

oerlikon
balzers

Get the advantage through innovative wear protection

Your guide to more machining productivity
and cost efficiency



Cutting Tools



Get all of the advantages for machining with BALINIT coatings

High productivity, manufacturing reliability, cost efficiency – the demands made on cutting tools are enormous. That's why you should rely on the innovative BALINIT® wear protection coatings from Oerlikon Balzers, a world-wide technological leader in the field of hard coatings.

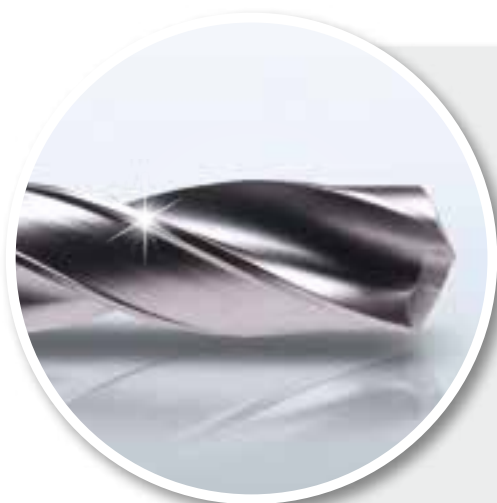
With BALINIT® you can employ a wide variety of coating properties such as extreme coating hardness and high wear resistance – and benefit from numerous advantages for milling, drilling, reaming, turning and threading.



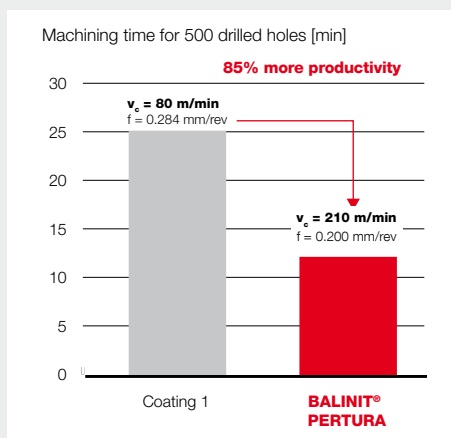
Lower your production costs with BALINIT

Wear-protection coatings from Oerlikon Balzers offer you enormous savings potentials. The single greatest influencing factor for more cost efficiency and productivity is the machining time: 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.



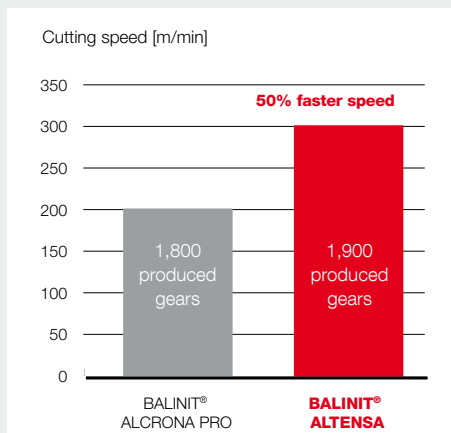
BALINIT® PERTURA on carbide drills



Tool	Carbide drill Ø 8.5 mm
Workpiece	Steel 1.7225 (AISI 4140, SCM440) 900 N/mm ²
Cutting data	LD = 5xD (throughhole) Internal cooling with emulsion VB = 0.3 mm
Source	Oerlikon Balzers cutting laboratory



BALINIT® ALTENSA on PM-HSS hobs



Tool	PM-HSS hob (S390)
Workpiece	Gear Steel 1.7131 (AISI 5115)
Cutting data	$v_c = 200 \rightarrow v_c = 300$ $m_n = 1.62$ $f_a = 6.0$ mm dry
Source	Oerlikon Balzers Automotive end user

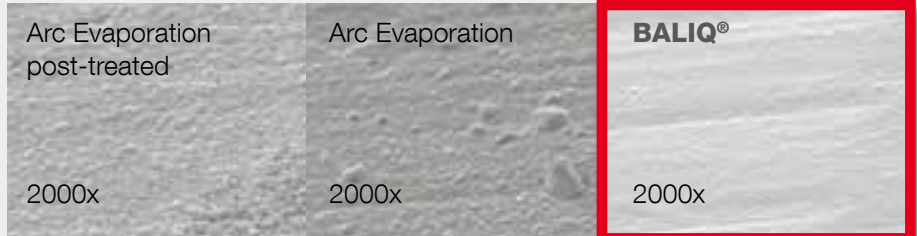
Experience the tailored diversity of applications with BALIQ

The innovative BALIQ® coating generation based on the S3p technology offers you a wide variety of coating solutions specially adapted to meet the requirements of your application.

BALIQ® coatings feature the same outstanding properties as BALINIT® coatings – and persuade with further advantages as well:

Revolutionary smoothness

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



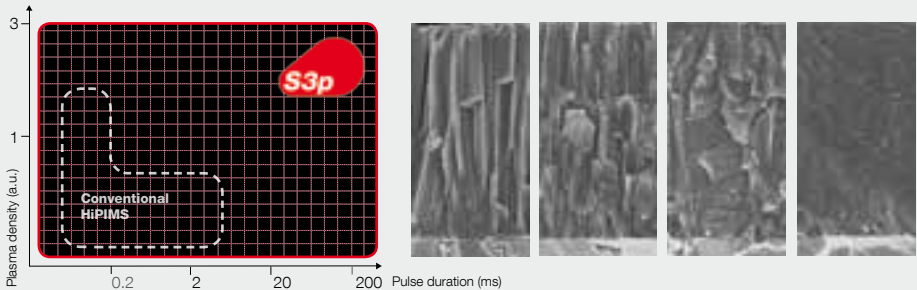
Exceptional precision

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

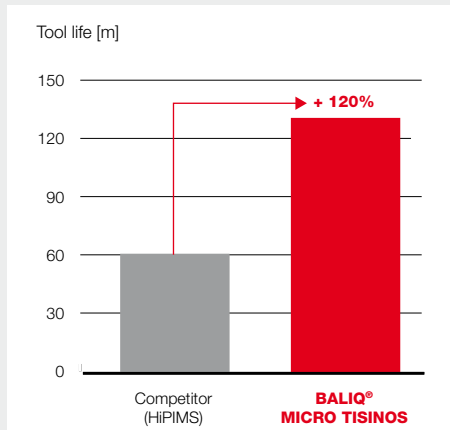


Maximum scalability

Customised coatings are possible thanks to the precise and independent scalability of pulse duration and shape as well as current density. The limits of conventional HiPIMS are overcome with the unique process window as well as significantly higher deposition rates and process stability.



BALIQ® MICRO TISINOS for high hardened steel



Tool	Ballnose end mill Ø 2.0 mm
Workpiece	Steel 1.2379 (AISI D2, SKD11) HRC 62
Cutting data	$v_c = 130$ m/min $f_t = 0.04$ mm $a_e = 0.1$ mm $a_p = 0.1$ mm Dry cutting
Source	Oerlikon Balzers cutting laboratory

Rely on our top notch services in everything having to do with coatings

Holistically innovative: Our coating services

In over 100 coating centres worldwide, cutting tools are being run through automated and standardized production sequences to yield the best in reproducible quality. Our Pick-Up Service collects the tools for coating and brings them back again after processing. And if you need them very fast, of course we also offer express service.

Hard, but successful: The quality analysis

Oerlikon Balzers uses the latest methodologies such as metallography, layer analysis and the measurement of surfaces and cutting edges. This ensures compliance with the high quality standards for coating surfaces, substrates and cutting edges.

Efficient and clean: Handling and cleaning

We develop individualized, product-specific fixture systems for multifunctional use in the overall value chain. Our multi-stage ultrasonic cleaning line delivers surface preparation that is ideal for PVD enabling perfect coating results.

Consistently trendsetting: Research and development

Oerlikon Balzers stands for new development and refinement of groundbreaking coating solutions tailored to current market needs and individual customer requirements. All coatings are tested thoroughly in our in-house cutting laboratory in which individual test series can also be carried out.

Even more economical: Reconditioning

Cutting tools can be reground and recoated in selected coating centres. Even with only 3 reconditionings, you save more than 50% as compared to the purchase of a new coated tool while simultaneously benefiting from the same high performance.

Reduce your tool costs with reconditioning

Amount of machined material, 100%



Coating recommendations for gear cutting and broaching

Material	GEAR CUTTING			BROACHING
	Hobs HSS / Carbide	Shaper cutters	Stick blades	HSS / Carbide
Unalloyed steel	AT / AP	AT / AP	AT / AP	AP
Steel < 1000 N/mm ²	AT / AP	AT / AP	AT / AP	AP
Steel > 1000 N/mm ²	AT / AP	AT / AP	AT / AP	AP
Steel 45 - 56 HRC	AT / AP	AT / AP	AT / AP	AP
Stahl 56 - 70 HRC	AT / AP	AT / AP	AT / AP	AP
Stainless steel				AP
Cast iron (GG, GGG)	AT / AP	AT / AP	AT / AP	AP
Al cast and wrought alloys				HC / AP
Nickel alloys				AP
Titanium and titanium alloys				AP
Brass, copper, bronze				HC / AP



AP = BALINIT® ALCRONA PRO
 AT = BALINIT® ALTENSA
 HC = BALINIT® HARD CARBON

Coating recommendations for turning and milling

Material	TURNING		MILLING			
	Inserts Carbide	Finishing inserts Carbide	End mills HSS	Carbide	Micro end mills	Inserts Carbide
Unalloyed steel	LM	ALT / LM	AP	AP	MALC	LM / AP
Steel < 1000 N/mm ²	LM	ALT / LM	AP	AP	MALC	LM / AP
Steel > 1000 N/mm ²	LM	ALT / LM	AP / LM	AP / LM	MALC	LM / AN
Steel 45 - 56 HRC	LM	ALT / LM	LM / AN / AP	LM / AN / AP	MTIS / MALC	LM / AN
Steel 56 - 72 HRC	AD	TIS / ALT / LM		TIS / AD / LM	MTIS	TIS / AD / LM
Stainless steel	LM	ALT / LM	AN / LM	AN / LM	MTIS / MALC	AN / LM
Cast iron (GG, GGG)	LM	ALT / LM	AN / LM / AP	AN / LM / AP	MALC	LM
Wrought Al / Cast Al (6 - 12% Si)	HC	HC	HC	HC	HC	HC
Al alloys > 12% Si	DIA N / HC	DIA N / HC	HC	DIA N / HC	DIA N / HC	DIA N / HC
Nickel alloys	LM	TIS / ALT / LM	LM / TIS / AN	LM / TIS / AN	MTIS	LM / AN
Titanium, titanium alloys	LM	TIS / ALT / LM	TIS / ALT / LM	TIS / ALT / LM	MTIS / MALC	TIS / AN / LM
Brass, copper, bronze	HC	HC	HC	HC	HC	HC
Graphite	DIA M	DIA M		DIA M / HC	DIA M / HC	DIA M / HC
Composite materials (CFRP/GFRP)	DIA N	DIA N		DIA N / HC	DIA N / HC	DIA N / HC

Recommended coatings for drilling, reaming and threading

DRILLING / REAMING				THREADING		
Drills HSS	Carbide	Micro drills	Reamers	Taps	Thread formers	Thread mills
AP / LM	PT / LM / AP	MALC	ALC / PT / AP	ALC / B	ALC / A	ALC / AP
AP / LM	PT / LM / AP	MALC	ALC / PT / AP	ALC / B	ALC / A	ALC / AP
AP / LM	PT / LM / AP	MALC	ALC / PT / AP	ALC / B	ALC / A	ALC / AP
LM / AP	PT / LM / AP	MTIS / MALC	ALC / PT / LM	ALC / B	ALC / A	ALC / LM
	AD / PT / LM	MTIS	TIS / PT			TIS / AD / LM
AP / LM	PT / LM / AP	MTIS / MALC	ALC / PT / AP	ALC / B	ALC / A	ALC / LM
AP / LM	PT / LM / AP	MALC	ALC / PT / AP	ALC / B	ALC / A	ALC / AP
HC	HC	HC	HC	HC / B	HC / A	HC / B
HC	HC / DIA N	HC / DIA N	HC / DIA N	HC / DIA N	HC / DIA N	HC / DIA N
	PT / LM	MTIS	TIS / LM	ALC / B	ALC / A	TIS / LM
	PT / LM / AP	MTIS / MALC	TIS / LM	ALC / B	ALC / A	TIS / LM
HC	HC	HC	HC	HC	HC	HC / B
	DIA M	DIA M / HC				
	DIA N / HC	DIA N / HC				

A = BALINIT® A
 AP = BALINIT® ALCRONA PRO
 AD = BALINIT® ALDURA
 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
 ALC = BALIQ® ALCRONOS
 ALT = BALIQ® ALTINOS
 MALC = BALIQ® MICRO ALCRONOS
 MTIS = BALIQ® MICRO TISINOS
 TIS = BALIQ® TISINOS



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Rely on outstanding coating properties for wear protection

BALINIT®	Coating material Coating structure	Coating hardness H _{IT} (GPa)	Intrinsic stress (GPa)	Available coating thicknesses (µm)	Maximum service temperature (°C)	Suitable substrates	Coating colour
A	TiN Monolayer	30 +/-3	-2 +/-1	application-related	600	HSS, PM-HSS, Carbide	golden yellow
ALCRONA PRO	AlCrN-based Monolayer	36 +/-3	-3 +/-1		1,100	HSS, PM-HSS, Carbide	light grey
ALDURA	AlCrN-based Multilayer	34 +/-3	-3 +/-1		>1,100	Carbide	blue grey
ALNOVA	AlCrN-based Multilayer	38 +/-3	-3 +/-1		>1,100	HSS, PM-HSS, Carbide	light grey
ALTENSA	AlCrN-based Multilayer	40 +/-3	-2 +/-1		>1,100	HSS, PM-HSS, Carbide	light grey
B	TiCN Multilayer	37 +/-3	-3 +/-1		400	HSS, PM-HSS, Carbide	blue grey
DIAMOND MICRO	C (sp ³) microcrystalline	80 - 100	-		600	Carbide	grey
DIAMOND NANO	C (sp ³) nanocrystalline	80 - 100	-		600	Carbide	grey
HARD CARBON	Carbon-based Monolayer	50 +/-5	-5		500	HSS, PM-HSS, Carbide	black
LATUMA	AlTiN-based Monolayer	35 +/-3	-3 +/-1		1,000	HSS, PM-HSS, Carbide	grey
PERTURA	AlTiN-based Nanolayer	35 +/- 3	-4 +/-1		1,000	Carbide	aubergine grey

Benefit from the BALINIT and BALIQ wear-resistance coatings for machining
Get in touch with us!

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