

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	RPM	12988	8659	6494	4329	3247	2598	2165	
		(340-510)	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	RPM	11613	7742	5806	3871	2903	2323	1935	
		(304-456)	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	RPM	6723	4482	3362	2241	1681	1345	1121	
		(176-264)	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	
	P ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	330	RPM	10085	6723	5042	3362	2521	2017	1681
			(264-396)	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	RPM	6112	4075	3056	2037	1528	1222	1019	
		(160-240)	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	
≤ 425 Bhn or ≤ 45 HRc		140	RPM	4278	2852	2139	1426	1070	856	713	
		(112-168)	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	
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	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 185 Bhn or ≤ 9 HRc	325	RPM	9932	6621	4966	3311	2483	1986	1655	
		(260-390)	Fr	0.0030	0.0045	0.0060	0.0091	0.0121	0.0151	0.0181	
			Feed (ipm)	30.0	30.0	30.0	30.0	30.0	30.0	30.0	
	≤ 275 Bhn or ≤ 28 HRc	210	RPM	6418	4278	3209	2139	1604	1284	1070	
		(168-252)	Fr	0.0023	0.0035	0.0047	0.0070	0.0093	0.0117	0.0140	
			Feed (ipm)	15.0	15.0	15.0	15.0	15.0	15.0	15.0	
	≤ 275 Bhn or ≤ 28 HRc	160	RPM	4890	3260	2445	1630	1222	978	815	
		(128-192)	Fr	0.0023	0.0035	0.0047	0.0070	0.0093	0.0117	0.0140	
			Feed (ipm)	11.4	11.4	11.4	11.4	11.4	11.4	11.4	
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 375 Bhn or ≤ 40 HRc	115	RPM	3514	2343	1757	1171	879	703	586
			(92-138)	Fr	0.0021	0.0031	0.0042	0.0062	0.0083	0.0104	0.0125
				Feed (ipm)	7.3	7.3	7.3	7.3	7.3	7.3	7.3

continued on next page

Series	Hardness	Vc (sfm)	DC • in							
			1/8	3/16	1/4	3/8	1/2	5/8	3/4	
K CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	360	RPM	11002	7334	5501	3667	2750	2200	1834
		(288-432)	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	RPM	10238	6825	5119	3413	2559	2048	1706
		(268-402)	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
S HIGH TEMP ALLOYS (NICKEL , COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	130	RPM	3973	2649	1986	1324	993	795	662
		(104-156)	Fr	0.0014	0.0022	0.0029	0.0043	0.0057	0.0072	0.0086
			Feed (ipm)	5.7	5.7	5.7	5.7	5.7	5.7	5.7
	≤ 400 Bhn or ≤ 43 HRc	70	RPM	2139	1426	1070	713	535	428	357
		(56-84)	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	

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 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	0.094	0.189	0.252	0.314	0.377	0.440	0.503	
			Feed (mm/min)	1295	1295	1295	1295	1295	1295	1295	
	≤ 275 Bhn or ≤ 28 HRc	116	RPM	12279	6140	4605	3684	3070	2631	2302	
		(93-139)	Fr	0.085	0.170	0.226	0.283	0.339	0.396	0.452	
			Feed (mm/min)	1041	1041	1041	1041	1041	1041	1041	
	≤ 425 Bhn or ≤ 45 HRc	67	RPM	7109	3555	2666	2133	1777	1523	1333	
		(54-80)	Fr	0.071	0.143	0.191	0.238	0.286	0.333	0.381	
			Feed (mm/min)	508	508	508	508	508	508	508	
	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	0.191	0.238	0.286	0.333	0.381
				Feed (mm/min)	762	762	762	762	762	762	762
≤ 375 Bhn or ≤ 40 HRc		61	RPM	6463	3231	2424	1939	1616	1385	1212	
		(49-73)	Fr	0.061	0.122	0.162	0.203	0.244	0.284	0.325	
			Feed (mm/min)	394	394	394	394	394	394	394	
≤ 425 Bhn or ≤ 45 HRc		43	RPM	4524	2262	1696	1357	1131	969	848	
		(34-51)	Fr	0.043	0.086	0.115	0.144	0.173	0.202	0.231	
			Feed (mm/min)	196	196	196	196	196	196	196	
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	0.062	0.125	0.166	0.208	0.249	0.291	0.332
				Feed (mm/min)	292	292	292	292	292	292	292
	≤ 375 Bhn or ≤ 40 HRc	29	RPM	3070	1535	1151	921	767	658	576	
		(23-35)	Fr	0.029	0.058	0.077	0.097	0.116	0.135	0.154	
			Feed (mm/min)	89	89	89	89	89	89	89	
STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 185 Bhn or ≤ 9 HRc	99	RPM	10502	5251	3938	3151	2626	2250	1969	
		(79-119)	Fr	0.073	0.145	0.193	0.242	0.290	0.339	0.387	
			Feed (mm/min)	762	762	762	762	762	762	762	
	≤ 275 Bhn or ≤ 28 HRc	64	RPM	6786	3393	2545	2036	1696	1454	1272	
		(51-77)	Fr	0.056	0.112	0.150	0.187	0.225	0.262	0.299	
			Feed (mm/min)	381	381	381	381	381	381	381	
STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	49	RPM	5170	2585	1939	1551	1293	1108	969	
		(39-59)	Fr	0.056	0.112	0.149	0.187	0.224	0.261	0.299	
			Feed (mm/min)	290	290	290	290	290	290	290	
	≤ 375 Bhn or ≤ 40 HRc	35	RPM	3716	1858	1394	1115	929	796	697	
		(28-42)	Fr	0.050	0.100	0.133	0.166	0.200	0.233	0.266	
			Feed (mm/min)	185	185	185	185	185	185	185	

continued on next page

Series 143M-S Metric	Hardness	Vc (m/min)	DC • mm							
			3	6	8	10	12	14	16	
K 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	0.364	0.436	0.509	0.582
			Feed (mm/min)	1181	1181	1181	1181	1181	1181	1181
S HIGH TEMP ALLOYS (Nickel , Cobalt, Iron Base) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	40	RPM	4201	2100	1575	1260	1050	900	788
		(32-48)	Fr	0.034	0.069	0.092	0.115	0.138	0.161	0.184
			Feed (mm/min)	145	145	145	145	145	145	145
	≤ 400 Bhn or ≤ 43 HRc	21	RPM	2262	1131	848	679	565	485	424
		(17-26)	Fr	0.029	0.058	0.078	0.097	0.117	0.136	0.156
			Feed (mm/min)	66	66	66	66	66	66	66
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	0.042	0.084	0.112	0.140	0.168	0.196	0.224
			Feed (mm/min)	292	292	292	292	292	292	292
	≤ 350 Bhn or ≤ 38 HRc	49	RPM	5170	2585	1939	1551	1293	1108	969
		(39-59)	Fr	0.038	0.077	0.102	0.128	0.153	0.179	0.204
			Feed (mm/min)	198	198	198	198	198	198	198
≤ 440 Bhn or ≤ 47 HRc	26	RPM	2747	1373	1030	824	687	589	515	
	(21-31)	Fr	0.029	0.057	0.076	0.096	0.115	0.134	0.153	
		Feed (mm/min)	79	79	79	79	79	79	79	

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