

Solid Carbide **Drills** Feeds and Speeds

Material	BRINELL HARDNESS (BHN)	SURFACE SPEED (SFM)	Coating 1st recommendation	Coating 2nd recommendation	FEED PER REVOLUTION BY DRILL DIAMETER (IPR)				
					1/16"	1/8"	1/4"	1/2"	3/4"+
Aluminum Alloys (Si <12%)	-150	350	ZrN	TiXCo3	0.002	0.004	0.006	0.008	0.012
Aluminum Alloys (Si >12%)	-150	350	TiXCo3	ZrN	0.002	0.004	0.006	0.008	0.012
Brass and Bronze	-200	250	Tru-PLEX-CT	TiCN-MP	0.001	0.002	0.004	0.006	0.01
Low Carbon Steel - 1018, 12112, 1108, 1213	175	200	TiXCo3	AlTiN, nACo	0.0005	0.001	0.002	0.004	0.006
Medium Carbon Steel - 1040, 1140, 4340, 8640	250	175	TiXCo3	AlTiN, nACo	0.0005	0.001	0.002	0.004	0.006
Cast Iron - Gray	200	250	TiXCo3	nACRo, nACo, AlTiN	0.001	0.002	0.003	0.005	0.007
Cast Iron - Ductile	250	200	TiXCo3	nACRo, nACo, AlTiN	0.001	0.002	0.003	0.005	0.007
Copper	-200	325	ZrN	Tru-PLEX-CT, TiCN-MP	0.001	0.003	0.005	0.007	0.01
Tool Steel - P20, A2, D2, H12	250	200	TiXCo3	AlTiN, nACo	0.001	0.003	0.004	0.006	0.008
Hardened Steel - 40RC +	-	60	TiXCo3	AlTiN, nACo	0.0005	0.001	0.0015	0.002	0.003
Free Stainless Steel - 303, 410, 416, 440F	-250	125	TiXCo3	AlTiN	0.0005	0.001	0.002	0.005	0.006
Moderate Stainless Steel - 304, 316	300	100	TiXCo3	AlTiN	0.0005	0.001	0.002	0.005	0.006
Hard Stainless Steel - 17-4PH, 316L, AM350	450	75	TiXCo3	AlTiN, AlI4	0.0005	0.0008	0.0015	0.003	0.005
Titanium Alloys - Soft	-150	150	TiXCo3	AlTiN, AlI4	0.0005	0.001	0.002	0.004	0.006
Titanium Alloys - 6AL-4V, ASTM B367, Grades C-3, C-4	-250	100	TiXCo3	AlTiN, nACRo	0.0005	0.0008	0.0015	0.003	0.005
High Temp Alloys - Inconel, Hastelloy, Waspaloy	250	60	TiXCo3	AlTiN, nACRo	0.0005	0.0008	0.0015	0.003	0.005

HSS Drills Reduce SFM 50%

With coating, add 10% to the SFPM

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				1/16"	1/8"	1/4"	1/2"	3/4"+
Aluminum Alloys	-150	350		0.002	0.004	0.006	0.008	0.012
Brass and Bronze	-200	250		0.001	0.002	0.004	0.006	0.01
Low Carbon Steel - 1018, 1212, 1108, 1213	175	200		0.0005	0.001	0.002	0.004	0.006
Medium Carbon Steel - 1040, 1140, 4340, 8640	250	175		0.0005	0.001	0.002	0.004	0.006
Cast Iron - Gray	200	250		0.001	0.002	0.003	0.005	0.007
Cast Iron - Ductile	250	200		0.001	0.002	0.003	0.005	0.007
Copper	-200	325		0.001	0.003	0.005	0.007	0.01
Tool Steel - P20, A2, D2, H12	250	200		0.001	0.003	0.004	0.006	0.008
Hardened Steel - 40RC +	-	60		0.0005	0.001	0.0015	0.002	0.003
Free Stainless Steel - 303, 410, 416, 440F	-250	125		0.0005	0.001	0.002	0.005	0.006
Moderate Stainless Steel - 304, 316	300	100		0.0005	0.001	0.002	0.005	0.006
Hard Stainless Steel - 17-4PH, 316L, AM350	450	75		0.0005	0.0008	0.0015	0.003	0.005
Titanium Alloys - Soft	-150	150		0.0005	0.001	0.002	0.004	0.006
Titanium Alloys - 6AL-4V, ASTM B367, Grades C-3, C-4	-250	100		0.0005	0.0008	0.0015	0.003	0.005
High Temp Alloys - Inconel, Hastelloy, Waspaloy	250	60		0.0005	0.0008	0.0015	0.003	0.005

HSS Endmills Reduce SFM 50%