

Coating solutions and services for cutting tools

Your guide to higher machining productivity and lower production costs



Cutting Tools



Sustainable coating solutions and services for your cutting tools

Coatings and services from Oerlikon Balzers give you high-performance cutting tools that are ready to meet the increasing demands of modern manufacturing. A wide range of coating technologies is available for

almost unlimited applications and various materials. Working in close collaboration with our customers around the world, our specialists are continuously opening up new applications. Customised coatings are available on request.



BALINIT coatings

High productivity, manufacturing reliability, production costs – the demands made on cutting tools are enormous. You can rely on the innovative BALINIT® coatings from Oerlikon Balzers, one of the world's leading suppliers of surface technologies.

BALINIT® coatings 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

Serving a wide range of markets


Power generation



Mechanical engineering


Medical


Oil and gas


Tool making and metal processing


Automotive industry


Consumer goods


Aerospace industry

Lower your production costs with BALINIT

Wear-resistant coatings from Oerlikon Balzers offer enormous potential to minimise 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.





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.

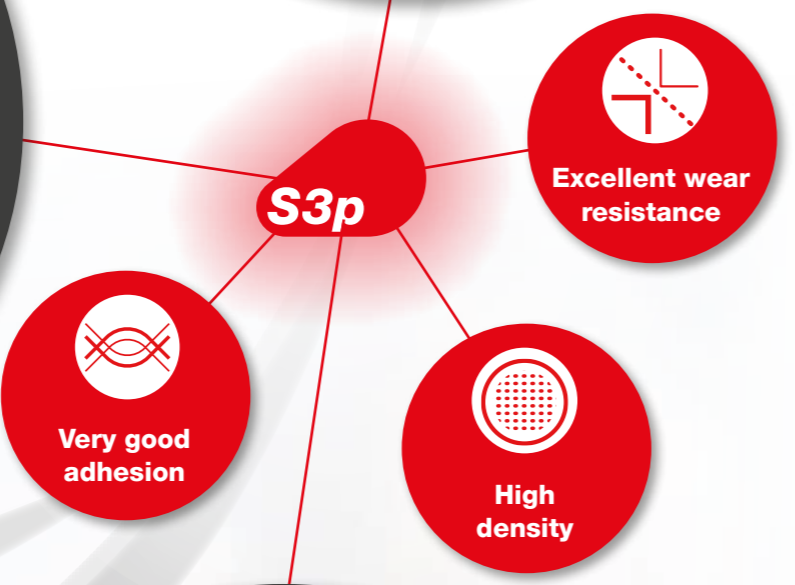
BALIQ® coatings offer revolutionary properties for a unique range of applications. You benefit from new opportunities that go beyond anything seen before – with coatings tailored precisely to your needs.

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

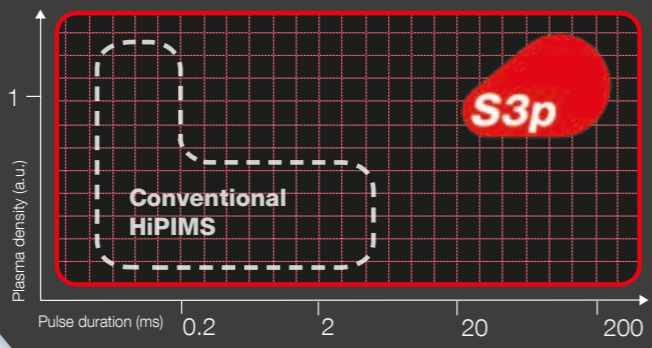


Revolutionary smoothness
BALIQ® enables smooth chip removal and eliminates the need for mechanical post-treatment. Adhesion and built-up edges are avoided even with difficult-to-machine materials.





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





BALDIA coatings

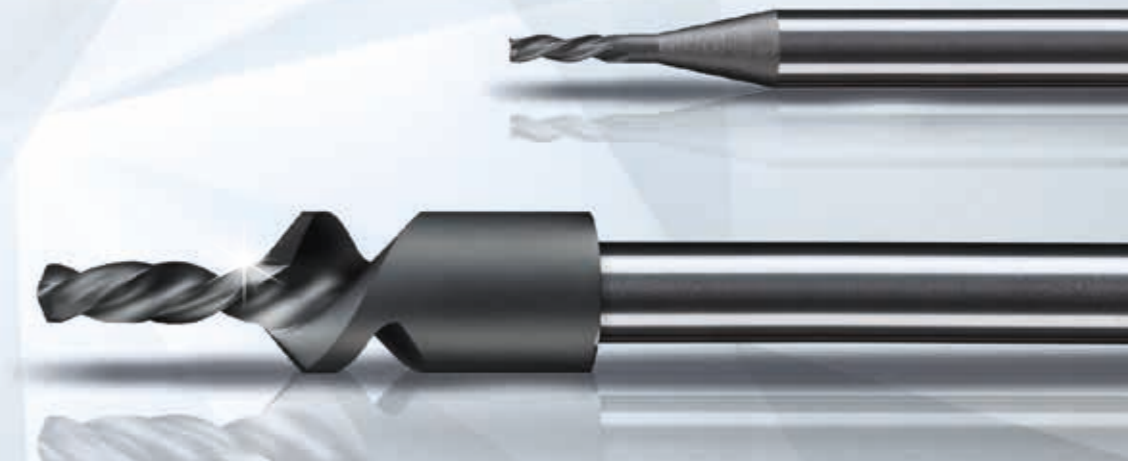
The diamond coatings from the BALDIA® portfolio are the best choice for machining highly abrasive base materials. They improve cutting performance and allow parts to be manufactured with tightest tolerances to produce the best possible finishing accuracy.

The Oerlikon Balzers diamond coating portfolio is divided into two groups of different base materials. In both groups the ending "DC" represents maximum coating quality with consistently high tool performance and the tightest possible tolerances for tool diameter and coating thickness.

- Unsurpassed hardness
- Enhanced thermal conductivity
- Extremely high wear resistance
- Chemically inert

Base materials to be machined	Tight tolerances achievable for	
	Coating thickness OR tool diameter	Coating thickness AND tool diameter
Compacted and sintered powders 	BALDIA® COMPACT	BALDIA® COMPACT DC
Fibre-reinforced composites, stack materials and Al alloys 	BALDIA® NANO	BALDIA® COMPOSITE DC

* Image source: ZECHA Hartmetall-Werkzeugfabrikation GmbH





BALINIT coatings Coating properties at a glance

BALINIT®	Coating material	Coating hardness H_{T1} [GPa]	Compressive stress [GPa]	Max. service temperature [°C]	Coating temperature [°C]	Coating colour
A	TiN	30 +/- 3	-2 +/- 1	600	< 500	golden yellow
ALCRONA EVO	AlCrN-based	44 +/- 4	-3.5 +/- 1	1,100	< 500	bright grey
ALNOVA	AlCrN-based	38 +/- 3	-3.5 +/- 1	1,100	< 500	light grey
ALTENSA	AlCrN-based	40 +/- 3	-2 +/- 1	1,100	< 500	light grey
B	TiCN	37 +/- 3	-3 +/- 1	400	< 500	blue grey
DURANA	AlTiN/TiSiXN	37 +/- 3	-3.5 +/- 1	1,000	< 500	bronze
LATUMA	AlTiN-based	35 +/- 3	-3 +/- 1	1,000	< 500	grey
MAYURA	ta-C	> 65	-	> 500	< 150	rainbow / rainbow black*
PERTURA	AlTiN-based	35 +/- 3	-4 +/- 1	1,000	< 600	aubergine grey
TISAFLEX	AlTiN/TiSiXN	38 +/- 5	-5 +/- 1	1,100	< 600	bronze



BALIQ coatings Coating properties at a glance

BALIQ®	Coating material	Coating hardness H_{T1} [GPa]	Compressive stress [GPa]	Max. service temperature [°C]	Coating temperature [°C]	Coating colour
ALCRONOS	AlCrN-based	37 +/- 3	-3.5 +/- 1	1,100	< 500	bright grey
ALTIKOS	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 grey
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_{T1} [GPa]	Available coating thicknesses [µm]*	Max. service temperature [°C]	Coating temperature [°C]	Coating colour
COMPACT	C-based (sp3)	80 – 100	6 – 12	600	< 900	grey
COMPACT DC	C-based (sp3)	80 – 100	4 – 15	600	< 900	grey
NANO	C-based (sp3)	80 – 100	6 – 12	600	< 900	grey
COMPOSITE DC	C-based (sp3)	80 – 100	4 – 15	600	< 900	grey

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

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

Recommended coatings for gear cutting, milling, drilling and reaming

Material	GEAR CUTTING				MILLING	DRILLING / REAMING	
	Hobs	Stick blades	Shaper cutters	Skiving tools	End mills	Drills	Reamers
Unalloyed steel	AT / AV	DR / AT / AV	AT / AV	AT / AV	AV	PT / AV / LM	ALC / PT / AV
Steel < 1,000 N/mm ²	AT / AV	DR / AT / AV	AT / AV	AT / AV	AV	PT / LM / AV	ALC / PT / AV
Steel > 1,000 N/mm ²	AT / AV	DR / AT / AV	AT / AV	AT / AV	AV / LM / DR	PT / DR / LM	ALC / DR / AV
Steel 45 – 56 HRC	AT / AV	DR / AT / AV	AT / AV	AT / AV	DR / AN / LM	PT / DR / LM	ALC / DR / LM
Steel 56 – 72 HRC	AT / AV / LM	DR / AT / AV	AT / AV / LM	AT / AV / LM	TSP / DR / LM	PT / DR / LM	TSP / DR / PT
Stainless steel					TF / AN / LM	PT / DR / LM	ALC / DR / PT
Cast iron (GG, GGG)	AT / AV	DR / AT / AV	AT / AV	AT / AV	AN / LM / AV	PT / DR / LM	ALC / PT / AV
Wrought Al / Al alloys < 12% Si					MY	MY	MY
Al alloys > 12% Si					DIA CS DC / DIA N / MY	DIA CS DC / DIA N / MY	
Nickel alloys					TF / TSP / LM	TF / PT / LM	TSP / LM
Titanium, titanium alloys					TSP / TF / AN	TF / PT / LM	TSP / LM
Brass, copper, bronze					MY	MY	MY
Graphite					DIA CT DC / DIA CT	DIA CT DC / DIA CT	DIA CT DC / DIA CT
CFRP / GFRP / Sandwich materials / Stacks					DIA CS DC / DIA N	DIA CS DC / DIA N / MY	DIA CS DC / DIA N / MY
Green ceramics					DIA CT / DIA CT DC	DIA CT DC / DIA CT	DIA CT / DIA CT DC
Sintered ceramics					DIA CT DC / DIA CT	DIA CT DC / DIA CT	
Organic fibres (e.g. wood, paper)					MY	MY	

Recommended coatings for machining with inserts, micromachining, threading and broaching

MACHINING WITH INSERTS		MICROMACHINING		THREADING			BROACHING
Turning	Milling	End mills	Drills	Taps	Thread formers	Thread mills	Broaches
LM / ALT	LM / AV	ALC / TSP	ALC / TSP	AUR / ANT / B	ALC / AUR / A	ALC / AV	AV
LM / ALT	LM / AV	ALC / TSP	ALC / TSP	AUR / ANT / B	ALC / AUR / A	ALC / AV	AV
LM / ALT	LM / AN	ALC / TSP	ALC / TSP	AUR / ANT / B	ALC / AUR / A	ALC / AV	AV
LM / ALT	LM / AN	TSP / ALC	TSP / ALC	AUR / ALC / B		ALC / LM	AV
TSP / ALT / LM	ALT / LM	TSP / ALC	TSP / ALC			TSP / TF / LM	AV / LM
LM / ALT	LM / AN / ALT	TSP / ALC	TSP / ALC	ANT / AUR / B	AUR / ALC / A	ALC / LM	AV
LM / ALT	LM	ALC / TSP	ALC / TSP	AUR / ALC / B		ALC / AV	AV
MY	MY	MY	MY	MY / B	MY / A	MY / B	MY / AV
DIA CS DC / DIA N / MY	DIA CS DC / DIA N / MY	DIA CS DC / DIA N / MY	DIA CS DC / DIA N / MY	MY	MY	MY	MY / AV
TSP / ALT / LM	LM / AN	TSP / ALC	TSP / ALC	ANT / AUR / B		TSP / LM	AV
TSP / ALT / LM	TSP / AN / LM	TSP / ALC	TSP / ALC	ANT / AUR / B	ALC	TSP / LM	AV
MY	MY	MY	MY	MY		MY / B	MY / AV
DIA CT / DIA CT DC	DIA CT / DIA CT DC	DIA CT / DIA CT DC	DIA CT DC / DIA CT				
DIA CS DC / DIA N	DIA CS DC / DIA N	DIA CS DC / DIA N	DIA CS DC / DIA N				
DIA CT / DIA CT DC	DIA CT / DIA CT DC	DIA CT / DIA CT DC	DIA CT / DIA CT DC				
DIA CT / DIA CT DC	DIA CT DC / DIA CT	DIA CT DC / DIA CT	DIA CT DC / DIA CT				
MY	MY						

A = BALINIT® A
 AN = BALINIT® ALNOVA
 AT = BALINIT® ALTENSA
 AV = BALINIT® ALCRONA EVO
 B = BALINIT® B
 DR = BALINIT® DURANA
 LM = BALINIT® LATUMA
 MY = BALINIT® MAYURA
 PT = BALINIT® PERTURA
 TF = BALINIT® TISAFLEX

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

DIA CT = BALDIA® COMPACT
 DIA CT DC = BALDIA® COMPACT DC
 DIA N = BALDIA® NANO
 DIA CS DC = BALDIA® COMPOSITE DC





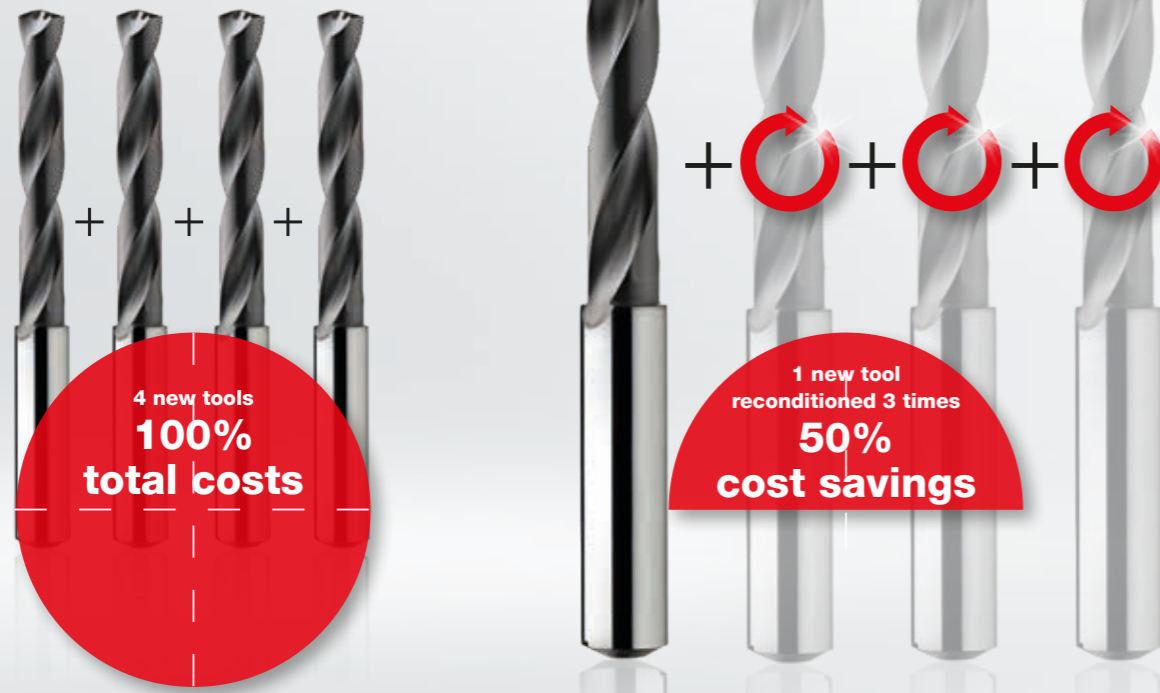
Reconditioning by Oerlikon Balzers – the fast, all-inclusive solution for your round tools

Cutting tools can be reconditioned several times, producing a quality and service life comparable to new tools. As well as reducing costs, reconditioning makes a substantial contribution to sustainability and environmental protection

by saving valuable resources. Our complete reconditioning service follows a globally defined standard process including incoming inspection, de-coating, regrinding, pre-treatment, re-coating and express delivery service on demand.

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 benefitting from the same high performance.

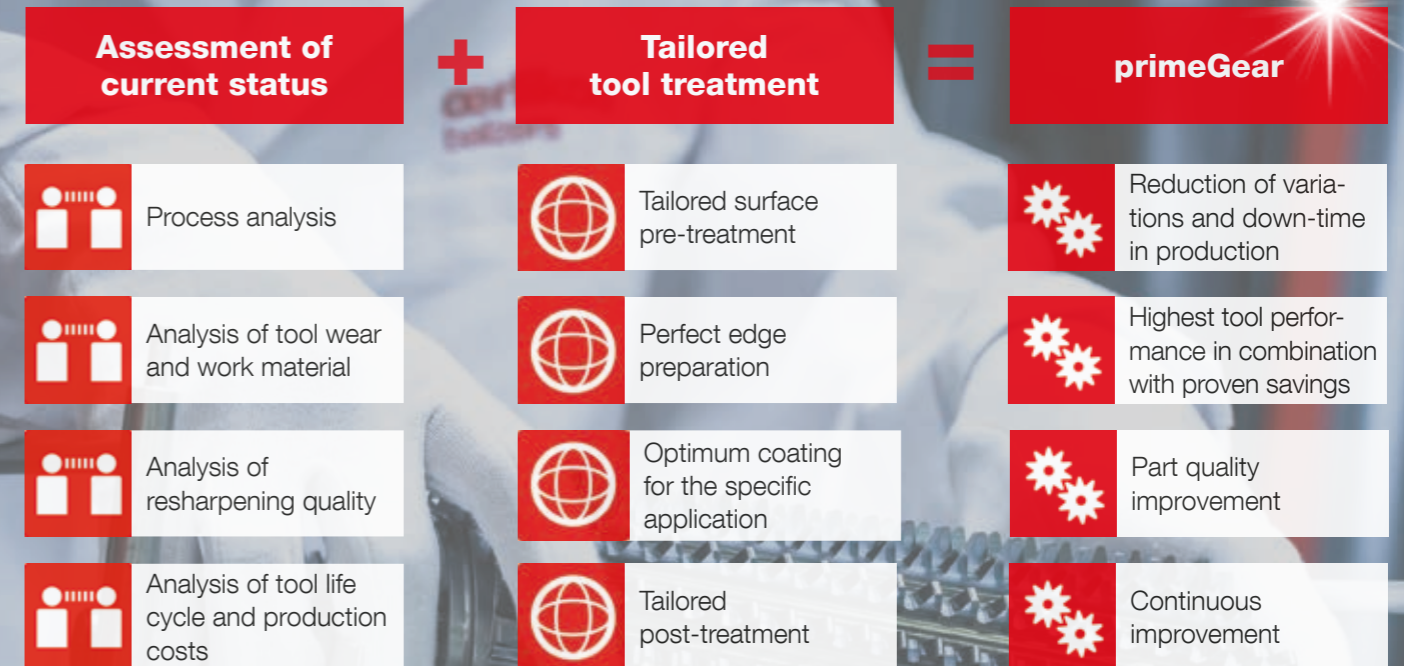


primeGear – a customised service that gives you unmatched gear cutting tool performance

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 analysing all phases of the tool life cycle:

- Surface treatment
- Cutting process
- Tool handling
- Resharpener

primeGear – Adding value to your gear production



Americas



Argentina: Buenos Aires
Mexico: Querétaro, Saltillo

Europe



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

Asia



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

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 resharpener variations in two steps and an optimum tool coating enabled longer reconditioning cycles, resulting in total tool cost savings of 90% per year.

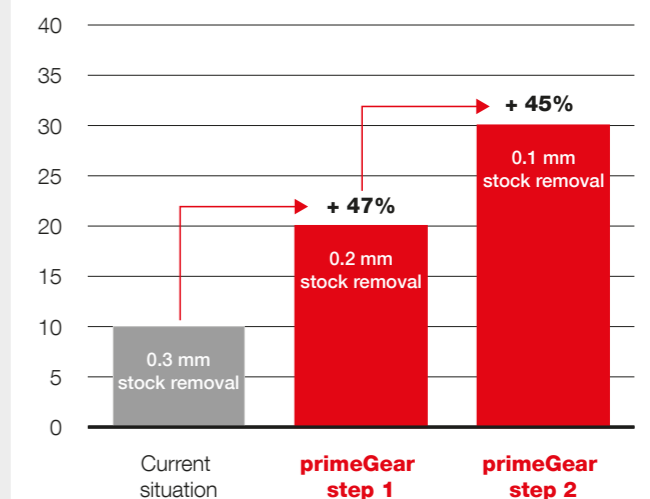
Direct effect:

- 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)

Resharpener cycles



Close to our customers – worldwide



Argentina
Brazil
Canada
Mexico
USA

Americas

more than **25** customer centres in



Austria
Belgium
Czech Republic
Finland
France
Germany
Hungary
Italy
Liechtenstein
Luxembourg

Poland
Portugal
Romania
Slovakia
Spain
Sweden
Switzerland
Turkey
United Kingdom

Europe

more than **45** customer centres in



China
India
Indonesia
Japan
Malaysia
Philippines
Singapore

South Korea
Thailand
Vietnam

Asia

more than **35** customer centres in

Contact us now!

Balzers Headquarters
Oerlikon Balzers Coating AG
Balzers Technology and
Service Centre
Iramali 18
9496 Balzers
Liechtenstein
T +423 388 7500

www.oerlikon.com/balzers

oerlikon
balzers