

## **SPEEDS & FEEDS**

## HFV

## High Feed End Mills

Material Guide	HFV / HFVC													
Material Guide														
CAMPION   Color   Fig.   Fig	Material Guide		Hardness	SFM	1/9			16	· · · · · ·		3/8		1/2	
CAPBON   TOOL 113X, 120X, 121X, 12   TS HIRB   MOD   DOZT   DOST   DOMD   DOST   DOMD   DOST   DOMD   DOST   DOSD   DOS			Halulioss								1			
COUNTIELL   APPLICATIVE   COUNTIELL   CO		1	∠ 75 UDD	900	<u> </u>				<u> </u>		<u> </u>		<u> </u>	
STEEL   AS IMMAZI, AS IMAGE   21 - 36 HRC   700   2013   2025   2026   2028   2027   2027   2027   2027   2028														
No.   STEEL   STEEL   SEC.   STOCK	STEEL	ASTM A27, ASTM A36			!		!		!		!		!	
SPECIALTY   STELL   A2, H13, L6, P20, S7   A5, HRC   400   0,020   0,033   0,030   0,050   0,040   0,060   0			75 - 98 HRB	600	.0027	.0057	.0040	.0085	.0053	.0113	.0080	.0140	.0107	.0187
TOOLSTEEL   A2, H13, L6, P20, S7   75, 98 HRB   550   0.027   0.067   0.069   0.063   0.080	LOW ALLOY	13XX, 41XX, 43XX, 51XX,	21 - 36 HRC	550	.0027	.0047	.0040	.0070	.0053	.0093	.0080	.0140	.0107	.0187
TOOLSTEEL  A2. H13, 16, P20, S7  A2. H13, 16, P20, S7  A3. FINED	STEEL	86XX, 93XX					!				!		!	
TOOLSTEEL  A2, H13, L6, P20, S7  21 - 36 HRC  36 - 50 HRC  450  0029  0039  0029  0039  0029  0039  0029  0039  0029  0039  0029  0039  0029  0039  0029  0039  0029  0039  0029  0039  0029  0039  0029  0039  0029  0039  0029  0039  0040  0060  00														
SPEDULTY   STEEL   A2, H13, L6, P20, S7   S9 HRB   450   0.0027   0.0020   0.0033   0.0030   0.0040   0.0067   0.0060   0.0060   0.0033   0.0030														
SF-COLATY   SPECIALTY   SPEC	TOOL STEEL	A2, H13, L6, P20, S7												
SPECIALTY SITEL  SPECIALTY SPECIAL SP							!		!			!		
SPECIALTY STEEL   Maraging 200, Maraging 250, Maraging														
SECOLATY   Marriagna 200. Marriagna 250, Marriagn			-											
Maraging 390, Maraging 390   36 - 50 HRC   400   .0020   .0033   .0030   .0050   .0040   .0067   .0060   .0100   .0080   .0133   .0080   .0140   .0080   .0083   .0080   .0083   .0080   .0083   .0080   .0083   .0080   .0083   .0080   .0083   .0080   .0083   .0080   .0083   .0080   .0083   .0080   .0083   .0080   .0083   .0080   .0083   .0080   .0083   .0080   .0083   .0080   .0083   .0080   .0083   .0080   .0083   .0080   .0083   .0080   .0080   .0083   .0080   .0083   .0080   .0083   .0080   .0080   .0083   .0080   .0080   .0083   .0080   .00									!					
AUSTENTIC STANLESS STEEL 30, 410, 416, 420, 440, 450	STEEL										1		1	
AUSTEINITIC STAINLESS STEEL  7MO, 316, 316, 321, 347  36 - 50 HRC 400 0022 0040 0033 0060 0043 0080 0065 0120 0087 0160 0160 0033 0060 0043 0080 0065 0120 0087 0160 0160 0033 0060 0043 0080 0065 0120 0087 0160 0160 0160 0160 0160 0160 0160 016														
AUSTEINITIC STAINLESS STEEL  7MO, 316, 316, 321, 347  36 - 50 HRC 400 0022 0040 0033 0060 0043 0080 0065 0120 0087 0160 0160 0033 0060 0043 0080 0065 0120 0087 0160 0160 0033 0060 0043 0080 0065 0120 0087 0160 0160 0160 0160 0160 0160 0160 016		75 - 98 HRB	500	0027	0053	0040	0080	0053	0107	0080	01/0	0107	0187	
STEEL   TMO, 316, 316L, 321, 347   36 - 50 HRC   400   .0022   .0040   .0033   .0060   .0043   .0080   .0066   .0120   .0087   .0160							1				l		l	1 1
MARTENSTIC   FERRITC   A03, 410, 416, 420, 440,   A16, 420, 440,   A21, 486, ASTM A602   A16, ASTM A602					l						l			
AFERTING   403, 416, 420, 440,   430, 446   420, 440,   430, 446			36 - 50 HKC	400	.0022	.0040	.0033	.0000	.0043	.0000	.0003	.0120	.0007	.0100
STANLESS   430, 446   21 - 36 HRC   650   .0027   .0053   .0040   .0080   .0053   .0107   .0080   .0140   .0107   .0187			75 - 98 HRB	750	.0025	.0037	.0038	.0055	.0050	.0073	.0075	.0110	.0100	.0147
PH STAINLESS   15-5, 17-4, Carpenter 450, Carpenter 450, Carpenter 465   36-50 Hr.C   400   .0020   .0033   .0030   .0050   .0040   .0067   .0060   .0110   .0100   .0147	STAINLESS		21 - 36 HRC	650	.0027	.0053	.0040	.0080	.0053	.0107	.0080	.0140	.0107	.0187
STEEL   Carpenter 465   36 - 50 HRC   400   .0020   .0033   .0030   .0050   .0040   .0067   .0060   .0100   .0080   .0133	STEEL													
GRAY CAST IRON  SAE J431, ASTM A48  T5 - 98 HRB  600  D027  D038  D040  D056  D040  D056  D040  D057  D058  D053  D053  D050  D053  D050  D050  D053  D050	PH STAINLESS	15-5, 17-4, Carpenter 450,	21 - 36 HRC	450	.0025	.0037	.0038	.0055	.0050	.0073	.0075	.0110	.0100	.0147
RON   SAE J431, ASTM A48   21 - 36 HRC   550   .0027   .0063   .0040   .0095   .0053   .0127   .0080   .0140   .0107   .0187	STEEL	Carpenter 465	36 - 50 HRC	400	.0020	.0033	.0030	.0050	.0040	.0067	.0060	.0100	.0080	.0133
RON   SAE JSJ, AS IM ARB   21 - 36 HRC   550   .0027   .0063   .0040   .0095   .0053   .0127   .0080   .0140   .0107   .0187	GRAY CAST		75 - 98 HRB	600	.0027	.0083	.0040	.0125	.0053	.0140	.0080	.0140	.0107	.0187
NODULAR (DUCTILE)   ASTM A602   21 - 36 HRC   450   .0027   .0040   .0040   .0060   .0053   .0080   .0080   .0120   .0107   .0160		SAE J431, ASTM A48												
NODULAR (DUCTILE)   CAST IRON   75 - 98 HRB   500   .0027   .0056   .0040   .0084   .0053   .0111   .0080   .0140   .0107   .0187   .0160   .027   .0040   .0040   .0060   .0053   .0080   .0080   .0080   .0120   .0107   .0160   .027   .0040   .0060   .0053   .0080   .0080   .0080   .0120   .0107   .0160   .027   .0040   .0060   .0053   .0080   .00			75 - 98 HRB	550	.0027	.0056	.0040	.0084	.0053	.0111	.0080	.0140	.0107	.0187
ASTM A536, ASTM 897   21 - 36 HRC   450   .0027   .0040   .0040   .0060   .0053   .0080   .0080   .0120   .0107   .0160			21 - 36 HRC	450	.0027	.0040	.0040	.0060	.0053	.0080	.0080	.0120	.0107	.0160
CAST IRON   36 - 50 HRC   400   .0013   .0020   .0020   .0030   .0027   .0040   .0040   .0060   .0053   .0080	NODULAR													
PURE NICKEL ALLOY    Nickel 200, Nickel 201   75 - 98 HRB   550   .0027   .0043   .0040   .0056   .0053   .0094   .0080   .0140   .0107   .0172     NICKEL ALLOY   Hastelloy C-22, Inconel 625, Waspaloy, René 41, Inconel 778, Incoley 20   75 - 98 HRB   200   .0027   .0038   .0040   .0056   .0053   .0087   .0080   .0113   .0107   .0150     PURE TITANIUM 7, Ti Grade 3, Ti Grade 4, Ti Grade 7, Ti Grade 14, Ti Grade 7, Ti Grade 14, Ti Grade 7, Ti Grade 17, Ti Grade 18, Ti Grade 17, Ti Grade 18, Ti Gr		ASTM A536, ASTM 897												
NICKEL ALLOY    Hastelloy C-22, Inconel 625, Waspaloy, René 41, Inconel 718, Incoley 20   75 - 98 HRB   200   .0027   .0038   .0040   .0056   .0053   .0075   .0080   .0130   .0107   .0150														
NICKEL ALLOY  Hastelloy C-22, Inconel 625, Waspaloy, René 41, Inconel 7718, Incoloy 20  Ti Grade 1, Ti Grade 2, Ti Grade 3, Ti Grade 4, Ti Grade 7, Ti Grade 14, Ti Grade 7, Ti Grade 14, Ti Grade 7, Ti Grade 14, Ti Grade 7, Ti Grade 17, Ti Grade 18, Ti Grade 17, Ti		Nickel 200, Nickel 201												
NICKEL ALLOY	NICKEL										<del></del>		<del>                                     </del>	
ALLOY 718, Incolory 20 36 - 50 HRC 150 .0022 .0028 .0033 .0042 .0043 .0056 .0065 .0084 .0087 .0112  PURE TITANIUM 7, 13 Grade 4, 17 Grade 7, 17 Grade 12 .1 - 36 HRC 300 .0027 .0040 .0040 .0060 .0053 .0084 .0080 .0127 .0107 .0168 .017 .0168 .017 .017 .0187 .0187 .0187 .0187 .0187 .0187 .0187 .0187 .0187 .0187 .0187 .0187 .0188 .0187 .0188 .0	NICKEL								1					
PURE TITANIUM 7, Ti Grade 1, Ti Grade 2, Ti Grade 4, Ti Grade 7, Ti Grade 1, Ti Grade 7, Ti Grade 1, Ti Grade 7, Ti Grade 1, Ti Grade 1, Ti Grade 7, Ti Grade 1, Ti Grade 1, Ti Grade 1, Ti Grade 1, Ti Grade 7, Ti Grade 12 21 - 36 HRC 300 .0027 .0040 .0040 .0060 .0053 .0084 .0080 .0127 .0107 .0168 .0058 .00					ļ .		!		!		ļ .	!	!	!!
PURE   TITANIUM   Ti Sal-2.5V, Ti Gale   4, Ti Grade   75 - 98 HRB   400   .0027   .0042   .0040   .0063   .0053   .0084   .0080   .0127   .0107   .0168   .0107   .0158   .0080   .0127   .0107   .0158   .0080   .0127   .0107   .0158   .0080   .0120   .0107   .0158   .0080   .0120   .0107   .0158   .0080   .0120   .0107   .0158   .0080   .0120   .0107   .0158   .0080   .0120   .0107   .0158   .0080   .0120   .0107   .0158   .0080   .0120   .0107   .0158   .0080   .0120   .0107   .0158   .0080   .0120   .0107   .0158   .0080   .0120   .0107   .0158   .0107   .0158   .0107   .0158   .0080   .0080   .0120   .0107   .0158   .0107   .0158   .0107   .0158   .0080   .0080   .0107   .0158   .0107   .0158   .0107   .0158   .0080   .0107   .0158   .0080   .0107   .0158   .0158   .0157   .0157   .0157   .0157   .0158   .0157   .0157   .0157   .0157   .0157   .0157   .0157   .0157   .0157   .0157   .0157   .0157   .0157   .0157   .0157   .0157   .0157   .0157   .0157   .		r 10, incoloy 20	36 - 50 HRC	150	.0022	.0028	.0033	.0042	.0043	.0056	.0065	.0084	.0087	.0112
TITANIUM 7, Ti Grade 12 21 - 36 HRC 325	PLIDE						!				!		!	
7, II Grade 12 21 - 36 HRC 325 .0027 .0040 .0040 .0060 .0053 .0080 .0080 .0120 .0107 .0158  TITANIUM ALLOY 10V-2Fe-3AI 36 - 50 HRC 250 .0025 .0023 .0038 .0035 .0050 .0047 .0075 .0070 .0100 .0093  COBALT ASTM F562, ASTM F90, ASTM F79 ALLOY ASTM F75 .ASTM F799 .21 - 36 HRC 150 .0027 .0035 .0040 .0053 .0050 .0053 .0060 .0047 .0060 .0070 .0080 .0093  ASTM F562, ASTM F799 ASTM F799 .21 - 36 HRC 150 .0027 .0035 .0040 .0053 .0053 .0050 .0070 .0080 .0105 .0107 .0140					!		!		!		!	!	!	
ALLOY 10V-ZFe-SAI 36 - 50 HRC 250 .0025 .0023 .0038 .0035 .0050 .0047 .0075 .0070 .0100 .0093  COBALT ASTM F562, ASTM F90, 21 - 36 HRC 150 .0027 .0035 .0040 .0053 .0050 .0047 .0060 .0070 .0080 .0093  ALLOY ASTM F75, ASTM F79, 21 - 36 HRC 150 .0027 .0035 .0040 .0053 .0053 .0070 .0080 .0105 .0107 .0140		,												
COBALT ASTM F562, ASTM F90, ASTM F75. ASTM F799 21 - 36 HRC 150 .0027 .0035 .0040 .0053 .0053 .0060 .0070 .0080 .0105 .0107 .0140														
COBALT ASTM F562, ASTM F90, ASTM F75, ASTM F799 21 - 36 HRC 150 .0027 .0035 .0040 .0053 .0053 .0050 .0070 .0080 .0105 .0107 .0140	ALLUY	IUV-ZFE-JAI				\								
A 10 Y														
	ALLOY	ASTM F75, ASTM F799			!	!	!		!				!	

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



