



Series 143M-S Fractional	Hardness	Vc (sfm)	DC • in								
			1/8	3/16	1/4	3/8	1/2	5/8	3/4		
CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	425 (340-510)	RPM	12988	8659	6494	4329	3247	2598	2165	
			Fr	0.0039	0.0059	0.0079	0.0118	0.0157	0.0196	0.0236	
			Feed (ipm)	51.0	51.0	51.0	51.0	51.0	51.0	51.0	
	≤ 275 Bhn or ≤ 28 HRc	380 (304-456)	RPM	11613	7742	5806	3871	2903	2323	1935	
			Fr	0.0035	0.0053	0.0071	0.0106	0.0141	0.0177	0.0212	
			Feed (ipm)	41.0	41.0	41.0	41.0	41.0	41.0	41.0	
	≤ 425 Bhn or ≤ 45 HRc	220 (176-264)	RPM	6723	4482	3362	2241	1681	1345	1121	
			Fr	0.0030	0.0045	0.0059	0.0089	0.0119	0.0149	0.0178	
			Feed (ipm)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	330 (264-396)	RPM	10085	6723	5042	3362	2521	2017	1681
				Fr	0.0030	0.0045	0.0059	0.0089	0.0119	0.0149	0.0178
				Feed (ipm)	30.0	30.0	30.0	30.0	30.0	30.0	30.0
≤ 375 Bhn or ≤ 40 HRc		200 (160-240)	RPM	6112	4075	3056	2037	1528	1222	1019	
			Fr	0.0025	0.0038	0.0051	0.0076	0.0101	0.0127	0.0152	
			Feed (ipm)	15.5	15.5	15.5	15.5	15.5	15.5	15.5	
≤ 450 Bhn or ≤ 48 HRc		140 (112-168)	RPM	4278	2852	2139	1426	1070	856	713	
			Fr	0.0018	0.0027	0.0036	0.0054	0.0072	0.0090	0.0108	
			Feed (ipm)	7.7	7.7	7.7	7.7	7.7	7.7	7.7	
STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F		≤ 185 Bhn or ≤ 9 HRc	305 (244-366)	RPM	11154	7436	5577	3718	2789	2231	1859
				Fr	0.0022	0.0032	0.0043	0.0065	0.0086	0.0108	0.0129
				Feed (ipm)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
	≤ 275 Bhn or ≤ 28 HRc	195 (156-234)	RPM	7029	4686	3514	2343	1757	1406	1171	
			Fr	0.0017	0.0026	0.0034	0.0051	0.0068	0.0085	0.0102	
			Feed (ipm)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	150 (120-180)	RPM	5501	3667	2750	1834	1375	1100	917
				Fr	0.0017	0.0025	0.0033	0.0050	0.0066	0.0083	0.0099
				Feed (ipm)	9.1	9.1	9.1	9.1	9.1	9.1	9.1
		≤ 375 Bhn or ≤ 40 HRc	110 (88-132)	RPM	3973	2649	1986	1324	993	795	662
				Fr	0.0015	0.0023	0.0030	0.0045	0.0060	0.0076	0.0091
				Feed (ipm)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
CAST IRONS Gray, Malleable, Ductile		≤ 220 Bhn or ≤ 19 HRc	360 (288-432)	RPM	11002	7334	5501	3667	2750	2200	1834
				Fr	0.0045	0.0068	0.0091	0.0136	0.0182	0.0227	0.0273
				Feed (ipm)	50.0	50.0	50.0	50.0	50.0	50.0	50.0
		≤ 260 Bhn or ≤ 26 HRc	335 (268-402)	RPM	10238	6825	5119	3413	2559	2048	1706
				Fr	0.0045	0.0068	0.0091	0.0136	0.0182	0.0227	0.0273
				Feed (ipm)	46.5	46.5	46.5	46.5	46.5	46.5	46.5

continued on next page

Series 143M-S Fractional	Hardness	Vc (sfm)	DC • in							
			1/8	3/16	1/4	3/8	1/2	5/8	3/4	
ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	770	RPM	23531	15687	11766	7844	5883	4706	3922
		(616-924)	Fr	0.0049	0.0073	0.0098	0.0147	0.0195	0.0244	0.0293
			Feed (ipm)	115.0	115.0	115.0	115.0	115.0	115.0	115.0
	≤ 150 Bhn or ≤ 7 HRc	660	RPM	20170	13446	10085	6723	5042	4034	3362
		(528-792)	Fr	0.0050	0.0074	0.0099	0.0149	0.0198	0.0248	0.0297
			Feed (ipm)	100.0	100.0	100.0	100.0	100.0	100.0	100.0
COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	550	RPM	16808	11205	8404	5603	4202	3362	2801
		(440-660)	Fr	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120
			Feed (ipm)	33.5	33.5	33.5	33.5	33.5	33.5	33.5
	≤ 200 Bhn or ≤ 23 HRc	440	RPM	13446	8964	6723	4482	3362	2689	2241
		(352-528)	Fr	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120
			Feed (ipm)	27.0	27.0	27.0	27.0	27.0	27.0	27.0
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	95	RPM	3514	2343	1757	1171	879	703	586
		(76-114)	Fr	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120
			Feed (ipm)	7.0	7.0	7.0	7.0	7.0	7.0	7.0
	≤ 400 Bhn or ≤ 43 HRc	50	RPM	2139	1426	1070	713	535	428	357
		(40-60)	Fr	0.0012	0.0018	0.0024	0.0036	0.0049	0.0061	0.0073
			Feed (ipm)	2.6	2.6	2.6	2.6	2.6	2.6	2.6
TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	215	RPM	6570	4380	3285	2190	1643	1314	1095
		(172-258)	Fr	0.0018	0.0026	0.0035	0.0053	0.0070	0.0088	0.0105
			Feed (ipm)	11.5	11.5	11.5	11.5	11.5	11.5	11.5
	≤ 350 Bhn or ≤ 38 HRc	160	RPM	4890	3260	2445	1630	1222	978	815
		(128-192)	Fr	0.0016	0.0024	0.0032	0.0048	0.0064	0.0080	0.0096
			Feed (ipm)	7.8	7.8	7.8	7.8	7.8	7.8	7.8
≤ 440 Bhn or ≤ 47 HRc	85	RPM	2598	1732	1299	866	649	520	433	
	(68-102)	Fr	0.0012	0.0018	0.0024	0.0036	0.0048	0.0060	0.0072	
		Feed (ipm)	3.1	3.1	3.1	3.1	3.1	3.1	3.1	
TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 200 Bhn or ≤ 13 HRc	145	RPM	4431	2954	2216	1477	1108	886	739
		(116-174)	Fr	0.0026	0.0039	0.0052	0.0078	0.0104	0.0130	0.0156
			Feed (ipm)	11.5	11.5	11.5	11.5	11.5	11.5	11.5
	≤ 375 Bhn or ≤ 40 HRc	95	RPM	2903	1935	1452	968	726	581	484
		(76-114)	Fr	0.0012	0.0018	0.0024	0.0036	0.0048	0.0060	0.0072
			Feed (ipm)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
≤ 475 Bhn or ≤ 50 HRc	85	RPM	2598	1732	1299	866	649	520	433	
	(68-102)	Fr	0.0008	0.0012	0.0015	0.0023	0.0031	0.0038	0.0046	
		Feed (ipm)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	

Note:

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



Series 143M-S Metric	Hardness	Vc (m/min)	DC • mm								
			3	6	8	10	12	14	16		
CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	130	RPM	13733	6867	5150	4120	3433	2943	2575	
		(104-155)	Fr	0.095	0.189	0.252	0.316	0.379	0.442	0.505	
			Feed (mm/min)	1300	1300	1300	1300	1300	1300	1300	
	≤ 275 Bhn or ≤ 28 HRc	116	RPM	12279	6140	4605	3684	3070	2631	2302	
		(93-139)	Fr	0.086	0.171	0.228	0.285	0.342	0.399	0.456	
			Feed (mm/min)	1050	1050	1050	1050	1050	1050	1050	
	≤ 425 Bhn or ≤ 45 HRc	67	RPM	7109	3555	2666	2133	1777	1523	1333	
		(54-80)	Fr	0.071	0.142	0.189	0.237	0.284	0.332	0.379	
			Feed (mm/min)	505	505	505	505	505	505	505	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	101	RPM	10664	5332	3999	3199	2666	2285	1999
			(80-121)	Fr	0.071	0.143	0.190	0.238	0.285	0.333	0.380
				Feed (mm/min)	760	760	760	760	760	760	760
≤ 375 Bhn or ≤ 40 HRc		61	RPM	6463	3231	2424	1939	1616	1385	1212	
		(49-73)	Fr	0.062	0.124	0.165	0.206	0.248	0.289	0.330	
			Feed (mm/min)	400	400	400	400	400	400	400	
≤ 450 Bhn or ≤ 48 HRc		43	RPM	4524	2262	1696	1357	1131	969	848	
		(34-51)	Fr	0.043	0.086	0.115	0.144	0.172	0.201	0.230	
			Feed (mm/min)	195	195	195	195	195	195	195	
STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F		≤ 185 Bhn or ≤ 9 HRc	93	RPM	11795	5897	4423	3538	2949	2527	2211
			(74-112)	Fr	0.051	0.103	0.137	0.171	0.205	0.239	0.274
				Feed (mm/min)	605	605	605	605	605	605	605
	≤ 275 Bhn or ≤ 28 HRc	59	RPM	7432	3716	2787	2230	1858	1593	1394	
		(48-71)	Fr	0.040	0.081	0.108	0.135	0.161	0.188	0.215	
			Feed (mm/min)	300	300	300	300	300	300	300	
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	46	RPM	5816	2908	2181	1745	1454	1246	1091
			(37-55)	Fr	0.040	0.079	0.105	0.132	0.158	0.185	0.211
				Feed (mm/min)	230	230	230	230	230	230	230
		≤ 375 Bhn or ≤ 40 HRc	34	RPM	4201	2100	1575	1260	1050	900	788
			(27-40)	Fr	0.036	0.071	0.095	0.119	0.143	0.167	0.190
				Feed (mm/min)	150	150	150	150	150	150	150
CAST IRONS Gray, Malleable, Ductile		≤ 220 Bhn or ≤ 19 HRc	110	RPM	11633	5816	4362	3490	2908	2493	2181
			(88-132)	Fr	0.109	0.218	0.291	0.364	0.437	0.509	0.582
				Feed (mm/min)	1270	1270	1270	1270	1270	1270	1270
		≤ 260 Bhn or ≤ 26 HRc	102	RPM	10825	5413	4059	3248	2706	2320	2030
			(82-123)	Fr	0.109	0.218	0.291	0.363	0.436	0.509	0.581
				Feed (mm/min)	1180	1180	1180	1180	1180	1180	1180

continued on next page

Series 143M-S Metric	Hardness	Vc (m/min)	DC • mm								
			3	6	8	10	12	14	16		
N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	235	RPM	24882	12441	9331	7465	6220	5332	4665	
		(188-282)	Fr	0.118	0.237	0.316	0.395	0.473	0.552	0.631	
			Feed (mm/min)	2945	2945	2945	2945	2945	2945	2945	
	≤ 150 Bhn or ≤ 7 HRc	201	RPM	21327	10664	7998	6398	5332	4570	3999	
		(161-241)	Fr	0.119	0.238	0.318	0.397	0.476	0.556	0.635	
			Feed (mm/min)	2540	2540	2540	2540	2540	2540	2540	
	Copper Alloys Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	168	RPM	17773	8886	6665	5332	4443	3808	3332
			(134-201)	Fr	0.048	0.096	0.128	0.159	0.191	0.223	0.255
				Feed (mm/min)	850	850	850	850	850	850	850
		≤ 200 Bhn or ≤ 23 HRc	134	RPM	14218	7109	5332	4265	3555	3047	2666
			(107-161)	Fr	0.048	0.096	0.128	0.161	0.193	0.225	0.257
				Feed (mm/min)	685	685	685	685	685	685	685
S SUPER ALLOYS (Nickel , Cobalt, Iron Base) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	29	RPM	3716	1858	1394	1115	929	796	697	
		(23-35)	Fr	0.016	0.032	0.043	0.054	0.065	0.075	0.086	
			Feed (mm/min)	60	60	60	60	60	60	60	
	≤ 400 Bhn or ≤ 43 HRc	15	RPM	2262	1131	848	679	565	485	424	
		(12-18)	Fr	0.011	0.022	0.029	0.037	0.044	0.052	0.059	
			Feed (mm/min)	25	25	25	25	25	25	25	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	66	RPM	6947	3474	2605	2084	1737	1489	1303
			(52-79)	Fr	0.040	0.079	0.106	0.132	0.158	0.185	0.211
				Feed (mm/min)	275	275	275	275	275	275	275
		≤ 350 Bhn or ≤ 38 HRc	49	RPM	5170	2585	1939	1551	1293	1108	969
			(39-59)	Fr	0.039	0.077	0.103	0.129	0.155	0.181	0.206
				Feed (mm/min)	200	200	200	200	200	200	200
≤ 440 Bhn or ≤ 47 HRc	26	RPM	2747	1373	1030	824	687	589	515		
	(21-31)	Fr	0.029	0.058	0.078	0.097	0.117	0.136	0.155		
		Feed (mm/min)	80	80	80	80	80	80	80		
H TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 200 Bhn or ≤ 13 HRc	44	RPM	4686	2343	1757	1406	1171	1004	879	
		(35-53)	Fr	0.061	0.122	0.162	0.203	0.243	0.284	0.324	
			Feed (mm/min)	285	285	285	285	285	285	285	
	≤ 375 Bhn or ≤ 40 HRc	29	RPM	3070	1535	1151	921	767	658	576	
		(23-35)	Fr	0.029	0.059	0.078	0.098	0.117	0.137	0.156	
			Feed (mm/min)	90	90	90	90	90	90	90	
	≤ 475 Bhn or ≤ 50 HRc	26	RPM	2747	1373	1030	824	687	589	515	
		(21-31)	Fr	0.018	0.036	0.049	0.061	0.073	0.085	0.097	
Feed (mm/min)			50	50	50	50	50	50	50		

Note:

- Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
- rpm = (Vc x 1000) / (DC x 3.14)
- mm/min = Fr x RPM
- reduce speed and feed for materials harder than listed
- refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

