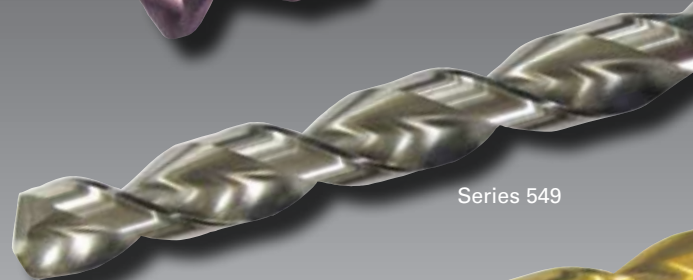


# GT parabolic drills

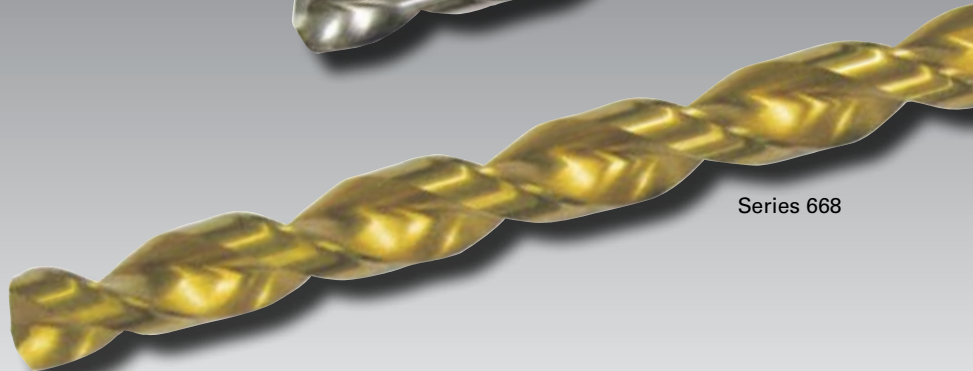
***Still the Best!***



Series 530



Series 549



Series 668

**The industry's largest offering of parabolic drills  
from the industry's leader in drilling innovations**

- Reduce -- and even eliminate -- the need for chip clearing peck cycles
- Increased feed rates over standard high speed steel drill flute designs
- Chip evacuation is improved for better finished hole and part quality
- Reduce cycle times and improve manufacturing efficiency
- Hundreds of stocked standard sizes in inventory

# Parabolic drills

## Rethinking HSS and HSCO drilling applications

Progressive manufacturers are continually looking for ways to reduce production costs but they may be overlooking one of the most common applications: high speed steel drilling. Although a high speed steel drill is an inexpensive tool, it can actually increase the cost of manufacturing through marginal performance. Fortunately, there is an alternative. A general purpose high speed steel (HSS) or cobalt (HSCO) drill with a standard flute design can be replaced with a Guhring GT (parabolic flute) drill, and production rates and part quality can both be significantly improved.

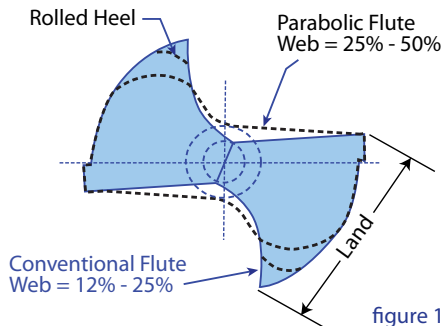


figure 1

The parabolic flute design was originally developed for deep hole drilling applications where chip packing limits the effectiveness of general purpose flute designs. Extra length drills were manufactured

with a parabolic flute to increase the flute spacing by 50% and allow for maximized chip control characteristics with better coolant flow (figure 1).

## Not all parabolic drills are the same

Some drill manufacturers only offer one style of parabolic flute drills with thin lands and reduced web thickness. These drills are designed for non ferrous materials such as aluminum, copper and mild carbon steels. Parabolic drills with thin lands are designed specifically for drilling depths up to 15 times diameter without pecking in materials no harder than 25 HRC. The Guhring GT50 design is an example of the style of parabolic drill.

Guhring offers another style of parabolic drill that has a wider land design and a stronger core web thickness called the GT100. Unlike the GT50 design, the GT100 parabolic drill can operate effectively in a wide range of materials because of this heavier construction, and the machinist can choose the material substrate and protective coating to suit the application. High Speed Steel (HSS) drills are excellent for applications under 25 HRC, while cobalt (HSCO) drills provide a higher red hardness and are more resistant to abrasion.

Guhring also offers a carbide version of the GT100 drill, in bright finish and TiN coated, for extremely abrasive applications in cast iron and high silicon content aluminum alloys. An even more robust version of the GT100 is the GT500, which Guhring offers in two powdered metal cobalt series, TiN coated or FIREX coated.

## Increased feed rates

The unique flute form of the parabolic drill contributes to increased chip flow which improves heat dissipation within the

In heavy fact, it is important to maintain a constant feed rate regardless of the depth of the hole. Conventional, non-parabolic, flute designs require a reduction in feed rate as the depth of the cut increases. The deeper the hole, the greater the tendency will be for chips to pack and clog the flutes and therefore the feed rate must be reduced. With a parabolic drill, feed rates can remain high and the drill speed may be reduced per the chart below.

Hole depth-to-diameter ratio (times drill diameter)	Speed reduction	Feed reduction
3	0	0
4	0	0
5	5%	0
6 to 8	10%	0
8 to 11	20%	0
11 to 14	30%	0
14 to 17	40%	0
17 to 20	50%	0

Speed reduction - parabolic drills (based upon hole depth)

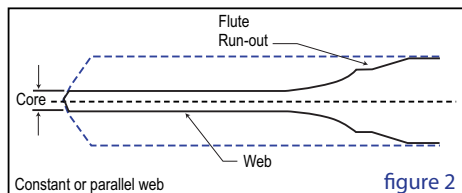
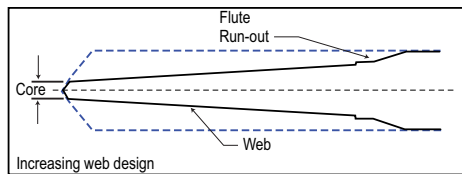


See the 2010 Full Line Drill Catalog for complete information on our drill offering, or log onto [www.guhring.com](http://www.guhring.com)

## RISK FREE test and trial drill policy:

**Purchase any GT drill to test, and if it fails to improve your productivity it can be returned for a full refund.**

A general purpose (Type N) flute profile incorporates an increasing web design that is tapered front to rear, which progressively reduces the flute spacing the farther the drill penetrates. The parabolic flute form has a constant web design from the front to the back of the flute (figure 2). This constant web design means that the chip space within the flute remains the same no matter how deep the drill goes. The extra flute space and constant web design reduce the need for drill retractions to clear chip packing -- known as pecking -- and allows the user to increase



feed rates (figure 3). Manufacturing cycle times are decreased along with production costs.

Guhring employs the parabolic flute style not only on extra length drills, but taper length, jobber length and even stub length tools.

While other manufacturers use parabolic drills for softer, non-ferrous materials, Guhring has developed a variety of designs that improve production in not only aluminum and copper, but also cast iron, alloyed steels, unalloyed steels and stainless steels. The maximized chip evacuation and coolant delivery to the cutting zone equates to higher production rates and longer tool life at any hole depth.

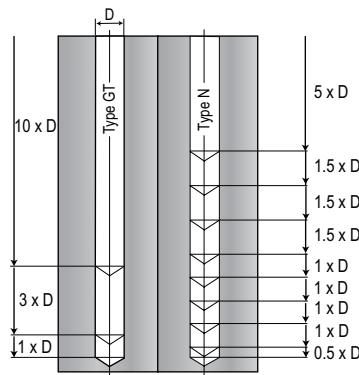
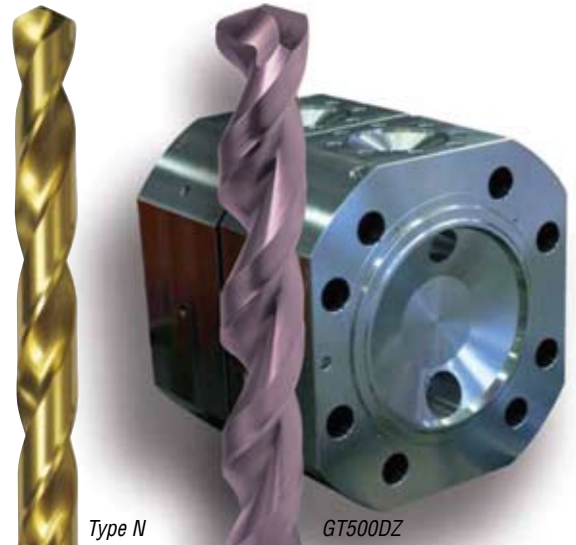


figure 3



## Case history:

### Guhring GT 500 DZ drill takes on 4130 high alloy steel

A manufacturer of aircraft components in the Northeast needed to improve their cycle time in a drilling application in 4130 high alloy steel. The 0.1248" diameter jobber drill they had been using required one minute and ten seconds to produce a 1 1/8" deep hole, and was not achieving great tool life.

Even in this hard material, a Guhring parabolic drill can dramatically outperform a standard flute profile. In this vertical CNC application, a Series 530 GT 500 DZ drill was tested against the competitor's HSS drill. The feed rate was boosted from 0.0002 to 0.002 inches per revolution (IPR), which reduced the cut time from 55 seconds to 9 seconds. With the parabolic drill, no withdrawal cycles or "pecks" were required, and the cycle time was reduced from one minute and ten seconds to just 24 seconds.

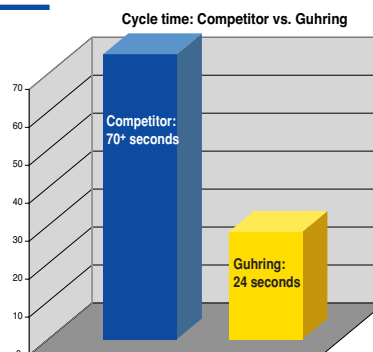
Tool life was also greatly improved with the Guhring drill. The superior chip flow of the GT 500 DZ parabolic flute form contributes to the longevity of the drill, as does the PM cobalt substrate and stronger core web thickness. Series 530 is a FIREX® coated drill, thus it benefits from additional tool life from this high heat- and wear-resistant PVD coating. The Guhring drill produced 48 holes in the high alloy steel before needing regrinding, whereas the competitor's tool only achieved 2 holes.

"I have never in my life seen a drill bit perform like this."

- Quote from blogger on Practical Machinist.com, describing a 1/4" Guhring parabolic drill he was running in W-1 die steel on a lathe.

"I've used Guhring drills in the past and I've never been let down by them, you get what you pay for..."

- One reply to the above blogger's post.















Overall, the end-user saw more than 64% savings in this application by switching to the GT 500 DZ parabolic drill, despite the fact that the initial purchase price was considerably higher than the drill they had been using. With the Guhring drill, they saved \$1.14 per hole drilled - needless to say, they have now replaced multiple HSS drills with Guhring parabolic drills.

## Stub Length Drills

SERIES	552	553	329	659	5521	515
Style	GT80	GT80 (LH)	GV120	GV120	GT500DZ	GT500DZ
Point Angle	130°	130°	130°	130°	130°	130°
Length	Stub	Stub	Stub	Stub	Stub	Stub
Substrate	HSS	HSS	Cobalt	Cobalt	PM-Cobalt	PM-Cobalt
Surface Finish	 	 	 			
Std. Dia. Range mm	1.000 - 20.000	1.000 - 20.000	0.400 - 48.000	0.500 - 15.500	1.000 - 14.000	1.000 - 14.000
Std. Dia. Range In.	0.0394 - 0.7874	0.0394 - 0.7874	0.0157 - 1.8898	0.0197 - 0.6102	0.0394 - 0.5512	0.0394 - 0.5512
Workpiece Materials	  	  	    	    	  	    


































**GUHRING**  
Select

## Jobber Length Drills

SERIES	549	550
Style	GT100	GT100(LH)
Point Angle	130°	130°
Length	Jobber	Jobber
Substrate	HSS	HSS
Surface Finish	 	 
Std. Dia. Range mm	0.600 - 16.000	1.000 - 16.000
Std. Dia. Range In.	0.0236 - 0.6299	0.0394 - 0.6299
Workpiece Materials	   	   









For detailed size information, refer to the 2010 Full Line Drill catalog, or go to [www.guhring.com](http://www.guhring.com), and click on the Products & Services tab.


## Taper Length Drills


SERIES	2601	2602	501	390	535	668	336
Style	GT 100	GT 100	GT50	GT100	GT100	GT100	GT100
Point Angle	130°	130°	130°	130°	130°	130°	130°
Length	8 x D	8 x D	Taper	Taper	Taper	Taper	Taper
Substrate	Carbide	Carbide	HSS	HSS	HSS	HSS	Cobalt
Surface Finish					 		 
Std. Dia. Range mm	3.17 - 12.70	3.17 - 12.70	1.000 - 14.000	3.000 - 13.000	1.000 - 14.000	1.000 - 14.000	1.000 - 16.000
Std. Dia. Range In.	0.1248 - 0.5000	0.1248 - 0.5000	0.0394 - 0.5512	0.1181 - 0.5118	0.0394 - 0.5512	0.0394 - 0.5512	0.0394 - 0.6299
Workpiece Materials	 	  	 	    	  	    	    


Coolant Through!

## Extra Length Drills

SERIES	502	524
Style	GT100	GT50
Point Angle	130°	130°
Length	XL #1	XL #1
Substrate	HSS	HSS
Surface Finish	 	
Std. Dia. Range mm	1.950 - 13.000	2.000 - 12.700
Std. Dia. Range In.	0.0768 - 0.5118	0.0787 - 0.500
Workpiece Materials	  	 


 bright








 steam oxide



















 nitrided lands

 nitrided









						
<b>652</b> GT100	<b>622</b> GT100	<b>658</b> GT100	<b>1221</b> GT100	<b>1223</b> GT100	<b>5522</b> GT500DZ	<b>530</b> GT500DZ
130°	130°	130°	130°	130°	130°	130°
Jobber	Jobber	Jobber	Jobber	Jobber	Jobber	Jobber
HSS	Cobalt	Cobalt	Cobalt	Cobalt	PM-Cobalt	PM-Cobalt
						
1.000 - 16.000	1.000 - 16.000	1.000 - 16.000	3.000 - 12.000	3.000 - 12.000	1.000 - 14.000	1.000 - 14.000
0.0394 - 0.6299	0.0394 - 0.6299	0.0394 - 0.6299	0.1181 - 0.4724	0.1181 - 0.4724	0.0394 - 0.5512	0.0394 - 0.5512
						

Color Code	Workpiece Material
	General Steels, Brass, Copper
	Alloyed, Nitrided or Case Hardened Steels
	Stainless and Acid-Resistant Steels
	Tool Steels, High-Tensile or Hardened Steels
	Aluminum and Aluminum Alloys
	Cast Iron
	Titanium and Ti-Alloys, Aerospace Materials, Nickel-Based Alloys

					
<b>670</b> GT100	<b>618</b> GT100	<b>503</b> GT100	<b>671</b> GT100	<b>619</b> GT100	<b>504</b> GT100
130°	130°	130°	130°	130°	130°
XL #1	XL #1	XL #2	XL #2	XL #2	XL #3
HSS	Cobalt	HSS	HSS	Cobalt	HSS
					
1.980 - 12.700	2.700 - 10.000	2.000 - 13.000	2.700 - 8.500	3.000 - 10.000	2.500 - 13.000
0.078 - 0.500	0.1063 - 0.3937	0.0787 - 0.5118	0.1063 - 0.3347	0.1181 - 0.3937	0.0984 - 0.5118
					

### Morse Taper Shank Drills

SERIES	<b>551</b>	<b>526</b>	<b>527</b>
Style	GT100	GT100	GT100
Point Angle	130°	130°	130°
Length	Bushing	XL #1	XL #2
Substrate	HSS	HSS	HSS
Surface Finish			
Std. Dia. Range mm	5.500 - 32.000	8.000 - 31.000	8.000 - 30.000
Std. Dia. Range In.	0.2165 - 1.2598	0.315 - 1.2205	0.315 - 1.1811
Workpiece Materials			

 TiN

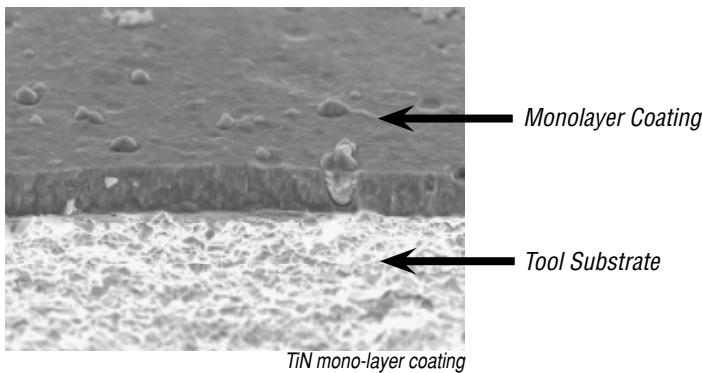
 TiCN

 TiAlN

 FIREX®



# PVD coatings and surface finishes



Coatings can improve many tool and part characteristics when properly applied. They increase surface hardness, lower the friction coefficient and thermal conductivity, and provide a chemically inert surface.

As a cutting tool manufacturer, Guhring offers a level of coating expertise without equal in the industry. Guhring was the first to introduce TiN coating (Titanium Nitride) to cutting tools in 1980, and has remained a global leader in developing and applying new coating technology to improve both cutting tool and wear part performance. Today, Guhring offers a full range of high performance PVD (Physical Vapor Deposition) coatings to meet customers' diverse needs.

## Surface refining processes

- steam nitrided
- ◐ nitrided lands

Nitriding is a further means of increasing the durability of tools. This finish is recommended for the machining of grey cast iron, aluminium with a high silicon content, plastics, steels with a high perlite content etc.

- steam oxide

Steam oxide tools also offer a reduction in sliding resistance. Thus cold welding which occurs for example during the machining of steels that have a low carbon content, can be avoided most economically. Steam oxide tools are only suitable for ferrous materials.

## PVD Hard Coatings

### **S** TiN (Titanium nitride)

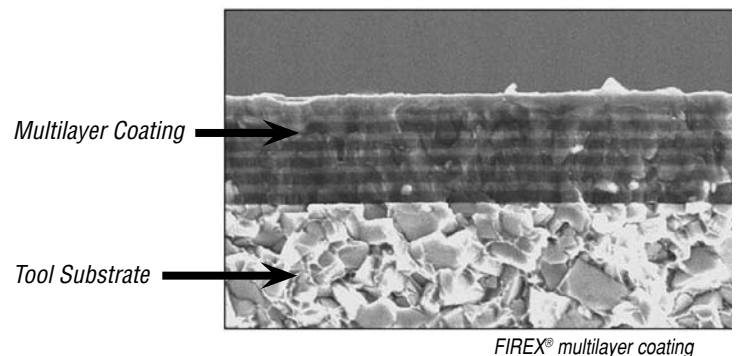
Physical appearance: golden color  
TiN (titanium nitride) significantly improves wear life and hole finish, which frequently enables higher drilling speeds, especially in ferrous materials.

### **C** TiCN (Titanium carbon nitride)

Physical appearance: grey-violet color  
TiCN is harder and more shock resistant than TiN coating under moderate cutting temperatures. The most common application for TiCN coated drills would be in steel applications and are not recommended for nonferrous materials.

### **A** TiAlN (Titanium aluminium nitride)

Physical appearance: black-violet color  
A special coat for machining abrasive materials and/or for working at high temperatures, TiAlN is more heat and wear resistant than TiN or TiCN but at elevated operating temperatures. This monolayer coating is best suited for applications over 25HRC but caution should be taken when drilling at temperatures below 1380° F.



### **F** FIREX® (multilayer TiAlN & TiN)

Physical appearance: black-violet color  
FIREX® provides the universal applicability of TiN with the heat and wear resistance of TiAlN. FIREX coated drills are recommended for ferrous materials and applications where heat build up is an issue. One of the key benefits of FIREX is that the coating will operate effectively in both high heat and low heat applications because of the multi-coating combination.

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## GT Parabolic drills from Guhring:

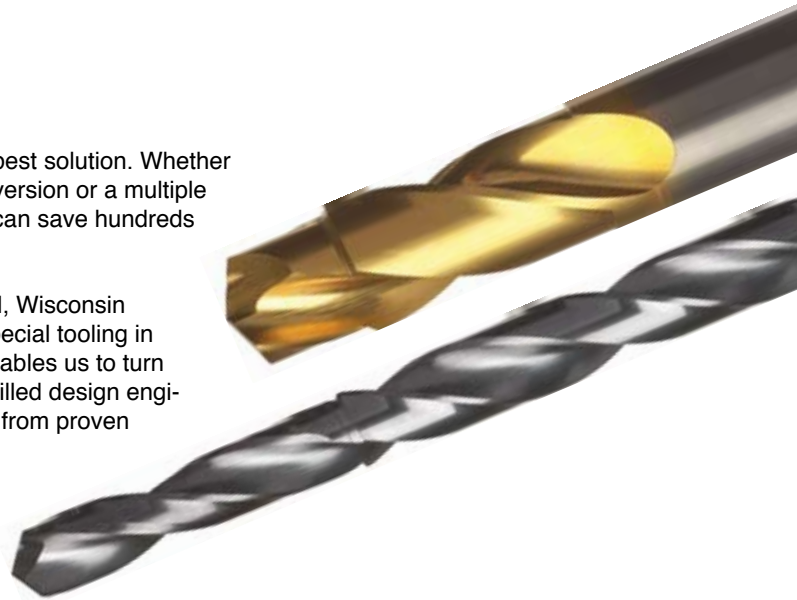
- Replaces standard general purpose high speed steel and cobalt drills
- Drill stainless steel, alloyed steels, cast iron, unalloyed steels and more
- Unique point geometry with a Type A or GN-B web thinning
- Guhring's own HSS substrate, longer lasting premium powdered metal cobalt substrate, or sub-micro grain carbide substrate for extended tool life
- High-performance PVD coatings provide heat and wear resistance under higher operating temperatures

## Special Tools - Made in the USA

For high production jobs, special design parabolic drills are often the best solution. Whether you need an odd size diameter, a non-standard length, a coolant fed version or a multiple diameter step tool, having a tool made specifically for your operation can save hundreds of dollars in manufacturing costs.

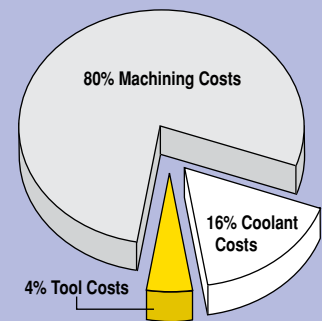
Guhring has two manufacturing plants in the United States (Brookfield, Wisconsin & New Hudson, Michigan) which produce a wide range of blueprint special tooling in all cutting tool substrates. Our fully computerized quotation system enables us to turn around special tooling quotations quickly and accurately. Guhring's skilled design engineers tap into our global database to produce custom tooling designs from proven geometries and substrates.

Guhring produces high speed steel, cobalt and carbide tooling to the most exacting specifications, utilizing the same manufacturing equipment and techniques as the production plants in Germany. Contact Guhring at (800) 776-6170 or arrange to have one of our field service engineers visit your facility to obtain a quotation on your special drill needs.



### Price Versus Cost

You may pay more for quality tools, but you are actually saving money. The cost of a cutting tool like a high speed drill or carbide end mill typically accounts for less than 4% of the total cost of manufacturing a part, but that cutting tool's performance can have a huge effect on the other 96% of the manufacturing costs.



Inferior cutting tools can lead to breakage and scrap parts, they can reduce cycle time and drive up production costs, and they can also affect part quality -- leading to rejections and part failures. The price of inferior cutting tools is not worth the ultimate cost.

When you think about it, the cost of a quality high speed drill is only on average \$10 to \$50 dollars but it can sap hundreds of dollars worth of production costs. Spend more for the right quality tooling and make more money.

### Free toolfinder software

*Find the best-suited Guhring cutting tools for your application quickly and easily with Guhring Navigator. Go to [www.guhring.com](http://www.guhring.com) and click on the icon to test drive this software.*



# STANDARD & SPECIAL PRODUCT RANGE

## • HSS, HSCO & PM Standards •

GU 500 DZ Universal Drills  
GT 500 DZ High Performance Drills  
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Coolant-Through GT 100 IC Parabolic Flute Deep Hole Drills  
GT 80 Parabolic Flute Deep Hole Drills  
Coolant-Through GT 80 IC Parabolic Flute Deep Hole Drills  
GT 50 Parabolic Flute Deep Hole Drills  
General Purpose Drills  
Heavy Duty Drills  
Heavy Duty Split Point Drills  
Low Helix Drills  
High Helix Drills  
Micro-Precision Drills  
NC Spot Drills  
Drill-Countersinks  
High Performance HSS-E Taps  
High Performance PM HSS-E Taps

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Step Drills  
Step Drill Reamers  
Step Core Drills  
Step Core Drill Reamers  
Reamers  
Step Reamers  
Subland Drills  
Subland Drill Reamers  
Subland Core Drills  
Taps

## • Carbide Standards •

RT 100 U/F High Penetration Drills  
RT 100 X High Penetration Drills  
RT 100 R High Penetration Drills  
RT 100 T Deep Hole Drills  
Coolant-Through RT 100 U/F/C High Penetration Drills  
Coolant-Through RT 150 GG Straight-Flute High Penetration Drills  
Coolant-Through HT/RT 800 WP Interchangeable Insert Drills  
GS 200 U/G Three-Flute High Precision Drills  
GT 100 Parabolic Flute Deep Hole Drills  
Exclusive Line® Small-Diameter Drills  
EB 100 Small-Diameter Single-Flute Gun Drills  
General Purpose Drills  
NC Spot Drills  
PRO-Line Universal End Mills  
TECH-Line High Performance End Mills

## • Carbide Specials •

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G Drills  
Gun Drills  
Three- & Four-Flute Drills  
Step Drills  
Step Drill Reamers  
Step Core Drills  
Step Core Drill Reamers  
Reamers  
Step Reamers  
Subland Drills  
Subland Drill Reamers  
Subland Core Drills  
Taps  
End Mills

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Titanium Carbonitride (TiCN)  
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Super A (AlTiN)  
MolyGlide® Lubricating Soft Coating  
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nano-FIREX® micro thin film gradient structure

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