oerlikon
balzers

Coating solutions and services for cutting tools

Your guide to higher machining productivity and lower production costs



Cutting Tools

Pioneering thin film coatings since 1946

Founded in Liechtenstein, Oerlikon Balzers has grown into a trusted partner for surface solutions in manufacturing industries worldwide. Our expertise in thin film technologies, such as PVD and CVD coatings, is built on decades of engineering experience, passion, and a strong commitment to innovation.

In close collaboration with our customers, we continuously develop tailor-made coatings that meet the demands of evolving materials, complex geometries, and challenging production environments.

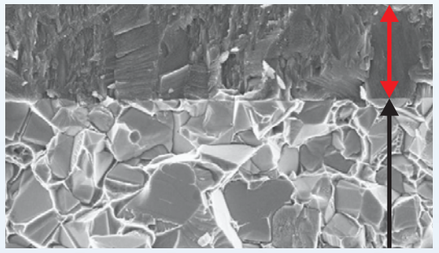
Only a few thousandths of a millimeter thin
– yet harder than steel



Meeting the demands of modern manufacturing
Tailored PVD and CVD coatings for your cutting tools

Discover how Oerlikon Balzers' wear-resistant coatings can enhance your manufacturing performance. Solutions from our BALINIT®, BALIQ®, and BALDIA® coating families support higher cutting speeds, longer tool life, and superior surface quality – all while helping to reduce production costs and environmental impact.

Whether your focus is on productivity, precision, or sustainability, our coatings deliver consistent, measurable results that help keep your operations competitive and prepared for future challenges.



SEM cross-section of a PVD-coated cutting tool.

BALINIT coatings

Cutting tools face extraordinary demands — from high productivity and manufacturing reliability to cost-efficient production. With Oerlikon Balzers' innovative BALINIT® coatings, you can count on advanced solutions that consistently deliver outstanding performance, even under the toughest conditions. They offer the properties you need for your application, including extreme hardness and high wear resistance – whatever your challenge in machining, you'll see a wide range of benefits.

- **Very good oxidation resistance**
- **Improved thermal stability**
- **High wear resistance**
- **Extremely hard coatings**

Lower your production costs with BALINIT coatings

Wear-resistant coatings from Oerlikon Balzers offer enormous potential to minimize production costs. Machining time plays the biggest role in keeping these costs down and productivity high. The outstanding properties of surface solutions from Oerlikon Balzers give you longer tool service life while increasing cutting speeds.



Discover our BALINIT® coatings!

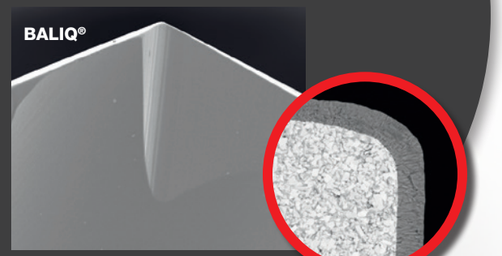
BALIQ coatings

The BALIQ® coating family from Oerlikon Balzers represents a major technological breakthrough. It is based on our S3p® technology (Scalable Pulsed Power Plasma) that intelligently combines the benefits of arc evaporation and magnetron sputtering.

BALIQ® coatings offer revolutionary properties for a unique range of applications. You benefit from new opportunities that go beyond anything seen before – with coatings tailored precisely to your needs.

Exceptional precision

High precision in coating thickness distribution guarantees extremely sharp edges. Outstanding results are achieved especially with tools that have ultra-small diameters.



Revolutionary smoothness

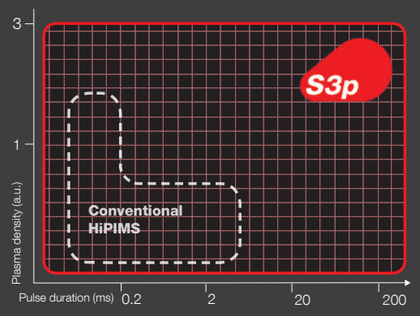
BALIQ® enables smooth chip removal and eliminates the need for mechanical post-treatment. Adhesion and built-up edges are avoided even with difficult-to-machine materials.



S3p

Remarkable scalability

Tailor-made coatings thanks to the revolutionary S3p® technology - overcoming the limits of conventional HiPIMS.



Discover our BALIQ® coatings!

BALDIA coatings

The growing use of advanced materials in industries such as aerospace, mobility, and medical technology is driving the need for higher cutting tool performance and reliability. CVD diamond coatings deliver exceptional hardness and wear resistance, making them the solution of choice for machining demanding materials – including lightweight composites, stacked structures, high-silicon aluminum and compacted or sintered powders such as graphite or zirconia. Our BALDIA® portfolio offers diamond coatings designed to meet the challenges of these applications, enabling longer tool life, enhanced surface quality, and greater cost-effectiveness in production.



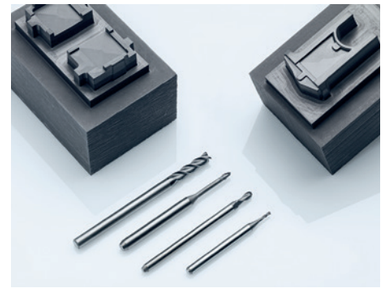
Composites

BALDIA® diamond coatings ensure tight tolerances and high efficiency when machining lightweight materials



Ceramics

BALDIA® diamond coatings protect tools and improve surface quality in dental machining



Graphite

BALDIA® diamond coatings enable high-precision manufacturing for mold and die applications

More than just a coating – trust in our diamond expertise

Coating technology for specific applications

Whether you have high volumes, demanding applications or extremely tight tolerance requirements, we offer the right plasma or hot filament-based coating solution to meet your needs.

Optimized pre-treatment for your carbide

Coating performance begins with the substrate. Our experts select and validate pre-treatments for specific applications to ensure reliable adhesion and optimum cutting performance across a wide range of carbide grades.

The right coating thickness – 4 to 15 µm

Coating thickness plays a critical role in tool performance. We work alongside you to define the optimum range, balancing wear resistance with the required cutting edge geometry.

Discover our BALDIA® coatings!

BALINIT coatings
Coating properties at a glance

BALINIT®	Coating material	Coating hardness H_{IT} [GPa]	Compressive stress [GPa]	Max. service temperature [°C]	Coating temperature [°C]	Coating color
A	TiN	30 +/- 3	-2 +/- 1	600	< 500	golden yellow
ALCRONA EVO	AlCrN-based	44 +/- 4	-3.5 +/- 1	1,100	< 500	bright gray
B	TiCN	37 +/- 3	-3 +/- 1	400	< 500	blue gray
DURANA	AlTiN/TiSiXN	37 +/- 3	-3.5 +/- 1	1,000	< 500	bronze
LATUMA	AlTiN-based	35 +/- 3	-3 +/- 1	1,000	< 500	gray
MAYURA	ta-C	> 65	–	> 500	< 150	rainbow / rainbow black*
OPTURA	TiAlN-based	42 +/- 2	-3 +/- 1	1,100	< 500	bronze
TISAFLEX	AlTiN/TiSiXN	38 +/- 5	-5 +/- 1	1,100	< 600	bronze



* Variations in color depend on tool dimensions, applications and geometry.
All given data are approximate values and dependent on application, environment and test conditions.

BALIQ coatings
Coating properties at a glance

BALIQ®	Coating material	Coating hardness H_{IT} [GPa]	Compressive stress [GPa]	Max. service temperature [°C]	Coating temperature [°C]	Coating color
ALCRONOS	AlCrN-based	37 +/- 3	-3.5 +/- 1	1,100	< 500	bright gray
ALTINOS	AlTiN-based	36 +/- 3	-3.3 +/- 1	1,000	< 500	anthracite
ANTOS	AlCrN + WC/C	35 +/- 2 18 +/- 1	-2.5 +/- 1	1,100 (AlCrN)	< 500	dark gray
AUROS	AlCrTiN- based	30 +/- 3	-2.5 +/- 1	600	< 500	rose gold
TISINOS PRO	AlTiSiN-based	38 +/- 1	-3.1 +/- 1	1,000	< 500	bronze

BALDIA coatings
Coating properties at a glance

BALDIA®	Coating material	Coating hardness H_{IT} ([GPa]	Available coating thicknesses [µm]*	Max. service temperature [°C]	Coating temperature [°C]	Coating color
COMPACT	C-based (sp3)	80 – 100	6 –12	600	< 900	dark gray
COMPOSITE			4 –15			
VARIA			6 –12			

*Additional coating thicknesses on request.
All given data are approximate values and dependent on application, environment and test conditions.

Recommended coatings
for gear cutting, broaching, drilling and reaming

	GEAR CUTTING				BROACHING	DRILLING / REAMING	
Material	**Hobs**	**Stick blades**	**Shaper cutters**	**Skiving tools**	**Broaches**	**Drills**	**Reamers**
Unalloyed steel	AV	AV / DR	AV	AV	AV	OT	ALC / OT
Steel < 1,000 N/mm²	AV	AV / DR	AV	AV	AV	OT	ALC / OT
Steel > 1,000 N/mm²	AV	AV / DR	AV	AV	AV	OT	ALC / OT
Steel 45 – 56 HRC	AV	AV / DR	AV	AV	AV	OT	ALC / OT
Steel 56 – 72 HRC	AV	AV / DR	AV	AV	AV / LM	OT	TSP / OT
Stainless steel					AV	OT / TSP	ALC / TSP / OT
Cast iron (GG, GGG)	AV	AV / DR	AV	AV	AV	OT	ALC / OT
Wrought Al / Al alloys < 12% Si					MY / AV	MY	MY
Al alloys > 12% Si					MY / AV	CS / MY	CS / MY
Nickel alloys					AV	OT / TSP	TSP / OT
Titanium, titanium alloys					AV	OT / TSP	TSP / OT
Brass, copper, bronze					MY / AV	MY	MY
Graphite						CS	CS
CFRP / GFRP / Sandwich materials / Stacks						CS	CS
Green ceramics						CS	CS
Sintered ceramics						CS	CS
Organic fibres (e.g. wood, paper)						MY	

A = BALINIT® A
AV = BALINIT® ALCRONA EVO
B = BALINIT® B
DR = BALINIT® DURANA
LM = BALINIT® LATUMA
MY = BALINIT® MAYURA
OT = BALINIT® OPTURA
TF = BALINIT® TISAFLEX

ALC = BALIQ® ALCRONOS
ALT = BALIQ® ALTINOS
ANT = BALIQ® ANTOS
AUR = BALIQ® AUROS
TSP = BALIQ® TISINOS PRO



Recommended coatings
for milling, turning, micromachining and threading

MILLING		TURNING	MICROMACHINING		THREADING		
Solid	**Inserts**	**Inserts**	**End mills**	**Drills**	**Taps**	**Thread formers**	**Thread mills**
AV	DR / AV	DR / LM / ALT	ALC / TSP	ALC / TSP	AUR / ANT / B	ALC / AUR / A	ALC
AV	DR / AV	DR / LM / ALT	ALC / TSP	ALC / TSP	AUR / ANT / B	ALC / AUR / A	ALC
AV / DR	DR / AV	DR / LM / ALT	ALC / TSP	ALT / TSP	AUR / ANT / B	ALC / AUR / A	ALC
DR / AV	DR / AV	DR / LM / ALT	TSP / ALC	TSP / ALT	AUR / ALC / B		ALC / DR
TSP / DR	TSP / DR	TSP / DR	TSP / ALC	TSP / ALC			TSP / TF / DR
TF / AV / TSP	DR / AV	ALT / DR	TSP / ALC / ALT	TSP / ALC	ANT / AUR / B	AUR / ALC / A	TSP / TF
DR / AV	DR / AV	DR / LM / ALT	ALC / TSP	ALC / TSP	AUR / ALC / B		ALC / DR
MY	MY	MY	MY	MY	MY / B	MY / A	MY / B
CS / MY	CS / MY	CS / MY	CS / MY	CS / MY	MY	MY	MY
TSP / TF / AV	TSP / TF / AV	TSP / ALT / DR	TSP / ALC	TSP / ALT	ANT / AUR / B		TSP / TF
TSP / TF / AV	TSP / TF / AV	TSP / ALT / DR	TSP / ALC	TSP / ALT	ANT / AUR / B	ALC	TSP / TF
MY	MY	MY	MY	MY	MY		MY / B
CV	CT	CT	CV	CV			
CV	CV	CV	CS	CS			
CS	CV	CV	CT	CT			
CS	CV	CV	CT	CT			
MY	MY	MY					

CS = BALDIA® COMPOSITE
CT = BALDIA® COMPACT
CV = BALDIA® VARIA

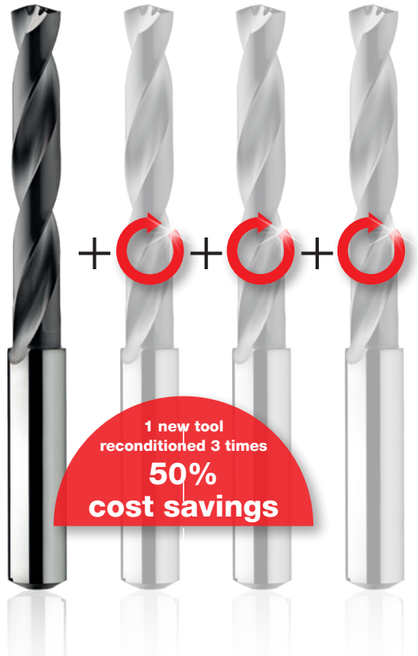


Reconditioning by Oerlikon Balzers
– the fast, all-inclusive solution for your round tools

Amount of machined material, 100%

Cutting tools can be reground and recoated in selected coating centres. Even after three reconditioning cycles, you save more than 50% compared to purchasing a new coated tool while simultaneously benefiting from the same high performance.





Cutting tools can be reconditioned multiple times, offering quality and service life comparable to new tools. This reduces costs and supports sustainability by conserving resources.

Our standardized global process includes inspection, decoating, regrinding, pre-treatment, re-coating, and optional express delivery.

Americas



Argentina: Buenos Aires
Mexico: Querétaro, Saltillo

Europe



Austria: Stainz
Romania: Maracineni (Piteşti)
Turkey: Bursa

Asia



China: Suzhou, Chengdu
India: Ahmedabad, Aurangabad, Bangalore, Chandigarh, Chennai, Jamshedpur, Manesar, Pune
Korea: Pyeongtaek, Busan
Malaysia: Kulai (Johor Bahru)
Philippines: Calamba City
Thailand: Chonburi
Vietnam: Bac Ninh (Hanoi)

primeGear
– a customized service for unmatched gear cutting performance

Assessment of current status	+	Tailored tool treatment	=	primeGear
Process analysis		Tailored surface pre-treatment		Reduction of variations and down-time in production
Analysis of tool wear and work material		Perfect edge preparation		Highest tool performance in combination with proven savings
Analysis of resharpening quality		Optimum coating for the specific application		Part quality improvement
Analysis of tool life cycle and production costs		Tailored post-treatment		Continuous improvement

primeGear gives you higher process reliability, reduced tool wear, extended tool life, shorter cycle times and lower production costs. We'll work alongside you to eliminate the weak links in your tool service life by analyzing all phases of the tool life cycle:

- Surface treatment
- Cutting process
- Tool handling
- Resharpening

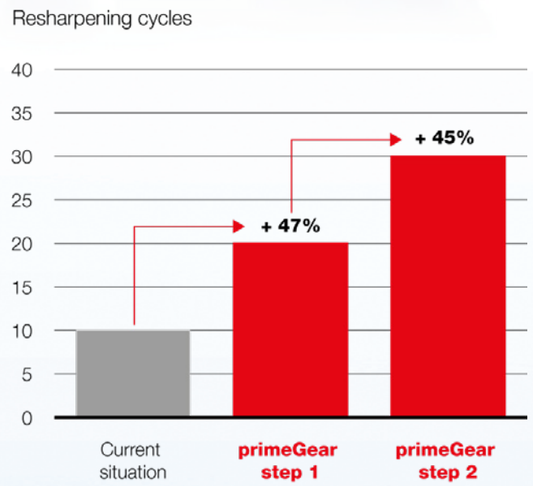


Example of tool cost reduction

The results of a customer test show a higher process stability, improved tool wear and reduced regrinding stock removal. Reducing the resharpening variations in two steps and an optimum tool coating enabled longer reconditioning cycles, resulting in total tool cost savings of 90% per year.

Direct effect:
- Step 1: Tool costs reduced by 47%
- Step 2: Tool costs reduced by additional 45%

Indirect effects:
- Predictability in tool service life increased milling machine uptime
- Quality of machined gears improved (the difference between the first and last gear was reduced)



Count on a powerful worldwide network!

Americas
25+ centers

Argentina | Brazil | Canada | Mexico | USA

Asia
35+ centers

China | India | Indonesia | Japan | Malaysia | Philippines | Singapore | South Korea | Thailand | Vietnam

Europe
45+ centers

Austria | Belgium | Czech Republic | Finland | France | Germany | Hungary | Italy | Liechtenstein | Luxembourg | Poland | Portugal | Romania | Spain | Sweden | Switzerland | Turkey | United Kingdom

Learn more about our coating solutions for cutting tools!

HQ189EN (2509)

Contact us now for your ideal coating!

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