oerlikon
balzers

BALDIA NANO &
BALDIA COMPOSITE DC

Diamond coatings for machining fibre-reinforced plastics, stack materials and aluminium alloys

Cutting Tools

Achieving optimum cutting performance when machining fibre-reinforced plastics, stack materials and Al alloys

Fibre-reinforced plastics, stack materials and aluminium alloys are the perfect materials for lightweight construction in a sustainable world – but machining these materials is a major challenge. For optimum cutting performance, the following aspects must be considered:

- Tool design and geometry
- Tool surface and edge preparation
- Tool substrate
- Tool pre-treatment for ultimate coating adhesion
- Optimum coating, tailored precisely to your application

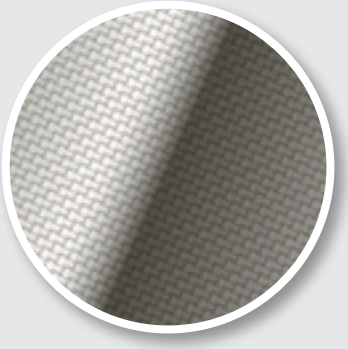
Diamond has special properties: it is extremely wear-resistant due to its unsurpassed hardness, offers thermal conductivity and is chemically almost inert.

BALDIA® NANO and BALDIA® COMPOSITE DC from Oerlikon Balzers are diamond coatings which provide these indispensable properties and enable these special materials to be machined with maximum efficiency. They allow parts to be manufactured with tightest tolerances resulting in excellent surface finishing.

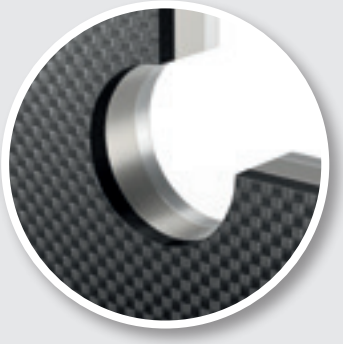
BALDIA NANO and BALDIA COMPOSITE DC
Perfectly tailored to your applications with fibre-reinforced plastics, stack materials and Al alloys.

Carbon fibre

Glass fibre



Stack material



Al alloys (Si > 12%)

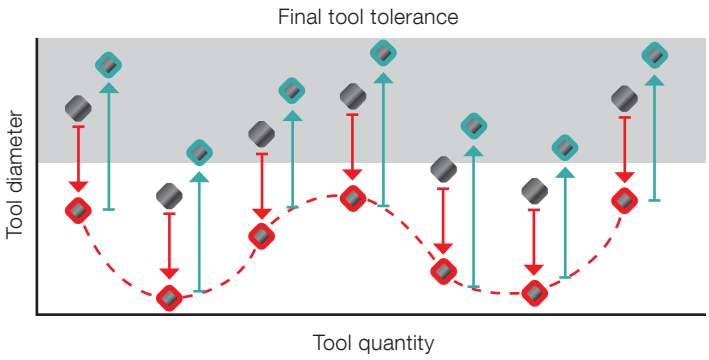
Benefit from perfect machining results

Challenge		Coating solutions from Oerlikon Balzers
High abrasive wear	>	Highest wear resistance due to superior hardness
Tight final diameter tolerance, especially for drilling and reaming applications	>	High-accuracy tool pre-treatment and controlled coating thickness distribution
Highest hole quality demands, including for force-controlled drill feed units	>	Coating also tolerates variations in cutting parameters thanks to superior coating adhesion and structure
Avoid delamination and fibre overhang for entry and exit holes	>	Special production processes result in sharp cutting edges
Extremely effective use of milling tools and high process reliability	>	Perfect coating thickness distribution on length and circumference of the tool
High demands on productivity for routing	>	New diamond coating equipment offers high-performance solutions

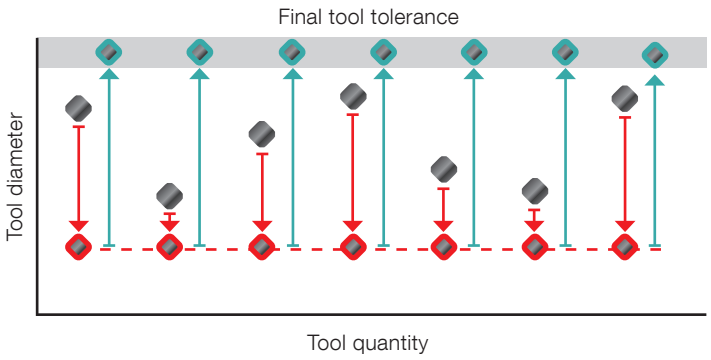
BALDIA® NANO and BALDIA® COMPOSITE DC give you optimum productivity and reliability when part quality matters most

When you need to machine to micron-level accuracy, there are two tolerances to choose from

BALDIA NANO



BALDIA COMPOSITE DC



Tool diameter on arrival **Tool diameter after pre-treatment** **Tool diameter after coating**

Features of BALDIA NANO

- Tolerance range same as after grinding
- Tighter tolerances can be achieved by adjusting the coating thickness (may result in variations in tool life)

Features of BALDIA COMPOSITE DC

- Tightest possible tolerances for both tool diameter **and** coating thickness
- Consistent high tool performance with tight bore tolerances

When minimum tolerances for both tool diameter and coating thickness are required, **BALDIA® COMPOSITE DC** offers improved, consistent cutting performance and tool service life.

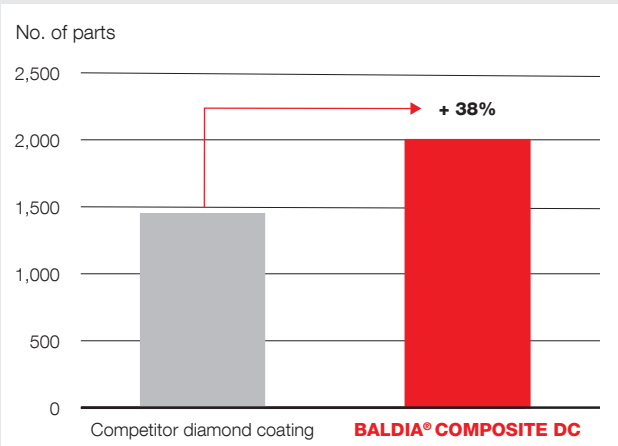
BALDIA NANO

Applications

- Perfect solution for **routers, end mills** and **inserts**
- Excellent **drilling** performance when machining fibre-reinforced plastics

BALDIA COMPOSITE DC

In an internal benchmark test the use of BALDIA® COMPOSITE DC for drilling CFRP resulted in excellent process reliability and perfect hole quality, leading to a 38% increase in productivity compared to the competition.



Tool	Cemented carbide step drill, Ø 5.560 mm
Workpiece	CFRP Carbonwerke / Predo®
Cutting parameters	v_c = 105 m/min RPM = 6.000 rpm f = 0.06 mm/rev
Source	Internal benchmark test

Coating properties of BALDIA NANO and BALDIA COMPOSITE DC at a glance

BALDIA®	Coating material	Coating temperature [°C]	Max. service temperature [°C]	Coating hardness H_{IT} [GPa]	Available coating thicknesses [µm]*	Coating colour
NANO	Carbon-based	< 900	600	80 – 100	6 – 12	grey
COMPOSITE DC					4 – 15	

*additional coating thicknesses on request

Benefit from our competence centres for diamond coatings around the world. Contact us now for your optimum BALDIA coating!

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