

GUHRING



**HIGH-PERFORMANCE CUTTING TOOLS FOR
COMPOSITE AND AEROSPACE MATERIALS**

Composite Materials

Milling



DL 100 2-Flute PCD End Mills

Series	No. Flutes	Cutting dia. (in)	Shank dia.	Overall length	Length of cut	Order Code
3867	2	1/4	1/4	2-1/2	3/4	006350
	2	3/8	3/8	3	3/4	009520
	2	1/2	1/2	3	1	012700
	2	3/4	3/4	4	1	019050

Stock Standard PCD End Mills

PCD (Polycrystalline Diamond) tooling provides the ultimate in wear resistance and tool life to maximize production efficiencies. Guhring produces two stocked standard series of PCD end mills that are used for machining highly abrasive composite materials as well as many high silicon grade aluminum parts. In addition, Guhring produces an extensive array of special design PCD end mills as well as reamers, drills and counterbores. Our engineers work directly with our customers to develop tooling designs that decrease machine cycle times while dramatically increasing tool life.

DL 100 3-Flute PCD End Mills

Series	No. Flutes	Cutting dia. (in)	Shank dia.	Overall length	Length of cut	Order Code
3870	3	1/2	1/2	3	1/2	012700
	3	3/4	3/4	3	1/2	019050
	3	1	1	4	1	025400

Stock Standard Carbide Routers

Constructed from our proprietary DK 400 N carbide, diamond coated for vastly extended tool life.

By eliminating Guhring's



Series 3083 Diamond Coated Slotting Router

For slot and periphery milling in composite materials, non-center cutting with 0.006" chamfer.

Series	Cutting Dia.	Shank Dia.	Number of flutes	Length of cut	OAL	Order Code
3083	1/4	1/4	10	3/4	2 1/2	006.350
	3/8	3/8	14	1	3	009.520
	1/2	1/2	15	1 1/4	3 1/2	012.700
	5/8	5/8	15	1 5/8	4	019.050



Series 3084 Solid Carbide Router

Carbide router features 118° drill point for plunging, slotting and periphery milling; 0.006" chamfer.

Series	Cutting Dia.	Shank Dia.	Number of flutes	Length of cut	OAL	Order Code
3084	1/4	1/4	10	3/4	2 1/2	006.350
	3/8	3/8	14	1	3	009.520
	1/2	1/2	15	1 1/4	3 1/2	012.700
	5/8	5/8	15	1 5/8	4	019.050



Series 3085 Carbide Router with coolant pilot

Internal coolant holes direct the composite powder back through the flutes, containing it within the vacuum.

Series	Cutting Dia.	Shank Dia.	Number of flutes	Length of cut	OAL	Coolant Pilot Length	Coolant Pilot Length	Order Code
3085	1/4	3/8	10	3/4	3	3/16	5/32	006.350
	3/8	1/2	14	1	3 1/2	1/4	9/32	009.520
	1/2	1/2	15	1 1/4	3 1/2	5/16	13/32	012.700
	5/8	5/8	15	1 5/8	4 1/4	13/32	1/2	019.050

Drilling

90° Diamond Coated Carbide Jobber Drills



Series 1068 90° Diamond Coated Carbide Jobber Drills

Unique point geometry features superior shearing action, minimizing heat generation and allowing this drill to excel in composite materials. Point geometry eliminates delamination on entry and exit; open flute spacing allows superior chip evacuation. Diamond coating greatly extends tool life in abrasive aerospace materials.

Series	Dia (fract)	Dia (dec)	Dia (mm)	Shank Dia	Flute Length	OAL
1068	11/64	0.1719	4.366	6.0	24.0	66.0
		0.1915	4.864	6.0	28.0	66.0
		0.2510	6.375	8.0	34.0	79.0
	5/16	0.3125	7.938	8.0	41.0	79.0
		0.3760	9.550	10.0	47.0	89.0
		0.3765	9.563	10.0	47.0	89.0
	0.4380	11.125	12.0	55.0	102.0	
	0.5010	12.725	14.0	60.0	107.0	

Special Tools for Composite Materials

Guhring designs and manufactures special PCD and carbide tooling for composite and other aerospace materials. We have the capacity to manufacture to customer specifications or we can utilize our highly experienced engineering staff to design tooling to meet customer requirements. Guhring not only manufactures new tools but also offers re-tip and recondition service for rejuvenating worn tools quickly and efficiently in our state-of-the-art manufacturing facility.

PCD Specials - Drills, one-shot drill/countersinks, piloted countersinks, reamers



Carbide Specials - Drills, step drills, FK drills, one-shot hand drilling, tools for one-shot drilling with air motors, reamers and core drills



Visit Guhring at www.guhring-es.com to obtain full-line catalogs.

Aluminum

Drilling

Stock Standard Carbide Drills



GS200 3-flute drills - Series 1452, 609 and 5518

Three flutes for aggressive material removal and added stability in the cut. This 5 x D drill is also excellent for uneven entry or exit, as well as interrupted cuts. Ultra-fine grain DK460UF carbide. Available in diameters from 3.0 mm - 20.0 mm.



RT150GG straight-flute drills - Series 768, 769, 5513

Self-centering point geometry has 120° cone point. Rigid, straight flute design allows for aggressive feed rates while maintaining excellent hole concentricity and straightness. Bright finish, DK460UF carbide, reinforced shank. Available in diameters from 3.0 mm - 20.0 mm.



RT800WP/HT800WP indexable insert drill

Ultra-fine grain DK460UF carbide inserts feature an aggressive 140° SF point which reduces axial thrust loading and provides freer cutting. The point geometry is self-centering and produces a narrow, easily evacuated chip. One body can be used with numerous inserts, providing flexibility and cost savings. Inserts available in diameters from 11.5 mm to 40.5 mm.

Special Tools for Aluminum Applications

Guhring offers a complete line of stocked standard as well as specialized tool designs for aluminum applications. Many of the worlds leading aerospace manufacturers use Guhring tools including NAS styles for high volume production drilling, along with thread and quick change shank designs. Guhring manufactures a wide range of high speed steel, M2, M35 and M42 grade cobalt drills as well as carbide tools with and without coolant holes for precision manufacturing.

Special Tools for Stacked Material Drilling

Guhring offers specialized tool designs for drilling stacked materials. This includes variations in layers of composite, aluminum, stainless and titanium. Guhring has developed one-shot tooling for applications that typically require reaming operations in CNC and air motor applications.



Milling and Threading

Stock Standard End Mills

Guhring offers some unique milling solutions for aluminum. The Alumi-Tech line of high performance carbide end mills are offered in both solid and coolant fed designs for maximum chip removal rates and superior finish requirements. Our ultra-fine grade carbide grades and unique geometry make Guhring carbide end mills the obvious choice for progressive manufacturing companies. Guhring also manufactures specialized end mill designs to suit customers' requirements.



Alumi-Tech L Solid and Coolant Fed Long Reach End Mills Series 3367, 3877, 3177

3-flute, center-cutting, radius square-end mills with a 45° right hand helix and straight shank. Recessed neck, long reach, coolant through the tool, DK400N ultra fine-grain carbide. Available in diameters from 6mm to 20mm, bright finish.



Alumi-Tech End Mills - Series 3174, 3874, 3175, 3875

DK400N ultra fine-grain carbide, 2-flute, center-cutting, square-end mills with a 45° right hand helix and straight shank. Available in diameters from 1/8" to 1", bright finish or Super-A™ coated. Also available in long length, in diameters from 1/4" to 5/8", bright finish or Super-A™ coated.



Rough-Tech ALU Mills with and without coolant through Series 3364 (Series 3184 and 3884 have external coolant)

3-flute, center-cutting, square-end mills with a 30° right hand helix and straight shank. Extra course tooth for maximum material removal, DK460N ultra-fine grain carbide. Available in diameters from 6mm to 20mm, bright finish.



Stock Standard Taps

Guhring premium grade cobalt taps are available for forming and cut thread applications. DIN and ANSI style designs available in UNC, UNF, and Metric thread specifications. An easy to use color ring designation system allows machinists to quickly identify the correct tap for their application.

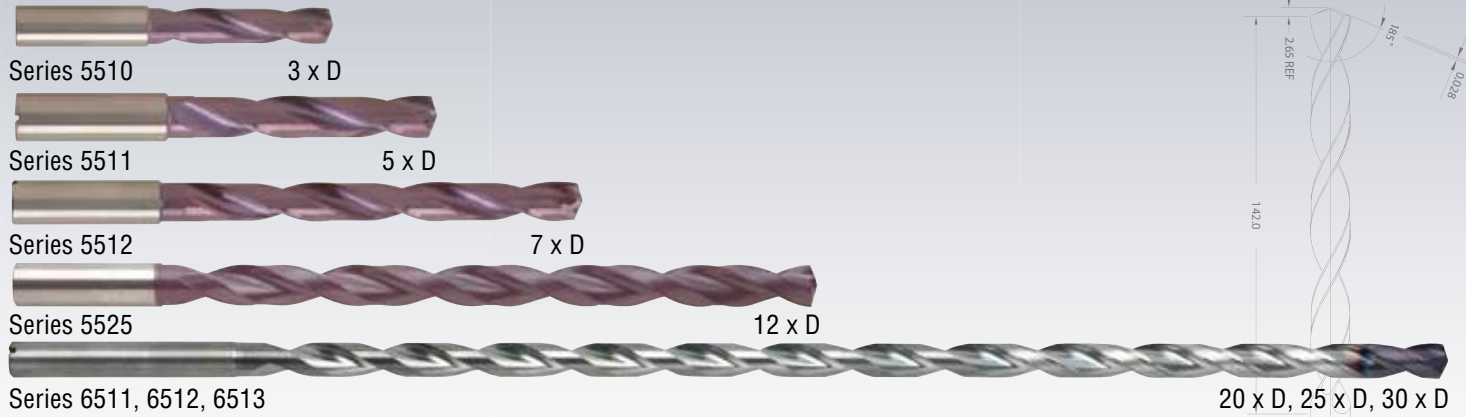
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Stainless Steel, Titanium Alloys, & Nickel Alloys

Stock Standard High-Performance Carbide Drills

Guhring's offering of solid carbide drills is the largest in the cutting tool industry. The tools shown below are just a sampling of drills well-suited to applications in aerospace materials - many other drill series are available.



RT100 Coolant fed high penetration carbide drills

Self-centering point geometry with a radius cutting edge for tight chip curl formation. Heat-resistant FIREX® or TiAlN coating adds to tool life. Helical coolant ducts through the DK460UF carbide tool body provide excellent coolant delivery to the cutting edge.



Special Tools for Stainless, Titanium or Nickel Applications

As one of the largest manufacturers of special design cutting tools, Guhring has the capacity and expertise to handle all your blueprint special requirements. Production facilities all around the world are equipped with the most modern CNC grinding equipment, many of which are designed and built by Guhring to our unique and exacting specifications. Whether your requirements call for drills, reamers, end mills, taps, countersinks or counterbores, Guhring has the capability to meet your needs.

Research and Testing Capabilities

Guhring's commitment to constantly develop and improve our tooling designs is enhanced by our in-house ability to run test cuts on equipment dedicated solely to research and to training. Customers may send in material, along with part requirements, allowing Guhring to develop and test cutting tools to best suit their needs.



Stock Standard Taps

Guhring premium grade cobalt taps are available for forming and cut thread applications. DIN and ANSI style designs available in UNC, UNF, and Metric thread specifications. An easy to use color ring designation system allows machinists to quickly identify the correct tap for their application.

Ti / Ni Taps for Titanium and Nickel Alloys

Series 2908, 2920 (blind hole); **2900, 2916** (through hole)
Other tap series are available for these materials.

Blue Ring Taps for Stainless Steels and Aerospace Alloys, Series 3910, 3911 (blind hole); **3907, 3908** (through hole). Multiple other tap series are available for these materials.

Stock Standard Solid Carbide End Mills

Nickel- and titanium-based materials as well as stainless steel call for carbide end mill designs that will hold up under unforgiving conditions. Guhring offers a number of standard and special carbide end mill designs for high temperature applications such as our Aero-Tech line of tools. New roughing and finishing Aero-Tech designs are combined with our most heat-resistant coatings to provide unmatched tool life. Guhring also offers a full line of variable flute end mills which dampen vibration and allow for increased production rates and improved surface finish results.



Aero-Tech End Mills for Titanium, Aerospace materials and Nickel alloys, Series 3173, 3741

These 3-flute DK400N carbide end mills feature Guhring's proprietary FIREX® heat-resistant coating for long tool life. Superior shearing action, plus unique center-cut geometry for improved chip evacuation. Standard length, straight shank.



Finish-Tech 50 and 62 for materials up to 50 or 62 HRC, Series 3179, 3689 and 3182

Additional flutes and an extra-stable core deliver an ultra-smooth chatter-free performance at high speeds and feeds. With 6-10 flutes, these finish mills produce an excellent surface finish. Square end, center cutting, standard straight shank. DK400N carbide with FIREX® heat-resistant coating.



Aero-Rough 56 End Mills for materials up to 56HRC, Series 3098

The roughing tooth profile of these roughing cutters allows heavy feed rates in aerospace materials and steels up to 56 HRC. These 5-6 flute end mills are center cutting with a square end and a 45° helix. Made from DK400N carbide, with FIREX® heat-resistant coating; standard straight shank.



RF 50 Variable Flute Rougher/Finisher, Series 3095, 3096

With its variable flute design, this end mill features greatly reduced vibration and chatter, even when cutting alloy steel. Four flutes, DK400N fine-grain carbide, FIREX® heat-resistant coating, stub or standard length.

Guhring Coating and Reconditioning Services

We can restore used standard and special carbide and PCD drills, step drills, reamers, and end mills to their original factory quality, condition and performance. We also recoat in the same facility that we recondition, allowing for quicker turn-around and excellent quality control.

Utilizing the same high-precision CNC grinding machines that are used in Guhring's manufacturing plants, our Reconditioning Division is well-equipped to restore standard and special carbide and PCD tooling to its original factory quality, condition and performance.



Guhring's Reconditioning Division is staffed with its own customer service team, allowing for extraordinary and personalized service. Combined with our in-house coating chambers, we are in a unique position to provide unmatched quality and service. Complimentary pickup and delivery is available.



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, including:



- **TiN** (Titanium Nitride)
- **TiCN** (Titanium Carbonitride)
- **TiAlN** (Titanium Aluminum Nitride)
- **FIREX®** (special TiN-TiAlN multilayer hard coating)
- **Super-A™** (Aluminum Titanium Nitride)
- **MolyGlide®** (Molybdenum Disulfide-based soft coating)
- **ICE®** (Chromium-Based)

Performance benefits include: significantly increased tool and part life, reduced friction and heat buildup, and high resistance to edge buildup, galling and fissure propagation.

- **High-precision CNC grinding machines**
- **Personalized customer service**
- **Reconditioning and coating at one facility**

GUHRING