SPEEDS & FEEDS

HFV

High Feed End Mills

HFV / HFVC

Material Guide		Hardness	SFM	Inches Per Tooth (IPT)									
				1/8		3/16		1/4		3/8		1/2	
				Rgh	Fin	Rgh	Fin	Rgh	Fin	Rgh	Fin	Rgh	Fin
CARBON STEEL	10XX, 11XX, 12XX, 12LXX, ASTM A27, ASTM A36	< 75 HRB	800	.0027	.0057	.0040	.0085	.0053	.0113	.0080	.0140	.0107	.0187
		75 - 98 HRB	750	.0020	.0037	.0030	.0055	.0040	.0073	.0060	.0110	.0080	.0147
		21 - 36 HRC	700	.0013	.0025	.0020	.0038	.0027	.0050	.0040	.0075	.0053	.0100
LOW ALLOY STEEL	13XX, 41XX, 43XX, 51XX, 86XX, 93XX	75 - 98 HRB	600	.0027	.0057	.0040	.0085	.0053	.0113	.0080	.0140	.0107	.0187
		21 - 36 HRC	550	.0027	.0047	.0040	.0070	.0053	.0093	.0080	.0140	.0107	.0187
		36 - 50 HRC	400	.0020	.0033	.0030	.0050	.0040	.0067	.0060	.0100	.0080	.0133
		> 50 HRC	350	.0013	.0020	.0020	.0030	.0027	.0040	.0040	.0060	.0053	.0080
TOOL STEEL	A2, H13, L6, P20, S7	75 - 98 HRB	550	.0027	.0057	.0040	.0085	.0053	.0113	.0080	.0140	.0107	.0187
		21 - 36 HRC	500	.0027	.0047	.0040	.0070	.0053	.0093	.0080	.0140	.0107	.0187
		36 - 50 HRC	450	.0020	.0033	.0030	.0050	.0040	.0067	.0060	.0100	.0080	.0133
		> 50 HRC	400	.0013	.0020	.0020	.0030	.0027	.0040	.0040	.0060	.0053	.0080
SPECIALTY STEEL	300M, Invar 36, Kovar, Maraging 200, Maraging 250, Maraging 300, Maraging 350	< 75 HRB	450	.0027	.0067	.0040	.0100	.0053	.0133	.0080	.0140	.0107	.0187
		75 - 98 HRB	500	.0027	.0060	.0040	.0090	.0053	.0120	.0080	.0140	.0107	.0187
		21 - 36 HRC	450	.0027	.0047	.0040	.0070	.0053	.0093	.0080	.0140	.0107	.0187
		36 - 50 HRC	400	.0020	.0033	.0030	.0050	.0040	.0067	.0060	.0100	.0080	.0133
		> 50 HRC	350	.0013	.0020	.0020	.0030	.0027	.0040	.0040	.0060	.0053	.0080
AUSTENITIC STAINLESS STEEL	Nitronic 50, Nitronic 60, 301, 303, 304, 304L, Incoloy 27-7MO, 316, 316L, 321, 347	75 - 98 HRB	500	.0027	.0053	.0040	.0080	.0053	.0107	.0080	.0140	.0107	.0187
		21 - 36 HRC	450	.0027	.0047	.0040	.0070	.0053	.0093	.0080	.0140	.0107	.0187
		36 - 50 HRC	400	.0022	.0040	.0033	.0060	.0043	.0080	.0065	.0120	.0087	.0160
MARTENSITIC & FERRITIC STAINLESS STEEL	403, 410, 416, 420, 440, 430, 446	75 - 98 HRB	750	.0025	.0037	.0038	.0055	.0050	.0073	.0075	.0110	.0100	.0147
		21 - 36 HRC	650	.0027	.0053	.0040	.0080	.0053	.0107	.0080	.0140	.0107	.0187
PH STAINLESS STEEL	15-5, 17-4, Carpenter 450, Carpenter 465	21 - 36 HRC	450	.0025	.0037	.0038	.0055	.0050	.0073	.0075	.0110	.0100	.0147
		36 - 50 HRC	400	.0020	.0033	.0030	.0050	.0040	.0067	.0060	.0100	.0080	.0133
GRAY CAST IRON	SAE J431, ASTM A48	75 - 98 HRB	600	.0027	.0083	.0040	.0125	.0053	.0140	.0080	.0140	.0107	.0187
		21 - 36 HRC	550	.0027	.0063	.0040	.0095	.0053	.0127	.0080	.0140	.0107	.0187
MALLEABLE CAST IRON	ASTM A47, ASTM A220, ASTM A602	75 - 98 HRB	550	.0027	.0056	.0040	.0084	.0053	.0111	.0080	.0140	.0107	.0187
		21 - 36 HRC	450	.0027	.0040	.0040	.0060	.0053	.0080	.0080	.0120	.0107	.0160
NODULAR (DUCTILE) CAST IRON	ASTM A536, ASTM 897	75 - 98 HRB	500	.0027	.0056	.0040	.0084	.0053	.0111	.0080	.0140	.0107	.0187
		21 - 36 HRC	450	.0027	.0040	.0040	.0060	.0053	.0080	.0080	.0120	.0107	.0160
		36 - 50 HRC	400	.0013	.0020	.0020	.0030	.0027	.0040	.0040	.0060	.0053	.0080
PURE NICKEL	Nickel 200, Nickel 201	< 75 HRB	600	.0027	.0047	.0040	.0070	.0053	.0094	.0080	.0140	.0107	.0187
		75 - 98 HRB	550	.0027	.0043	.0040	.0065	.0053	.0087	.0080	.0130	.0107	.0172
NICKEL ALLOY	Hastelloy C-22, Inconel 625, Waspaloy, René 41, Inconel 718, Incoloy 20	75 - 98 HRB	200	.0027	.0038	.0040	.0056	.0053	.0075	.0080	.0113	.0107	.0150
		21 - 36 HRC	180	.0027	.0033	.0040	.0049	.0053	.0066	.0080	.0098	.0107	.0130
		36 - 50 HRC	150	.0022	.0028	.0033	.0042	.0043	.0056	.0065	.0084	.0087	.0112
PURE TITANIUM	Ti Grade 1, Ti Grade 2, Ti Grade 3, Ti Grade 4, Ti Grade 7, Ti Grade 12	< 75 HRB	350	.0027	.0047	.0040	.0070	.0053	.0094	.0080	.0140	.0107	.0187
		75 - 98 HRB	400	.0027	.0042	.0040	.0063	.0053	.0084	.0080	.0127	.0107	.0168
		21 - 36 HRC	325	.0027	.0040	.0040	.0060	.0053	.0080	.0080	.0120	.0107	.0158
TITANIUM ALLOY	Ti 3Al-2.5V, Ti 6Al-4V, Ti 10V-2Fe-3Al	21 - 36 HRC	300	.0027	.0033	.0040	.0049	.0053	.0066	.0080	.0098	.0107	.0130
		36 - 50 HRC	250	.0025	.0023	.0038	.0035	.0050	.0047	.0075	.0070	.0100	.0093
COBALT ALLOY	ASTM F562, ASTM F90, ASTM F75, ASTM F799	75 - 98 HRB	225	.0020	.0023	.0030	.0035	.0040	.0047	.0060	.0070	.0080	.0093
		21 - 36 HRC	150	.0027	.0035	.0040	.0053	.0053	.0070	.0080	.0105	.0107	.0140
		36 - 50 HRC	90	.0020	.0023	.0030	.0035	.0040	.0047	.0060	.0070	.0080	.0093

Milling Process	Hardness	ADOC	RDOC
Slot (Full Slotting)	< 35 HRC	3.00%-5.00% Diameter	100% Diameter
	≥ 35 HRC	2.50%-4.00% Diameter	100% Diameter
Rgh (Traditional Roughing)	< 35 HRC	3.00%-5.00% Diameter	Up to 65% Diameter
	≥ 35 HRC	2.75%-4.25% Diameter	Up to 65% Diameter

NOTES:

IPT values shown are for 3xD reach tools, and should be adjusted for longer or shorter reaches. For tools with reaches greater than 3xD, IPT should be reduced.

Please note for slotting applications, axial engagement will increase while axial stepdown (ADOC) remains the same.