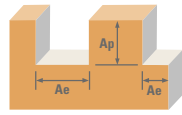


Series	Z1B Fractional	Hardness	Ae x DC	Ap x DC	Vc (sfm)	DC • in								
						1/8	1/4	3/8	1/2	5/8	3/4	1		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.5	≤ 1.5	555	RPM	16961	8480	5654	4240	3392	2827	2120
						(444-666)	Fz	0.0004	0.0010	0.0019	0.0025	0.0031	0.0032	0.0035
							Feed (ipm)	25.8	33.9	43.0	42.4	42.1	36.5	29.7
						440	RPM	13446	6723	4482	3362	2689	2241	1681
						(352-528)	Fz	0.0004	0.0010	0.0019	0.0025	0.0031	0.0032	0.0035
							Feed (ipm)	20.4	26.9	34.1	33.6	33.3	29.0	23.5
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile 	≤ 0.5	≤ 1.5	315	RPM	9626	4813	3209	2407	1925	1604	1203
						(252-378)	Fz	0.0003	0.0008	0.0014	0.0019	0.0024	0.0025	0.0027
							Feed (ipm)	10.8	15.4	18.0	18.3	18.5	16.0	13.0
						250	RPM	7640	3820	2547	1910	1528	1273	955
						(200-300)	Fz	0.0003	0.0008	0.0014	0.0019	0.0024	0.0025	0.0027
							Feed (ipm)	8.6	12.2	14.3	14.5	14.7	12.7	10.3
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.5	≤ 1.5	490	RPM	14974	7487	4991	3744	2995	2496	1872
						(392-588)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (ipm)	18.0	21.0	28.0	27.0	27.6	24.0	18.7
						390	RPM	11918	5959	3973	2980	2384	1986	1490
						(312-468)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (ipm)	14.3	16.7	22.2	21.5	21.9	19.1	14.9
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.5	≤ 1.5	340	RPM	10390	5195	3463	2598	2078	1732	1299
						(272-408)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020
							Feed (ipm)	8.3	12.5	15.2	14.5	15.0	13.2	10.4
						270	RPM	8251	4126	2750	2063	1650	1375	1031
						(216-324)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020
							Feed (ipm)	6.6	9.9	12.1	11.6	11.9	10.5	8.3
STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	≤ 325 Bhn or ≤ 35 HRc	Profile 	≤ 0.5	≤ 1.5	310	RPM	9474	4737	3158	2368	1895	1579	1184	
					(248-372)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020	
						Feed (ipm)	7.6	11.4	13.9	13.3	13.6	12.0	9.5	
					250	RPM	7640	3820	2547	1910	1528	1273	955	
					(200-300)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020	
						Feed (ipm)	6.1	9.2	11.2	10.7	11.0	9.7	7.6	
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile 	≤ 0.5	≤ 1.5	445	RPM	13599	6800	4533	3400	2720	2267	1700
						(356-534)	Fz	0.0004	0.0010	0.0018	0.0024	0.0030	0.0031	0.0034
							Feed (ipm)	19.0	27.2	32.6	32.6	32.6	28.1	23.1
						355	RPM	10849	5424	3616	2712	2170	1808	1356
						(284-426)	Fz	0.0004	0.0010	0.0018	0.0024	0.0030	0.0031	0.0034
							Feed (ipm)	15.2	21.7	26.0	26.0	26.0	22.4	18.4

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FRACTIONAL Z-Carb



Series	Z1B Fractional	Hardness	Ae x DC	Ap x DC	Vc (sfm)	DC • in								
						1/8	1/4	3/8	1/2	5/8	3/4	1		
K	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	Profile	≤ 0.5	≤ 1.5	340	RPM	10390	5195	3463	2598	2078	1732	1299
						(272-408)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
						Feed (ipm)	12.5	14.5	19.4	18.7	19.1	16.6	13.0	
			Slot	1	≤ 1	270	RPM	8251	4126	2750	2063	1650	1375	1031
						(216-324)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
						Feed (ipm)	9.9	11.6	15.4	14.9	15.2	13.2	10.3	
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ 0.5	≤ 1.5	80	RPM	2445	1222	815	611	489	407	306
						(64-96)	Fz	0.0002	0.0004	0.0008	0.0010	0.0013	0.0014	0.0015
						Feed (ipm)	2.2	2.0	2.6	2.4	2.5	2.3	1.8	
			Slot	1	≤ 1	65	RPM	1986	993	662	497	397	331	248
						(52-78)	Fz	0.0002	0.0004	0.0008	0.0010	0.0013	0.0014	0.0015
						Feed (ipm)	1.6	1.6	2.1	2.0	2.1	1.9	1.5	
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ 0.5	≤ 1.5	62	RPM	1895	947	632	474	379	316	237	
					(50-74)	Fz	0.0001	0.0003	0.0005	0.0007	0.0008	0.0009	0.0010	
					Feed (ipm)	0.8	1.1	1.3	1.3	1.2	1.1	0.9		
		Slot	1	≤ 1	50	RPM	1497	749	499	374	299	250	187	
					(40-60)	Fz	0.0001	0.0003	0.0005	0.0007	0.0008	0.0009	0.0010	
					Feed (ipm)	0.6	0.9	1.0	1.0	1.0	0.9	0.7		
S	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ 0.5	≤ 1.5	215	RPM	6570	3285	2190	1643	1314	1095	821
						(172-258)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
						Feed (ipm)	5.3	6.6	8.8	8.5	8.4	7.4	5.9	
			Slot	1	≤ 1	170	RPM	5195	2598	1732	1299	1039	866	649
						(136-204)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
						Feed (ipm)	4.2	5.2	6.9	6.8	6.6	5.9	4.7	
TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	≤ 0.5	≤ 1.5	75	RPM	2292	1146	764	573	458	382	287	
					(60-90)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018	
					Feed (ipm)	1.8	2.3	3.1	3.0	2.9	2.6	2.1		
		Slot	1	≤ 1	60	RPM	1834	917	611	458	367	306	229	
					(48-72)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018	
					Feed (ipm)	1.5	1.8	2.4	2.4	2.3	2.1	1.7		
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 0.5	≤ 1.5	185	RPM	5654	2827	1885	1413	1131	942	707
						(148-222)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
						Feed (ipm)	4.5	5.7	7.5	7.3	7.2	6.4	5.1	
			Slot	1	≤ 1	145	RPM	4431	2216	1477	1108	886	739	554
						(116-174)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
						Feed (ipm)	3.5	4.4	5.9	5.8	5.7	5.0	4.0	

Bhn (Brinell) HRc (Rockwell C)
 $rpm = Vc \times 3.82 / DC$
 $ipm = Fz \times 4 \times rpm$
 reduce speed and feed for materials harder than listed
 reduce feed and Ae when finish milling (.02 x DC maximum)
 refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)