 BHN or ≤ 55 HRC	115-270	.0004 - .0017	.0008 - .0017	.0013 - .0020	.0016 - .0024	.0020 - .0030	.0022 - .0035	.0028 - .0045	.0032 - .0053	.0036 - .0062	.0040 - .0078
S	HR SUPER ALLOYS Inconel 718, Waspaloy, Hastelloy, Inconel 625, Stellite 31, Haynes 25, Rene 41	≤ 275 BHN or ≤ 28 HRC	70-180	.0005 - - .0018	.0008 - - .0022	.0010 - - .0028	.0012 - - .0032	.0015 - - .0036	.0017 - - .0042	.0018 - - .0047	.0019 - - .0050	.0022 - - .0055	.0025 - - .0065
	TITANIUM 6AL-4V, ASTM 1, 2, 3, 6AL-2S	≤ 275 BHN or ≤ 28 HRC	140-400	.0007 - .0013	.0011 - .0016	.0013 - .0018	.0015 - .0021	.0019 - .0026	.0022 - .0031	.0024 - .0035	.0025 - .0044	.0030 - .0053	.0031 - .0075
*LOWER Vc AND Fz APPLY TO HEAVY/ROUGHING ENGAGEMENT				*HIGHER Vc AND Fz APPLY TO LIGHT/PROFILING ENGAGEMENT									

*Speeds & feeds are starting recommendations only. Factors such as machine type, fixture, tooling rigidity, available horsepower, coolant delivery method and others will affect the performance significantly.

h_{ex}

% Radial vs Chip Thinning Multiplier	
100%	1
50%	1
30%	1.091
25%	1.212
20%	1.641
15%	2.1
10%	4.375
5%	6.882