



HOW SATISFIED ARE YOU WITH ...

the performance of your stainless steel parts
when it comes to ...

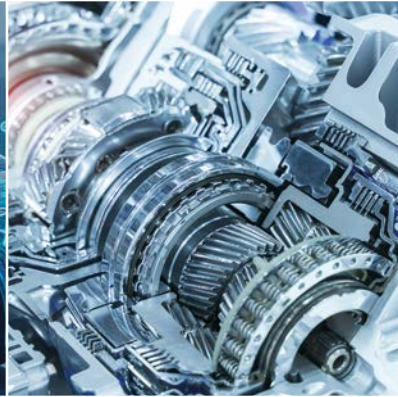
- ... fatigue life
- ... abrasive resistance
- ... post-weldability
- ... dimensional stability

Bodycote



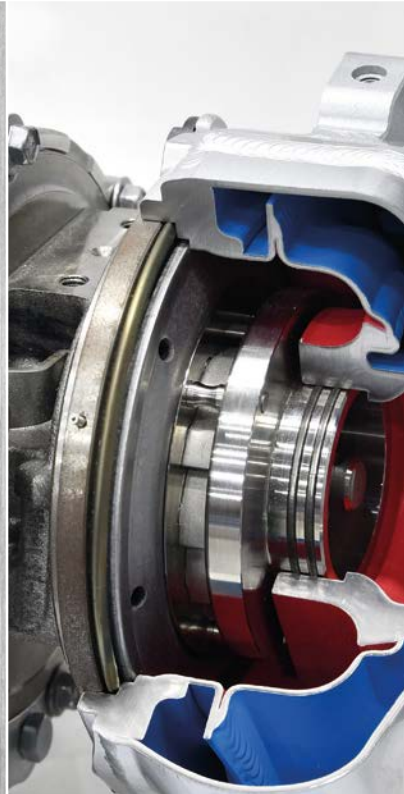
Kolsterising® of stainless steel is often a reliable alternative to:

- Conventional plasma, gas or salt bath nitriding
- High temperature processes
- Nickel coating
- PVD coating
- DLC coating
- Hard Chrome coating (Cr6)



In the automotive industry, Kolsterising® of stainless steel benefits various applications including:

- Fuel management
- Turbochargers
- Variable camshaft systems
- Water pumps
- Exhaust systems e.g. EGR
- Gearboxes
- Fuel cell systems





S³P – Specialty Stainless Steel Processes

IMPROVED PERFORMANCE IN THE AUTOMOTIVE INDUSTRY THROUGH KOLSTERISING®

We understand the multitude of requirements facing the automotive industry, including higher efficiency, emission reduction and the need for consistent exceptional quality. These factors are crucial from a technical and performance perspective.

Stainless steel components are commonly used in electric and powertrain systems technologies (i.e. internal combustion engines) with a growing number of new applications and also technologies (Electric Vehicle or fuel-cell).

However, most stainless steels have some natural deficiencies that can be addressed with Kolsterising®. Highly improved wear resistance, combined with dimensional stability and weldability allows for a number of applications that wouldn't be possible without Kolsterising® treatment. Additionally, fatigue strength is improved and corrosion resistance is maintained.

YOUR ADVANTAGES THROUGH KOLSTERISING®



- Improves wear resistance
- Maintains corrosion resistance
- Improves fatigue strength
- Post-welding feasible
- Maintains non-magnetic behavior
- Consistent process results

WHAT IS KOLSTERISING®?

Kolsterising® is a low-temperature process for the surface hardening of stainless steels based on the diffusion of carbon and/or nitrogen into the steel.

■ **Kolsterising® is NOT a coating**

Kolsterising® is a surface hardening process – the surface of the part itself is hardened, therefore, delamination is avoided

■ **Consistent quality - always**

Kolsterising® is unique in its consistent treatment results offering the highest level of quality and reliability with a proven track record

■ **Environmentally friendly process**

All S³P plants are certified according to ISO 50001 (energy management) and ISO 14001 (environmental management) accreditations

WHAT CAN KOLSTERISING® ACHIEVE?

Kolsterising® offers many advantages and valuable properties for your material.

■ **Stainless remains stainless**

Corrosion resistance is maintained

■ **Surface hardness increased up to 8 times**

Surface hardness from 900 - 1300 HV_{0.05} depending on material and surface condition while maintaining ductility

■ **Prevention of galling / fretting**

Increasing the resistance to galling/fretting by a factor of 20 to values beyond the material yield strength (in typical applications)

■ **Geometry independent**

Kolsterising® allows bulk treatments so all surfaces are treated equally, including internally threaded fasteners

■ **Non-magnetic behavior maintained**

In comparison to other surface treatments, the non-magnetic behavior of the material is maintained depending on the base material composition

APPLICATION EXAMPLES FOR KOLSTERISING®



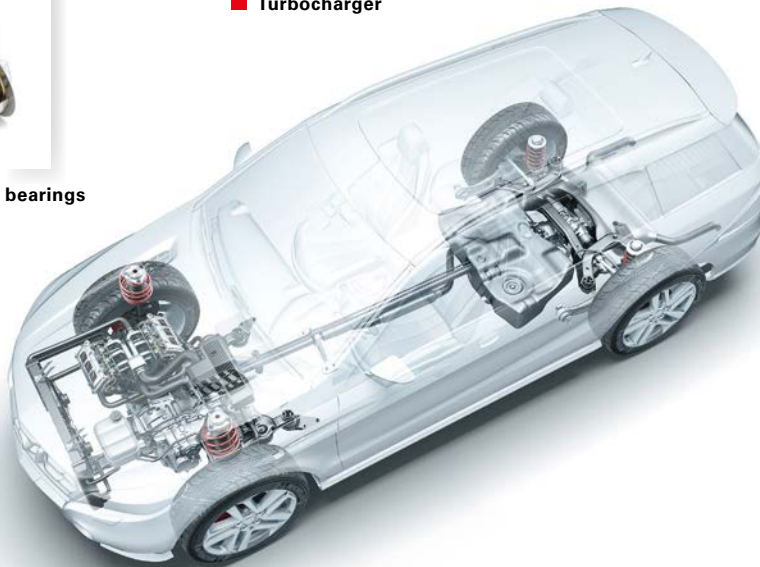
■ Waterpumps and ball bearings



■ Turbocharger



■ Exhaust gas recirculation



■ Stack pack for fuel cells

■ Valve lift management



■ High-pressure fuel pumps



■ Servomotors for headlights



**Bodycote is the worldwide leading service provider
of thermal processing.**

S³P is part of our Specialist Technologies division.

Kolsterising® is a low-temperature process for surface hardening of stainless steels based on the diffusion of carbon and/or nitrogen into the steel. Carbon is already an element of stainless steel and therefore does not change the material composition – a significant advantage, especially in the automotive industry.

Through extensive laboratory testing and numerous customer applications, we have developed trend setting solutions that are proving reliable in daily use worldwide.

Please contact us to benefit from the advantages of Kolsterising® for your application.

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www.bodycote.com/kolsterising

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