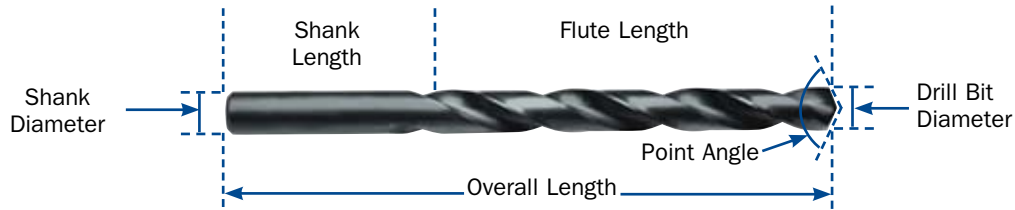


Engineered For Controlled Precision And Speed



Overall Length: The length from the point to the end of the drill

Point Angle: The angle of the cutting edges

Drill Diameter: The cutting diameter of the drill

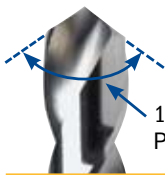
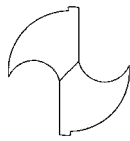
Shank Length: The end of the drill bit that is secured by the drill

Flute Length: The length from the point to the end of the flutes

Tip Geometry

118° Conventional Point

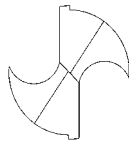
- General Use
- Not self-centering
- For Stationary Drills
- Performs better in softer materials than hard metal



118°
Point Angle

135° Split Point

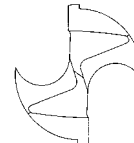
- Self-centering (won't "walk")
- For Portable Drills
- Requires less force than 118°



135°
Point Angle

TURBOMAX® Tip

- Self-centering (won't "walk")
- Precision ground to stay sharp longer and drill faster
- For Portable Drills
- Requires less force than 118°



Drill Bit Section

Material	Point Angle	Black & Gold TURBOMAX®		Heavy-Duty	Titanium Nitride (TiN) Coated	Cobalt	General Purpose
		(135°)	(TURBOMAX®)	(135°)	(135°)	(135°)	(118°)
Wood/Drywall		●	●	●	●	●	●
Sheet Metal		●	●	●	●	●	●
Mild Steel		●	●	●	●	●	●
High Alloy Steels		●	●	●	●	●	●
Stainless Steels		●	●	●	●	●	●
Cast Iron		●	●	●	●	●	●
Aluminum, Brass & Copper		●	●	●	●	●	●
Plastic		●	●	●	●	●	●

Key: ● Recommended ● Acceptable ● Not Recommended

Cutting Speeds - by Working Material

Speeds for High Speed Steel Drills

	SFM*
Aluminum and its Alloys	200 - 300
Brass and Bronze (Ordinary)	150 - 300
Bronze (High Tensile)	70 - 150
Die Castings (Zinc Base)	300 - 400
Iron-Cast (Soft)	100 - 150
Cast (Medium hard)	70 - 100
Hard Chilled	30 - 40
Malleable	80 - 90
Magnesium and its Alloys	250 - 400
Monel Metal or High-Nickel Steel	30 - 50
Plastics or Similar Materials (Bakelite)	100 - 300
Steel - Mild (.2 carbon to .3 carbon)	80 - 110
Steel (.4 carbon to .5 carbon)	70 - 80
Tool (1.2 carbon)	50 - 60
Forgings	40 - 50
Alloy - 300 to 400 Brinell	20 - 30
High Tensile (Heat Treated)	
35 to 40 Rockwell C	30 - 40
40 to 45 Rockwell C	25 - 35
45 to 50 Rockwell C	15 - 25
50 to 55 Rockwell C	7 - 15
Stainless Steel	
Free Machining Grades	30 - 80
Work Hardening Grades	15 - 50
Wood	300 - 400

*Surface Feet per Minute (SFM)

$$\text{RPM} = \frac{\text{SFM} \times 3.82}{\text{Drill Diameter}}$$

Speeds and Feeds for Deep Hole Drilling

Holes that qualify as "deep-hole drilling" are three or more drill bit diameters deep. When drilling this deep, the speed and feed rate must be adjusted to reduce friction. Friction creates heat, and heat build-up in the drill bit can cause failure and breakage. Lubricants help dissipate heat from the tip of the drill bit, prolonging drill life, and should always be used when deep-hole drilling.

Another technique that should be used when deep-hole drilling is called "pecking". Pecking is the process whereby the user drills a short distance then backs the drill out of the hole before progressing. Pecking lessens the possibility of chips getting lodged in the flute and allows for the reintroduction of lubricant into the hole.

Speed and Feed Reduction (Based upon the hole depth)

Hole Depth to Dia. (times drill dia.)	Speed Reduction	Feed Reduction
3	10%	10%
4	20%	10%
5	30%	20%
6	35 - 40%	20%

Feed Per Drill Revolution

Drill Dia. Range	Light	Medium	Heavy
1/16" to 1/8"	.0005 - .0010	.0010 - .0020	.0020 - .0040
1/8" to 1/4"	.0010 - .0030	.0030 - .0050	.0040 - .0050
1/4" to 3/8"	.0030 - .0050	.0050 - .0070	.0060 - .0100
3/8" to 1/2"	.0040 - .0060	.0050 - .0080	.0080 - .0120
1/2" to 3/4"	.0050 - .0070	.0070 - .0100	.0090 - .0140
3/4" to 1"	.0070 - .0100	.0090 - .0140	.0140 - .0200

See pages 127-128 for Tap & Drill Selection Chart

Titanium Nitride (TiN) Coated HSS Fractional Straight Shank Jobber Length Drill Bits 135° Split Point (Series 639/637)



63724

- Titanium Nitride coated bits last up to six times longer than standard high speed steel drill bits
- Cutting edge stays sharper longer
- Titanium Nitride coating reduces friction
- Repetitive metal drilling with Portable Drills, Stationary Drill Press

Sets:

Metal Index: 63737, 3018003

*Note: 2 bits per Card

Size	Decimal Equiv.	Flute Length	Overall Length	Carded Stock #	Bulk Stock #
1/16"	.0625	7/8"	1-7/8"	63904*	63704
5/64"	.0781	1"	2"	63905*	63705
3/32"	.0938	1-1/8"	2-1/4"	63906*	63706
7/64"	.1094	1-1/2"	2-5/8"	63907*	63707
1/8"	.1250	1-5/8"	2-3/4"	63908*	63708
9/64"	.1406	1-3/4"	2-7/8"	63909	63709
5/32"	.1563	2"	3-1/8"	63910	63710
11/64"	.1719	2-1/8"	3-1/4"	63911	63711
3/16"	.1875	2-5/16"	3-1/2"	63912	63712
13/64"	.1563	2-7/16"	3-5/8"	63913	63713
7/32"	.2188	2-1/2"	3-3/4"	63914	63714
15/64"	.2344	2-5/8"	3-7/8"	63915	63715
1/4"	.2500	2-3/4"	4"	63916	63716
17/64"	.2656	2-7/8"	4-1/8"	—	63717
9/32"	.2812	2-15/16"	4-1/4"	63918	63718
19/64"	.2969	3-1/16"	4-3/8"	—	63719
5/16"	.3125	3-3/16"	4-1/2"	63920	63720
21/64"	.3281	3-5/16"	4-5/8"	—	63721
11/32"	.3438	3-7/16"	4-3/4"	63922	63722
23/64"	.3594	3-1/2"	4-7/8"	—	63723
3/8"	.3750	3-5/8"	5"	63924	63724
25/64"	.3906	3-3/4"	5-1/8"	—	63725
13/32"	.4063	3-7/8"	5-1/4"	63926	63726
27/64"	.4219	3-15/16"	5-3/8"	—	63727
7/16"	.4375	4-1/16"	5-1/2"	63928	63728
29/64"	.4531	4-3/16"	5-5/8"	—	63729
15/32"	.4689	4-5/16"	5-3/4"	63930	63730
31/64"	.4844	4-3/8"	5-7/8"	—	63731
1/2"	.5000	4-1/2"	6"	63932	63732

**Cobalt HSS Fractional
Straight Shank Jobber Length Drill Bits
135° Point (Series 3016/631)**



63124

- 5% Cobalt for higher heat and abrasion resistance
- Heavy-duty web construction for strength and durability
- 135° split point begins drilling immediately, minimizing bit "walk"

Applications:

Tough metal drilling, including heavy-duty abrasive alloy metal drilling on hardened steel (heat-treated)

Sets:

Pro Set Case: 316015

Metal Index: 63137, 63221, 3018002b (M42 grade)

Size	Decimal Equiv.	Flute Length	Overall Length	Carded Stock #	Bulk Stock #
1/16"	.0625	7/8"	1-7/8"	3016004	63104
5/64"	.0781	1"	2"	3016005	63105
3/32"	.0938	1-1/8"	2-1/4"	3016006	63106
7/64"	.1094	1-1/2"	2-5/8"	3016007	63107
1/8"	.1250	1-5/8"	2-3/4"	3016008	63108
9/64"	.1406	1-3/4"	2-7/8"	3016009	63109
5/32"	.1563	2"	3-1/8"	3016010	63110
11/64"	.1719	2-1/8"	3-1/4"	3016011	63111
3/16"	.1875	2-5/16"	3-1/2"	3016012	63112
13/64"	.2031	2-7/16"	3-5/8"	3016013	63113
7/32"	.2188	2-1/2"	3-3/4"	3016014	63114
15/64"	.2344	2-5/8"	3-7/8"	3016015	63115
1/4"	.2500	2-3/4"	4"	3016016	63116
17/64"	.2656	2-7/8"	4-1/8"	3016017	63117
9/32"	.2813	2-15/16"	4-1/4"	3016018	63118
19/64"	.2969	3-1/16"	4-3/8"	3016019	63119
5/16"	.3125	3-3/16"	4-1/2"	3016020	63120
21/64"	.3281	3-5/16"	4-5/8"	3016021	63121
11/32"	.3438	3-7/16"	4-3/4"	3016022	63122
23/64"	.3594	3-1/2"	4-7/8"	3016023	63123
3/8"	.3750	3-5/8"	5"	3016024	63124
25/64"	.3906	3-3/4"	5-1/8"	3016125	63125
13/32"	.4063	3-7/8"	5-1/4"	3016126	63126
27/64"	.4219	3-15/16"	5-3/8"	3016127	63127
7/16"	.4375	4-1/16"	5-1/2"	3016128	63128
29/64"	.4531	4-3/16"	5-5/8"	3016129	63129
15/32"	.4689	4-5/16"	5-3/4"	3016130	63130
31/64"	.4844	4-3/8"	5-7/8"	3016131	63131
1/2"	.5000	4-1/2"	6"	3016132	63132

**Cobalt HSS Fractional 3/8" Reduced
Shank Jobber Length Drill Bits
135° Point (Series 30160)**



3016228

- Standard Cobalt bit with 3/8" reduced shanks

Applications:

Tough metal drilling, including heavy-duty abrasive alloy metal drilling on hardened steel (heat treated)

Sets:

Pro Set Case: 316015

Metal Index: 3018002 (M35 grade)

Size	Decimal Equiv.	Flute Length	Overall Length	Carded Stock #	Bulk Stock #
25/64"	.3906	7/8"	1-7/8"	3016025	3016225
13/32"	.4063	1"	2"	3016026	3016226
27/64"	.4219	1-1/8"	2-1/4"	3016027	3016227
7/16"	.4375	1-1/2"	2-5/8"	3016028	3016228
29/64"	.4531	1-5/8"	2-3/4"	3016029	3016229
15/32"	.4689	1-3/4"	2-7/8"	3016030	3016230
31/64"	.4844	2"	3-1/8"	3016031	3016231
1/2"	.5000	2-1/8"	3-1/4"	3016032	3016232