

# **BALINIT DIAMOND MICRO & BALINIT DIAMOND NANO**

Brilliant, tailor-made surfaces



**Cutting Tools**



# BALINIT DIAMOND MICRO and BALINIT DIAMOND NANO

## Tailored precisely for your application and tool type

In the demanding machining of highly abrasive materials such as graphite, composite materials and ceramics, not only the substrate and the tool design are of essential importance. Just as significant are the surface and edge treatment, the interface engineering and optimal tool coating.

Our new BALINIT® DIAMOND coatings are specifically targeted at the unique demands connected with machining CFRP/GFRP/sandwich materials, graphite, Al alloys and ceramics. However, not only the application, but also the tool type and geometry impose special conditions on the wear-protective coating. Our answer: optimal interface engineering and an adaptable coating thickness.

### Application

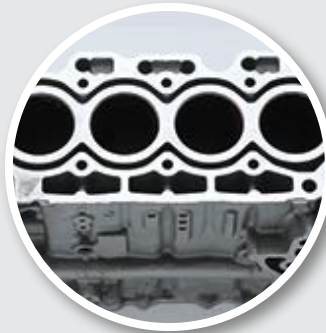
CFRP/GFRP/Sandwich



Graphite



Al alloys



Ceramics



**Tool type**  
Also for very complex tool geometries



Ø 0.1 mm



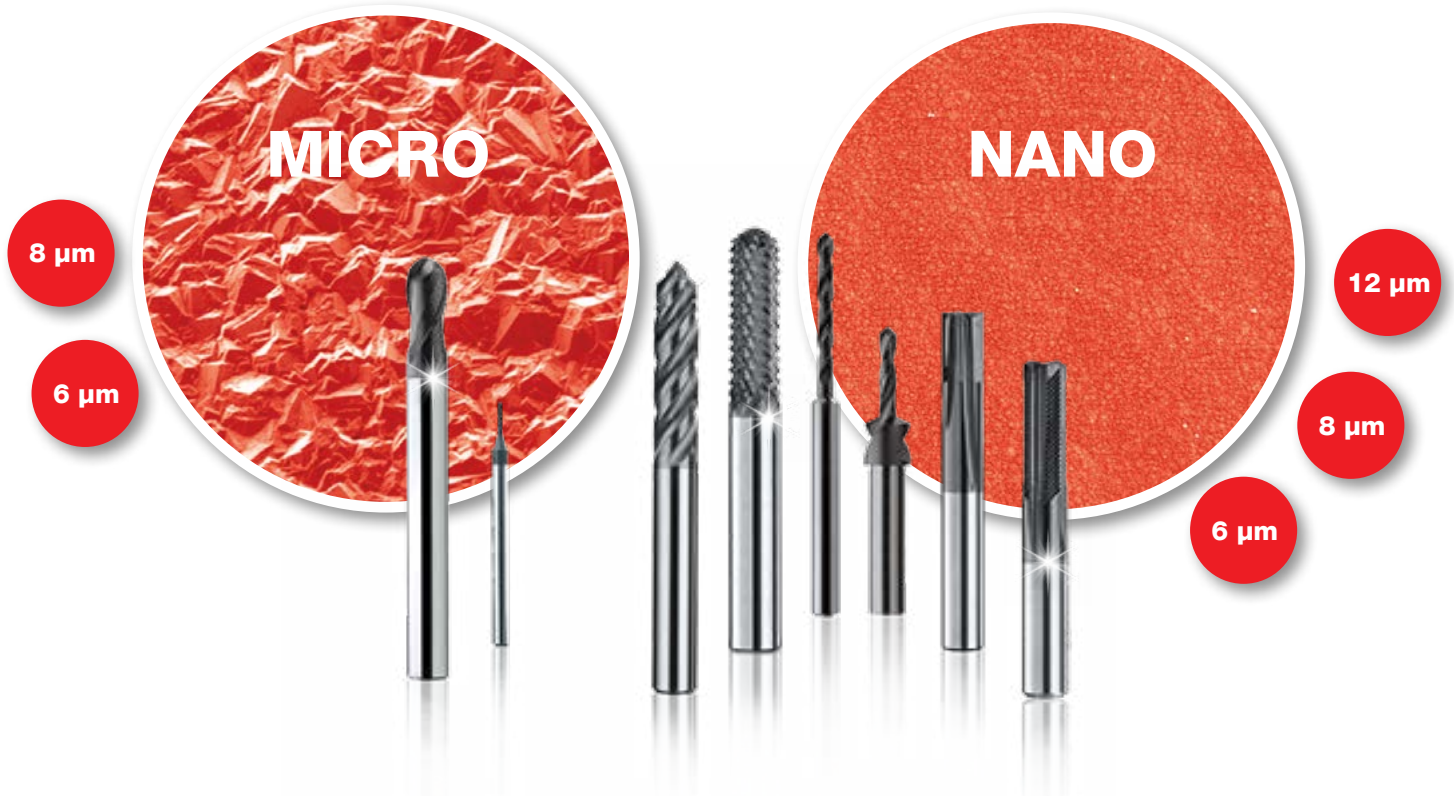
Ø 25 mm

# Interface engineering

## Our solution for your unique requirements

Optimised interface engineering ensures that you get improved coating adhesion. It is exactly suited for a great number of carbides. With two layer versions (micro and nano crystalline) and up to three different

coating thicknesses to choose from (6, 8 and 12 µm), we can match the coating to your special application with perfection. You benefit from the best possible machining results.



## BALINIT DIAMOND MICRO and BALINIT DIAMOND NANO

### Benefit from outstanding coating properties

#### OPTIMISED PERFORMANCE

Adapted interface engineering



- Optimised coating adhesion
- Larger range in carbide grades
- Higher coating thicknesses
- Increased reliability

Specialised crystallinity



- Tailored diamond structure
- Longer tool lifetime
- Increased performance
- Customised solution

**BALINIT® DIAMOND MICRO & BALINIT® DIAMOND NANO**  
More productivity, manufacturing reliability and efficiency in machining

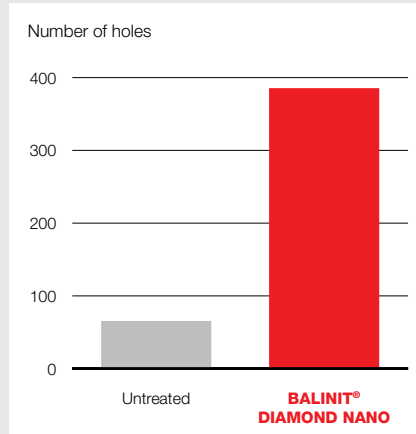
# BALINIT DIAMOND NANO for machining composites

Machining composites involves abrasive wear. Tools coated with BALINIT® DIAMOND NANO can reliably and cost-effectively machine fibreglass- and carbonfibre-reinforced plastics (GFRP, CFRP).

Selecting the optimal coating thickness and the ideal interface engineering prevents burr formation and delamination. Longer tool life and better surface quality significantly reduce manufacturing costs.



## Drilling CFRP/Al with BALINIT® DIAMOND NANO



<b>Tool</b>	Drill
<b>Workpiece</b>	CFRP/Al (14 + 3 mm)
<b>Cutting data</b>	$v_c = 80$ m/min $f_t = 0.07$ mm/rev Cooling: air
<b>Source</b>	Tool manufacturer

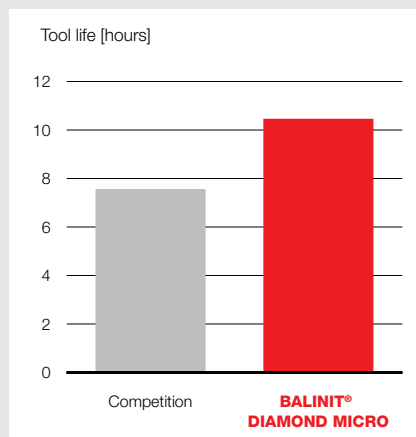
# BALINIT DIAMOND MICRO for machining graphite

Carbide tools coated with BALINIT® DIAMOND MICRO make it possible to cut graphite workpieces at substantially greater speeds and in significantly better quality. Thanks to the extension of tool life by several orders of magnitude,

even sophisticated workpieces and finest structures can be produced with a single cutter in a single clamping. Time and cost-intensive reworking procedures are eliminated.



## Milling graphite with BALINIT® DIAMOND MICRO

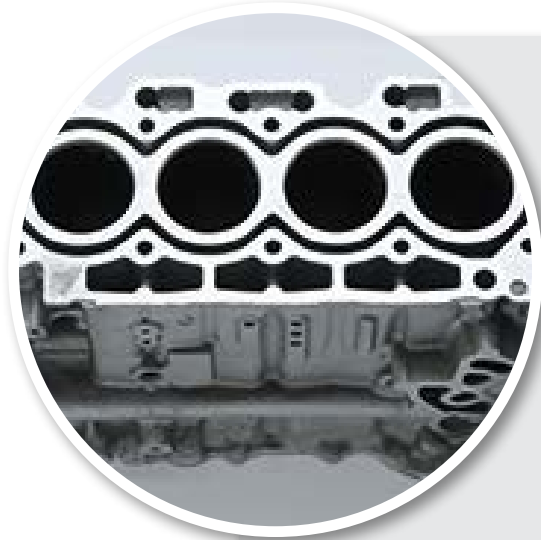


<b>Tool</b>	Solid-cemented carbide end mill Ø 6 EMT100
<b>Workpiece</b>	Graphite
<b>Cutting data</b>	$f = 22,000$ mm/min rpm = 42,000 1/min $a_p = 6$ mm
<b>Source</b>	Tool manufacturer

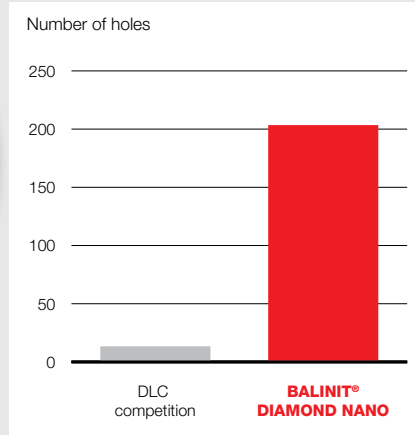
# BALINIT DIAMOND NANO for machining aluminium alloys

Due to its excellent abrasion resistance, BALINIT® DIAMOND NANO is eminently suited for machining aluminium alloys with high silicon concentrations as typically used for workpieces in the automotive and

aerospace industries. BALINIT® DIAMOND NANO makes it possible to replace expensive and geometrically limited polycrystalline diamond (PCD) tools with coated carbide tools at significantly lower cost.



## Drilling Duralcan® with BALINIT® DIAMOND NANO



<b>Tool</b>	Carbide drill D = 8
<b>Workpiece</b>	Duralcan® (A359 + 20% SiC particles)
<b>Cutting data</b>	$v_c = 60$ m/min $f = 0.1$ mm $L_D = 5$ mm Emulsion 5%
<b>Source</b>	IPK Berlin

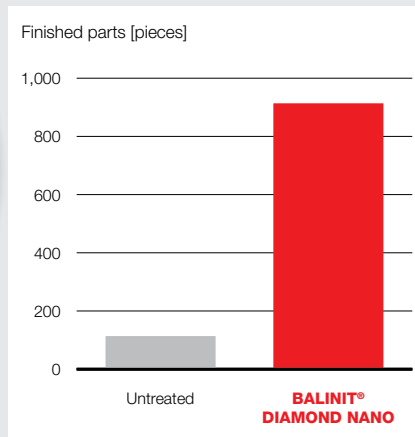
# BALINIT DIAMOND MICRO & NANO for machining ceramics

Milling and drilling tools used to machine ceramics, typically in the dental segment, must withstand severe abrasive wear. Coating them with BALINIT® DIAMOND can massively extend the tool life and perceptibly

improve the surface quality of the workpiece. BALINIT® DIAMOND is suitable for machining both green compacts and sintered ceramics.



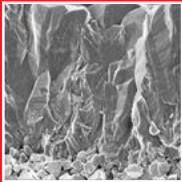
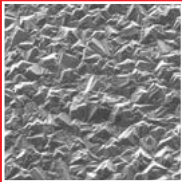
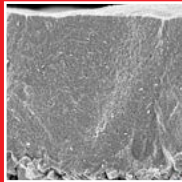
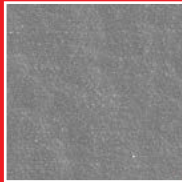
## Machining ceramics with BALINIT® DIAMOND NANO



<b>Tool</b>	Micro ball nose end mill
<b>Workpiece</b>	Dental application Zirconium oxide
<b>Source</b>	Customer Oerlikon Balzers

# BALINIT DIAMOND MICRO and BALINIT DIAMOND NANO

## Coating properties

	BALINIT® DIAMOND MICRO	BALINIT® DIAMOND NANO
	 	 
Coating material and structure	C (sp <sup>3</sup> ) - microcrystalline	C (sp <sup>3</sup> ) - nanocrystalline
Coating temperature [°C]	800 – 850	800 – 850
Max. service temperature [°C]	600	600
Coating hardness H <sub>IT</sub> [GPa]	80 – 100	80 – 100
Available coating thicknesses [µm]*	6, 8	6, 8, 12
Coating colour	grey	grey
Applications	Graphite Ceramics	CFRP Al > 12% Si Ceramics

\*additional coating thicknesses on request

## Benefit from the BALINIT DIAMOND MICRO and BALINIT DIAMOND NANO high-performance coatings

### Contact us now!

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