

# HMAF-FE-4

## SPEEDS & FEEDS

### 4 Flute - Multi-Axis Finishers

HMAF-FE-4										
Material Guide		Hardness	SFM	Inches per Tooth (IPT)						
				1/8	3/16	1/4	3/8	1/2	5/8	3/4
				Fin	Fin	Fin	Fin	Fin	Fin	Fin
Carbon Steel	10XX, 11XX, 12XX, 12LXX, ASTM A27, ASTM A36	< 75 HRB	800	.0017	.0019	.0022	.0025	.0029	.0034	.0042
		75 - 98 HRB	750	.0014	.0016	.0018	.0021	.0025	.0029	.0036
		21 - 36 HRC	700	.0012	.0013	.0015	.0017	.0020	.0024	.0029
Low Alloy Steel	13XX, 41XX, 43XX, 51XX, 86XX, 93XX	75 - 98 HRB	600	.0013	.0015	.0017	.0020	.0023	.0027	.0033
		21 - 36 HRC	550	.0011	.0013	.0015	.0017	.0020	.0023	.0028
		36 - 50 HRC	400	.0011	.0012	.0014	.0016	.0018	.0022	.0027
		> 50 HRC	350	.0010	.0011	.0012	.0014	.0016	.0019	.0024
Tool Steel	A2, H13, L6, P20, S7	75 - 98 HRB	550	.0013	.0015	.0017	.0020	.0023	.0027	.0033
		21 - 36 HRC	500	.0012	.0013	.0015	.0017	.0020	.0024	.0029
		36 - 50 HRC	450	.0011	.0012	.0014	.0015	.0018	.0022	.0026
		> 50 HRC	400	.0010	.0011	.0012	.0014	.0016	.0019	.0023
Specialty Steel	300M, Invar 36, Kovar, Maraging 200, Maraging 250, Maraging 300, Maraging 350	< 75 HRB	450	.0015	.0017	.0020	.0022	.0026	.0031	.0038
		75 - 98 HRB	500	.0013	.0014	.0016	.0019	.0022	.0026	.0031
		21 - 36 HRC	450	.0012	.0013	.0015	.0018	.0020	.0025	.0030
		36 - 50 HRC	400	.0011	.0013	.0014	.0017	.0019	.0023	.0028
		> 50 HRC	350	.0009	.0010	.0011	.0013	.0015	.0018	.0022
Austenitic Stainless Steel	Nitronic 50, Nitronic 60, 301, 303, 304, 304L, Incoloy 27-7MO, 316, 316L, 321, 347	75 - 98 HRB	500	.0013	.0015	.0017	.0019	.0023	.0027	.0033
		21 - 36 HRC	450	.0013	.0014	.0016	.0018	.0021	.0026	.0031
		36 - 50 HRC	400	.0011	.0012	.0014	.0016	.0019	.0023	.0028
Martensitic & Ferritic Stainless Steel	403, 410, 416, 420, 440, 430, 446	75 - 98 HRB	750	.0013	.0015	.0017	.0020	.0023	.0027	.0033
		21 - 36 HRC	650	.0013	.0014	.0016	.0018	.0021	.0025	.0031
PH Stainless Steel	15-5, 17-4, Carpenter 450, Carpenter 465	21 - 36 HRC	450	.0011	.0013	.0015	.0017	.0020	.0023	.0028
		36 - 50 HRC	400	.0011	.0012	.0014	.0016	.0018	.0022	.0027
Gray Cast Iron	SAE J431, ASTM A48	75 - 98 HRB	600	.0017	.0019	.0022	.0025	.0029	.0035	.0042
Malleable Cast Iron	ASTM A47, ASTM A220, ASTM A602	75 - 98 HRB	550	.0014	.0015	.0017	.0020	.0023	.0028	.0034
		21 - 36 HRC	450	.0013	.0014	.0016	.0018	.0021	.0026	.0031
Nodular (Ductile) Cast Iron	ASTM A536, ASTM 897	75 - 98 HRB	500	.0014	.0015	.0018	.0020	.0024	.0028	.0034
		21 - 36 HRC	450	.0011	.0013	.0014	.0017	.0019	.0023	.0028
		36 - 50 HRC	400	.0009	.0010	.0011	.0013	.0015	.0018	.0022
Pure Nickel	Nickel 200, Nickel 201	< 75 HRB	600	.0016	.0018	.0020	.0023	.0027	.0032	.0039
		75 - 98 HRB	550	.0014	.0016	.0018	.0021	.0025	.0029	.0036
Nickel Alloy	Hastelloy C-22, Inconel 625, Waspaloy, René 41, Inconel 718, Incoloy 20	75 - 98 HRB	200	.0011	.0013	.0014	.0016	.0019	.0023	.0028
		21 - 36 HRC	180	.0011	.0012	.0014	.0016	.0019	.0023	.0027
		36 - 50 HRC	150	.0010	.0011	.0013	.0015	.0017	.0021	.0025
Pure Titanium	Ti Grade 1, Ti Grade 2, Ti Grade 3, Ti Grade 4, Ti Grade 7, Ti Grade 12	< 75 HRB	350	.0019	.0021	.0024	.0027	.0032	.0038	.0046
		75 - 98 HRB	400	.0017	.0019	.0022	.0025	.0029	.0035	.0042
		21 - 36 HRC	325	.0015	.0017	.0019	.0022	.0025	.0030	.0036
Titanium Alloy	Ti 3Al-2.5V, Ti 6Al-4V, Ti 10V-2Fe-3Al	21 - 36 HRC	300	.0013	.0015	.0017	.0019	.0022	.0027	.0032
		36 - 50 HRC	250	.0012	.0014	.0016	.0018	.0021	.0025	.0031
Cobalt Alloy	ASTM F562, ASTM F90, ASTM F75, ASTM F799	75 - 98 HRB	225	.0012	.0013	.0015	.0018	.0021	.0024	.0030
		21 - 36 HRC	150	.0012	.0013	.0015	.0017	.0020	.0024	.0029
		36 - 50 HRC	90	.0010	.0011	.0012	.0014	.0017	.0020	.0024

NOTES:

Style	Toolpath	ADOC (Stock Removal)	RDOC (Stepover Per Pass)
HMAF-FE-4 Lens	Finishing (Fin)	.005"-.010"	.025 x Dia x Benefit Multiple

ADOC and RDOC are recommended starting values, and should be adjusted according to your finish requirements

If converting from a ball end mill, the benefit multiple can be used to recalculate stepover pass-to-pass