

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 | -150 | 350 | TiB2 | ZrN | 0.002 | 0.004 | 0.006 | 0.008 | 0.012 |
| Brass and Bronze | -200 | 250 | FeinAL-Tribo | TiCN, CrN | 0.001 | 0.002 | 0.004 | 0.006 | 0.01 |
| Low Carbon Steel - 1018, 12112, 1108, 1213 | 175 | 200 | TiXCo4 | AlTiN, nACo | 0.0005 | 0.001 | 0.002 | 0.004 | 0.006 |
| Medium Carbon Steel - 1040, 1140, 4340, 8640 | 250 | 175 | TiXCo4 | AlTiN, nACo | 0.0005 | 0.001 | 0.002 | 0.004 | 0.006 |
| Cast Iron - Gray | 200 | 250 | TiXCo4 | nACRo3, nACo3, AlTiN | 0.001 | 0.002 | 0.003 | 0.005 | 0.007 |
| Cast Iron - Ductile | 250 | 200 | TiXCo4 | nACRo3, nACo3, AlTiN* | 0.001 | 0.002 | 0.003 | 0.005 | 0.007 |
| Copper | -200 | 325 | CrN, ZrN | FeinAL-Tribo, TiCN | 0.001 | 0.003 | 0.005 | 0.007 | 0.01 |
| Tool Steel - P20, A2, D2, H12 | 250 | 200 | TiXCo4 | AlTiN*, nACo | 0.001 | 0.003 | 0.004 | 0.006 | 0.008 |
| Hardened Steel - 40RC + | - | 60 | TiXCo4 | AlTiN*, nACo | 0.0005 | 0.001 | 0.0015 | 0.002 | 0.003 |
| Free Stainless Steel - 303, 410, 416, 440F | -250 | 125 | TiXCo4 | AlTiN* | 0.0005 | 0.001 | 0.002 | 0.005 | 0.006 |
| Moderate Stainless Steel - 304, 316 | 300 | 100 | TiXCo4 | AlTiN* | 0.0005 | 0.001 | 0.002 | 0.005 | 0.006 |
| Hard Stainless Steel - 17-4PH, 316L, AM350 | 450 | 75 | TiXCo4 | AlTiN*, AlI4 | 0.0005 | 0.0008 | 0.0015 | 0.003 | 0.005 |
| Titanium Alloys - Soft | -150 | 150 | TiXCo4 | 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 | TiXCo4 | AlTiN*, nACRo3 | 0.0005 | 0.0008 | 0.0015 | 0.003 | 0.005 |
| High Temp Alloys - Inconel, Hastelloy, Waspaloy | 250 | 60 | TiXCo4 | AlTiN*, nACRo3 | 0.0005 | 0.0008 | 0.0015 | 0.003 | 0.005 |

Al < 12%

** Version with LGD etching recommended*

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, 12112, 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%