

Speed & Feed Recommendations

Series 103M Metric	Hardness BRINELL	Vc (m/min)	Diameter (D ₁) (mm)							
			3	6	10	12	16	20		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	81	RPM	8563	4282	2569	2141	1606	1284
			(65-97)	Fr	0.053	0.108	0.176	0.216	0.264	0.352
				Feed (IPM)	454	462	452	462	424	452
		≥ 200 ≤ 300	38	RPM	4039	2020	1212	1010	757	606
			(30-46)	Fr	0.048	0.096	0.160	0.192	0.240	0.320
				Feed (IPM)	194	194	194	194	182	194
		≥ 300 ≤ 420	26	RPM	2747	1373	824	687	515	412
			(21-31)	Fz	0.031	0.062	0.104	0.125	0.156	0.208
				Feed (IPM)	85	85	86	86	80	86
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 270	70	RPM	7432	3716	2230	1858	1394	1115
			(56-84)	Fz	0.048	0.096	0.160	0.192	0.240	0.320
				Feed (IPM)	357	357	357	357	334	357
		≥ 275 ≤ 375	44	RPM	4686	2343	1406	1171	879	703
			(35-53)	Fr	0.048	0.096	0.160	0.192	0.240	0.320
				Feed (IPM)	225	225	225	225	211	225
		≥ 375 ≤ 450	18	RPM	1939	969	582	485	364	291
			(15-22)	Fr	0.031	0.062	0.104	0.125	0.156	0.208
				Feed (IPM)	60	60	60	61	57	60
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	26	RPM	2747	1373	824	687	515	412
			(21-31)	Fr	0.031	0.062	0.104	0.125	0.156	0.208
				Feed (IPM)	85	85	86	86	80	86
		≥ 250 ≤ 330	17	RPM	1777	889	533	444	333	267
			(13-20)	Fr	0.017	0.036	0.056	0.074	0.084	0.112
				Feed (IPM)	30	32	30	33	28	30
		≥ 330 ≤ 450	12	RPM	1293	646	388	323	242	194
			(10-15)	Fr	0.012	0.024	0.040	0.046	0.060	0.080
				Feed (IPM)	16	16	16	15	15	16
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	85	RPM	9048	4524	2714	2262	1696	1357
			(68-102)	Fr	0.060	0.125	0.200	0.247	0.300	0.400
				Feed (IPM)	543	565	543	559	509	543
		≥ 200 ≤ 330	76	RPM	8078	4039	2424	2020	1515	1212
			(61-91)	Fr	0.060	0.125	0.200	0.247	0.300	0.400
Feed (IPM)	485	505		485	499	454	485			
S	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 280	26	RPM	2747	1373	824	687	515	412
			(21-31)	Fr	0.048	0.096	0.160	0.192	0.240	0.320
				Feed (IPM)	132	132	132	132	124	132
		≥ 280 ≤ 350	20	RPM	2100	1050	630	525	394	315
			(16-24)	Fr	0.029	0.058	0.096	0.113	0.144	0.192
				Feed (IPM)	61	61	60	59	57	60
		≥ 350 ≤ 440	17	RPM	1777	889	533	444	333	267
			(13-20)	Fr	0.029	0.058	0.096	0.113	0.144	0.192
				Feed (IPM)	52	52	51	50	48	51
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80	165	RPM	17449	8725	5235	4362	3272	2617
			(132-198)	Fr	0.077	0.156	0.256	0.312	0.384	0.512
				Feed (IPM)	1344	1361	1340	1361	1256	1340
		≥ 80	139	RPM	14703	7351	4411	3676	2757	2205
			(111-166)	Fr	0.077	0.156	0.256	0.312	0.384	0.512
Feed (IPM)	1132	1147	1129	1147	1059	1129				
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	58	RPM	6140	3070	1842	1535	1151	921
			(46-69)	Fr	0.038	0.077	0.128	0.156	0.192	0.256
				Feed (IPM)	233	236	236	239	221	236
		≥ 140	53	RPM	5655	2827	1696	1414	1060	848
			(43-64)	Fr	0.038	0.077	0.128	0.156	0.192	0.256
Feed (IPM)	215	218	217	221	204	217				

rpm = (1000 x m/min) / (3.14 x D₁)

mm / min = (mm / revolution) x rpm

reduce speed and feed rates shown by 30 percent when using uncoated drills

reduce speed and feed for materials harder than listed

refer to the SGS Tool Wizard for complete technical information (I)