

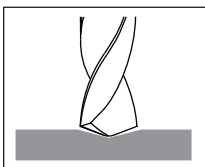
## Carbide Micro Spotting Speeds & Feeds

Material	Grades	SFM		Tool Diameter (IPR)							
		Uncoated	AlTiN	(.0050)	(.0100)	(.0150)	(.0200)	(.0312)	(.0625)	(.0938)	(.1250)
<b>P - Steels</b>											
High Strength Tool Steel	A2, D2, P20, H11, H13, S2, 01	295-390	360-460	.00015	.0003	.0006	.0008	.0010	.0019	.0025	.0030
Low Carbon	A36, 12L14, 12L15, 1005, 1018, 1020, 1108-1119, 1213-1215, 1513-1518, 4012, 5015, 9310	260-325	325-390	.00015	.0003	.0006	.0008	.0010	.0019	.0025	.0030
Medium Carbon	1040-1095, 1140-1151, 1330-1345, 1520-1572, 4023-4063, 4120-4161, 4330-4340, 4620-4640, 8620-8660, 8740-8750, 6150, 51000, 52100	195-300	260-360	.00015	.0003	.0006	.0008	.0010	.0019	.0025	.0030
<b>M - Stainless Steels</b>											
Austenitic	301-304L, 310, 316L, 321, 347	80-165	95-195	.0001	.0005	.0008	.0011	.0017	.0020	.0027	.0033
Martensitic	403, 410, 416, 420, 430, 431, 440	80-165	95-195	.0001	.0005	.0008	.0011	.0017	.0020	.0027	.0033
Precipitation Hardening	12/8, 15/5, 17/4, AM-350/355 /363, PH13-8MO, PH14-8/MO	80-165	95-195	.0001	.0005	.0008	.0011	.0017	.0020	.0027	.0033
<b>K - Cast Irons</b>											
Ductile	A536, J434, 60-40-18	195-295	230-295	.0001	.0004	.0008	.0011	.0019	.0028	.0032	.0040
Gray	A48, A436, A319, Class 20, G4000	165-250	260-295	.0001	.0004	.0008	.0011	.0019	.0028	.0032	.0040
Malleable	A220, A602, J158	290-350	330-390	.0001	.0004	.0008	.0011	.0019	.0028	.0032	.0040
<b>N - Non-Ferrous</b>											
Aluminum Alloys	2014, 2024, 6061, 7075	325-590	490-655	.0003	.0010	.0015	.0025	.0025	.0040	.0050	.0060
Aluminum High Silicon	A380, A390	325-590	490-655	.0003	.0010	.0015	.0025	.0025	.0040	.0050	.0060
Brass/Bronze	Aluminum Bronze, Low Silicon Bronze	190-300	225-375	.0003	.0010	.0015	.0025	.0025	.0040	.0050	.0060
Composites	G-10, Fiberglass, Graphite, Graphite Epoxy, Plastics	325-590	490-655	.0003	.0010	.0015	.0025	.0025	.0040	.0050	.0060
Copper		190-300	225-375	.0003	.0010	.0015	.0025	.0025	.0040	.0050	.0060
Magnesium		260-325	260-295	.0003	.0010	.0015	.0025	.0025	.0040	.0050	.0060
<b>S - High Temp Alloys</b>											
Cobalt Base	Stellite, HS-21, Haynes 25/188, X40, L605	80-115	95-130	.0001	.0003	.0009	.0011	.0017	.0020	.0025	.0030
Iron Base	Incoloy 800-802, Multmet N-155, Timkin 16-25-6, Carpenter 22-b3	60-80	80-100	.0001	.0003	.0009	.0011	.0017	.0020	.0025	.0030
Nickel Base	Inconel 625/718, Inco 700, 713C, 718, Monel 400-401, 404, K401, Rene, Rene 41 & 95 Hastelloy, Waspoly, Udimet 500 & 700	60-80	80-100	.0001	.0003	.0009	.0011	.0017	.0020	.0025	.0030
Titanium	Commercially Pure, 6Al-4V, ASTM 1/2/3, 6Al-25N-4Zr-2Mo-Si,v Ti-8Al-1Mo, Ti-8Al-4Mo	80-115	95-130	.0001	.0003	.0009	.0011	.0017	.0020	.0025	.0025

**NOTE:** Speeds and Feeds listed are estimated and will vary by application. These tools can be found on pages 222-223.

### Selecting the Correct Spotting Drill

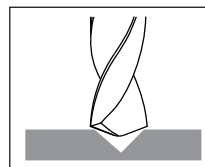
#### Spotting for Carbide Drills



Select a spotting drill with a point angle = to or > Greater than the final drill point angle.

The spot drill diameter should be 30% less than your drill diameter.

#### Spotting for HSS/Cobalt Drills



Select a spotting drill with a point angle < Less than the final drill point angle.

The spot drill diameter should be 30% less than your drill diameter.