

BALITHERM IONIT ST

wear-resistant and non-magnetic

For the treatment of austenitic and
non-corrosive martensitic steels



Automotive



BALITHERM IONIT ST – a reliable diffusion process for austenites and non-corrosive martensites

With the new BALITHERM® IONIT ST process, Oerlikon Balzers has developed a reliable diffusion process for austenites and non-corrosive martensites. Non-magnetic properties are preserved, and the steels become more reliably resistant to wear while retaining their corrosion resistance.

In the automotive industry, high-alloy steels are used primarily in mechanical components. They are valued not only for their amagnetic (non-magnetic) properties, but also for their high wear resistance.

Inlet and outlet valves, for instance, which are subject to high mechanical and thermal stresses, are made from a combination of martensitic steel and austenitic steel – the former is the ideal solution for high, thumping stresses resulting from the cams in the camshaft, while the latter is resistant to the high temperatures and mechanical stresses on the valve plate.

WEAR MECHANISM	REQUIRED PROPERTIES
Adhesive wear	<ul style="list-style-type: none"> ■ Low friction coefficient ■ Low affinity between the materials (adhesive force, mutual solubility)
Abrasive wear	<ul style="list-style-type: none"> ■ High surface hardness ■ Low friction coefficient ■ Low roughness ■ High fracture toughness
Fatigue wear	<ul style="list-style-type: none"> ■ High surface hardness ■ Low friction coefficient ■ Low roughness ■ High fracture toughness
Erosion	<ul style="list-style-type: none"> ■ High surface hardness ■ High elasticity

BALITHERM IONIT ST for austenites and martensites

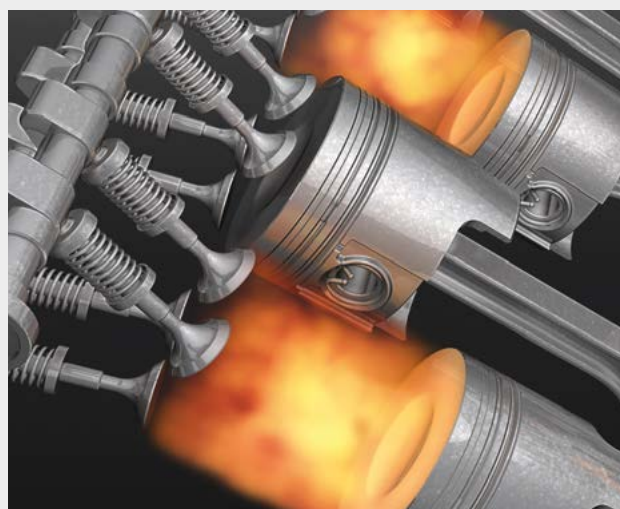
HEAT TREATMENT	BALITHERM® IONIT ST Austenite	BALITHERM® IONIT ST Martensite
Compound layer thickness	5 – 50 µm	30 – 100 µm
Surface hardness (HV 0.1)	> 1000	> 1000
Max. application temperature	< 550 °C	< 520 °C
Corrosion resistance	Depends on the treatment temperature	

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

Robust protection for toughest demands



BALITHERM® IONIT ST treated valves withstand high loads in an engine.



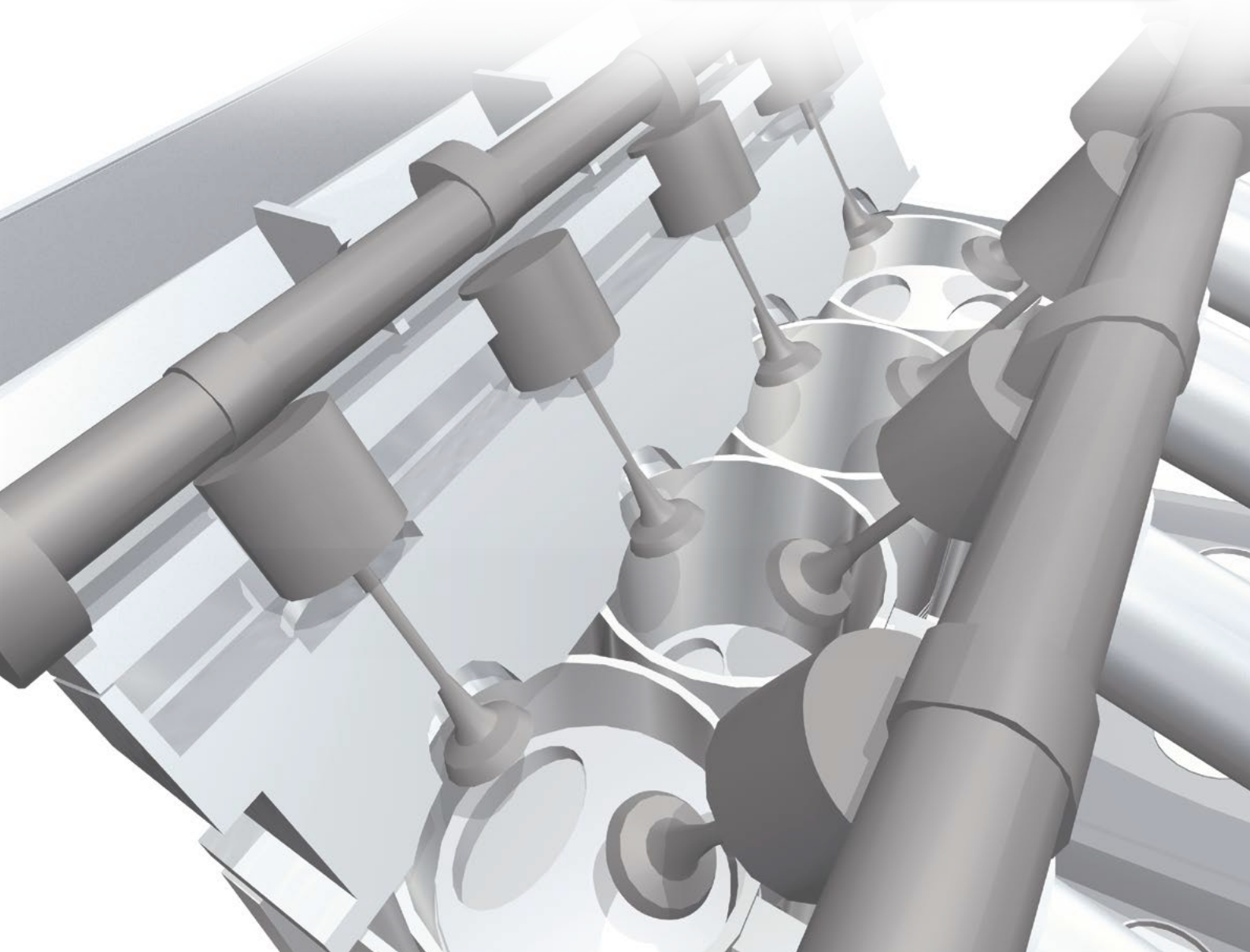
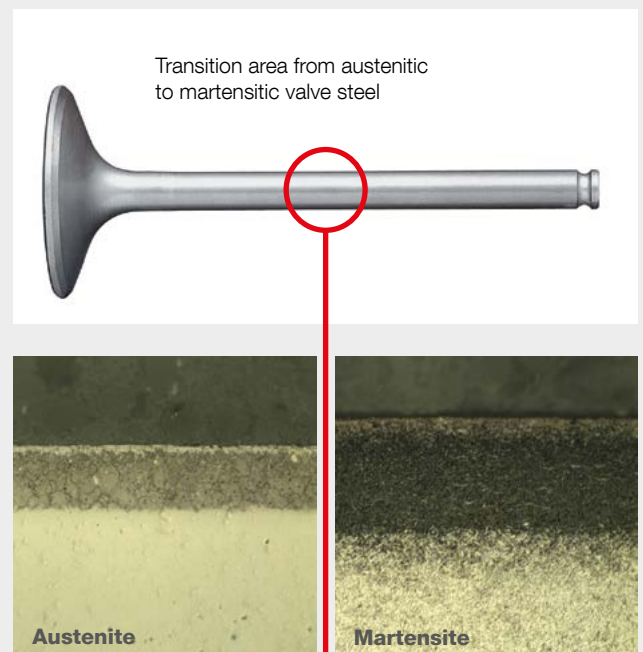
High thermal and mechanical loads of the valves during combustion process.

BALITHERM IONIT ST for refining of valve steels

The BALITHERM® IONIT ST process means that Oerlikon Balzers can now offer a nitriding process which significantly improves the wear resistance of the austenite without affecting its non-magnetic properties. As the two materials nitride differently, diffusion depths of 15 μm in the austenite and 30 μm in the martensite can be achieved without any problems, increasing the reliability of their wear resistance. The low process temperature also ensures that no chromium depletion occurs at the edges, helping retain corrosion resistance.

- **Non-magnetic properties are preserved**
- **Corrosion resistance of high-alloy steels is retained**
- **Scuffing is avoided**
- **Wear protection for austenitic materials with low core hardness**

Seizure of austenite and martensite



Take advantage of the benefits from BALITHERM IONIT ST Get in touch with us today!

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You can find a full listing
of our locations at:

www.oerlikon.com/balzers