

Series 140M 8D Metric	Hardness	Vc (m/min)	DC • mm								
			3	6	8	10	12	14	16		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	123	RPM	13087	6544	4908	3926	3272	2804	2454	
		(100-170)	Fr	0.085	0.171	0.228	0.285	0.342	0.399	0.455	
			Feed (mm/min)	1118	1118	1118	1118	1118	1118	1118	
	≤ 275 Bhn or ≤ 28 HRc	113	RPM	11956	5978	4484	3587	2989	2562	2242	
		(90-135)	Fr	0.072	0.144	0.193	0.241	0.289	0.337	0.385	
			Feed (mm/min)	864	864	864	864	864	864	864	
	≤ 425 Bhn or ≤ 45 HRc	64	RPM	6786	3393	2545	2036	1696	1454	1272	
		(51-77)	Fr	0.062	0.124	0.165	0.206	0.247	0.288	0.329	
			Feed (mm/min)	419	419	419	419	419	419	419	
	M ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	98	RPM	10340	5170	3878	3102	2585	2216	1939
			(78-117)	Fr	0.061	0.123	0.164	0.205	0.246	0.287	0.328
				Feed (mm/min)	635	635	635	635	635	635	635
≤ 375 Bhn or ≤ 40 HRc		58	RPM	6140	3070	2302	1842	1535	1316	1151	
		(46-69)	Fr	0.048	0.095	0.127	0.159	0.190	0.222	0.254	
			Feed (mm/min)	292	292	292	292	292	292	292	
≤ 450 Bhn or ≤ 48 HRc		41	RPM	4362	2181	1636	1309	1091	935	818	
		(33-49)	Fr	0.038	0.076	0.101	0.126	0.151	0.177	0.202	
			Feed (mm/min)	165	165	165	165	165	165	165	
K STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F		≤ 185 Bhn or ≤ 9 HRc	88	RPM	9371	4686	3514	2811	2343	2008	1757
			(71-106)	Fr	0.047	0.095	0.126	0.158	0.190	0.221	0.253
				Feed (mm/min)	445	445	445	445	445	445	445
	≤ 275 Bhn or ≤ 28 HRc	55	RPM	5816	2908	2181	1745	1454	1246	1091	
		(44-66)	Fr	0.044	0.087	0.116	0.146	0.175	0.204	0.233	
			Feed (mm/min)	254	254	254	254	254	254	254	
K STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	40	RPM	4201	2100	1575	1260	1050	900	788	
		(32-48)	Fr	0.042	0.085	0.113	0.141	0.169	0.198	0.226	
			Feed (mm/min)	178	178	178	178	178	178	178	
	≤ 375 Bhn or ≤ 40 HRc	29	RPM	3070	1535	1151	921	767	658	576	
		(23-35)	Fr	0.037	0.074	0.099	0.124	0.149	0.174	0.199	
			Feed (mm/min)	114	114	114	114	114	114	114	
K CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	107	RPM	11310	5655	4241	3393	2827	2424	2121	
		(85-128)	Fr	0.090	0.180	0.240	0.299	0.359	0.419	0.479	
			Feed (mm/min)	1016	1016	1016	1016	1016	1016	1016	
	≤ 260 Bhn or ≤ 26 HRc	94	RPM	10017	5009	3756	3005	2504	2147	1878	
		(76-113)	Fr	0.094	0.188	0.250	0.313	0.375	0.438	0.500	
			Feed (mm/min)	940	940	940	940	940	940	940	

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Series 140M 8D 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	223	RPM	23589	11795	8846	7077	5897	5055	4423	
		(178-267)	Fr	0.108	0.215	0.287	0.359	0.431	0.502	0.574	
			Feed (mm/min)	2540	2540	2540	2540	2540	2540	2540	
	≤ 150 Bhn or ≤ 7 HRc	194	RPM	20519	10260	7695	6156	5130	4397	3847	
		(155-232)	Fr	0.111	0.223	0.297	0.371	0.446	0.520	0.594	
			Feed (mm/min)	2286	2286	2286	2286	2286	2286	2286	
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	78	RPM	8240	4120	3090	2472	2060	1766	1545
			(62-93)	Fr	0.043	0.086	0.115	0.144	0.173	0.201	0.230
				Feed (mm/min)	356	356	356	356	356	356	356
		≤ 200 Bhn or ≤ 23 HRc	72	RPM	7594	3797	2848	2278	1898	1627	1424
			(57-86)	Fr	0.043	0.087	0.116	0.145	0.174	0.203	0.232
				Feed (mm/min)	330	330	330	330	330	330	330
S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	20	RPM	2100	1050	788	630	525	450	394	
		(16-24)	Fr	0.021	0.041	0.055	0.069	0.082	0.096	0.110	
			Feed (mm/min)	43	43	43	43	43	43	43	
	≤ 400 Bhn or ≤ 43 HRc	11	RPM	1131	565	424	339	283	242	212	
		(9-13)	Fr	0.013	0.027	0.036	0.045	0.054	0.063	0.072	
			Feed (mm/min)	15	15	15	15	15	15	15	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	56	RPM	5978	2989	2242	1793	1495	1281	1121
			(45-68)	Fr	0.038	0.076	0.102	0.127	0.153	0.178	0.204
				Feed (mm/min)	229	229	229	229	229	229	229
		≤ 350 Bhn or ≤ 38 HRc	43	RPM	4524	2262	1696	1357	1131	969	848
			(34-51)	Fr	0.028	0.056	0.075	0.094	0.112	0.131	0.150
				Feed (mm/min)	127	127	127	127	127	127	127
≤ 440 Bhn or ≤ 47 HRc	23	RPM	2424	1212	909	727	606	519	454		
	(18-27)	Fr	0.024	0.048	0.064	0.080	0.096	0.112	0.129		
		Feed (mm/min)	58	58	58	58	58	58	58		
H TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 200 Bhn or ≤ 13 HRc	43	RPM	4524	2262	1696	1357	1131	969	848	
		(34-51)	Fr	0.048	0.095	0.127	0.159	0.191	0.223	0.255	
			Feed (mm/min)	216	216	216	216	216	216	216	
	≤ 375 Bhn or ≤ 40 HRc	27	RPM	2908	1454	1091	872	727	623	545	
		(22-33)	Fr	0.026	0.052	0.070	0.087	0.105	0.122	0.140	
			Feed (mm/min)	76	76	76	76	76	76	76	
	≤ 475 Bhn or ≤ 50 HRc	24	RPM	2585	1293	969	776	646	554	485	
		(20-29)	Fr	0.015	0.029	0.039	0.049	0.059	0.069	0.079	
			Feed (mm/min)	38	38	38	38	38	38	38	

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)