

## 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"+
<b>Aluminum Alloys (Si &lt;12%)</b>	-150	350	ZrN	TiXCo3	0.002	0.004	0.006	0.008	0.012
<b>Aluminum Alloys (Si &gt;12%)</b>	-150	350	TiXCo3	ZrN	0.002	0.004	0.006	0.008	0.012
<b>Brass and Bronze</b>	-200	250	Tru-PLEX-CT	TiCN-MP	0.001	0.002	0.004	0.006	0.01
<b>Low Carbon Steel -</b> 1018, 12L12, 1108, 1213	175	200	TiXCo3	AlTiN, nACo	0.0005	0.001	0.002	0.004	0.006
<b>Medium Carbon Steel -</b> 1040, 1140, 4340, 8640	250	175	TiXCo3	AlTiN, nACo	0.0005	0.001	0.002	0.004	0.006
<b>Cast Iron - Gray</b>	200	250	TiXCo3	nACRo, nACo, AlTiN	0.001	0.002	0.003	0.005	0.007
<b>Cast Iron - Ductile</b>	250	200	TiXCo3	nACRo, nACo, AlTiN	0.001	0.002	0.003	0.005	0.007
<b>Copper</b>	-200	325	ZrN	Tru-PLEX-CT, TiCN-MP	0.001	0.003	0.005	0.007	0.01
<b>Tool Steel - P20, A2, D2, H12</b>	250	200	TiXCo3	AlTiN, nACo	0.001	0.003	0.004	0.006	0.008
<b>Hardened Steel - 40RC +</b>	-	60	TiXCo3	AlTiN, nACo	0.0005	0.001	0.0015	0.002	0.003
<b>Free Stainless Steel -</b> 303, 410, 416, 440F	-250	125	TiXCo3	AlTiN	0.0005	0.001	0.002	0.005	0.006
<b>Moderate Stainless Steel -</b> 304, 316	300	100	TiXCo3	AlTiN	0.0005	0.001	0.002	0.005	0.006
<b>Hard Stainless Steel -</b> 17-4PH, 316L, AM350	450	75	TiXCo3	AlTiN, AlI4	0.0005	0.0008	0.0015	0.003	0.005
<b>Titanium Alloys - Soft</b>	-150	150	TiXCo3	AlTiN, AlI4	0.0005	0.001	0.002	0.004	0.006
<b>Titanium Alloys - 6AL-4V,</b> ASTM B367, Grades C-3, C-4	-250	100	TiXCo3	AlTiN, nACRo	0.0005	0.0008	0.0015	0.003	0.005
<b>High Temp Alloys -</b> 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"+
<b>Aluminum Alloys</b>	-150	350		0.002	0.004	0.006	0.008	0.012
<b>Brass and Bronze</b>	-200	250		0.001	0.002	0.004	0.006	0.01
<b>Low Carbon Steel</b> - 1018, 12L12, 1108, 1213	175	200		0.0005	0.001	0.002	0.004	0.006
<b>Medium Carbon Steel</b> - 1040, 1140, 4340, 8640	250	175		0.0005	0.001	0.002	0.004	0.006
<b>Cast Iron</b> - Gray	200	250		0.001	0.002	0.003	0.005	0.007
<b>Cast Iron</b> - Ductile	250	200		0.001	0.002	0.003	0.005	0.007
<b>Copper</b>	-200	325		0.001	0.003	0.005	0.007	0.01
<b>Tool Steel</b> - P20, A2, D2, H12	250	200		0.001	0.003	0.004	0.006	0.008
<b>Hardened Steel</b> - 40RC +	-	60		0.0005	0.001	0.0015	0.002	0.003
<b>Free Stainless Steel</b> - 303, 410, 416, 440F	-250	125		0.0005	0.001	0.002	0.005	0.006
<b>Moderate Stainless Steel</b> - 304, 316	300	100		0.0005	0.001	0.002	0.005	0.006
<b>Hard Stainless Steel</b> - 17-4PH, 316L, AM350	450	75		0.0005	0.0008	0.0015	0.003	0.005
<b>Titanium Alloys</b> - Soft	-150	150		0.0005	0.001	0.002	0.004	0.006
<b>Titanium Alloys</b> - 6AL-4V, ASTM B367, Grades C-3, C-4	-250	100		0.0005	0.0008	0.0015	0.003	0.005
<b>High Temp Alloys</b> - Inconel, Hastelloy, Waspaloy	250	60		0.0005	0.0008	0.0015	0.003	0.005
<b>High Temp Alloys</b> - Inconel, Hastelloy, Waspaloy	250	60		0.0005	0.0008	0.0015	0.003	0.005

**HSS Endmills Reduce SFM 50%**