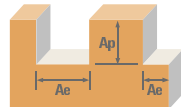


Series 77, 77CR Fractional	Hardness	Ae x D ₁	Ap x D ₁	Vc (sfm)	D ₁ • inch						
					1/4	3/8	1/2	5/8	3/4	1	
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	HSM	2.5xD	816 (653-979)	RPM	11552	7701	5776	4621	3851	2888
					Fz	0.0015	0.0024	0.0031	0.0035	0.0038	0.0042
		Feed (ipm)	121	129	125	113	102	85			
		HSM	3xD	845 (676-1014)	Fz	0.0017	0.0027	0.0035	0.0040	0.0043	0.0047
					Feed (ipm)	136	146	140	129	116	95
		HSM	4xD	756 (605-907)	Fz	0.0018	0.0028	0.0036	0.0041	0.0044	0.0049
	Feed (ipm)				146	151	146	133	119	99	
	≤ 375 Bhn or ≤ 40 HRc	HSM	2.5xD	595 (476-714)	RPM	8419	5613	4210	3368	2806	2105
					Fz	0.0009	0.0019	0.0026	0.0028	0.0031	0.0035
		Feed (ipm)	53	75	77	66	61	52			
		HSM	3xD	616 (493-739)	Fz	0.0010	0.0021	0.0030	0.0033	0.0035	0.0039
					Feed (ipm)	59	83	88	78	69	57
HSM		4xD	551 (441-661)	Fz	0.0011	0.0022	0.0031	0.0034	0.0036	0.0041	
	Feed (ipm)			65	86	91	80	71	60		
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	HSM	2.5xD	646 (517-775)	RPM	9137	6092	4569	3655	3046	2284
					Fz	0.0009	0.0017	0.0023	0.0025	0.0028	0.0032
		Feed (ipm)	58	72	74	64	60	51			
		HSM	3xD	669 (535-803)	Fz	0.0010	0.0019	0.0026	0.0029	0.0031	0.0036
					Feed (ipm)	64	81	83	74	66	58
		HSM	4xD	598 (478-718)	Fz	0.0011	0.0020	0.0027	0.0030	0.0033	0.0037
	Feed (ipm)				70	85	86	77	70	59	
	≤ 275 Bhn or ≤ 28 HRc	HSM	2.5xD	425 (340-510)	RPM	6020	4014	3010	2408	2007	1505
					Fz	0.0007	0.0014	0.0019	0.0023	0.0026	0.0030
		Feed (ipm)	29	39	40	39	37	32			
		HSM	3xD	440 (352-528)	Fz	0.0008	0.0016	0.0021	0.0025	0.0029	0.0034
					Feed (ipm)	34	45	44	42	41	36
HSM		4xD	394 (315-473)	Fz	0.0008	0.0016	0.0022	0.0026	0.0030	0.0035	
	Feed (ipm)			34	45	46	44	42	37		
≤ 325 Bhn or ≤ 35 HRc	HSM	2.5xD	408 (326-490)	RPM	5776	3851	2888	2310	1925	1444	
				Fz	0.0007	0.0014	0.0019	0.0023	0.0026	0.0030	
	Feed (ipm)	28	38	38	37	35	30				
	HSM	3xD	422 (338-506)	Fz	0.0008	0.0016	0.0021	0.0025	0.0029	0.0034	
				Feed (ipm)	32	43	42	40	39	34	
	HSM	4xD	378 (302-454)	Fz	0.0008	0.0016	0.0022	0.0026	0.0030	0.0035	
Feed (ipm)				32	43	44	42	40	35		
P CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	HSM	2.5xD	714 (571-857)	RPM	10100	6733	5050	4040	3367	2525
					Fz	0.0010	0.0018	0.0024	0.0028	0.0033	0.0037
		Feed (ipm)	71	85	85	79	78	65			
		HSM	3xD	739 (591-887)	Fz	0.0011	0.0020	0.0027	0.0033	0.0037	0.0042
					Feed (ipm)	78	94	95	93	87	73
		HSM	4xD	661 (529-793)	Fz	0.0012	0.0021	0.0028	0.0034	0.0039	0.0043
	Feed (ipm)				85	99	99	96	92	76	
	≤ 260 Bhn or ≤ 26 HRc	HSM	2.5xD	425 (340-510)	RPM	6020	4014	3010	2408	2007	1505
					Fz	0.0007	0.0014	0.0019	0.0023	0.0026	0.0030
		Feed (ipm)	29	39	40	39	37	32			
		HSM	3xD	440 (352-528)	Fz	0.0008	0.0016	0.0021	0.0025	0.0029	0.0037
					Feed (ipm)	34	45	44	42	41	39
HSM		4xD	394 (315-473)	Fz	0.0008	0.0016	0.0022	0.0026	0.0030	0.0035	
	Feed (ipm)			34	45	46	44	42	37		

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Series 77, 77CR Fractional	Hardness	Ae x D ₁	Ap x D ₁	Vc (sfm)	D ₁ • inch							
					1/4	3/8	1/2	5/8	3/4	1		
N NON-FERROUS MATERIALS	Not Recommended for this Material Group											
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	HSM	2.5xD	136	RPM	1925	1284	963	770	642	481
			≤ 0.2	≤ APMX	(109-163)	Fz	0.0006	0.0011	0.0016	0.0018	0.0021	0.0025
			Feed (ipm)	8	10	11	10	9	8			
		HSM	3xD	141	Fz	0.0007	0.0012	0.0018	0.0021	0.0024	0.0028	
		≤ 0.15	≤ APMX	(113-169)	Feed (ipm)	9	11	12	11	11	9	
		HSM	4xD	126	Fz	0.0007	0.0013	0.0018	0.0022	0.0025	0.0029	
	≤ 0.1	≤ APMX	(101-151)	Feed (ipm)	9	12	12	12	11	10		
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	HSM	2.5xD	85	RPM	1207	805	604	483	402	302
			≤ 0.2	≤ APMX	(68-102)	Fz	0.0005	0.0009	0.0013	0.0015	0.0018	0.0022
Feed (ipm)			4	5	5	5	5	5				
HSM		3xD	88	Fz	0.0005	0.0010	0.0015	0.0018	0.0020	0.0025		
≤ 0.15		≤ APMX	(70-106)	Feed (ipm)	4	6	6	6	6	5		
HSM		4xD	79	Fz	0.0006	0.0011	0.0015	0.0018	0.0021	0.0026		
≤ 0.1	≤ APMX	(63-95)	Feed (ipm)	5	6	6	6	6	5			
TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	HSM	2.5xD	289	RPM	4095	2730	2048	1638	1365	1024	
		≤ 0.2	≤ APMX	(231-347)	Fz	0.0008	0.0015	0.0021	0.0024	0.0028	0.0032	
		Feed (ipm)	23	29	30	28	27	23				
	HSM	3xD	299	Fz	0.0009	0.0017	0.0023	0.0025	0.0028	0.0036		
	≤ 0.15	≤ APMX	(239-359)	Feed (ipm)	26	32	33	29	27	26		
	HSM	4xD	268	Fz	0.0009	0.0018	0.0024	0.0029	0.0033	0.0037		
≤ 0.1	≤ APMX	(214-322)	Feed (ipm)	26	34	34	33	32	27			
TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	HSM	2.5xD	170	RPM	2399	1599	1199	960	800	600	
		≤ 0.2	≤ APMX	(136-204)	Fz	0.0008	0.0015	0.0021	0.0024	0.0028	0.0032	
		Feed (ipm)	13	17	18	16	16	13				
	HSM	3xD	176	Fz	0.0009	0.0017	0.0023	0.0025	0.0028	0.0036		
	≤ 0.15	≤ APMX	(141-211)	Feed (ipm)	15	19	19	17	16	15		
	HSM	4xD	157	Fz	0.0009	0.0018	0.0024	0.0029	0.0033	0.0037		
≤ 0.1	≤ APMX	(126-188)	Feed (ipm)	15	20	20	19	18	16			
TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	HSM	2.5xD	272	RPM	3851	2567	1925	1540	1284	963	
		≤ 0.2	≤ APMX	(218-326)	Fz	0.0006	0.0011	0.0014	0.0017	0.0020	0.0024	
		Feed (ipm)	16	20	19	18	18	16				
	HSM	3xD	282	Fz	0.0007	0.0012	0.0016	0.0019	0.0022	0.0027		
	≤ 0.15	≤ APMX	(226-338)	Feed (ipm)	19	22	22	20	20	18		
	HSM	4xD	252	Fz	0.0007	0.0013	0.0017	0.0020	0.0023	0.0028		
≤ 0.1	≤ APMX	(202-302)	Feed (ipm)	19	23	23	22	21	19			

Bhn (Brinell) HRc (Rockwell C) HSM (High Speed Machining)
 rpm = Vc x 3.82 / DC
 mm/min = Fz x 7 x rpm
 reduce speed and feed for materials harder than listed
 reduce feed and Ae when finish milling (.02 x DC maximum)
 feed rates listed have chip thinning adjustments included where applicable
 refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)