



ISO	MATERIAL	HARDNESS	Vc (SFM)*		EFFECTIVE CUTTER DIAMETER (INCH)						
					≤ 1/16"	1/16"- 1/8"	1/8"- 1/4"	1/4"- 3/8"	3/8" - 1/2"	1/2" - 3/4"	3/4" - 1"
					Fz (INCH PER TOOTH)*						
			HSS/ Cobalt	Carbide							
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 BHN or ≤ 28 HRC	80-200	220-650	.0004 - .0009	.0006 - .0015	.0010 - .0028	.0020 - .0030	.0023 - .0040	.0028 - .0060	.0032 - .0080
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 17-4 PH	≤ 375 BHN or ≤ 40 HRC	60-120	180-500	.0006 - .0012	.0008 - .0019	.0009 - .0022	.0010 - .0027	.0020 - .0038	.0026 - .0050	.0030 - .0065
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 BHN or ≤ 28 HRC	50-100	200-450	.0004 - .0019	.0008 - .0025	.0012 - .0030	.0016 - .0035	.0019 - .0040	.0023 - .0050	.0026 - .0065
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 BHN or ≤ 28 HRC	30-75	120-350	.0005 - .0013	.0009 - .0017	.0013 - .0021	.0015 - .0040	.0017 - .0048	.0021 - .0060	.0025 - .0075
K	GRAY IRONS Class 20, 30, 40, 50, 60, G3000, G3500	≤ 220 BHN or ≤ 19 HRC	60-150	250-700	.0005 - .0014	.0009 - .0023	.0012 - .0032	.0016 - .0041	.0022 - .0053	.0028 - .0090	.0030 - .0100
	DUCTILE IRONS D&M series, 250, 300, 350, 400, 60-40-18, 65-45-12	≤ 260 BHN or ≤ 26 HRC	50-90	150-450	.0003 - .0010	.0006 - .0019	.0010 - .0028	.0014 - .0038	.0020 - .0048	.0025 - .0080	.0030 - .0092
N	NON-FERROUS Aluminum, Aluminum cast, Brass, Copper, Bronze, Non Metallic	≤ 271 BHN or ≤ 28 HRC	100-400	250-950	.0003 - .0010	.0006 - .0021	.0010 - .0028	.0025 - .0040	.0028 - .0065	.0030 - .0080	.0050 - .0130
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 555 BHN or ≤ 55 HRC	40-65	80-250	.0003 - .0010	.0006 - .0015	.0012 - .0021	.0015 - .0030	.0023 - .0045	.0028 - .0050	.0030 - .0065
S	HR SUPER ALLOYS Inconel 718, Waspaloy, Hastelloy, Inconel 625, Stellite 31, Haynes 25, Rene 41	≤ 275 BHN or ≤ 28 HRC	30-50	50-160	.0003 - .0007	.0005 - .0012	.0008 - .0018	.0012 - .0022	.0018 - .0035	.0020 - .0045	.0025 - .0060
	TITANIUM 6AL-4V, ASTM 1, 2, 3, 6AL-2S	≤ 275 BHN or ≤ 28 HRC	40-65	90-250	.0006 - .0014	.0008 - .0017	.0013 - .0018	.0015 - .0026	.0020 - .0035	.0025 - .0060	.0025 - .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