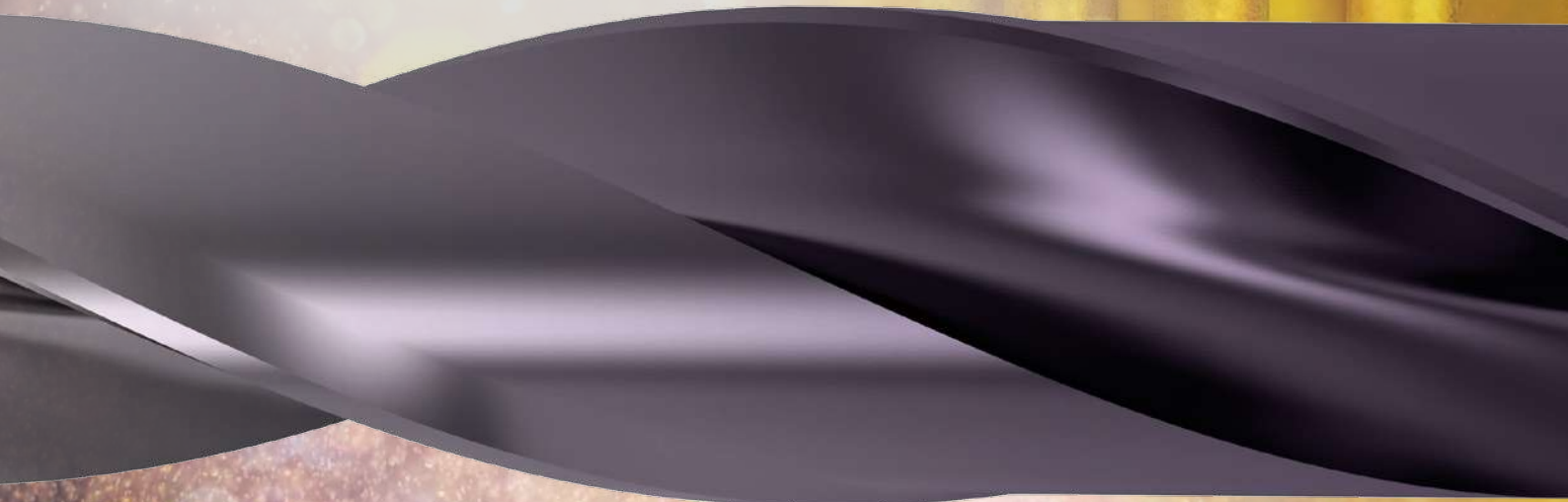
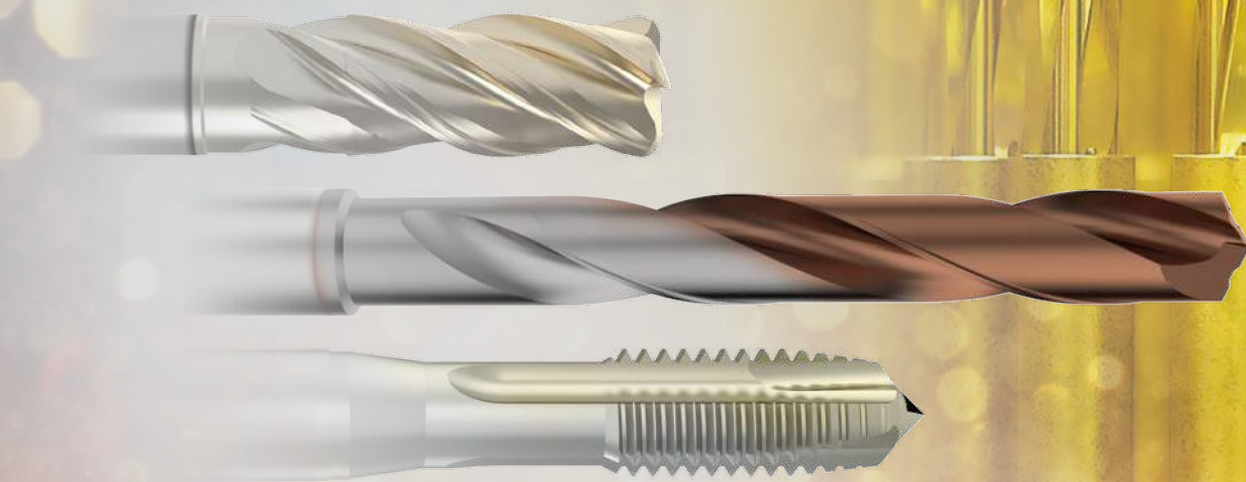


GUHRING

Coatings



in-house coating system engineering

development and service under one roof

in excess of 50 service centres world-wide

Application of Guhring coatings

		D R I L L I N G			M I L L I N G		
		C A R B I D E		H S S	C A R B I D E		H S S
		conv.	MQL		conv.	MQL	
C-steels, Free-cutting steels, Mn-steels		Endurum Raptor Fire	Endurum Raptor Fire	Fire – –	Endurum Fire Raptor	Fire Endurum Raptor	Fire – –
Steel, low-alloyed		Fire Endurum Raptor	Fire Endurum Raptor	Fire TiN –	Fire Signum nanoA	Fire Signum nanoA	Fire TiCN –
Steel, alloyed		Fire Signum nanoA	Fire Signum nanoA	Fire TiN –	Fire nanoA Signum	Fire nanoA Signum	Fire TiCN –
Steel, hardened, <55 HRC		Signum Fire TiAlN	Signum Fire TiAlN	– – –	Signum nanoA TiAlN	Signum nanoA TiAlN	– – –
Steel, hardened, 55–65 HRC		Signum Fire TiAlN	Signum Fire TiAlN	– – bright –	Signum SuperA nanoA	Signum SuperA nanoA	– – –
Steel, stainless and acid-resistant		nanoA Sirius Endurum	nanoA Sirius Endurum	Sirius Fire TiN	nanoA Sirius Fire	nanoA Sirius Fire	Fire – –
Cast iron		Signum Fire nanoA	Signum Fire nanoA	Fire – –	Signum Fire nanoA	Signum Fire nanoA	Fire TiCN –
Nickel-based alloys (i.e. Inconel)		nanoA Signum Fire	nanoA Signum Fire	Fire – –	nanoA Signum Zenit	nanoA Signum –	Fire – –
Titanium / titanium-alloys		Zenit nanoA	Zenit nanoA	Fire –	Zenit SuperA	Zenit SuperA	Fire –
Cobalt-chromium-alloys		nanoA Signum Fire	nanoA Signum Fire	– – –	nanoA Signum Fire	nanoA Signum Fire	– – –
Precious metals		nanoA	nanoA	–	nanoA	nanoA	–
Aluminium-wrought-alloys		bright Carbo Cristall	bright Carbo Cristall	bright Carbo –	bright Carbo Zenit	bright Carbo Zenit	bright Carbo –
Aluminium-cast-alloys (<12% Silizium)		bright Zenit Carbo	bright Zenit Carbo	bright Zenit Carbo	Zenit Carbo Cristall	Zenit Carbo Cristall	bright Carbo –
Aluminium-cast-alloys (≥12% Silizium)		Cristall – –	Cristall – –	– – –	Cristall – –	Cristall – –	– – –
Copper / bronze / brass		ICE Carbo	ICE Carbo	TiN –	ICE Carbo	ICE Carbo	TiN –
Ceramics		Cristall	Cristall	–	Cristall	Cristall	–
Plastics, not reinforced		Carbo	–	–	Carbo	–	–
Plastics, fibre-reinforced		Cristall Signum	Cristall Signum	– –	Cristall Signum	Cristall Signum	– –
Graphite		–	Cristall	–	–	Cristall	–

Note: The overview shows the general application recommendations for Guhring coatings.
Prioritisation is from top to bottom.

TAPPING			THREAD MILLING			FLUTELESS TAPPING			REAMING			
CARBIDE		HSS	CARBIDE			CARBIDE		HSS	CARBIDE		HSS	
conv.	MQL		conv.	MQL		conv.	MQL		conv.	MQL		
–	–	TiCN	–	–	TiCN	–	–	TiCN	Endurum nanoA	Endurum nanoA	TiN	
–	–	TiAlN	–	–	–	–	–	–	–	–	–	
–	–	TiN	–	–	–	–	–	–	–	–	–	
–	–	TiCN	–	–	TiCN	–	–	TiCN	nanoA Endurum	nanoA Endurum	TiN	
–	–	TiAlN	–	–	–	–	–	TiCN	–	–	–	
–	–	TiN	–	–	–	–	–	AlCrN	–	–	–	
–	–	TiCN	–	–	TiCN	–	–	TiCN	nanoA Endurum	–	TiN	
–	–	TiAlN	–	–	–	–	–	AlCrN	–	–	–	
–	–	TiN	–	–	–	–	–	–	–	–	–	
–	–	TiCN	–	–	TiAlN	–	–	–	nanoA	nanoA	–	
–	–	–	–	–	–	–	–	–	–	–	–	
–	–	–	–	–	–	–	–	–	–	–	–	
TiCN	–	–	TiAlN	TiAlN	–	–	–	–	Signum	–	–	
–	–	–	–	–	–	–	–	–	–	–	–	
–	–	–	–	–	–	–	–	–	–	–	–	
–	–	Sirius ¹ /TiAlN ²	TiCN	TiCN	TiCN	–	–	TiCN	nanoA	nanoA	TiN	
–	–	TiN	–	–	–	–	–	–	–	–	–	
–	–	–	–	–	–	–	–	–	–	–	–	
TiAlN	TiAlN	TiAlN	TiCN	TiCN	TiCN	–	–	TiCN	Signum	Signum	TiN	
TiCN	–	TiCN	–	–	–	–	–	–	–	–	–	
–	–	–	–	–	–	–	–	–	–	–	–	
–	–	TiCN	–	–	TiCN	–	–	TiCN	nanoA	–	TiN	
–	–	TiAlN	–	–	–	–	–	–	–	–	–	
–	–	–	–	–	–	–	–	–	–	–	–	
–	–	TiCN	–	–	TiCN	–	–	TiCN	Zenit nanoA	–	TiN	
–	–	TiAlN	–	–	–	–	–	–	–	–	–	
bright	–	bright	TiCN	TiCN	–	–	–	–	nanoA	–	TiN	
–	–	–	–	–	–	–	–	–	–	–	–	
–	–	–	–	–	–	–	–	–	–	–	–	
–	–	–	–	–	–	–	–	–	nanoA	nanoA	TiN	
–	–	–	–	–	–	–	–	–	–	–	–	
bright	bright	bright	bright	bright	Carbo	Carbo	Carbo	Carbo	Carbo	–	–	
Carbo	Carbo	Carbo	–	–	–	–	–	–	–	–	–	
–	–	–	–	–	–	–	–	–	–	–	–	
TiCN	TiCN	TiCN	TiCN	TiCN	TiCN	TiCN	TiCN	TiCN	Carbo	Carbo	–	
Carbo	Carbo	Carbo	bright	bright	–	–	–	–	–	–	–	
–	–	–	–	–	–	–	–	–	–	–	–	
TiCN	TiCN	TiCN	TiCN	TiCN	–	–	–	–	–	–	–	
Cristall	–	–	Cristall	–	–	–	–	–	–	–	–	
–	–	–	–	–	–	–	–	–	–	–	–	
bright	bright	bright	bright	–	Carbo	Carbo	Carbo	Carbo	bright	–	–	
Carbo	Carbo	Carbo	–	–	–	–	–	–	–	–	–	
–	–	–	–	–	–	–	–	–	–	–	–	
–	–	–	–	–	–	–	–	–	–	–	–	
bright	–	bright	bright	bright	–	–	–	–	–	–	–	
–	–	–	–	–	–	–	–	–	–	–	–	
TiCN	TiCN	–	TiCN	TiCN	–	–	–	–	–	–	–	
–	–	–	–	–	–	–	–	–	–	–	–	
–	–	–	–	–	–	–	–	–	–	–	–	

¹ with through hole, ² with blind hole

GUHRING

Detailed information on the individual coatings can be found from page 16.



Application table
for Guhring coatings

Collection & delivery service Re-grinding Re-coating

► Our service centres world-wide



an overview from page 38



Contents

Milestones of our know-how

from page 6

Coating technology and R+D

from page 8

Evolution of Guhring coatings

from page 14

Our coating high-lights

from page 16

Basic and broad-band protection

from page 32

Special solutions and after-sales

from page 36

Service centres

from page 38

INHOUSE **GUHRING**



Geometry



Tool material



Coating



Machinery and
plant engineering

The performance of modern cutting tools

is essentially determined by the tool material, the tool geometry, the cutting parameters and the coating.

An overwhelming number of cutting tools applied are coated.

As a manufacturer of precision tools Guhring already recognised the potential early on.

Since the introduction of the world's first TiN-coating on HSS drills in 1980, Guhring can look back on decades of experience in the field of coating. From the start the refinement was carried out in-house.

In-house mechanical and process plant engineering results in further pooling of coating experiences in the company.



The adaptation of tool material, geometry and coating to the respective task can be entirely mapped at Guhring in-house.

Specifically, it means in-house manufacture of carbide blanks that are then given a geometry optimised for the application task on Guhring grinding machines. The package is completed by adapted hard material coatings, refined on Guhring systems with in-house developed coatings.

From hype to status quo:

Development of hard material coatings in the metalworking industry

With the presentation of the world-wide first TiN-coating on HSS drills in 1980, Guhring set the milestone in the machining world.

What was initially smiled at as a marketing tool – golden tools in metal cutting – became the status quo of an entire industry.

A suitable coating can significantly improve the performance of cutting tools. Increases by factor 2 to 3 are not impossible.

The range of different hard material coatings has been heavily extended in recent decades. Due to their high hardness, good friction characteristics as well as thermo-chemical resistance they offer considerable advantages in comparison to un-coated tools:



higher cutting parameters ◀

reduction in manufacturing costs per item

increased tool life and volume ◀

tool saving potential

reduction in auxiliary machine process time

possible conversion to MQL / dry machining ◀

reduced cleaning expense

reduced disposal expense

2017

► in excess of 50 coating centres world-wide
by **GUHRING**

from **2000**

► development of diamond coatings
and highly specialised coatings
by **GUHRING**

1994

► opening of first service centre
for re-grinding and re-coating
by **GUHRING**

1991

► development of coating technologies
by **GUHRING**

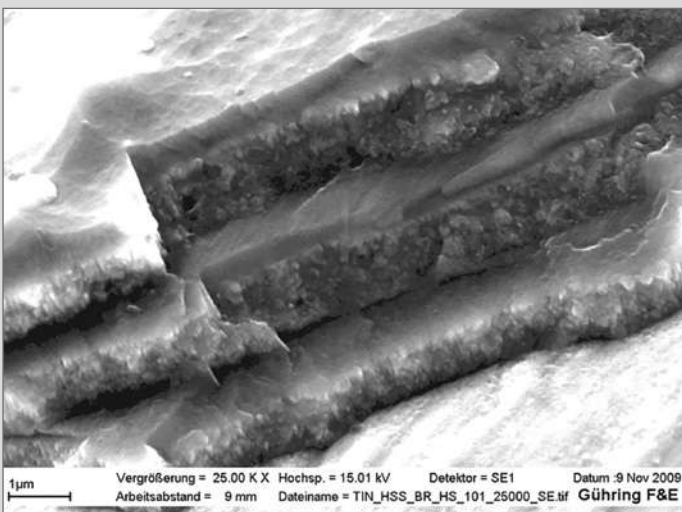
1980

► world-wide first TIN-coating on HSS drills

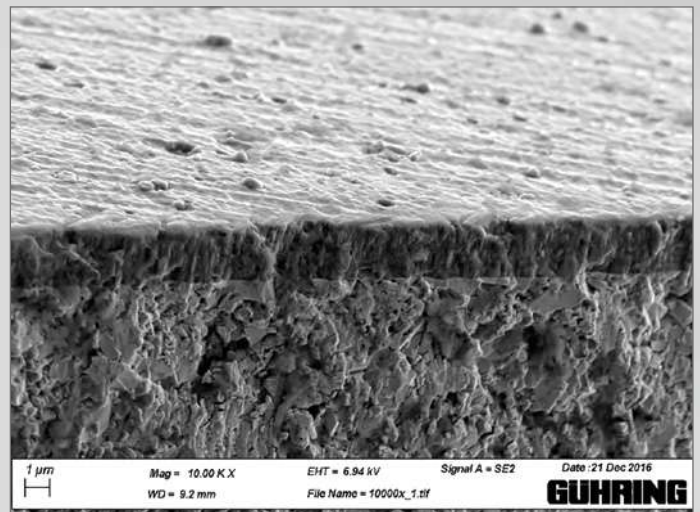
by **GUHRING**



Fracture patterns are visualised via scanning electron microscopy (SEM) in order to make differences visible in the phase structure, morphology and structure dependent on process design and deposition conditions.



Fracture pattern, multi-layer coating, 25,000 x magnification



Fracture pattern, Arc-coating, 10,000 x magnification

Coating development

In the scope of an application related coating development, coating characteristics can be influenced by different parameters and boundary conditions.



► **Elementary composition of coatings**

i.e. titanium, aluminium, chromium, silicon, nitrogen, carbon, oxygen

► **Coating architecture**

i.e. single-layer, multi-layer, nano-composite, nano-layer, grading

► **Process parameters during coating**

i.e. discharge current, substrate voltage, pressure, temperature

► **Coating thickness**

typically between 1 and 10 μm

► **Cutting edge preparation prior to coating**

micro-geometry

► **Post-treatment following coating**

polishing

The possibilities are more or less unlimited.

The results range from all-rounder to differentiated specialist.



In this context we rely on the state-of-the-art laboratories of our in-house research and development.

As well as systems for depositing the coating there are also analytical processes available to determine the coating properties such as chemical composition, crystal structure, morphology, coating thickness, micro-hardness, friction value and adhesion.

Coating deposit

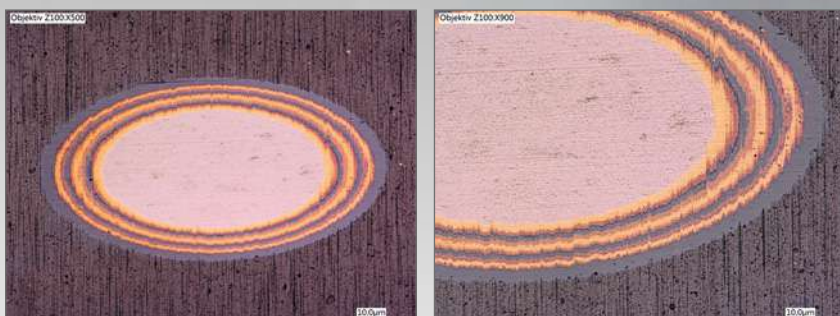
The coating technology Guhring predominantly relies on is the so-called arc evaporation from the group of PVD processes (physical vapour deposition). Here the metallic target (i.e. titanium or titanium-aluminium) is vaporised by an arc, subsequently reacts with the admitted reactive gas (i.e. nitrogen) and consequently deposits on the tool as a coating (i.e. titanium [Ti] + nitrogen [N] → titanium nitride [TiN]). This process has largely developed into the global standard for hard material coating of cutting tools due to the high deposit rate, the very good coating adhesion and the high density of the coatings.

Alongside other PVD processes as for example thermal vaporisation and sputtering are applied at Guhring. Thermal vaporisation with which the initial TiN-coatings were deposited can still be found in the threading tool area. As well as for TiN it is also applied for depositing TiCN (titanium carbon nitride). The so-called sputtering (atomising) is suitable for nearly every target material. It is used for example in order to vaporise poor electrically conductive materials. An essential feature and advantage of both vaporisation types is the low coating surface roughness, making polishing following coating not absolutely necessary.

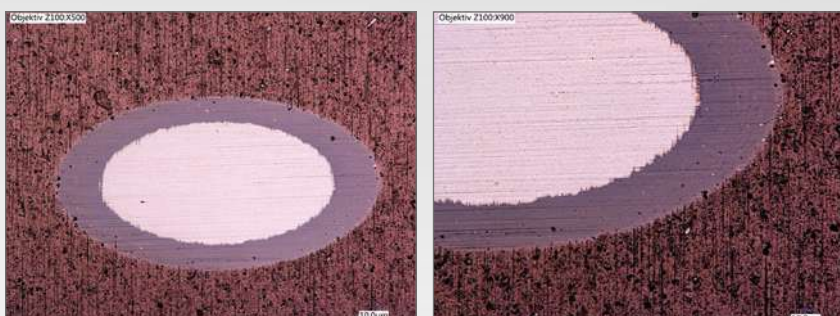
Guhring also uses the CVD process (chemical vapour deposition) according to the hot-filament principle for the deposition of diamond coatings in-house!



A spherical calotte is ground into the surface to be inspected using a steel ball as well as an abrasive fluid. The ground form is sectioned through the coating up to the substrate lying underneath. The procedure serves to determine the wear resistance, the coating thickness as well as to evaluate the coating structure and is therefore an important element of a quality inspection.



Calotte grind in a multi-layer coating



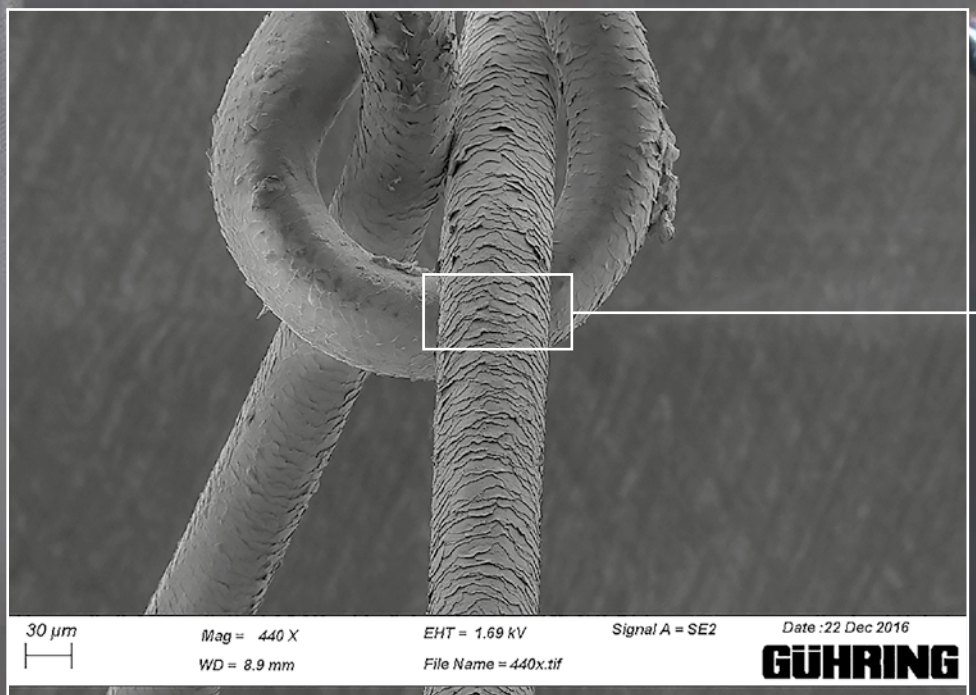
Calotte grind in a nano-structured coating



No matter how fine: Coatings can be adapted.

Features such as composition, micro-structure or hardness have a direct influence on wear resistance, cutting forces, surface quality or cooling lubricant consumption.

Decisive is always that the coating is adapted to the specific application task. No matter which parameters are focused on dependent on the application an unbelievably thin coating always guarantees a significant effect.



Human hair
440 x magnification

30 μ m
|—|

Mag = 440 X
WD = 8.9 mm

EHT = 1.69 kV
File Name = 440x.tif

Signal A = SE2

Date : 22 Dec 2016

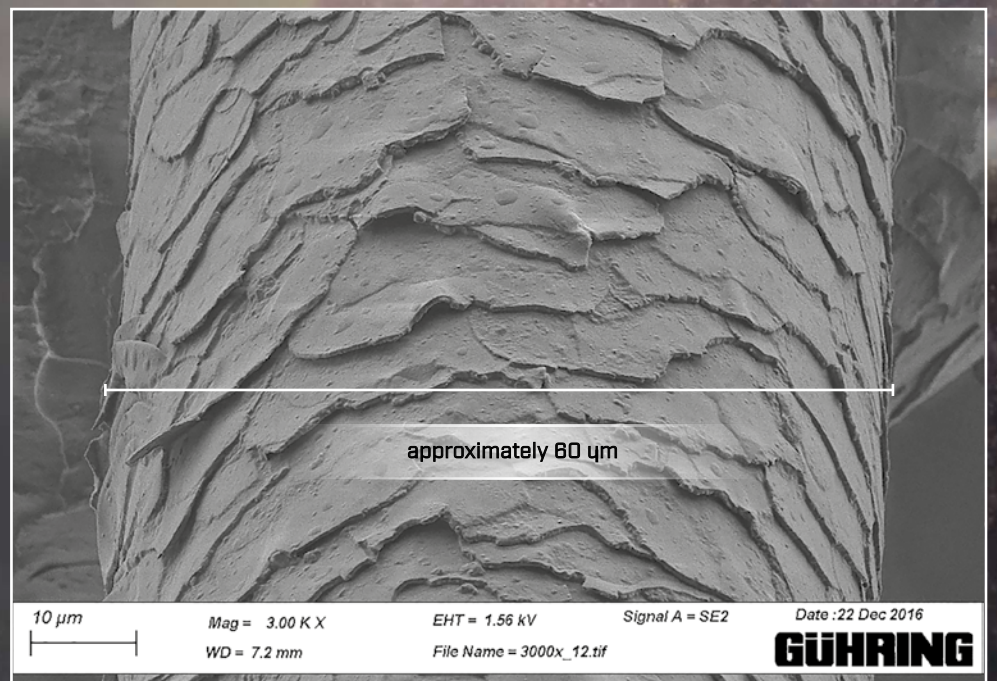
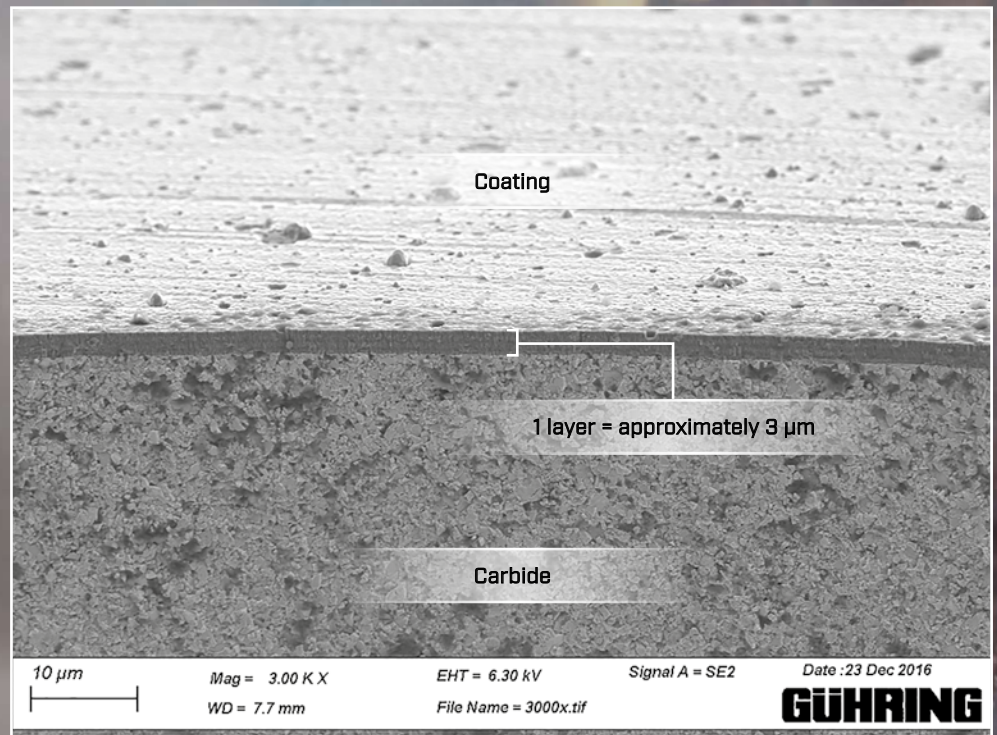
GÜHRING

Thin coating, enormous effect

1 hair | 20 coatings

*Fracture pattern
Arc-PVD coating
on carbide substrate*

*3000 x magnification,
approximately 0.003 mm*



Human hair

*3000 x magnification,
approximately 0.06 mm*

A large industrial machine, the Gühring BA 170G3, is shown in a factory setting. The machine has a white frame and a central grey cylindrical component. On top of the machine, there are four safety icons: a blue circle with a white 'P' (pressure), a yellow triangle with a black hand and flame (hot surface), a yellow triangle with a black flame (fire), and a blue circle with a white 'P' (pressure). The name 'GÜHRING BA 170G3' is printed in large yellow letters on a black background across the top. On the side of the grey cylinder, the name 'GÜHRING BA 170G3' is printed vertically in black. To the right of the cylinder, there is a control panel with a red emergency stop button, several indicator lights, and a small digital display. A black flexible hose is connected to the bottom of the machine.

GÜHRING BA 170G3

In-house plant engineering

The efficiency of our coatings is not accidental but has to be developed by specific research for each application task. This is only achieved by close co-operation between the actual coating development and process engineering.

Gühring has established an in-house coating division that develops and manufactures new coatings as well as the necessary coating technology. Thanks to in-house process plant engineering Gühring ensures the necessary precision, speed and flexibility to optimally adjust micro-geometry and coating to one another.



and our R&D

As well as coating systems, Guhring's in-house mechanical engineering also develops technologies for cleaning and de-coating systems for the pre-treatment and post-treatment of tools. The aim of the pre-treatment process is to better adapt the tool's micro-geometry to the respective application task and to improve the coating adhesion. Post-treatment is aimed at polishing the coated tool surface which further improves the application behaviour.



1st generation

world-wide first TiN-coating
on drills

2nd generation

TiN- / TiAlN multi-layers



TiN
p.32



TiCN
p.32



Fire
p.33



TiAlN
p.34

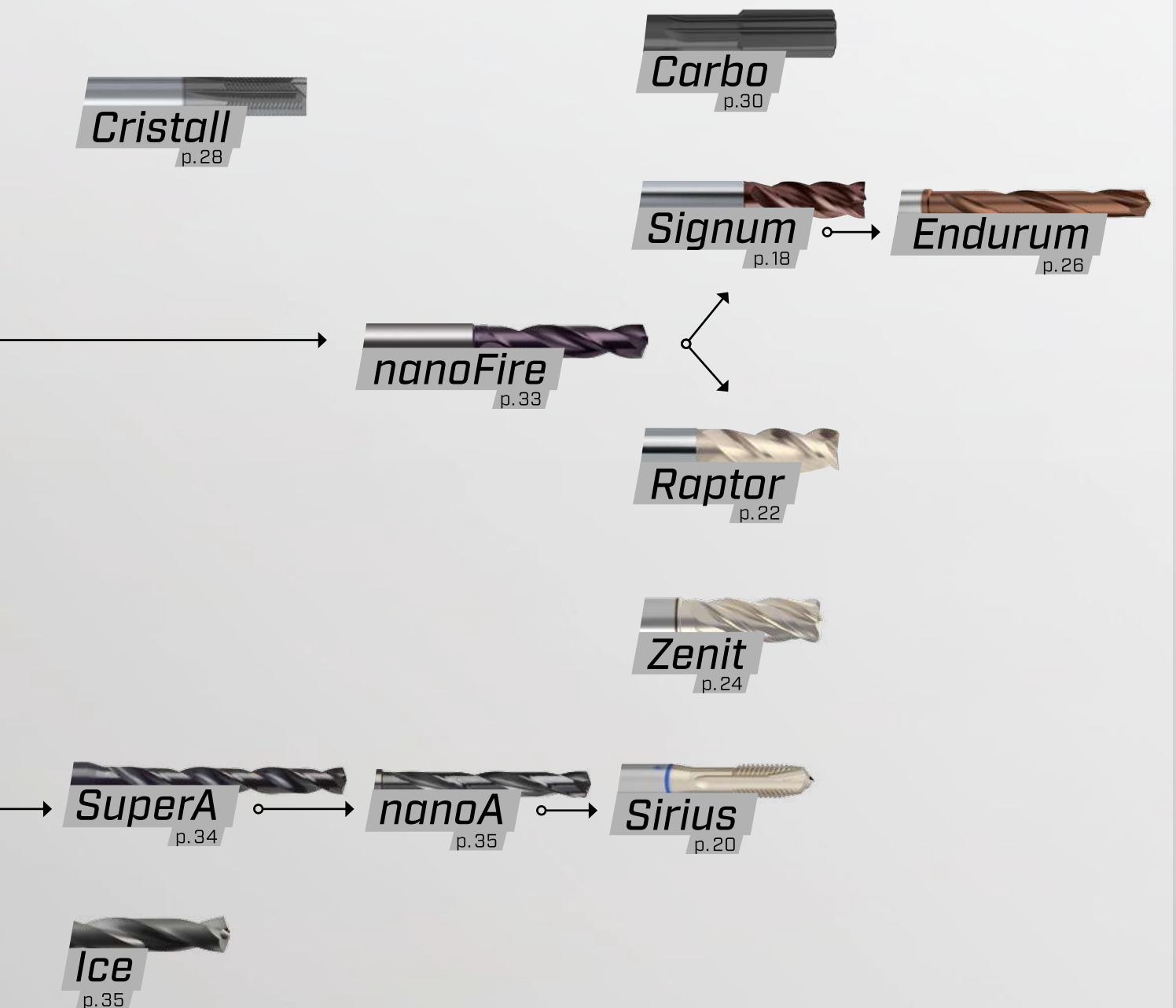
Coating evolution

3rd generation

high Al-content, nano-layers,
AlCrN-coatings, diamond-coatings

4th generation

nano-layers, nano-composite,
chip-adapted chemistry, DLC





High
lights

Signum

Hard machining specialist



S. 18 – 19

Sirius

VA specialist



S. 20 – 21

Raptor

Steel specialist



S. 22 – 23

Zenit

Titanium specialist



S. 24 – 25

Endurum

Steel drilling specialist



S. 26 – 27

Cristall

GFRP / CFRP specialist



S. 28 – 29

Carbo

Non-ferrous metal specialist



S. 30 – 31

Highlight

Hard machining specialist **Signum**

Main application

Drilling / milling / reaming of hardened steels and cast iron



Hardened
steel



Cast iron



► **structure**

multi-layer, nano-structure

► **colour**

bronze

► **hardness**

5500 HV 0.05

► **application temperature**

< 800 °C

► **coating material**

TiAlSiN-based



With a hardness of 5500 HV Guhring's in-house developed Signum-coating is one of the hardest nitride coatings on the market. Guhring was able to achieve this extraordinary coating hardness thanks to the special nano composite structure with a TiAlN and TiAlSiN layer structure. In these nano composite structures extremely fine TiAlN-crystals [<10 nm] are embedded in a glass-type silicon nitride matrix. This results in an extremely high hardness, that is retained even at high temperatures. As there are no continuous grain boundary networks in this structure, the diffusion of chip material is heavily impeded by the coating. Therefore, the Signum-coating provides an especially high wear-resistance and at the same time a high diffusion resistance.



Signum

Highlight

VA specialist *Sirius*

Main application

Tapping in VA (through holes)
Drilling / milling in VA



Stainless



► **structure**

multi-layer, nano-structure

► **colour**

pale gold

► **hardness**

3400 HV 0.05

► **application temperature**

< 900 °C

► **coating material**

TiAlSiN-based with ZrN cover coating

When drilling in VA the cutting edges of cutting tools are subjected to extreme stresses. A mechanically especially wear resistant coating with a low friction value prevents damage to the cutting edges. Pre-requisite is a very low chemical interaction with stainless steels. The tough-hard TiAlN function coating guarantees a very high wear resistance. Zircon nitride in the cover coating significantly improves chip evacuation as the chemical reaction between coating and workpiece is reduced. Therefore, SIRIUS offers the best pre-requisites for the machining of VA materials.



Sirius

Highlight

Steel specialist **Raptor**®

Main application

Drilling / milling of carbon, free-cutting as well as low-alloyed steels



Steel



▶ **structure**

multi-layer, graded

▶ **colour**

pale gold

▶ **hardness**

3300 HV 0.05

▶ **application temperature**

< 800 °C

▶ **coating material**

TiN / TiAlN based
with ZrN cover coating



Guhring's Raptor-coating relies on a proven TiN and TiAlN multi-layer structure combined with a ZrN based cover coating. The multi-layer structure guarantees good values of hardness and toughness making it possible to limit the mechanical wear.

The cover coating minimises the chemical reaction between the coating and the material to be machined thereby reducing the development of edge build-up and the adhesion of the material to the cutting edge as much as possible.



Raptor

Highlight

Titanium specialist *Zenit*



Main application

Drilling / milling of titanium-alloys



Aluminium



non-ferrous metals,
plastics



► **structure**

multi-layer, nano-structure

► **colour**

pale gold

► **hardness**

2500 HV 0.05

► **application temperature**

< 700 °C

► **coating material**

TiAlN-ZrN based



With the pale gold Zenit multi-layer system the aluminium content of established coatings was specifically reduced and partly replaced with Zircon. This causes a minimised chemical reaction when coming into contact with titanium alloys.

Thanks to the special structure of the coating system the reaction tendency between material and coating should be significantly reduced. Furthermore, this coating also brings significant benefits for the machining of cast aluminium (<10% Si) and wrought aluminium alloys. The focus here is primarily the prevention of built-up edges between coating and material.



Zenit

Highlight

Steel specialist *Endurum*

Main application

Drilling carbon, free-cutting and manganese steel
at low and medium cutting speeds



Steel



► **structure**

multi-layer with nano-layers,
nano composite

► **colour**

copper

► **hardness**

4000 HV 0.05

► **application temperature**

< 800 °C

► **coating material**

TiAlSiN based



Thanks to a nano-layer structure as well as reduced aluminium content Endurum was specifically adapted for the drilling of low-alloyed steels such as carbon, free-cutting and manganese-alloyed steels.

By adding silicon it forces a nano composite structure causing a high hardness. In addition, thanks to the composition the reaction tendency is decisively reduced. Especially with low and medium cutting speeds it is the first choice for drilling operations.



Endurum

Highlight

GRFP/CFRP specialist **Cristall**

Main application

Drilling / milling of graphite, ceramics, fibre-reinforced plastics, aluminium-alloys ($\geq 12\%$ silicon)



Aluminium,
non-ferrous metals,
plastics, graphite, ceramics



► **structure**

single-layer, micro-crystalline

► **colour**

grey black

► **hardness**

8000 HV 0.05

► **application temperature**

< 600 °C

► **coating material**

carbon

Like its naturally occurring relative, this diamond-coating possesses an outstanding hardness in excess of 8000 HV. Thanks to the so-called sp^3 -structure in which the carbon atoms with both materials are spatially arranged, Cristall is qualified for highly abrasive applications such as for example the machining of GRFP and CFRP, aluminium-alloys, ceramics and graphite. Thanks to different coating thicknesses it is adapted to the specific application task. Due to the high coating temperature it is only possible to deposit it on carbide. Thanks to Guhring's in-house carbide production this is not a problem. Process related re-grinding and re-coating is not possible.



Cristall

Highlight

Non-ferrous metal specialist

Carbo



Main application

Drilling / milling / reaming / threading in aluminium
and aluminium-alloys (up to max. 10% Si)
non-ferrous metals (copper, brass, bronze)
GFRP / CFRP, wood



Aluminium,
non-ferrous metals, plastics



► **structure**
single-layer

► **colour**
grey black

► **hardness**
5000 HV 0.05

► **application temperature**
< 500 °C

► **coating material**
carbon (ta-C)



Thanks to its composition of 100% carbon and its high spatial bond content (sp^3 -content >60%) Carbo displays a high hardness and application temperature. Therefore, this also as ta-C (tetrahedral carbon) described coating type is suitable for a wide field of applications. Carbo closes the gap to Cristall, where un-coated tools or conventional carbide grades fail. For example, it concerns the machining of aluminium and aluminium-alloys (up to max. 10% silicon), non-ferrous metals, GFRP / CFRP or wood. Up to a certain abrasive stress the considerably more expensive diamond-coating can be substituted by Carbo. In addition, the coating of HSS and carbide as well as re-grinding and re-coating is possible.



Carbo

Basic protection



TiN

Gühring already in the early 80's introduced TiN-coating which can be applied for drilling and milling on HSS as well as on carbide as a cost-efficient broadband coating. It is still particularly widely spread in threading applications.



TiCN

Due to the additional embedding of carbon, TiCN distinguishes itself with a higher toughness, hardness and a reduced friction coefficient compared to TiN. With its high wear resistance it is very well suited for more abrasive threading applications.

Broadband protection

Fire/ nanoFire



F

The Fire-coating was introduced at the end of the 90's.
Its further development nanoFire came on the market in 2008.
As well as titanium and nitrogen the coating also includes aluminium and
distinguishes itself with a higher hardness as well as an improved
thermo-chemical resistance. It is suitable for coating HSS as well as carbide.
To today it is a very good choice for drilling and milling steel.

Broadband protection



TiAlN

The TiAlN-coating with its titanium-aluminium structure displays similar characteristics to Fire and nanoFire. Thanks to its single-layer structure it is especially suitable for the coating of micro-precision tools.



SuperA

The single-layer and aluminium rich SuperA is for example applied for milling hardened steel or titanium-alloys due to its high hardness and oxidation resistance.

Broadband protection

nanoA

a



The TiAlN based nanoA has proven itself especially in the machining of stainless steels, but is sometimes also applied for drilling and milling of cast iron, titanium, nickel based and cobalt-chrome alloys. Its nano-layered structure delays the fracture growth.

Individualist

Ice

l



The titanium, aluminium and chrome based Ice specialises in the machining of non-ferrous metals, e.g. copper-alloys as well as bronze and brass.



**Adapting
your tools
to your
requirements**

GUHRING

Special solutions

The application conditions during the cutting process as well as the demands on the cutting tools themselves are becoming ever more complex and individual.

Boundary conditions for tool adaptation:



- ▶ ***Cutting parameters***
- ▶ ***Material***
- ▶ ***Workpiece***
- ▶ ***Demanded workpiece dimensions and surface finish quality***
- ▶ ***Tool life***
- ▶ ***Cycle times***
- ▶ ***Machine influence***
- ▶ ***Cooling***



To be able to map this complexity, more and more customer specific special solutions are applied in tooling as well as in coating. The demand for special tools is constantly increasing. In this context not only macro- and micro-geometry is adapted to the specific machining task but also the coating is selected accordingly.

Service centres

Our support from the service centre

Speed requires short routes, therefore, we have developed in excess of 50 service centres for you world-wide – and are constantly increasing this service. All service centres are equipped with high-performance production machines and Guhring developed coating systems. Every service centre has its own collection and delivery service. This way we can process your orders saving time and money. We provide this high-tech upgrade with Guhring coatings also for non-Guhring products.



Resource conservation ◀

Reducing tooling costs ◀

Re-grinding to original geometry ◀

***Re-grinding and re-coating
non-Guhring tools ◀***

Collection and delivery service ◀

Available world-wide ◀

Tool refurbishing

Re-grinding and re-coating





EUROPE

Service centres

Germany

Albstadt Werk II	info@guehring.de · www.guehring.de Sigmaringer Straße 160 · 72458 Albstadt · ☎ +49 (0) 74 31170
Chemnitz	Röhrsdorfer Allee 39 · 09247 Röhrsdorf/Chemnitz · ☎ +49 (0) 37 22 50 40
Eisenach	Industriestraße 3 · 99820 Hörselberg-Hainich · ☎ +49 (0) 36 92 07 01
Ramstein-Miesenbach	Robert-Bosch-Straße 7 · 68877 Ramstein-Miesenbach ☎ +49 (0) 63 71 40 69 894
Leverkusen	Campusallee 18 · 51381 Leverkusen · ☎ +49 (0) 21 71 36 33 5-0
Neutraubling	Hartinger Straße 3 · 93073 Neutraubling · ☎ +49 (0) 94 01 913 33 72
Wehingen	Steinstraße 40 · 78564 Wehingen · ☎ +49 (0) 74 26 60 03 98
Langenhagen	Gleiwitzer Straße 27 · 30855 Langenhagen · ☎ +49 (0) 511 80 72 32 44

Europe

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Service centres

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AMERICA

AFRICA



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What lasts long is good

Sustainability & certifications

Whether during machining, coating or refurbishing:

Solutions from Guhring revolve around reducing the requirement and increasing the performance at the same time. Longevity and a lower consumption of resources, be it operating materials, energy or raw materials, ultimately mean reduced pollutant emission, more efficient production, lower process costs and improved sustainability.

Pre-requisite for these successes is the high priority Guhring attaches to the best possible quality of its products and services.

This is why Guhring is certified to:

ISO 9001:2008 Quality Management System

ISO 14001:2004 + Cor 1:2009 Environmental Management

ISO 50001:2011 Energy Management

VDA 6.0 part 4 with product development



GUHRING

Coatings

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