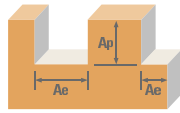








2 Flute: Square & Ball End

4 Flute: Square & Ball End



Diamond 1, 1B, 3, 3B Fractional	Ae x DC	Ap x DC	Vc (sfm)	DC • in						
				1/8	1/4	5/16	3/8	1/2		
GRAPHITE Ultrafine, Superfine	Profile 	≤ 0.25	≤ 1.5	720	RPM	22003	11002	8801	7334	5501
					Fz	0.0009	0.0023	0.0036	0.0043	0.0058
				(576-864)	Feed 2 flutes (ipm)	38.3	50.6	63.4	63.1	63.8
		Feed 4 flutes (ipm)	76.6	101.2	126.7	126.2	127.6			
	Slot 	≤ 1	≤ 1	580	RPM	17725	8862	7090	5908	4431
					Fz	0.0075	0.0020	0.0031	0.0038	0.0050
(464-696)				Feed 2 flutes (ipm)	265.9	35.4	44.0	44.9	44.3	
	Feed 4 flutes (ipm)	531.7	70.9	87.9	89.8	88.6				
COMPOSITES FRP, CFRP, GRP	Profile 	≤ 0.25	≤ 1.5	385	RPM	11766	5883	4706	3922	2941
					Fz	0.0005	0.0014	0.0022	0.0026	0.0035
				(308-462)	Feed 2 flutes (ipm)	12.2	16.5	20.7	20.4	20.6
		Feed 4 flutes (ipm)	24.5	32.9	41.4	40.8	41.2			
	Slot 	≤ 1	≤ 1	350	RPM	10696	5348	4278	3565	2674
					Fz	0.0005	0.0012	0.0019	0.0023	0.0030
(280-420)				Feed 2 flutes (ipm)	9.6	12.8	16.3	16.4	16.0	
	Feed 3 flutes (ipm)	19.3	25.7	32.5	32.8	32.1				
PLASTICS Polycarbonate, PVC, Polypropylene	Profile 	≤ 0.25	≤ 1.5	1200	RPM	36672	18336	14669	12224	9168
					Fz	0.0009	0.0023	0.0036	0.0043	0.0058
				(960-1440)	Feed 2 flutes (ipm)	63.8	84.3	105.6	105.1	106.3
		Feed 4 flutes (ipm)	127.6	168.7	211.2	210.3	212.7			
	Slot 	≤ 1	≤ 1	960	RPM	29338	14669	11735	9779	7334
					Fz	0.0008	0.0020	0.0031	0.0038	0.0050
(768-1152)				Feed 2 flutes (ipm)	44.0	58.7	72.8	74.3	73.3	
	Feed 3 flutes (ipm)	88.0	117.4	145.5	148.6	146.7				

rpm = (Vc x 3.82) / DC
 ipm = Fz x number of flutes x rpm
 finish cuts typically require reduced feed and cut depths (.02 x D maximum)
 refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

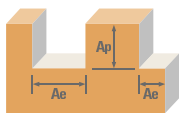
FRACTIONAL

2 Flute: Square, Double, Stub, Long, Ball, Corner Radius

3 Flute: Square, Ball, Tapered

4 Flute: Square, Double, Stub, Ball, Corner Radius

Tapered: Square, Radius



Series
1, 3, 5, 14, 15, 16,
17, 23, 24, 59
Fractional

Material	Hardness	Flutes	Ae x DC	Ap x DC	Vc (sfm)	RPM	DC • in										
							1/64	1/32	1/16	1/8	1/4	3/8	1/2	3/4	1		
CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRC	Profile	2	≤ 0.50	≤ 1.5	460	RPM	112461	56230	28115	14058	7029	4686	3514	2343	1757	
							Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028	
							Feed (ipm)	6.7	6.7	7.3	8.4	11.2	14.1	14.1	16.9	14.8	
		Slot	2	1	≤ 1	335	RPM	81901	40950	20475	10238	5119	3413	2559	1706	1280	
							Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028	
							Feed (ipm)	4.9	4.9	5.3	6.1	8.2	10.2	10.2	8.2	7.2	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRC	Profile	2	≤ 0.50	≤ 1.5	335	RPM	81901	40950	20475	10238	5119	3413	2559	1706	1280
								Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
								Feed (ipm)	3.3	4.1	3.7	4.1	6.1	7.5	7.7	6.1	5.4
			Slot	2	1	≤ 1	245	RPM	59898	29949	14974	7487	3744	2496	1872	1248	936
								Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
								Feed (ipm)	2.4	3.0	2.7	3.0	4.5	5.5	5.6	4.5	3.9
STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F		≤ 275 Bhn or ≤ 28 HRC	Profile	2	≤ 0.50	≤ 1.5	370	RPM	90458	45229	22614	11307	5654	3769	2827	1885	1413
								Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
								Feed (ipm)	3.6	4.5	4.1	4.5	6.8	8.3	8.5	6.8	5.9
			Slot	2	1	≤ 1	270	RPM	66010	33005	16502	8251	4126	2750	2063	1375	1031
								Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
								Feed (ipm)	2.6	3.3	3.0	3.3	5.0	6.1	6.2	5.0	4.3
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L, 17-4 PH, 15-5, 13-4, Custom 450	≤ 275 Bhn or ≤ 28 HRC	Profile	2	≤ 0.50	≤ 1.5	255	RPM	62342	31171	15586	7793	3896	2598	1948	1299	974
								Fz	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017
								Feed (ipm)	2.5	2.5	2.5	2.6	3.9	4.7	4.7	3.6	3.3
			Slot	2	1	≤ 1	185	RPM	45229	22614	11307	5654	2827	1885	1413	942	707
								Fz	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017
								Feed (ipm)	1.8	1.8	1.8	1.9	2.8	3.4	3.4	2.6	2.4
CAST IRONS Gray, Malleable, Ductile		≤ 220 Bhn or ≤ 19 HRC	Profile	2	≤ 0.50	≤ 1.5	335	RPM	81901	40950	20475	10238	5119	3413	2559	1706	1280
								Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
								Feed (ipm)	4.9	4.9	5.3	6.1	8.2	10.2	10.2	8.2	7.2
			Slot	2	1	≤ 1	245	RPM	59898	29949	14974	7487	3744	2496	1872	1248	936
								Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
								Feed (ipm)	4.9	4.9	5.3	6.1	8.2	10.2	10.2	8.2	7.2
	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRC	Profile	2	≤ 0.50	≤ 1.5	880	RPM	215142	107571	53786	26893	13446	8964	6723	4482	3362
								Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
								Feed (ipm)	25.8	28.0	26.9	32.3	43.0	53.8	53.8	43.0	37.6
			Slot	2	1	≤ 1	640	RPM	156467	78234	39117	19558	9779	6519	4890	3260	2445
								Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
								Feed (ipm)	18.8	20.3	19.6	23.5	31.3	39.1	39.1	31.3	27.4
COPPER ALLOYS Alum Bronze, C110, Muntz Brass		≤ 140 Bhn or ≤ 3 HRC	Profile	2	≤ 0.50	≤ 1.5	485	RPM	118573	59286	29643	14822	7411	4941	3705	2470	1853
								Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
								Feed (ipm)	7.1	7.1	7.7	8.9	11.9	14.8	14.8	11.9	10.4
			Slot	2	1	≤ 1	350	RPM	85568	42784	21392	10696	5348	3565	2674	1783	1337
								Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
								Feed (ipm)	5.1	5.1	5.6	6.4	8.6	10.7	10.7	8.6	7.5

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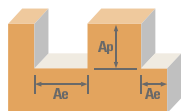
FRACTIONAL

2 Flute: Square, Double, Stub, Long, Ball, Corner Radius

3 Flute: Square, Ball, Tapered

4 Flute: Square, Double, Stub, Ball, Corner Radius

Tapered: Square, Radius



Series
1, 3, 5, 14, 15, 16,
17, 23, 24, 59
Fractional

Material	Hardness	Flutes	Ae x DC	Ap x DC	Vc (sfm)	DC • in									
						1/64	1/32	1/16	1/8	1/4	3/8	1/2	3/4	1	
N PLASTICS Polycarbonate, PVC, Polypropylene	Profile	2	≤ 0.50	≤ 1.5	880	RPM	215142	107571	53786	26893	13446	8964	6723	4482	3362
						Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
						Feed (ipm)	25.8	28.0	26.9	32.3	43.0	53.8	53.8	43.0	37.6
							38.7	42.0	40.3	48.4	64.5	80.7	80.7	64.5	56.5
							51.6	55.9	53.8	64.5	86.1	107.6	107.6	86.1	75.3
							64.0	78.234	39117	19558	9779	6519	4890	3260	2445
	Slot	2	1	≤ 1	640	RPM	156467	78234	39117	19558	9779	6519	4890	3260	2445
						Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
						Feed (ipm)	18.8	20.3	19.6	23.5	31.3	39.1	39.1	31.3	27.4
							28.2	30.5	29.3	35.2	46.9	58.7	58.7	46.9	41.1
							37.6	40.7	39.1	46.9	62.6	78.2	78.2	62.6	54.8
							48.0	58.675	29338	14669	7334	4890	3667	2445	1834
GRAPHITE	Profile	2	≤ 0.50	≤ 1.5	660	RPM	161357	80678	40339	20170	10085	6723	5042	3362	2521
						Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
						Feed (ipm)	19.4	21.0	20.2	24.2	32.3	40.3	40.3	32.3	28.2
							29.0	31.5	30.3	36.3	48.4	60.5	60.5	48.4	42.4
							38.7	42.0	40.3	48.4	64.5	80.7	80.7	64.5	56.5
							48.0	58.675	29338	14669	7334	4890	3667	2445	1834
Slot	2	1	≤ 1	480	RPM	117350	58675	29338	14669	7334	4890	3667	2445	1834	
					Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056	
					Feed (ipm)	14.1	15.3	14.7	17.6	23.5	29.3	29.3	23.5	20.5	
						21.1	22.9	22.0	26.4	35.2	44.0	44.0	35.2	30.8	
						28.2	30.5	29.3	35.2	46.9	58.7	58.7	46.9	41.1	
						36.0	44.0	42.0	50.0	64.5	80.7	80.7	64.5	56.5	
S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, 718, Incoloy 800, Monel 400, Rene, Waspalloy	Profile	2	≤ 0.50	≤ 1.5	65	RPM	15891	7946	3973	1986	993	662	497	331	248
						Fz	0.00002	0.00003	0.00006	0.0002	0.0004	0.0008	0.0010	0.0012	0.0014
						Feed (ipm)	0.6	0.5	0.5	0.7	0.7	1.1	1.0	0.8	0.7
							1.0	0.7	0.7	1.1	1.0	1.6	1.5	1.2	1.0
							1.3	1.0	1.0	1.4	1.4	2.1	2.0	1.6	1.4
							1.7	1.3	1.3	1.7	1.7	2.5	2.4	1.9	1.7
	Slot	2	1	≤ 1	45	RPM	11002	5501	2750	1375	688	458	344	229	172
						Fz	0.00002	0.00003	0.00006	0.0002	0.0004	0.0008	0.0010	0.0012	0.0014
						Feed (ipm)	0.4	0.3	0.3	0.5	0.5	0.7	0.7	0.6	0.5
							0.7	0.5	0.5	0.7	0.7	1.1	1.0	0.8	0.7
							0.9	0.7	0.7	1.0	1.0	1.5	1.4	1.1	1.0
							1.2	0.9	0.9	1.2	1.2	1.8	1.7	1.4	1.2
H TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	Profile	2	≤ 0.50	≤ 1.5	180	RPM	44006	22003	11002	5501	2750	1834	1375	917	688
						Fz	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017
						Feed (ipm)	1.8	1.8	1.8	2.2	2.8	3.3	3.3	2.6	2.3
							2.6	2.6	2.6	3.3	4.1	5.0	5.0	3.9	3.5
							3.5	3.5	3.5	4.4	5.5	6.6	6.6	5.1	4.7
							4.7	3.5	3.5	4.7	5.8	7.2	7.2	5.8	5.1
	Slot	2	1	≤ 1	130	RPM	31782	15891	7946	3973	1986	1324	993	662	497
						Fz	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017
						Feed (ipm)	1.3	1.3	1.3	1.6	2.0	2.4	2.4	1.9	1.7
							1.9	1.9	1.9	2.4	3.0	3.6	3.6	2.8	2.5
							2.5	2.5	2.5	3.2	4.0	4.8	4.8	3.7	3.4
							3.4	2.5	2.5	3.4	4.2	5.1	5.1	4.2	3.7
H TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	Profile	2	≤ 0.50	≤ 1.5	315	RPM	77011	38506	19253	9626	4813	3209	2407	1604	1203
						Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
						Feed (ipm)	3.1	3.9	3.5	3.9	5.8	7.1	7.2	5.8	5.1
							4.6	5.8	5.2	5.8	8.7	10.6	10.8	8.7	7.6
							6.2	7.7	6.9	7.7	11.6	14.1	14.4	11.6	10.1
							7.7	6.2	6.2	7.7	9.6	11.6	11.6	9.6	8.3
	Slot	2	1	≤ 1	230	RPM	56230	28115	14058	7029	3514	2343	1757	1171	879
						Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
						Feed (ipm)	2.2	2.8	2.5	2.8	4.2	5.2	5.3	4.2	3.7
							3.4	4.2	3.8	4.2	6.3	7.7	7.9	6.3	5.5
							4.5	5.6	5.1	5.6	8.4	10.3	10.5	8.4	7.4
							5.5	4.5	4.5	5.5	6.8	8.4	8.4	6.8	5.9

Bhn (Brinell) HRC (Rockwell C)

rpm = (Vc x 3.82) / DC

ipm = Fz x number of flutes x rpm

reduce speed and feed for materials harder than listed

for tapered end mills, base the speed on the largest diameter contacting

the workpiece and the feed on the smallest diameter

limit cut depths of long and extra long flute mills to .05 x DC when slotting

or profiling

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)