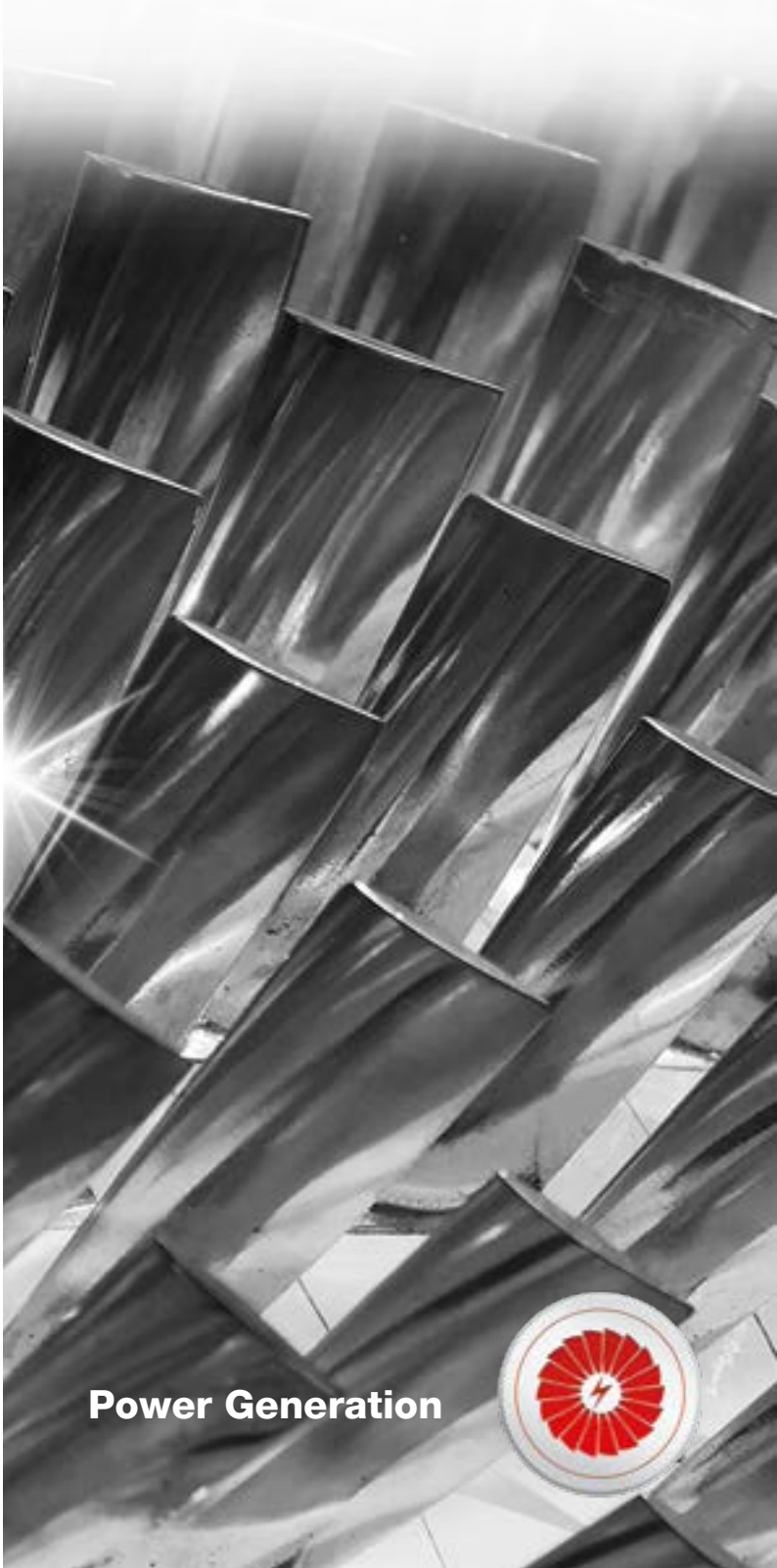


# BALINIT TURBINE PRO

Coatings to protect your blades and vanes for gas and steam turbines



Power Generation



# BALINIT TURBINE PRO – a compressor erosion coating

Protect your components from corrosion and erosion, reducing damage and repair costs, protecting surface finishes and preventing down time. BALINIT®TURBINE PRO offers outstanding protection from solid particle erosion (SPE) and liquid droplet erosion (LDE) without affecting your components fatigue life. It provides the maximum lifetime erosion resistance using Oerlikon Balzers latest technology to produce a hard dense PVD coating family. The BALINIT®TURBINE PRO family of coatings uses metallic-ceramic nitride structures;

this results in an optimal relation of the highest hardness to residual compressive stress. Oerlikon Balzers have the expertise and knowledge that allows our coatings to be fully adaptable to meet our customers’ requirements for erosion, oxidation and corrosion protection. With over a 100 coating centres worldwide in 35 countries, Oerlikon Balzers surface solutions are designed to bring our coating performance closer to you. Tests have shown BALINIT®TURBINE PRO exceeds all other coatings tested for erosion resistance.

## The advantages of using BALINIT TURBINE PRO

### BALINIT® TURBINE PRO anti-erosion and corrosion resistant turbine coatings allow longer maintenance cycles and functional reliability

- PVD coatings are especially suitable for precision components due to the coating uniformity and the repeatability
- No post-finish is required
- 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 maintains:
  - Minimal fatigue debit of original finished component material
  - A low surface roughness to improve gas flow efficiency

|                                     | BALINIT TURBINE PRO          |
|-------------------------------------|------------------------------|
| Coating material                    | MeAlN                        |
| Coating hardness H <sub>IT</sub>    | 32 ± 2 GPa<br>4641 ± 300 ksi |
| Typical coating thickness (µm)      | 5 – 25                       |
| Friction against steel, dry running | ~0.5                         |
| Coating temperature                 | < 500°C / < 932°F            |
| Max. service temperature            | 700°C / 1292°F               |
| Colour                              | Violet-grey                  |

# Applications of BALINIT TURBINE PRO

BALINIT®TURBINE PRO is used on industrial gas turbine compressor blades and vanes as well as steam turbine high pressure (HP), intermediate pressure (IP) and low pressure (LP) section blades.

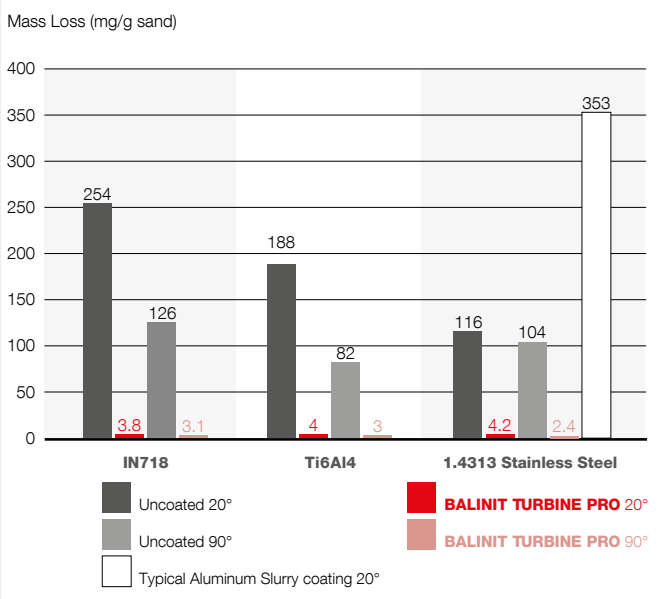
The BALINIT®TURBINE PRO family of coatings can be applied to large sized blades and produces excellent mirror surface finishes down to <0.1 Ra µm (<4 Ra µm).

**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 <sub>2</sub> O <sub>3</sub>   |
| 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<br>(ASTM G76 standard only ~2 g/min) |
| Test duration            | 300 sec                                         |

### Results (Figure 1)

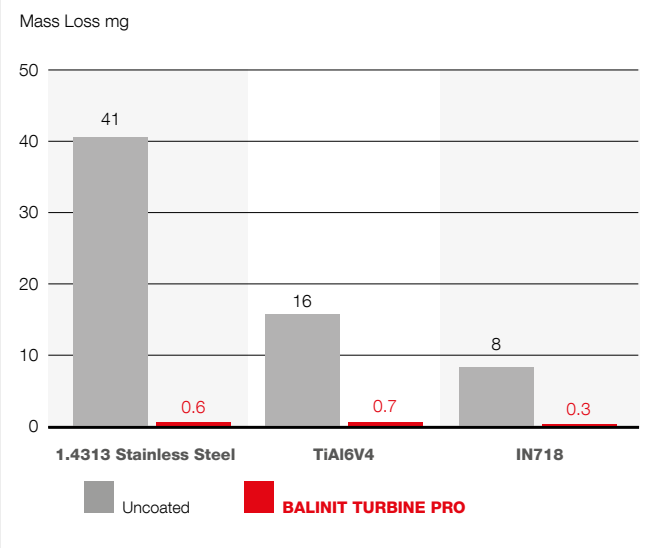


**BALINIT TURBINE PRO outstanding in LDE conditions**  
Figure 2 demonstrates the cavitation resistance of BALINIT®TURBINE PRO compared to the substrate materials. Cavitation is a good indication of the liquid droplet erosion of a material or coating.

### Test parameters

| LDE erosion            | Parameters   |
|------------------------|--------------|
| Water temperature      | ~25°C (77°F) |
| Frequency              | 20 kHz       |
| Peak to peak amplitude | 50 µm        |
| Test duration          | 20 hrs       |

### Results (Figure 2)





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

**Balzers Headquarters**

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