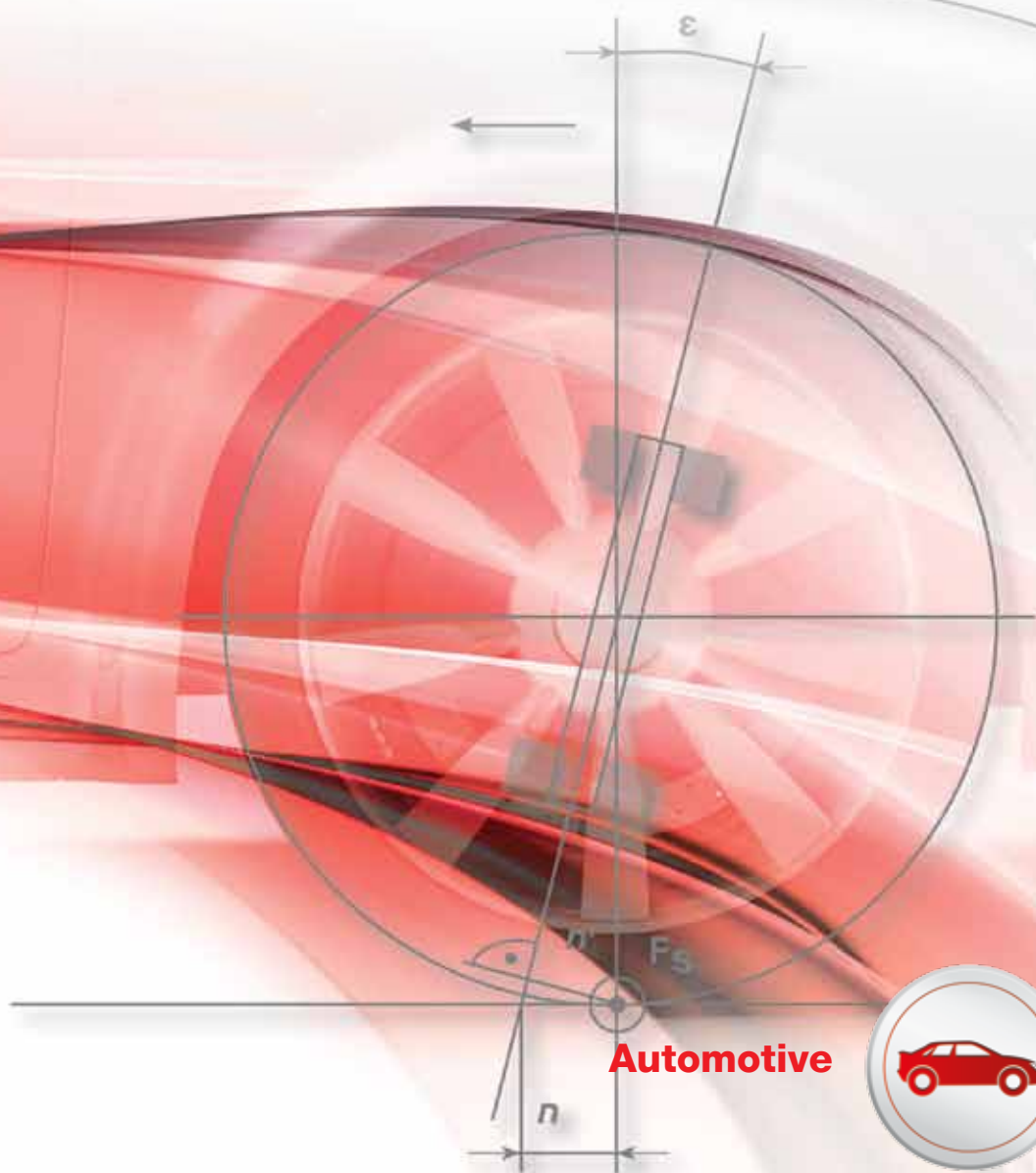


# The future is along for the ride

BALITHERM IONIT & IONIT OX – The efficient  
and environmentally friendly surface treatments  
for the automotive industry



**Automotive**



# BALITHERM IONIT & IONIT OX

in automobiles



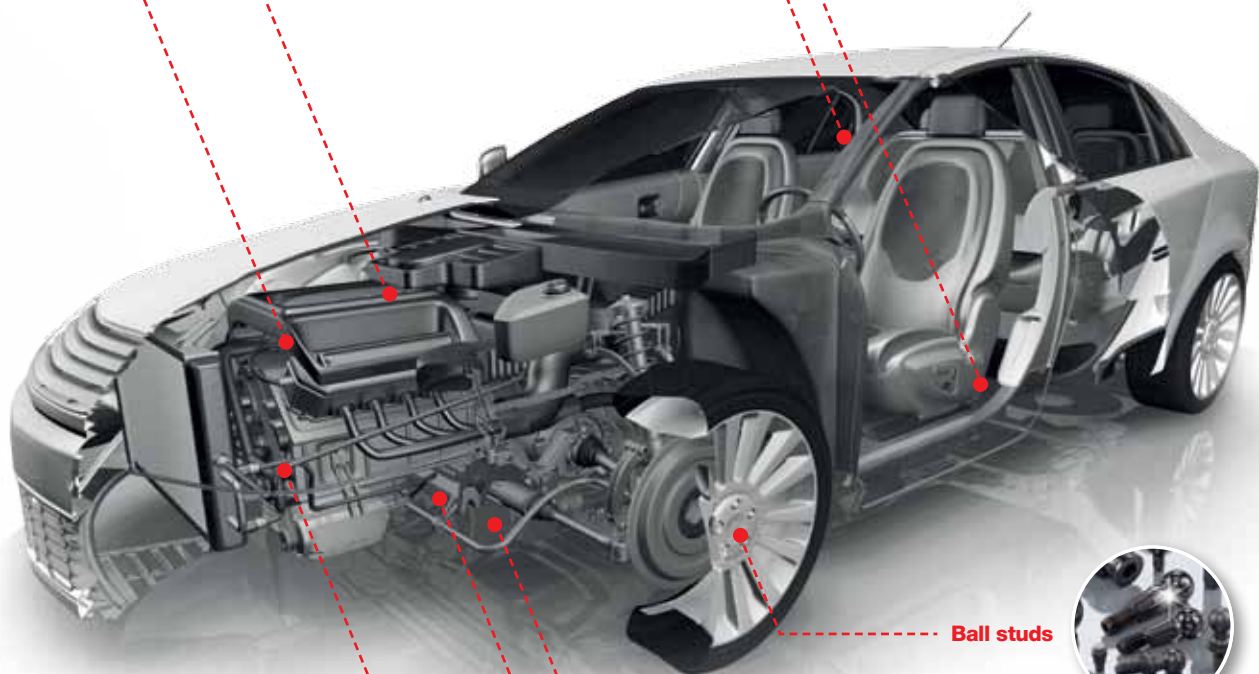
----- Connecting rods / Piston rings / Piston pins / Crankshafts / Sockets



----- Valve springs



----- Bevel gears



----- Ball studs

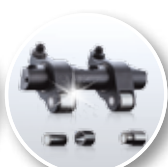
----- Injector needles / Valve pistons / Injector nozzles



----- Synchronizer rings



----- Tappets / Valves / Rocker arms



Oerlikon Balzers is a global specialist for surface treatments in the automotive industry. In addition to the innovative BALITHERM® heat-treatment approach, Oerlikon Balzers also offers high-performance PVD/PACVD coating solutions.

Our experts will be happy to advise you regarding your individual application requirements.

# Get more power onto the road: with the surface hardening solution for suspension components

To remain competitive in the suspension technology field means you need components that deliver performance. Oerlikon Balzers has the ideal solution: The advanced heat treatment processes BALITHERM® IONIT & IONIT OX. They make ball studs, tie rods, brake discs and many other suspension components wear resistant and durable.

Moreover, with BALITHERM® IONIT & IONIT OX, no hazardous chemicals are used. That makes them the efficient and environmentally friendly alternative to common methods of treatment, such as hard chrome plating or salt bath nitriding. Take advantage of the many benefits offered by Oerlikon Balzers, a worldwide technological leader in the field of hard coating solutions.

## Take advantage of numerous benefits

- Corrosion protection
- Low friction coefficient
- Material substitution: Cost-optimized material selection
- Higher energy efficiency
- Improved break-in properties
- Longer component service life
- Improved dimensional stability
- Reduced CO<sub>2</sub> emissions
- Environmentally friendly process
- Replacement of hard chrome plating and salt bath nitriding

## The requirements for more efficient transmission components

Wear Mechanism	Required Properties
Adhesive wear	<ul style="list-style-type: none"><li>■ Low friction coefficient</li><li>■ Low affinity between the materials (adhesive force, mutual solubility)</li></ul>
Abrasive wear	<ul style="list-style-type: none"><li>■ High surface hardness</li><li>■ Low friction coefficient</li><li>■ Low roughness</li><li>■ High fracture toughness</li></ul>
Fatigue wear	<ul style="list-style-type: none"><li>■ Residual compressive stresses</li><li>■ High elasticity</li></ul>
Erosion	<ul style="list-style-type: none"><li>■ High surface hardness</li><li>■ High elasticity</li></ul>
Corrosion	<ul style="list-style-type: none"><li>■ High chemical and thermal stability</li><li>■ Diffusion barrier</li></ul>

## Application examples

- Gear-shift shafts
- Tie rods
- Brake discs and brake pistons
- Camshafts
- Ball studs
- Ball sleeves
- Attachment parts
- Clutch segments
- Disc carriers
- Synchronizer rings
- Pinion shafts

# BALITHERM IONIT OX means: 8 fewer work steps – and up to 30% lower costs!

Imagine meeting the requirements for corrosion resistance, wear protection and strength while at the same time achieving cost-effectiveness in production:  
The example of a gear-shift shaft that has been treated with BALITHERM® IONIT OX shows how this works.  
The number of work steps can be reduced from ten to two thanks to surface treatment of the component.

**Corrosion resistance:** Corrosion free in individual cases after up to 700 hrs. using salt spray test

**Wear protection:** Formation of an oxide layer (1-2 µm), compound layer (10 + 10 µm)

**Component strength under dynamic mechanical loading:** Surface hardness of 650 + 100 HV 0.3



Manufacture component  
to final dimensions

**BALITHERM® IONIT OX**

**30%**  
lower  
costs

Production with grinding  
requirements

Cleaning

Covering

Case Hardening

Cleaning

Aligning

Pre-grinding

**Partial chrome plating**

Annealing for H<sub>2</sub> degassing

Finish grinding

## First-class coating properties

	BALITHERM® IONIT OX	BALITHERM® IONIT
Surface composition	$\varepsilon + \gamma' + \text{Fe}_3\text{O}_4$	$\varepsilon + \gamma'$
Compound layer thickness [µm]	10-28	6-15
NHD [mm] (nitriding hardness depth)	0.1-0.5	0.05-0.9
Oxide layer thickness [µm]	1-3	–
Hardness [HV]	300-900	300-1400
Max. application temp. [°C]	600	600
Friction coefficient $\mu$ (dry, against steel)	0.15	0.5

## Support in every development phase: Rely on the competence of Oerlikon Balzers

With Oerlikon Balzers, you have a partner at your side that has many successful years of experience working with the automotive industry. Our development engineers and consultants assist you from the conceptional phase right on through to later serial production.

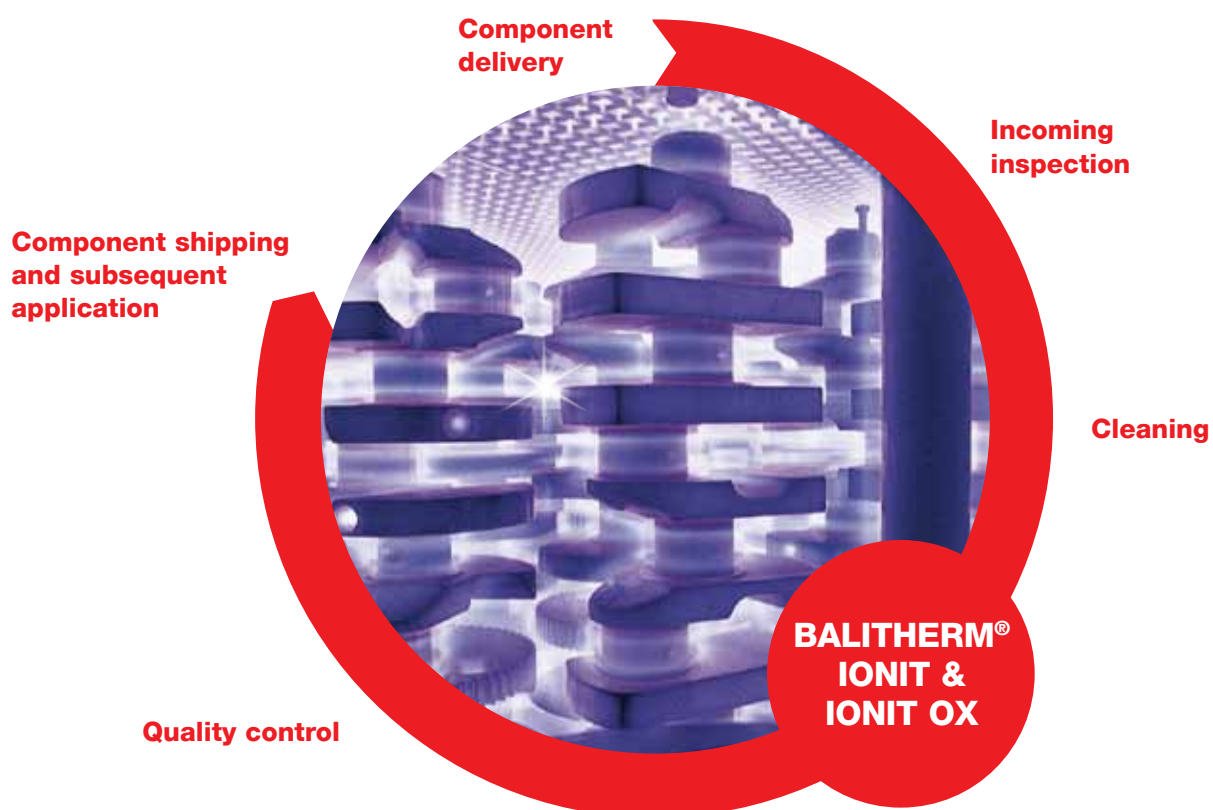
They offer advice in selecting the material, the correct design form and the subsequent processing. Moreover, you benefit from innovative, customized surface treatments, our worldwide service centres and much more.



### Benefit from:

- Standardized and individualized coating solutions
- Global presence with over 100 Service Centres
- Know-how and logistics for contract treatment
- Consulting in applications and materials technology
- Individualized services: For example, automated and standardized fabrication processes, quality analysis, handling and cleaning, reconditioning as well as research and development

## The decisive advantage for more efficiency: The service process





**Benefit from our efficient and environmentally friendly  
BALITHERM service  
Contact us today!**

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[www.oerlikon.com/balzers](http://www.oerlikon.com/balzers)