

Because every thread counts

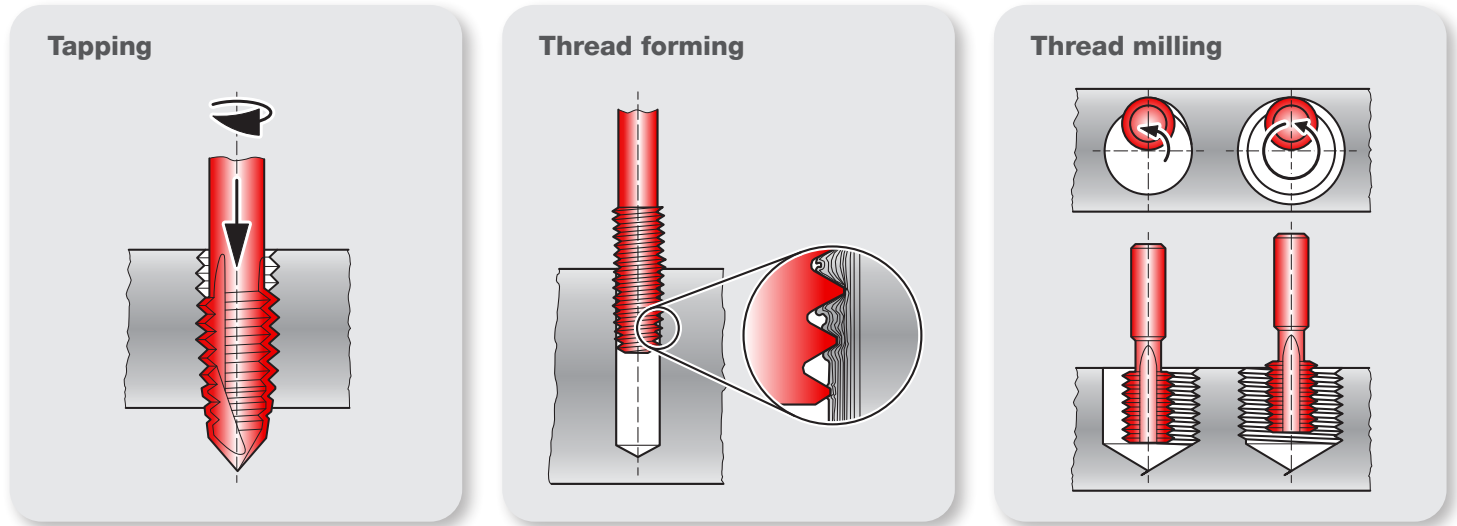
High-performance coating solutions
for outstanding threading results



High-performance, reliable and efficient threading tools with coating solutions from Oerlikon Balzers

Threading is often the final manufacturing step, and ensuring a high-quality product in the critical final phase requires threading tools to work efficiently and reliably. In addition to the base material, the geometry and the design of the cutting edge, a high-performance coating plays an

important role in the threading process: it significantly improves wear resistance, enables a favourable torque curve and enhances chip formation and removal. Oerlikon Balzers' optimised coatings increase productivity and extend the service life of tools.



New manufacturing options with high process reliability

Demands in threading

High stability and reliability of the manufacturing process

Universal tool coatings for a wide range of high-performance applications

Significantly reduced torque during threading for exceptional tool performance

Resistance to abrasive wear

High precision on the tool geometry

Coating solutions from Oerlikon Balzers

Revolutionary smooth and defect-free coatings with outstanding adhesion, no post-treatment needed

Well-established solutions like BALINIT® B and A ensure a high level of performance. The latest Oerlikon Balzers technology enables coating design beyond TiN and TiCN, boosting tool performance in a variety of threading applications

Coating specifically designed to prevent welding between tool surface and work-piece, defect-free coating enables smooth chip flow

Oerlikon Balzers coating solutions, especially the AlCrN-based layers, provide a very high level of protection against abrasive wear, boosting performance for threading tools

Innovative coating technology enables homogeneous coatings on the cutting edge



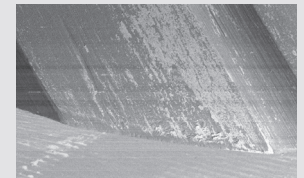
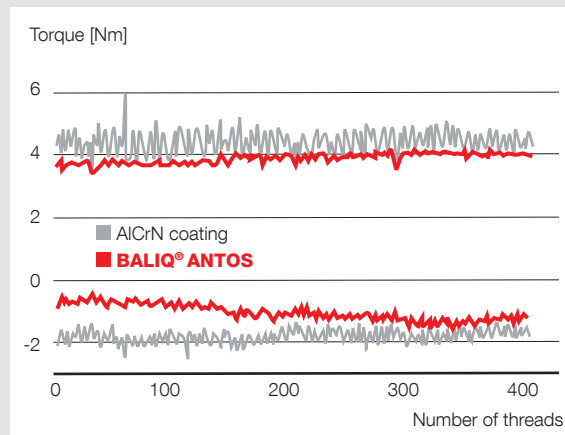
BALIQ ANTOS: Running smoothly into stainless steels for longer tool life

We have used all our experience and expertise to develop BALIQ® ANTOS, our latest coating solution for threading. It is based on the pioneering S3p technology, which enables extremely hard coatings with very smooth surfaces and outstanding adhesion. BALIQ® ANTOS consists of an AlCrN base coating with excellent wear resistance that offers high performance, especially when tapping stainless

steel. The WC/C top coating provides exceptional friction and lubrication properties with high temperature resistance. This produces a smooth running-in effect, with optimised chip formation and removal as a result. The low torque with fewer peak loads helps ensure stable performance and longer tool service life.

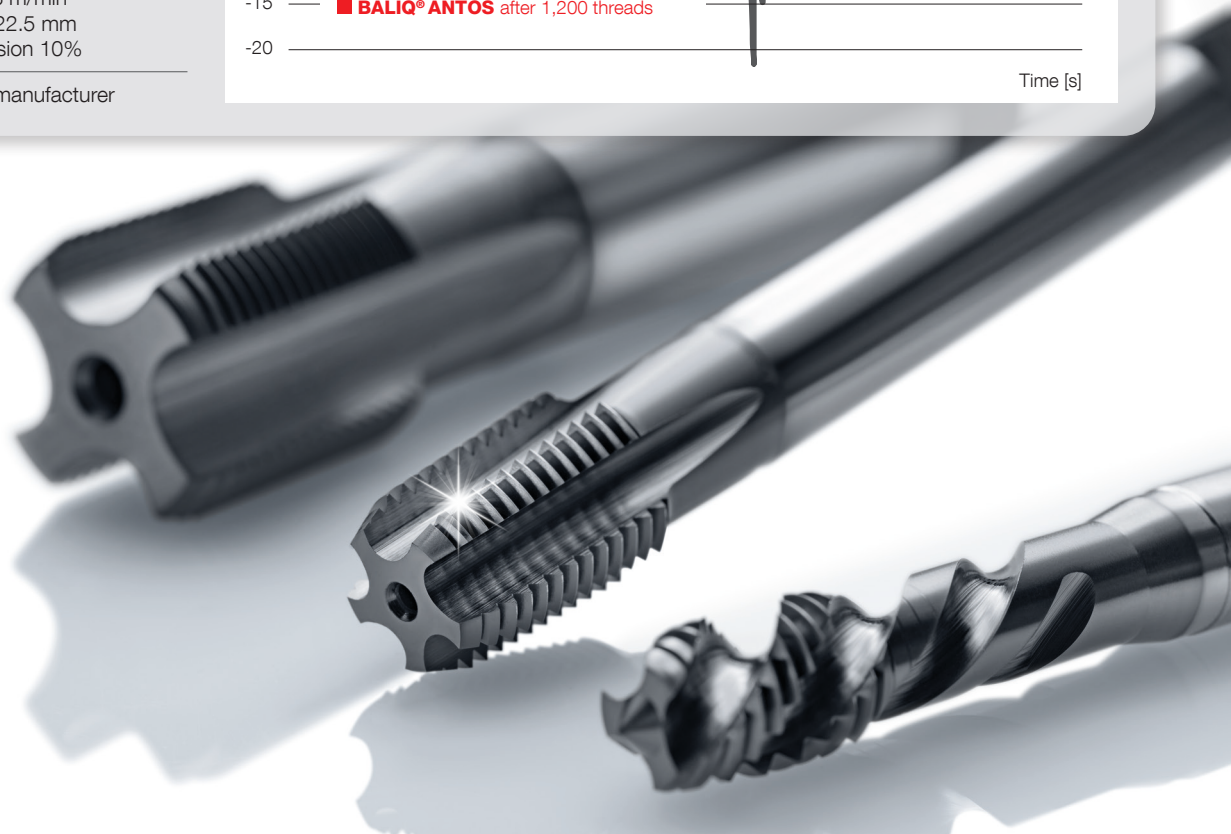
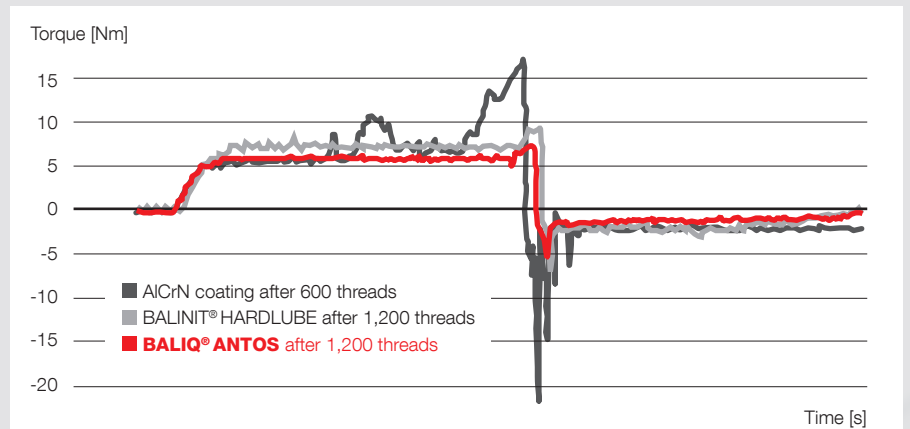
BALIQ ANTOS Tapping into stainless steel

Tool	HSS M6 tap
Workpiece	Steel 1.4571 (X6 CrNiMoTi 17 12 2)
Cutting parameters	$v_c = 5$ m/min $a_p = 12$ mm Blind hole Emulsion 8%
Source	Oerlikon Balzers



BALIQ ANTOS Lower torque with fewer peak loads

Tool	HSS M8 spiral tap
Workpiece	Steel 1.4301 (X5CrNi18-10)
Cutting parameters	$v_c = 8$ m/min $a_p = 22.5$ mm Emulsion 10%
Source	Tool manufacturer



Our coating solutions for reliable threading applications

	THREADING		
Material	Taps	Thread formers	Thread mills
Unalloyed steel	AUR / ANT / B	ALC / AUR / A	ALC / AP
Steel < 1000 N/mm ²	AUR / ANT / B	ALC / AUR / A	ALC / AP
Steel > 1000 N/mm ²	AUR / ANT / B	ALC / AUR / A	ALC / AP
Steel 45 - 56 HRC	AUR / ALC / B		ALC / LM
Steel 56 - 72 HRC			TIS / TF / LM
Stainless steel	ANT / AUR / B	AUR / ALC / A	ALC / LM
Cast iron (GG, GGG)	AUR / ALC / B		ALC / AP
Wrought Al / Al alloys < 12% Si	MY / HC / B	MY / HC / A	MY / HC / B
Al alloys > 12% Si	MY / HC	MY / HC	MY / HC
Nickel alloys	ANT / AUR / B		TIS / LM
Titanium, titanium alloys	ANT / AUR / B	ALC	TIS / LM
Brass, copper, bronze	MY / HC		MY / HC / B

A = BALINIT® A
AP = BALINIT® ALCRONA PRO

B = BALINIT® B
HC = BALINIT® HARD CARBON

LM = BALINIT® LATUMA
MY = BALINIT® MAYURA
TF = BALINIT® TISAFLEX

ALC = BALIQ® ALCRONOS
ANT = BALIQ® ANTOS

AUR = BALIQ® AUROS
TIS = BALIQ® TISINOS

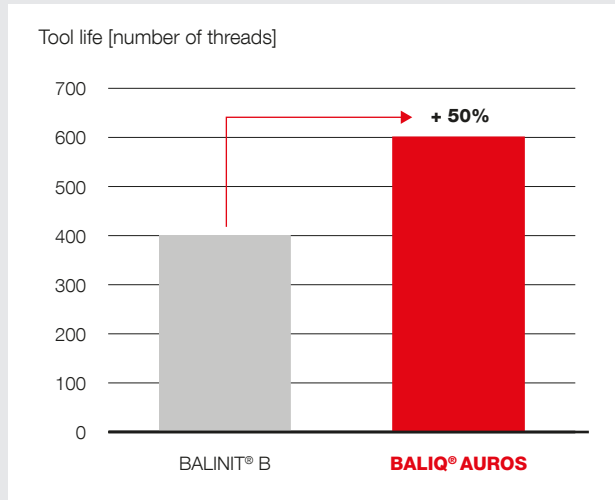
Coating properties at a glance

BALINIT®	Coating material	Coating hardness H _{IT} (GPa)	Compressive stress (GPa)	Max. service temperature (°C)	Coating temperature (°C)	Coating colour
A	TiN	30 +/- 3	-2 +/- 1	600	< 500	golden yellow
ALCRONA PRO	AlCrN-based	36 +/- 3	-3 +/- 1	1,100	< 500	light grey
B	TiCN	37 +/- 3	-3 +/- 1	400	< 500	blue grey
HARD CARBON	ta-C	50 - 60	-	500	< 150	rainbow black
LATUMA	AlTiN-based	35 +/- 3	-3 +/- 1	1,000	< 500	grey
MAYURA	ta-C	> 65	-	> 500	< 150	rainbow / rainbow black*
TISAFLEX	AlTiN/TiSiN	38 +/- 5	-5 +/- 1	1,100	< 600	bronze
BALIQ®						
ALCRONOS	AlCrN-based	37 +/- 3	-3.5 +/- 1	1,100	< 500	bright grey
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	AlTiSiN-based	38 +/- 5	-3.1 +/- 1	1,000	< 500	bronze

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

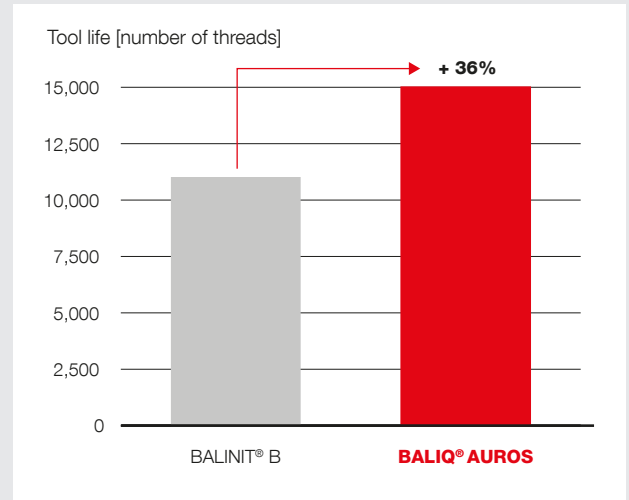
Outstanding threading results

BALIQ AUROS Tapping low alloyed steel



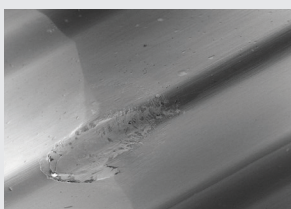
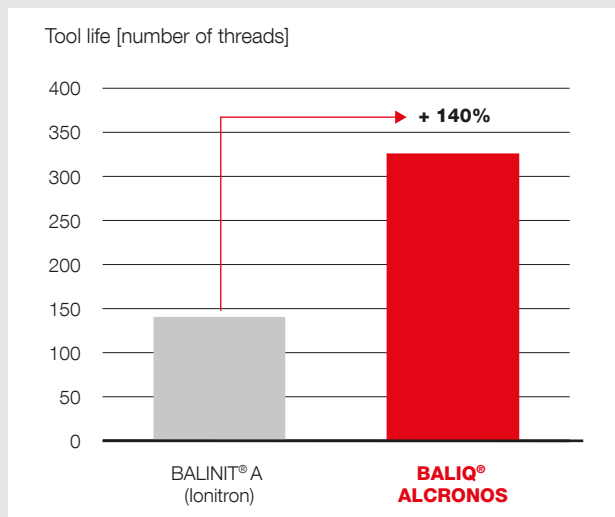
Tool	PM-HSS tap M15
Workpiece	Steel 1.7225, 42CrMo4 (AISI4140, SCM440) 1000 N/mm ²
Cutting parameters	$v_c = 20$ m/min Thread depth: 40 mm Blind hole Emulsion
Source	Tool manufacturer

BALIQ AUROS Tapping carbon steel

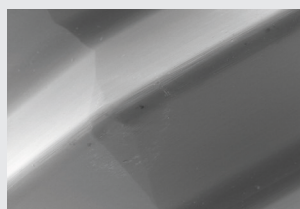


Tool	PM-HSS tap M6
Workpiece	Steel 1.1141, Ck15 (AISI 1015, JIS S15C) 120 - 140 HB
Cutting parameters	$v_c = 30$ m/min Thread depth: 10 mm Blind hole Emulsion
Source	Tool manufacturer

Process reliability in thread forming Application: Steel

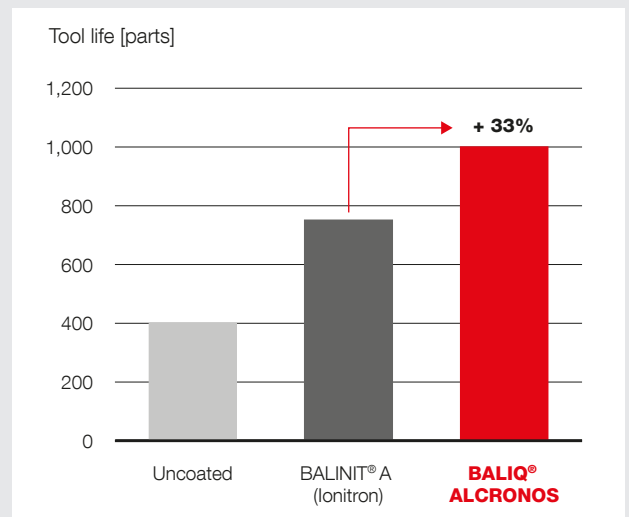


BALINIT A® (lonitron)



BALIQ® ALCRONOS

BALIQ ALCRONOS Steel tapping in moderate cutting conditions



Tool	HSS taps M12 x 1.25 spiral flute
Workpiece	Steel 1.1141, Ck15 (AISI 1015, JIS S15C) 120 - 140 HB
Cutting parameters	Spindle speed: 600 rpm Criteria for end of tool life: Thread quality
Source	Automotive industry end user

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