

# Coating Services for Cutting Tools

Your guide to higher machining  
productivity and cost efficiency



**Cutting Tools**



# The Oerlikon Balzers production process ensures high, reproducible quality all the time – worldwide

Oerlikon Balzers stands for new development and refinement of groundbreaking coating solutions tailored to current market needs and individual customer requirements. In over 110 coating centres worldwide, cutting tools are run through automated and standardised production sequences to achieve the best in reproducible quality. All Balzers coating centres throughout the world are certified according to ISO and QS standards.

## Packaging/delivery

Coated parts are usually returned in the packaging in which they were delivered. Considerable savings are possible if the parts are delivered in suitable cleaning baskets.

## Post-treatment

Numerous methods are available to give cutting tools the finishing touches. Over many years, Oerlikon Balzers has gained the indispensable experience and expertise to provide you with the best possible solution and equipment for your needs.

## Coating

Coatings of Oerlikon Balzers provide you with high-performance cutting tools that are ready to meet the increasing demands of modern manufacturing. A broad range of coating technologies is available for almost unlimited applications. Working in close collaboration with our customers throughout the world, our specialists are continuously opening up new applications. Customised coatings are available on request.



**oerlikon**  
balzers



### **Pick-up service**

Our pick-up service collects your cutting tools and returns them after coating. And if you need them back very quickly, Oerlikon Balzers of course also offers you an express service.

### **Incoming inspection**

The tools to be coated are checked for quantity, material and surface condition. The production sequence is determined on the basis of specifications provided by the customer.

### **Handling and cleaning**

In all our coating centres, we ensure efficient logistics by individual transport- and product-specific mounting systems. Our multi-step ultrasonic cleaning line enables PVD-compatible surface preparation.

### **Pre-treatment**

If additional pre-treatment is required, Oerlikon Balzers employs the appropriate technologies in each case. We offer various edge preparation & surface treatment technologies depending on your needs.

# Our coating solutions – tailor-made for your markets

## High demands on automotive manufacturing tools

Coated tools give you precision and high-quality surfaces for many automotive components.



## First-class mechanical engineering with Oerlikon Balzers coatings

Coating solutions which deliver significant improvements in performance and wear resistance for manufacturing tools that are used in machine construction.



## Performance at the highest level for aerospace materials that are hard-to-cut

Oerlikon Balzers high-end coating solutions provide reliability and long life for the aerospace industry.



## Reliable machining of large components for the power generation industry

Oerlikon Balzers coatings make a valuable contribution to the reliable machining of large components such as windmill and turbine blades, and to the sustainability of their manufacturing process.



## Extreme and demanding environmental conditions in the oil & gas industry

Coating solutions from Oerlikon Balzers meet expectations to the fullest extent for the machining of components for the oil and gas industry.



## High precision machining in medical applications

Oerlikon Balzers hard coatings are perfectly designed to machine difficult-to-cut materials in medical applications.





## BALINIT coatings

High productivity, manufacturing reliability, cost efficiency – the demands made on cutting tools are enormous. You can rely on the innovative BALINIT® wear-resistant coatings from Oerlikon Balzers, a world-wide technological leader in the field of hard coatings.

With BALINIT® you can expect a wide variety of coating properties such as extreme coating hardness and high wear resistance – and benefit from numerous advantages for milling, drilling, reaming, turning, threading and gear cutting.

**Very good oxidation resistance**

**Cutting edge thermal stability**

**High wear resistance**

**Outstanding hot hardness**

**Extremely hard coatings**



## Lower your production costs with BALINIT


Wear-protection coatings from Oerlikon Balzers offer you enormous savings potentials. The machining time has the greatest influence on cost efficiency and productivity: A 20% increase in the cutting parameters reduces production costs by up to 15%.

The outstanding properties of Oerlikon Balzers coating solutions provide longer tool service lives at higher cutting speeds at the same time.




# BALIQ coatings

A technological milestone has been achieved: BALIQ® by Oerlikon Balzers. It is based on our S3p® technology (Scalable Pulsed Power Plasma) that intelligently combines the advantages of Arc Evaporation and Sputtering. The result is BALIQ®, a new family of wear-resistant coatings with revolutionary properties for a unique spectrum of applications. You benefit from new possibilities that transcend anything seen before – with coatings tailored precisely to your needs.

**High density**  
The density of BALIQ® coatings is very close to the greatest density theoretically possible. High toughness and high resistance to crack propagation and diffusion are salient features.



**Excellent friction**  
Among other benefits, the excellent coefficient of friction of BALIQ® results in improved chip flow and reduced built-up edge formation.



### Revolutionary smoothness

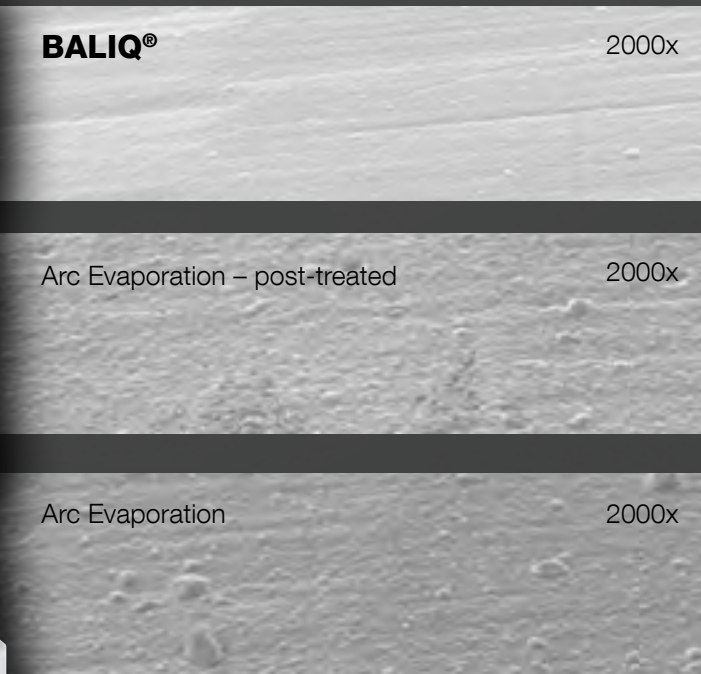
BALIQ® enables smooth chip removal and eliminates the need for mechanical post-treatment. Adhesion and built-up edges are avoided even with difficult-to-machine materials.



**BALIQ®** 2000x

Arc Evaporation – post-treated 2000x

Arc Evaporation 2000x

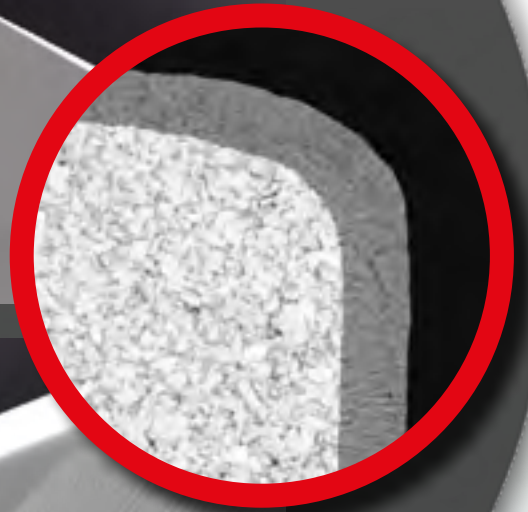
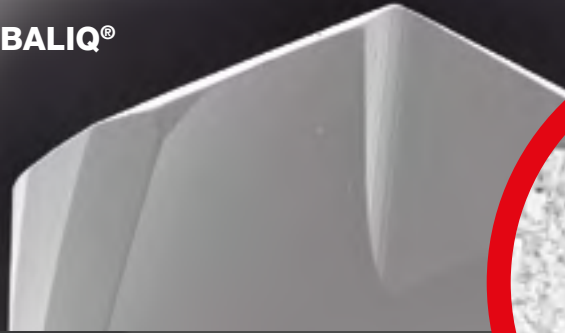




### Exceptional precision

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

BALIQ®



BALIQ®



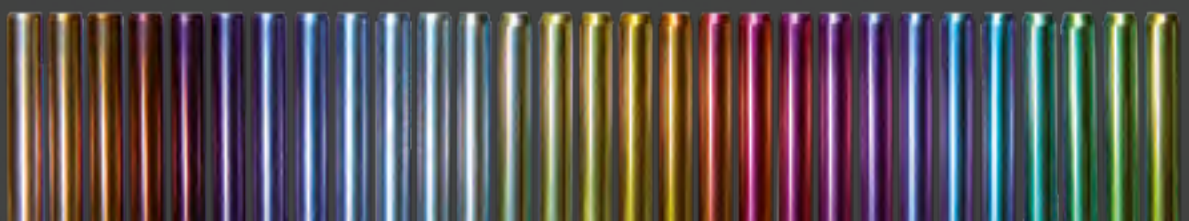
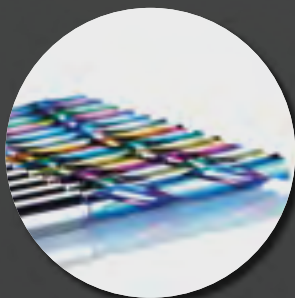
### Very good adhesion

BALIQ® coatings feature an exceptionally strong coating/substrate bond. High adhesion guarantees long and reproducible tool service lives.

### BALIQ UNIQUE –

#### Differentiation, Classification and Visualisation with coloured high performance coatings

With BALIQ® UNIQUE, colour has come into play literally for the first time. That means, you can benefit from the outstanding wear protection properties of BALIQ® coatings, as well as giving your tools a look that is absolutely unique.





# 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
<b>A</b>	TiN	30 +/-3	-2 +/--1	600	< 500	golden yellow
<b>B</b>	TiCN	37 +/-3	-3 +/--1	400	< 500	blue grey
<b>ALCRONA PRO</b>	AlCrN-based	36 +/-3	-3 +/--1	1,100	< 500	bright grey
<b>ALTENSA</b>	AlCrN-based	40 +/-3	-2 +/--1	1,100	< 500	light grey
<b>ALNOVA</b>	AlCrN-based	38 +/-3	-3 +/--1	1,100	< 500	light grey
<b>LATUMA</b>	AlTiN-based	35 +/-3	-3 +/--1	1,000	< 500	grey
<b>PERTURA</b>	AlTiN-based	35 +/- 3	-4 +/--1	1,000	< 600	aubergine grey
<b>TISAFLEX</b>	AlTiN/TiSiXN	38 +/-5	-5 +/--1	1,100	< 600	bronze
<b>DIAMOND MICRO</b>	C (sp <sup>3</sup> ) micro-crystalline	80 – 100	–	600	< 900	grey
<b>DIAMOND NANO</b>	C (sp <sup>3</sup> ) nano-crystalline	80 – 100	–	600	< 900	grey
<b>HARD CARBON</b>	ta-C	50 – 60	–	500	< 150	black rainbow

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 $H_T$ (GPa)	Compressive stress (GPa)	Max. service temperature (°C)	Coating temperature (°C)	Coating colour
<b>ALCRONOS</b>	AlCrN-based	37 +/-3	-3.5 +/-1	1,100	< 500	bright grey
<b>AUROS</b>	AlCrTiN-based	30 +/- 3	-2.5 +/-1	600	< 500	rose gold
<b>ALTINOS</b>	AlTiN-based	36 +/-3	-3.3 +/-1	1,000	< 500	anthracite
<b>TISINOS</b>	AlTiSiN-based	38 +/-5	-3.1 +/-1	1,000	< 500	bronze
<b>MICRO ALCRONOS</b>	AlCrN-based	37 +/-3	-3.5 +/-1	1,100	< 500	bright grey
<b>MICRO ALTINOS</b>	AlTiN-based	36 +/-3	-3.3 +/-1	1,000	< 500	anthracite
<b>MICRO TISINOS</b>	AlTiSiN-based	38 +/-5	-3.1 +/-1	1,000	< 500	bronze

All given data are approximate values and dependent on application, environment and test conditions.

**S3p**

# Coating recommendations for Gear Cutting, Milling

	GEAR CUTTING		
Material	Hobs (HSS/carbide)	Stick blades	Shaper cutters
Unalloyed steel	AT / AP	AT / AP	AT / AP
Steel < 1000 N/mm <sup>2</sup>	AT / AP	AT / AP	AT / AP
Steel > 1000 N/mm <sup>2</sup>	AT / AP	AT / AP	AT / AP
Steel 45 - 56 HRC	AT / AP	AT / AP	AT / AP
Steel 56 - 72 HRC	AT / AP / LM	AT / AP / LM	AT / AP / LM
Stainless steel			
Cast iron (GG, GGG)	AT / AP	AT / AP	AT / AP
Wrought Al / Cast Al (6 - 12% Si)			
Al alloys > 12% Si			
Nickel alloys			
Titanium, titanium alloys			
Brass, copper, bronze			
Graphite			
Composites (CFRP/GFRP)			
Organic material (e.g. wood)			



# g, Drilling and Reaming

		MILLING	DRILLING / REAMING		
	Skiving tools	End mills (carbide)	Drills (carbide)	Drills (HSS)	Reamers
	AT / AP	AP	PT / AP / LM	AP / LM	ALC / PT / AP
	AT / AP	AP	PT / LM / AP	AP / LM	ALC / PT / AP
	AT / AP	AP / LM	PT / LM / AP	AP / LM	ALC / PT / AP
	AT / AP	TF / AN / LM	PT / LM / AP	LM / AP	ALC / PT / LM
	AT / AP / LM	TIS / TF / LM	PT / TF / LM		TIS / PT
		TF / AN / LM	PT / LM / AP	AP / LM	ALC / PT / AP
	AT / AP	AN / LM / AP	PT / LM / AP	AP / LM	ALC / PT / AP
		HC	HC	HC	HC
		DIA N / HC	DIA N / HC	HC	HC / DIA N
		TF / TIS / LM	PT / LM		TIS / LM
		TIS / TF / AN	PT / LM / AP		TIS / LM
		HC	HC	HC	HC
		DIA M / HC	DIA M		
		DIA N / HC	DIA N / HC		
		HC	HC	HC	

A = BALINIT® A  
 AP = BALINIT® ALCRONA PRO  
 AN = BALINIT® ALNOVA  
 AT = BALINIT® ALTENSA  
 B = BALINIT® B  
 DIA M = BALINIT® DIAMOND MICRO  
 DIA N = BALINIT® DIAMOND NANO  
 HC = BALINIT® HARD CARBON  
 LM = BALINIT® LATUMA  
 PT = BALINIT® PERTURA  
 TF = BALINIT® TISAFLEX

ALC = BALIQ® ALCRONOS  
 ALT = BALIQ® ALTINOS  
 AUR = BALIQ® AUROS  
 MALC = BALIQ® MICRO ALCRONOS  
 MALT = BALIQ® MICRO ALTINOS  
 MTIS = BALIQ® MICRO TISINOS  
 TIS = BALIQ® TISINOS



# Coating recommendations for Inserts, Micromachining, Threading

INSERTS		MICROMACHINING		THREADING
Turning	Milling	End mills	Drills	Taps
LM / ALT	LM / AP	MALC / MTIS	MALC / MTIS	AUR / ALC / B
LM / ALT	LM / AP	MALC / MTIS	MALC / MTIS	AUR / ALC / B
LM / ALT	LM / AN	MALC / MTIS	MALC / MTIS	AUR / ALC / B
LM / ALT	LM / AN	MTIS / MALC	MTIS / MALC	AUR / ALC / B
ALT / LM	ALT / LM	MTIS / MALC	MTIS / MALC	
LM / ALT	LM / AN / ALT	MTIS / MALC	MTIS / MALC	AUR / ALC / B
LM / ALT	LM	MALC / MTIS	MALC / MTIS	AUR / ALC / B
HC	HC	HC	HC	HC / B
DIA N / HC	DIA N / HC	DIA N / HC	HC / DIA N	HC / DIA N
LM	LM / AN	MTIS / MALT	MTIS / MALT	AUR / ALC / B
LM	TIS / AN / LM	MTIS / MALC	MTIS / MALC	AUR / ALC / B
HC	HC	HC	HC	HC
DIA M	DIA M / HC	DIA M / HC	DIA M / HC	
DIA N	DIA N / HC	DIA N / HC	DIA N / HC	
HC	HC			



# g and Broaching

			BROACHING
	Thread formers	Thread mills	HSS / carbide broaches
	AUR / ALC / A	ALC / AP	AP
	AUR / ALC / A	ALC / AP	AP
	AUR / ALC / A	ALC / AP	AP
	AUR / ALC / A	ALC / LM	AP
		TIS / TF / LM	AP / LM
	AUR / ALC / A	ALC / LM	AP
	AUR / ALC / A	ALC / AP	AP
	HC / A	HC / B	HC / AP
	HC / DIA N	HC / DIA N	HC / AP
	AUR / ALC / A	TIS / LM	AP
	AUR / ALC / A	TIS / LM	AP
	HC	HC / B	HC / AP



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

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

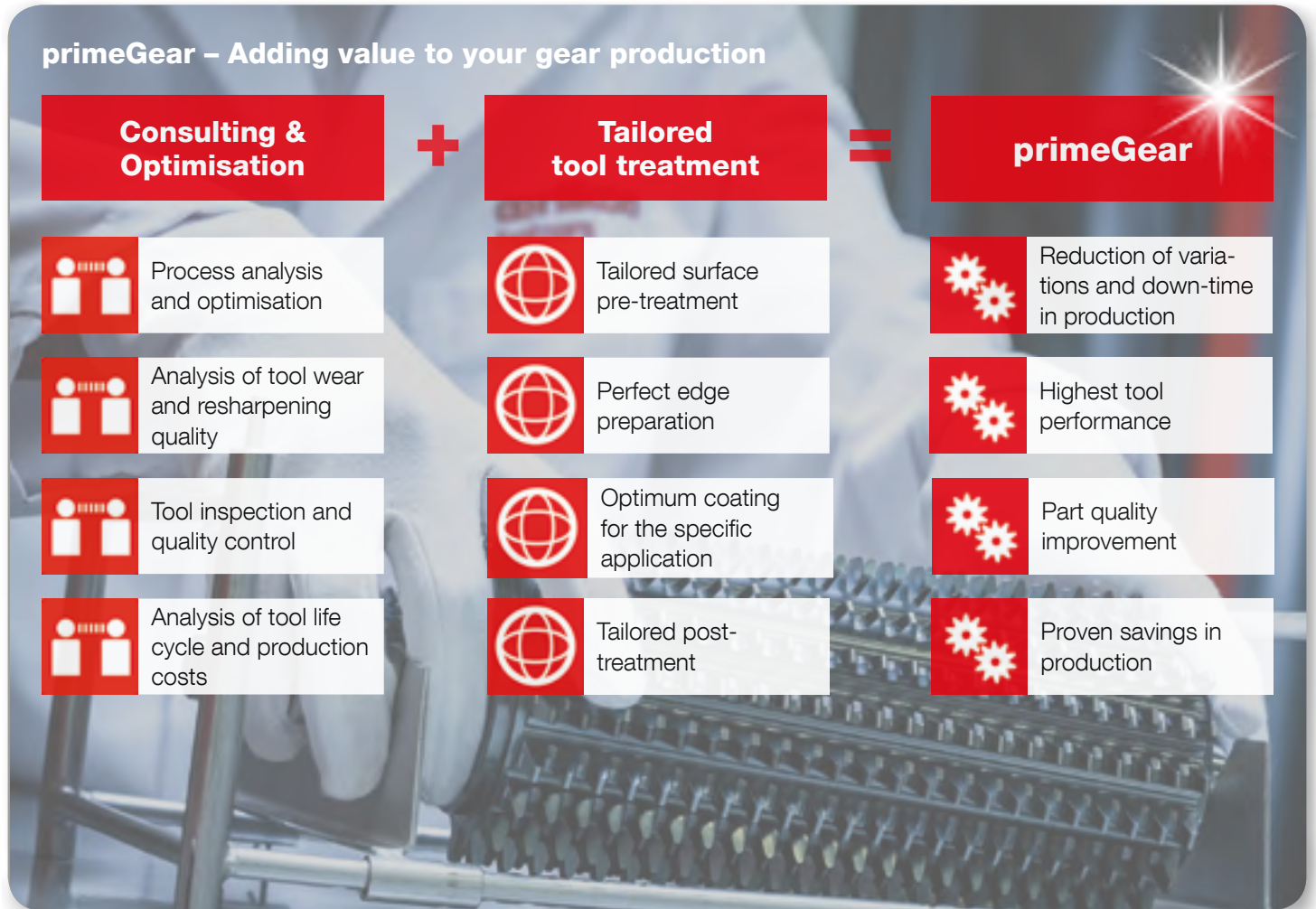
Amount of machined material, 100%



# primeGear – a customised service to realise unmatched gear cutting tool performance

primeGear offers you a higher process reliability, less tool wear, longer tool life and reduced cycle time. The result: production cost reduction of up to 40%. Together with you we identify and eliminate the weak links in the tool life cycle:

- Surface treatment
- Cutting process
- Tool handling
- Resharpener

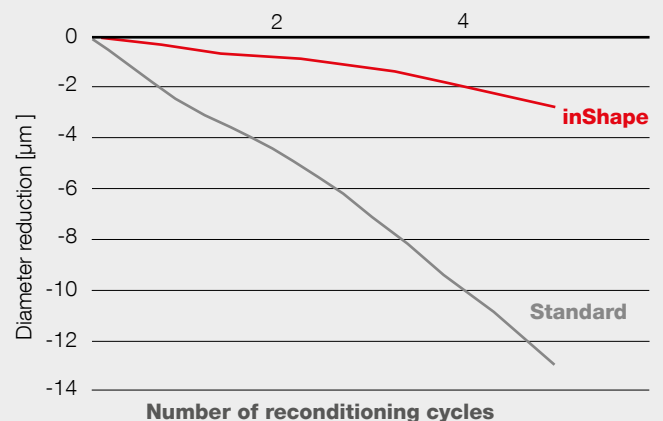


## inShape – gentle de-coating of cemented carbide tools

With inShape Balzers offers an innovative process for the reconditioning of carbide tools without damaging the tool surface or losing the profile.

- Complex tools like hobs, broaches or skiving tools keep their profile shape
- Allows reconditioning of BALINIT® ALTENZA, LATUMA and PERTURA coated tools
- Reduces tool costs over a tool life cycle by up to 25%
- Smooth de-coating of cemented carbide tools without damaging the surface
- No profile grinding required over the whole tool life cycle to retain tolerances

### No profile grinding required over whole tool life cycle to retain tolerances



**Close to our customers – worldwide**



Argentina  
Brazil  
Canada  
Mexico  
USA

## Americas

around **25** customer centres in the



Austria  
Belgium  
Czech Republic  
Finland  
France  
Germany  
Hungary  
Italy  
Liechtenstein  
Luxembourg  
Netherlands

Poland  
Portugal  
Romania  
Russia  
Slovakia  
Spain  
Sweden  
Switzerland  
Turkey  
United Kingdom

## Europe

around **50** 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**

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