

High Speed Steel & Cobalt Drills

Speed and Feed Recommendations

WORKPIECE MATERIAL	BRINELL HARDNESS BHN	SURFACE SPEED SFM	FEED PER REVOLUTION BY DRILL DIAMETER				
			1/8"	1/4"	1/2"	3/4"	1"
Low Carbon Steel 1018, 12L12, 1108, 1213	≤120	110	0.0030	0.0040	0.0080	0.0100	0.0110
Low & Medium Carbon Steel 1018, 1551, 11L44	120 - 250	65	0.0040	0.0060	0.0110	0.0130	0.0140
Medium Carbon and Alloyed Steel 1040, 1140, 4340, 8640	≤250	60	0.0030	0.0040	0.0080	0.0100	0.0110
Tool and Die Steels P20, A2, D2, H12	≤250	50	0.0030	0.0040	0.0080	0.0100	0.0110
Tool and Die Steels P20, A2, D2, H12	250 - 350	35	0.0020	0.0030	0.0060	0.0070	0.0080
Free Machining Stainless Steels 303, 410, 416, 440F	≤250	60	0.0040	0.0060	0.0110	0.0130	0.0140
Moderate Machining Stainless Steels 304, 316	≤300	45	0.0020	0.0030	0.0060	0.0070	0.0080
Difficult Machining Stainless Steels 17-4PH, 316L, AM350	≤300	20	0.0020	0.0030	0.0060	0.0070	0.0080
Cast Iron Soft Gray	≤160	105	0.0040	0.0060	0.0110	0.0130	0.0140
Cast Iron Gray	160 - 260	90	0.0040	0.0060	0.0110	0.0130	0.0140
Cast Iron Ductile	250	80	0.0030	0.0040	0.0080	0.0100	0.0110
Cast Iron Malleable	250 - 330	55	0.0020	0.0030	0.0060	0.0070	0.0080
Titanium Alloys Commercially Pure 99.0	110 - 170	90	0.0030	0.0040	0.0080	0.0100	0.0110
Titanium Alloys Ti-6Al-4V, ASTM B367 Grades C-3, C-4	≤250	50	0.0030	0.0040	0.0080	0.0100	0.0110
High Temperature Alloys Inconel, Hastelloy, Waspaloy	≤150	50	0.0030	0.0040	0.0080	0.0100	0.0110
High Temperature Alloys Inconel, Hastelloy, Waspaloy	150 - 250	20	0.0010	0.0020	0.0045	0.0060	0.0070
Aluminum Alloys 2025, 6061, A140, 514.0	≤150	325	0.0040	0.0060	0.0110	0.0130	0.0140
Copper Alloys Brass and Bronze	≤200	80	0.0040	0.0060	0.0110	0.0130	0.0140
Composites & Plastics	≤128	175	0.0020	0.0030	0.0060	0.0070	0.0080
Magnesium Alloys AZ80A, HM12A, AM60A, ZE41A	50 - 90	325	0.0040	0.0060	0.0110	0.0130	0.0140

NOTE: The speeds and feeds shown are suggested starting points only and may be increased or decreased depending on actual material and machining conditions. Start conservatively and increase speed and feed until drilling cycle is optimized.

Tool Coatings Also Available