

Perfect cutting edge protection for ultimate performance

Tailored coatings for demanding machining
with inserts



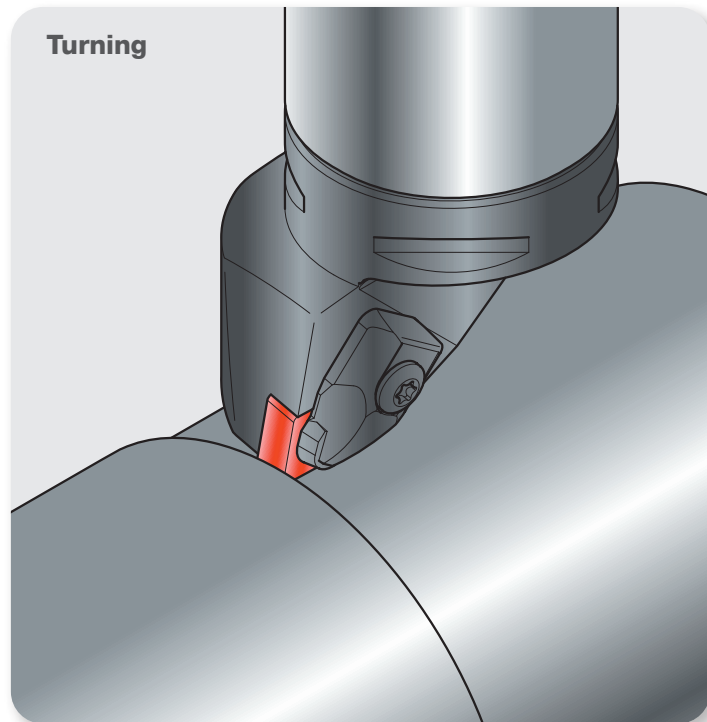
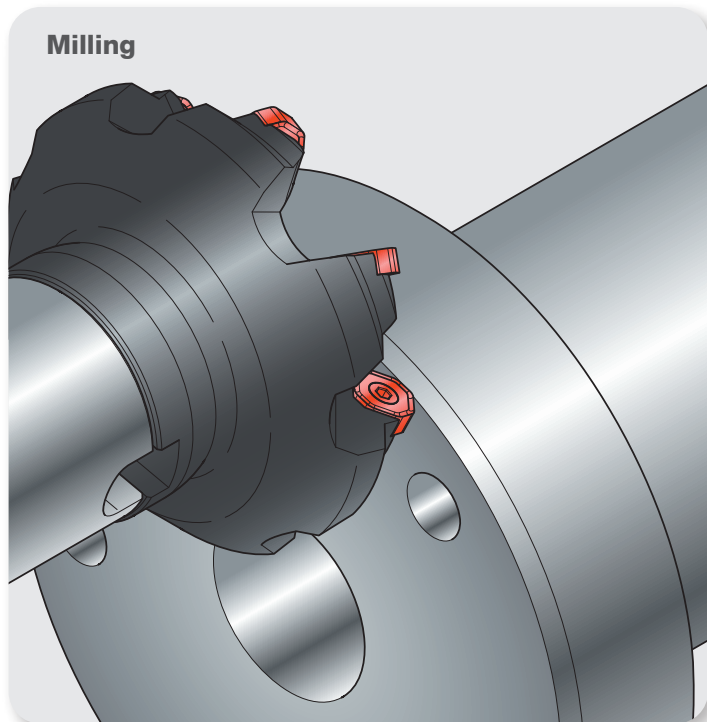
Cutting Tools



High performance Oerlikon Balzers coating solutions for continuous and discontinuous chip formation with inserts

Inserts that are used for turning and milling applications need to withstand highest temperatures and variations in thermal stress. The Oerlikon Balzers coating solutions for turning, parting, grooving, threading and milling insert tools guarantee the outmost in thermal stability.

Depending on the machining process, work piece material and tool geometry we offer tailored coating solutions from our BALINIT®, BALIQ® and BALDIA® coating families for the highest performance in machining with inserts.



New manufacturing options with high process reliability

Demands for machining with indexable inserts

Superior performance and a reliable machining process for a wide range of materials

High wear resistance for noticeable cost and time savings, even at high service temperatures

Reliable performance for difficult-to-cut materials and expensive workpieces

Universal coatings for an extensive range of high-performance applications using indexable inserts

Very homogenous coating thickness distribution over the cutting edge enables coating of even the sharpest cutting edges

Coating solutions from Oerlikon Balzers

> The BALINIT®, BALIQ® and BALDIA® coatings offer the right solution for continuous and interrupted cuts with inserts

> The tool shows very high thermal stability, giving it a long service life with noticeably fewer number of tool changes

> With BALINIT®, BALIQ® and BALDIA® we offer dedicated coatings for machining stainless steel, titanium and nickel based alloys as well as non-ferrous materials

> The AlTiN based coating BALINIT® LATUMA as allrounder for turning and milling applications with worldwide availability

> Innovative S3p coating technology enables homogeneous coatings for sharp cutting edges



Oerlikon Balzers coating solutions for insert applications

Material	Turning with inserts	Milling with inserts
Unalloyed steel	LM / ALT	LM / AP
Steel < 1,000 N/mm ²	LM / ALT	LM / AP
Steel > 1,000 N/mm ²	LM / ALT	LM / AN
Steel 45 – 56 HRC	LM / ALT	LM / AN
Steel 56 – 72 HRC	ALT / LM	ALT / LM
Stainless steel	LM / ALT	LM / AN / ALT
Cast iron (GG, GGG)	LM / ALT	LM
Wrought Al / Al alloys < 12% Si	MY / HC	MY / HC
Al alloys > 12% Si	DIA CS DC / DIA N / MY	DIA CS DC / DIA N / MY
Nickel alloys	LM	LM / AN
Titanium, titanium alloys	LM	TIS / AN / LM
Brass, copper, bronze	MY / HC	MY / HC
Graphite	DIA CT / DIA CT CD	DIA CT / DIA CT DC
CFRP / GFRP / Sandwich materials / Stacks	DIA CS DC / DIA N	DIA CS DC / DIA N
Organic fibres (e.g. wood, paper)	MY / HC	MY / HC

AN = BALINIT® ALNOVA HC = BALINIT® HARD CARBON ALT = BALIQ® ALTINOS DIA N = BALDIA® NANO DIA CT = BALDIA® COMPACT
 AP = BALINIT® ALCRONA PRO LM = BALINIT® LATUMA TIS = BALIQ® TISINOS DIA CS DC = BALDIA® COMPOSITE DC DIA CT DC = BALDIA® COMPACT DC
 MY = BALINIT® MAYURA

Coating properties at a glance

BALINIT®	Coating material	Coating hardness H _T [GPa]	Compressive stress [GPa]	Max. service temperature [°C]	Coating temperature [°C]	Coating colour
ALCRONA PRO	AlCrN-based	36 +/-3	-3 +/-1	1,100	< 500	light grey
ALNOVA	AlCrN-based	38 +/-3	-3 +/-1	1,100	< 500	light grey
HARD CARBON	ta-C	50 – 60	–	500	< 150	black rainbow
LATUMA	AlTiN-based	35 +/-3	-3 +/-1	1,000	< 500	grey
MAYURA	ta-C	> 65	–	> 500	< 150	rainbow / rainbow black
BALIQ®						
ALTINOS	AlTiN-based	36 +/-3	-3.3 +/-1	1,000	< 500	anthracite
TISINOS	AlTiSiN-based	38 +/-5	-3.1 +/-1	1,000	< 500	bronze
BALDIA®						
COMPACT						
COMPACT DC	C-based (sp ³)	80 – 100	–	600	< 900	grey
NANO						
COMPOSITE DC						

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

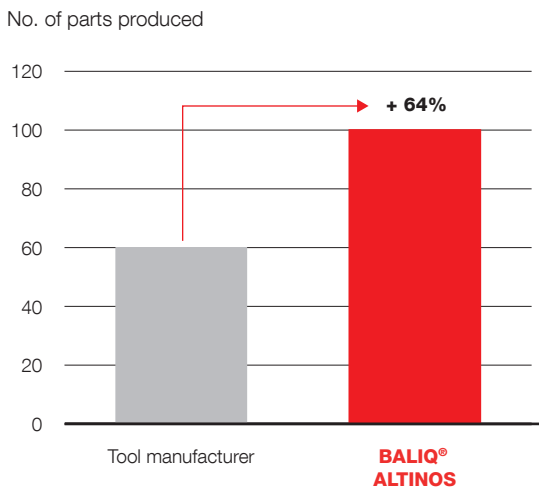
BALIQ coatings to machine difficult-to-cut materials

Oerlikon Balzers' S3p (Scalable Pulsed Power Plasma)-based BALIQ® coatings offer manifold advantages that make them perfectly suiting for demanding insert applications.

The BALIQ® coatings have a low propensity to stick and are very wear-resistant, even at high operating temperatures. The result: Very high tool thermal stability combined with long service lifetime and thus fewer tool changes. Outstanding surface and cutting edge quality bring significant performance advantages, especially with the very thinnest chips.

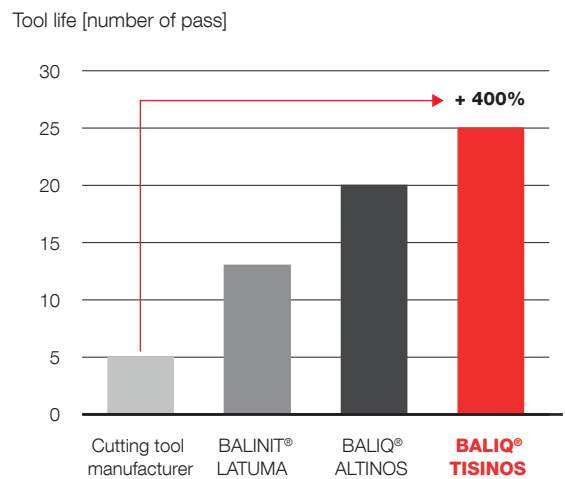
One of the unmatched qualities of the BALIQ® coatings are the precise coating thickness, protecting all shapes and cutting edges homogeneously. With these, BALIQ® offers exceptional wear resistance and oxidation resistance, even at extreme temperatures. BALIQ® enables long tool life at toughest conditions. Through the extremely smooth surface, polishing is no longer required, reaching further cost reduction possibilities.

BALIQ ALTINOS – turning of heat resistant casting steel in the automotive industry

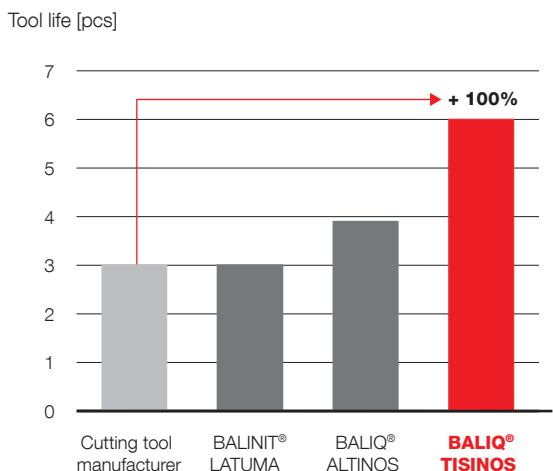


Tool	DCMT11T308
Workpiece	Steel 1.4837, GX40CrNiSi25-12, turbocharger component
Cutting parameters	$v_c = 110$ m/min $f_t = 0.40$ mm
Source	Automotive end customer

BALIQ TISINOS – milling of titanium alloy in the aerospace industry



Tool	Carbide insert RPHT
Workpiece	Titanium 3.7165, TiAl6V4, (AISI TAP6400H, SUS R56400), turbine engine component
Cutting parameters	$v_c = 50$ m/min $f_z = 0.3$ mm $a_p = 2.0$ mm, $a_e = 37$ mm wet
Source	Tool manufacturer Japan

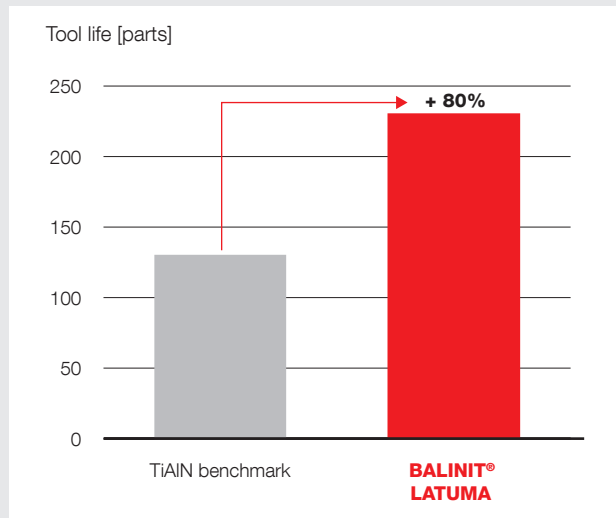


BALIQ TISINOS – milling of nickel based alloy in the power generation and gas turbine industry

Tool	Carbide insert XNMU160708 (milling)
Workpiece	Turbine wheel nozzle – nickel based material
Cutting parameters	$v_c = 23$ m/min $f = 0.35$ mm wet
Source	Industry gas turbine customer

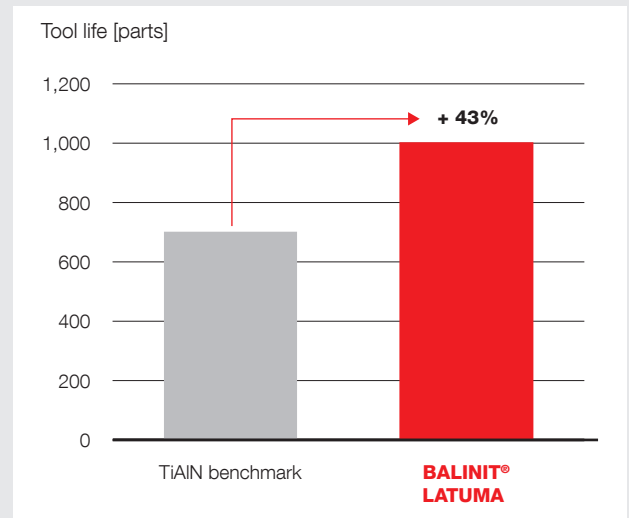
Convincing results with Oerlikon Balzers coatings

BALINIT LATUMA – hard machining with inserts



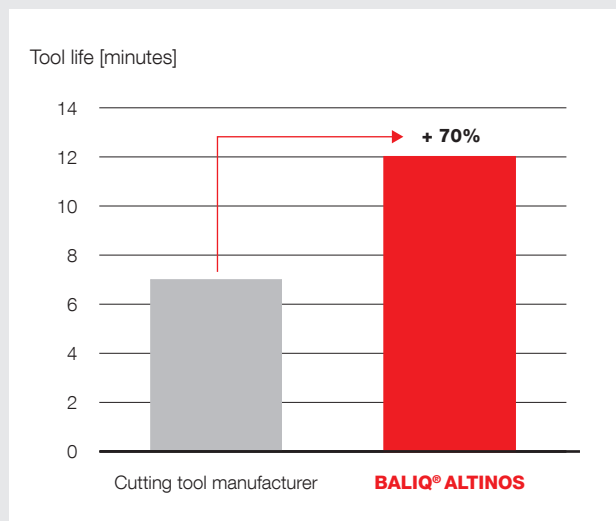
Tool	Ballnose insert
Workpiece	Steel 1.2344, X40CrMoV5-1, 52 HRC
Cutting parameters	$v_c = 200$ m/min $f_z = 0.05$ mm $a_p = 0.5$ mm $a_e = 0.5$ mm
Source	Axle manufacturer

BALINIT LATUMA – inserts application for crank shaft milling



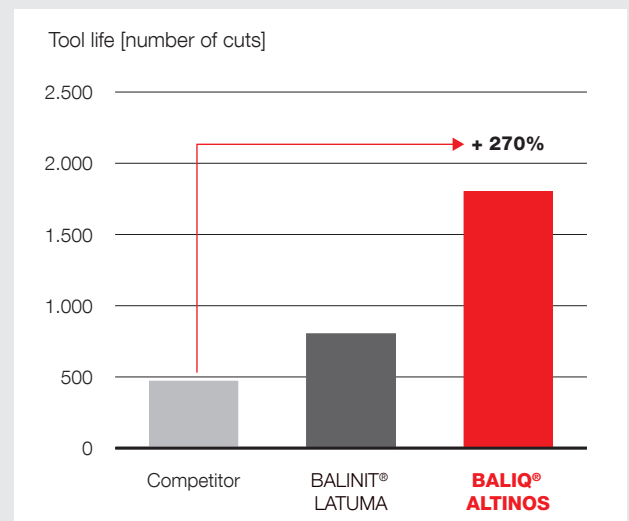
Tool	Carbide insert (milling)
Workpiece	GGG80 EN-GJS-800-2
Cutting parameters	$v_c = 180$ m/min $f_z = 0.2 - 0.3$ mm
Source	Automotive end customer

BALIQ ALTINOS – turning hardened steel with CBN inserts



Tool	PCBN insert (CNMA 120408)
Workpiece	Steel 1.7262, 15CrMo5 (SCM 415) 60-63 HRC
Cutting parameters	$v_c = 220$ m/min $f = 0.15$ mm $a_e = 0.10$ mm wet
Source	Tool manufacturer

BALIQ ALTINOS – steel grooving



Tool	Carbide insert (grooving)
Workpiece	Steel 1.7225, 42CrMo4 (AISI 1040, SCM 440)
Cutting parameters	$v_c = 220$ m/min $a_e = 2$ mm $a_p = 4$ mm wet
Source	Oerlikon Balzers cutting laboratory

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