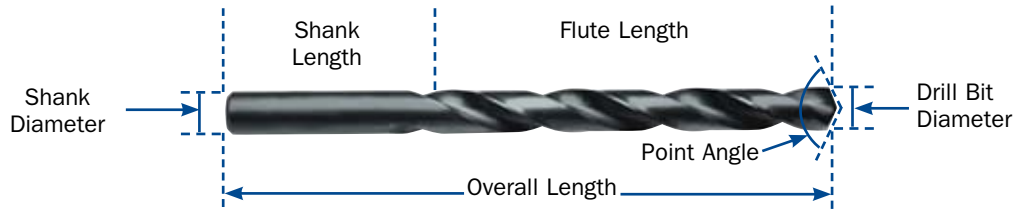


Engineered For Controlled Precision And Speed



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

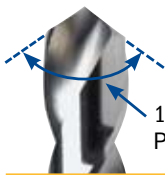
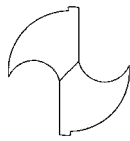
Shank Length: The end of the drill bit that is secured by the drill

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

Tip Geometry

118° Conventional Point

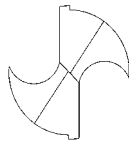
- General Use
- Not self-centering
- For Stationary Drills
- Performs better in softer materials than hard metal



118°
Point Angle

135° Split Point

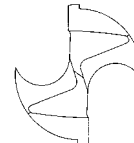
- Self-centering (won't "walk")
- For Portable Drills
- Requires less force than 118°



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°



METAL DRILLING

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)

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

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

METAL DRILLING

STEP DRILL BITS

UNIBIT® HSS Fractional Titanium Nitride (TiN) Coated



15101

- Titanium Nitride coating extends cutting edge life up to 6x
- Single-fluted cutting edge for greater control & rounder holes

Set: 15502

	Description	# of Hole Sizes	Shank Size	Carded Stock #
▲	#1T 1/8" - 1/2" (1/32" steps)	13	1/4"	15101
▲	#2T 3/16" - 1/2" (1/16" steps)	6	1/4"	15102
▲	#3T 1/4" - 3/4" (1/16" steps)	9	3/8"	15103
▲	#4T 3/16" - 7/8" (1/16" steps)	12	3/8"	15104
▲	#13T 1-1/8" (single hole)	10	1/2"	15313
	#21T 13/16" - 1-3/8" (hole enlarging)	1	1/2"	15221

UNIBIT HSS Metric Titanium Nitride (TiN) Coated



16103

- Titanium Nitride coating extends cutting edge life up to 6x
- Single-fluted cutting edge for greater control & rounder holes

	Description	# of Hole Sizes	Shank Size	Carded Stock #
▲	#1MT 4 mm - 12 mm (1 mm steps)	9	1/4"	16101
▲	#2MT 4 mm - 12 mm (2 mm steps)	5	1/4"	16102
▲	#3MT 6 mm - 18 mm (2 mm steps)	7	3/8"	16103
▲	#4MT 4 mm - 22 mm (2 mm steps)	10	3/8"	16104
▲	#5MT 5 mm - 35 mm (2 - 3 mm steps)	13	1/2"	16105

UNIBIT HSS Fractional



10234

- Single-fluted cutting edge for greater control & rounder holes
- Ideal for drilling holes in thin materials such as mild steel, copper, brass, aluminum, plexiglass, wood and laminates

Sets: 10225, 10228, 10502

	Description	# of Hole Sizes	Shank Size	Carded Stock #
	#1 1/8" - 1/2" (1/32" steps)	13	1/4"	10231
▲	#2 3/16" - 1/2" (1/16" steps)	6	1/4"	10232
▲	#3 1/4" - 3/4" (1/16" steps)	9	3/8"	10233
▲	#4 3/16" - 7/8" (1/16" steps)	12	3/8"	10234
▲	#5 1/4" - 1-3/8" (1/8" steps)	10	1/2"	10235
▲	#9 7/8" and 1-1/8" (1/2" and 3/4" Knock-Out)	2	1/2"	10239
	#10 1/2" (single hole)	1	1/4"	10310
	#11 7/8" (single hole)	1	3/8"	10311
	#12 3/8" (single hole)	1	1/4"	10312
▲	#13 1-1/8" (single hole)	1	1/2"	10313
▲	#14 1-7/32" (single hole)	1	1/2"	10314
	#20 9/16" - 1" (hole enlarging)	8	1/2"	10220
	#21 13/16" - 1-3/8" (hole enlarging)	10	1/2"	10221

UNIBIT HSS Metric



11101

- Single-fluted cutting edge for greater control & rounder holes
- Ideal for drilling holes in thin materials such as mild steel, copper, brass, aluminum, plexiglass, wood and laminates

	Description	# of Hole Sizes	Shank Size	Carded Stock #
▲	#1M 4 mm - 12 mm (1 mm steps)	9	1/4"	11101
▲	#2M 4 mm - 12 mm (2 mm steps)	5	1/4"	11102
▲	#3M 6 mm - 18 mm (2 mm steps)	7	3/8"	11103
▲	#4M 4 mm - 22 mm (2 mm steps)	10	3/8"	11104
▲	#5M 5 mm - 35 mm (2-3 mm steps)	13	1/2"	11105
	#20M 14 mm - 24 mm (hole enlarging)	6	1/2"	11580
	#21M 20 mm - 34 mm (hole enlarging)	8	1/2"	11581
	PG29M 5 mm - 28.3 mm	10	1/2"	11194
	29 mm 5 mm - 29 mm	10	1/2"	11195

▲ — SpeedPoint™ Tip