

œerlikon
balzers

BALINIT TURBINE PRO

Coatings that protect your turbine components
to improve flight safety and fuel efficiency



Aerospace



BALINIT TURBINE PRO – an anti-erosion and corrosion coating

Serious damages to turbine components caused by corrosion and erosion generates substantial high repair costs and costly downtime. BALINIT® TURBINE PRO provides excellent surface protection against solid particle erosion (SPE) and liquid drop erosion (LDE) without affecting your components' fatigue life.

This hard, dense PVD coating offers maximum lifetime erosion resistance using Oerlikon Balzers' latest technology. BALINIT® TURBINE PRO uses dense ceramic nitride structures; this results in an optimal relation of the highest

hardness to residual compressive stress. Tests have shown that BALINIT® TURBINE PRO exceeds other tested coatings for erosion resistance.

At Oerlikon Balzers, we have the expertise and knowledge that allows our coatings to be fully tailor-made to meet our customers' requirements for erosion, oxidation and hot corrosion protection. With over a 110 coating centres worldwide in 36 countries, Oerlikon Balzers surface solutions are designed to bring our coating performance closer to you.

The advantages of using BALINIT TURBINE PRO

BALINIT® TURBINE PRO anti-erosion and corrosion resistant turbine coatings allow longer maintenance cycles, extended time on wing, improved flight safety and fuel efficiency

- BALINIT® TURBINE PRO maintains:
 - Minimal fatigue debit of original finished component material
 - A low surface roughness to improve gas flow efficiency
- PVD coatings are especially suitable for flight critical components due to the coating uniformity and the repeatability of the process
- Surface finishes achievable < 0.1 Ra µm
- Coating thickness can be optimised to keep uniformity of your part
- Oerlikon Balzers' solutions offer environmentally friendly coating technologies that reduce operating costs, extend service intervals and protect valuable components from all types of wear
- BALINIT® TURBINE PRO is:
 - 40 x more erosion resistant than steel
 - 5 x more erosion resistant than other PVD coating solutions

	BALINIT TURBINE PRO
Coating material	MeAlN
Coating hardness H _{IT}	32 ± 2 GPa 4641 ± 300 ksi
Typical coating thickness (µm)	5 – 25
Friction against steel, dry running	~0.5
Coating temperature	< 500°C / < 932°F
Long term temperature stability	700°C / 1292°F
Typical substrates	Inconel, titanium and steels
Colour	Violet-grey



Applications of BALINIT TURBINE PRO

BALINIT® TURBINE PRO is used on aircraft low pressure and high pressure compressors as well as on helicopter axial compressors and impellers.

The BALINIT® TURBINE PRO family of coatings can be applied to large sized blades and produces excellent mirror surface finishes down to < 0.1 Ra µm (< 4 Ra µin).

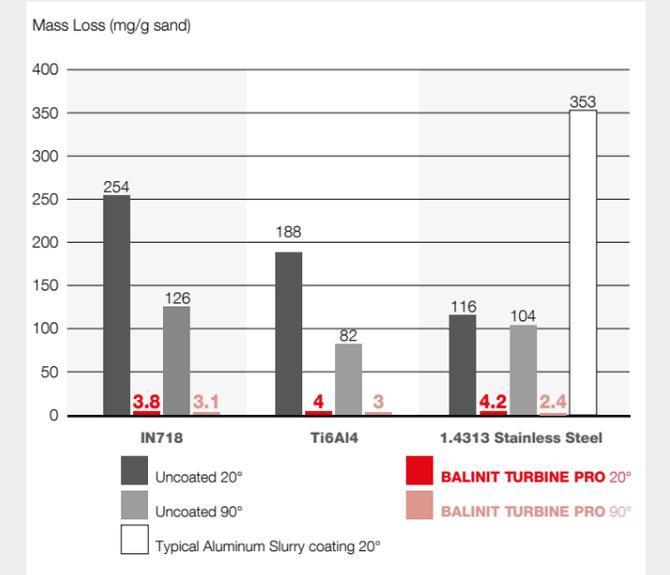
BALINIT TURBINE PRO demonstrates minimal erosion in tough conditions

Figure 1 shows the erosion resistance for BALINIT® TURBINE PRO compared to other materials and coatings, at different angles of incidence.

Test parameters

SPE erosion	Parameters
Impingement angle	20° and 90°
Abrasive material	White Corundum Al ₂ O ₃
Distance nozzle-sample	90 mm (3.5 in)
Particle size	F 240 (~50 µm)
Estimated particle speed	90 m/s
Abrasive feed rate	~350 g/min (ASTM G76 standard only ~2 g/min)
Test duration	300 sec

Results (Figure 1)

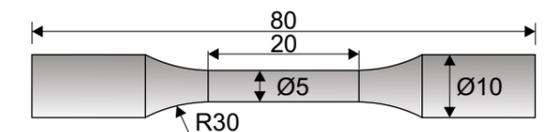


BALINIT TURBINE PRO maintains high cycle life

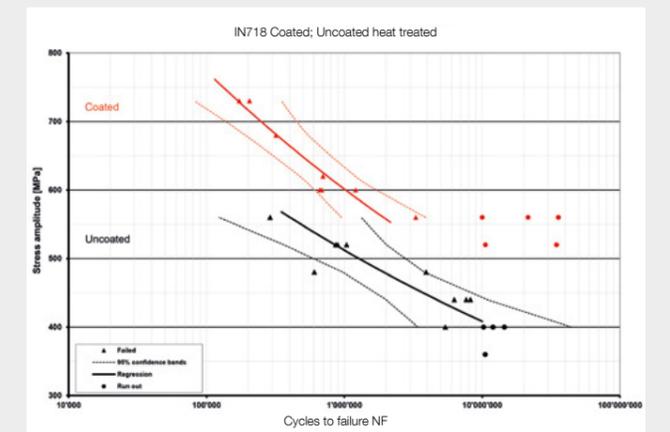
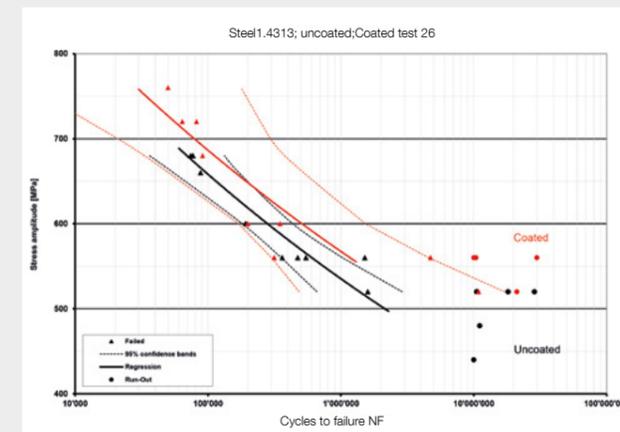
The below test results demonstrate that BALINIT® TURBINE PRO coated material does not decrease the fatigue life using a rotating beam fatigue test.

Test parameters

Rotating beam bending test	Parameters
Temperature	Ambient temperature
Frequency	100 Hz
Reverse stress cycle	R = -1



High cycle fatigue test specimen





• All our locations

Count on a powerful network of over 110 sites in 36 countries

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EN/AS/JISQ 9100 certified quality management

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**Benefit from the BALINIT TURBINE PRO coating solutions
Contact us now!**

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