

FRACTIONAL
Hi-PerCarb®

Series 135 5D Fractional	Hardness	Vc (sfm)	DC • in								
			1/32	1/8	1/4	3/8	1/2	5/8	7/8		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	345	RPM	42173	10543	5272	3514	2636	2109	1506	
		(276-414)	Fr	0.0010	0.0040	0.0080	0.0120	0.0159	0.0199	0.0279	
			Feed (ipm)	42.0	42.0	42.0	42.0	42.0	42.0	42.0	
	≤ 275 Bhn or ≤ 28 HRc	310	RPM	37894	9474	4737	3158	2368	1895	1353	
		(248-372)	Fr	0.0009	0.0036	0.0072	0.0108	0.0144	0.0179	0.0251	
			Feed (ipm)	34.0	34.0	34.0	34.0	34.0	34.0	34.0	
	≤ 425 Bhn or ≤ 45 HRc	180	RPM	22003	5501	2750	1834	1375	1100	786	
		(144-216)	Fr	0.0007	0.0030	0.0060	0.0090	0.0120	0.0150	0.0210	
			Feed (ipm)	16.5	16.5	16.5	16.5	16.5	16.5	16.5	
	M ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	270	RPM	33005	8251	4126	2750	2063	1650	1179
			(216-324)	Fr	0.0008	0.0030	0.0061	0.0091	0.0121	0.0151	0.0212
				Feed (ipm)	25.0	25.0	25.0	25.0	25.0	25.0	25.0
≤ 375 Bhn or ≤ 40 HRc		165	RPM	20170	5042	2521	1681	1261	1008	720	
		(132-198)	Fr	0.0006	0.0026	0.0052	0.0077	0.0103	0.0129	0.0180	
			Feed (ipm)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	
≤ 450 Bhn or ≤ 48 HRc		115	RPM	14058	3514	1757	1171	879	703	502	
		(92-138)	Fr	0.0004	0.0018	0.0035	0.0053	0.0071	0.0088	0.0123	
			Feed (ipm)	6.2	6.2	6.2	6.2	6.2	6.2	6.2	
K STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F		≤ 185 Bhn or ≤ 9 HRc	250	RPM	30560	7640	3820	2547	1910	1528	1091
			(200-300)	Fr	0.0006	0.0026	0.0051	0.0077	0.0102	0.0128	0.0179
				Feed (ipm)	19.5	19.5	19.5	19.5	19.5	19.5	19.5
	≤ 275 Bhn or ≤ 28 HRc	150	RPM	18336	4584	2292	1528	1146	917	655	
		(120-180)	Fr	0.0005	0.0020	0.0039	0.0059	0.0079	0.0098	0.0137	
			Feed (ipm)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	
K STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	80	RPM	9779	2445	1222	815	611	489	349	
		(64-96)	Fr	0.0005	0.0020	0.0039	0.0059	0.0079	0.0098	0.0137	
			Feed (ipm)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	
	≤ 375 Bhn or ≤ 40 HRc	55	RPM	6723	1681	840	560	420	336	240	
		(44-66)	Fr	0.0004	0.0018	0.0036	0.0054	0.0071	0.0089	0.0125	
			Feed (ipm)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
K CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	300	RPM	36672	9168	4584	3056	2292	1834	1310	
		(240-360)	Fr	0.0011	0.0045	0.0089	0.0134	0.0179	0.0224	0.0313	
			Feed (ipm)	41.0	41.0	41.0	41.0	41.0	41.0	41.0	
	≤ 260 Bhn or ≤ 26 HRc	265	RPM	32394	8098	4049	2699	2025	1620	1157	
		(212-318)	Fr	0.0011	0.0046	0.0091	0.0137	0.0183	0.0228	0.0320	
			Feed (ipm)	37.0	37.0	37.0	37.0	37.0	37.0	37.0	

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Series 135 5D Fractional	Hardness	Vc (sfm)		DC • in							
				1/32	1/8	1/4	3/8	1/2	5/8	7/8	
N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	635 (508-762)	RPM	77622	19406	9703	6469	4851	3881	2772	
			Fr	0.0012	0.0049	0.0099	0.0148	0.0198	0.0247	0.0346	
			Feed (ipm)	96.0	96.0	96.0	96.0	96.0	96.0	96.0	
	≤ 150 Bhn or ≤ 7 HRc	540 (432-648)	RPM	66010	16502	8251	5501	4126	3300	2357	
			Fr	0.0012	0.0050	0.0099	0.0149	0.0199	0.0248	0.0348	
			Feed (ipm)	82.0	82.0	82.0	82.0	82.0	82.0	82.0	
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	450 (360-540)	RPM	55008	13752	6876	4584	3438	2750	1965
				Fr	0.0005	0.0020	0.0040	0.0060	0.0080	0.0100	0.0140
				Feed (ipm)	27.5	27.5	27.5	27.5	27.5	27.5	27.5
		≤ 200 Bhn or ≤ 23 HRc	360 (288-432)	RPM	44006	11002	5501	3667	2750	2200	1572
				Fr	0.0005	0.0020	0.0040	0.0060	0.0080	0.0100	0.0140
				Feed (ipm)	22.0	22.0	22.0	22.0	22.0	22.0	22.0
S SUPER ALLOYS (Nickel , Cobalt, Iron Base) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	40 (32-48)	RPM	4890	1222	611	407	306	244	175	
			Fr	0.0002	0.0008	0.0016	0.0025	0.0033	0.0041	0.0057	
			Feed (ipm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
	≤ 400 Bhn or ≤ 43 HRc	20 (16-24)	RPM	2445	611	306	204	153	122	87	
			Fr	0.0002	0.0007	0.0013	0.0020	0.0026	0.0033	0.0046	
			Feed (ipm)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	105 (84-126)	RPM	12835	3209	1604	1070	802	642	458
				Fr	0.0005	0.0018	0.0036	0.0054	0.0072	0.0090	0.0127
				Feed (ipm)	5.8	5.8	5.8	5.8	5.8	5.8	5.8
		≤ 350 Bhn or ≤ 38 HRc	80 (64-96)	RPM	9779	2445	1222	815	611	489	349
				Fr	0.0004	0.0016	0.0032	0.0048	0.0064	0.0080	0.0112
				Feed (ipm)	3.9	3.9	3.9	3.9	3.9	3.9	3.9
≤ 440 Bhn or ≤ 47 HRc	42 (34-50)	RPM	5134	1284	642	428	321	257	183		
		Fr	0.0003	0.0012	0.0025	0.0037	0.0050	0.0062	0.0087		
		Feed (ipm)	1.6	1.6	1.6	1.6	1.6	1.6	1.6		
H TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 200 Bhn or ≤ 13 HRc	120 (96-144)	RPM	14669	3667	1834	1222	917	733	524	
			Fr	0.0006	0.0026	0.0051	0.0077	0.0103	0.0128	0.0179	
			Feed (ipm)	9.4	9.4	9.4	9.4	9.4	9.4	9.4	
	≤ 375 Bhn or ≤ 40 HRc	80 (64-96)	RPM	9779	2445	1222	815	611	489	349	
			Fr	0.0003	0.0012	0.0024	0.0036	0.0047	0.0059	0.0083	
			Feed (ipm)	2.9	2.9	2.9	2.9	2.9	2.9	2.9	
	≤ 475 Bhn or ≤ 50 HRc	70 (56-84)	RPM	8557	2139	1070	713	535	428	306	
			Fr	0.0002	0.0008	0.0016	0.0024	0.0032	0.0040	0.0056	
			Feed (ipm)	1.7	1.7	1.7	1.7	1.7	1.7	1.7	

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
 $rpm = Vc \times 3.82 / DC$
 $ipm = Fr \times rpm$
 reduce speed and feed for materials harder than listed
 refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)