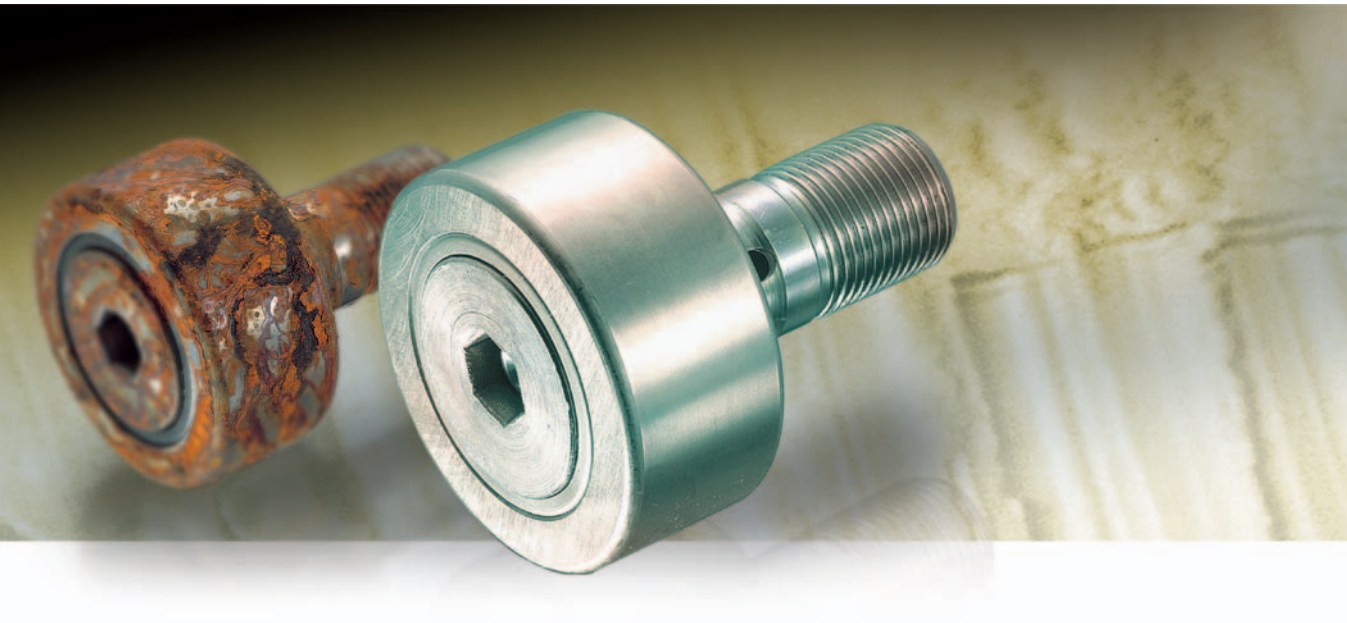


Special coating Corrotect®

Anti-corrosion protection for rolling bearings and precision components

SCHAEFFLER GROUP

Special coating Corrotect®

Features

"Rust" is public enemy number 1 for metals. The Schaeffler Group continues to fight back. For example with Corrotect®, an extremely thin, electroplated coating. This gives long term protection of rolling bearings and seal running surfaces against corrosion.

Advantages of the Corrotect® coating:

- All-round anti-corrosion protection, even on machined surfaces on chamfers and radii.
- Penetration of rust under seals is prevented for the long term.
- Small bright spots are protected against corrosion by the cathodic protection mechanism.
- The anti-corrosion protection gives a significant increase in operating life compared to uncoated parts.
- Parts of the same dimensions can be interchanged without problems.
- In many cases, bearings made from corrosion-resistant rolling bearing steel can be replaced.

Basic data on the Corrotect® coating

Composition:

- Zinc alloy (for example with Ni, Fe or Co)
- Yellow or black chromate passivation (containing Cr(VI))
- Thick layer or nanoparticle-backed thick layer passivation (free from Cr(VI))
- Thickness ranges:
  - 0,5 µm to 3 µm
  - 2 µm to 5 µm.

Test method:

- neutral salt spray test in accordance with DIN EN ISO 9 227, ASTM B117.

The coating is effective against condensation, rainwater, contaminated water and weakly alkaline and weakly acidic cleaning agents. The coating is attacked by strongly acidic or alkaline media, oxidising media and media containing high levels of salt. Advice is available from our skilled engineers in the Application Engineering departments and the engineering service of the Schaeffler Group in this country and abroad.

Since the coating is very thin, there is normally no negative effect due to the increased bearing clearance that is present through erosion of the layer after running-in of the bearing.

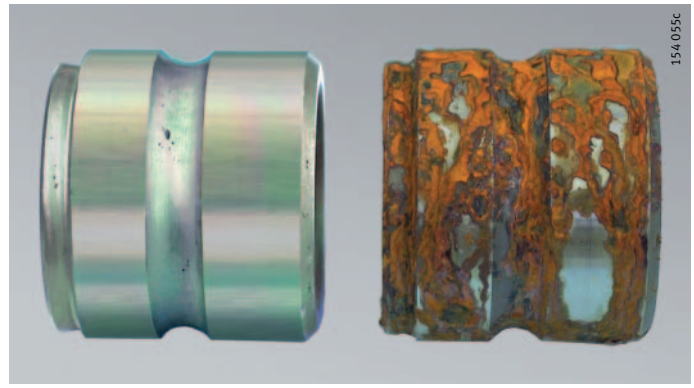


Figure 1

Coated and uncoated part after 24 h in the salt spray test

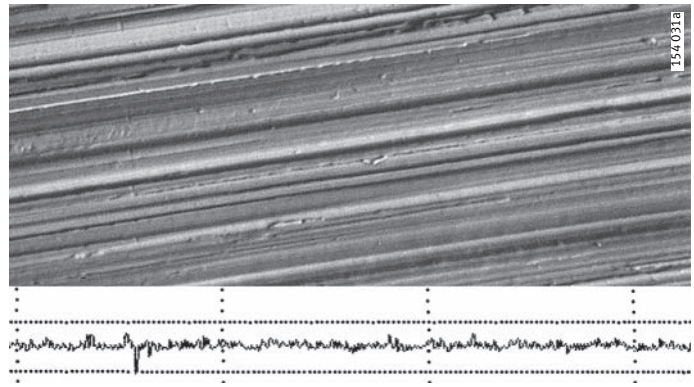


Figure 2

Surface roughness profile of a ground raceway, uncoated (R_z1,7, R_a0,14)

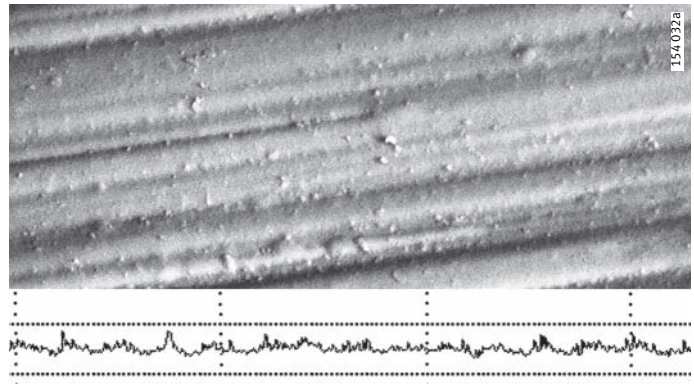


Figure 3

Surface roughness profile of a ground raceway, coated (R_z2, R_a0,18)

Special coating Corrotect®

Characteristics of the coating

The special coating Corrotect® has the following characteristics:

- It is an extremely thin anti-corrosion coating with cathodic protection. Under load, the coating is rolled into the surface roughness profile and partially worn away, *Figure 4*.
- The chromate coating and the passivation increase the anti-corrosion protection and contribute to the optical appearance of the component.
- Anti-corrosion protection in the seal area.
- In comparison with many other coating systems and materials, Corrotect® combines good anti-corrosion protection with low cost, *Figure 5*.

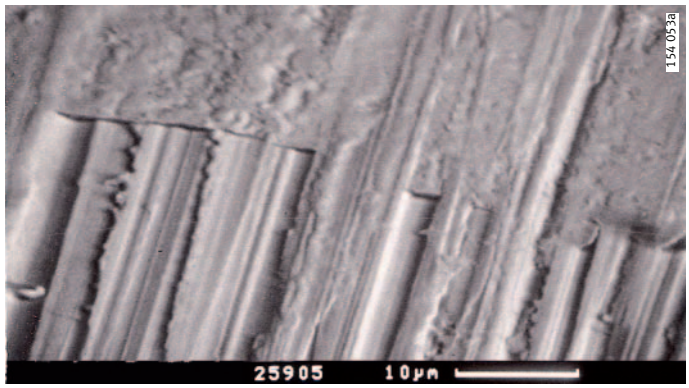
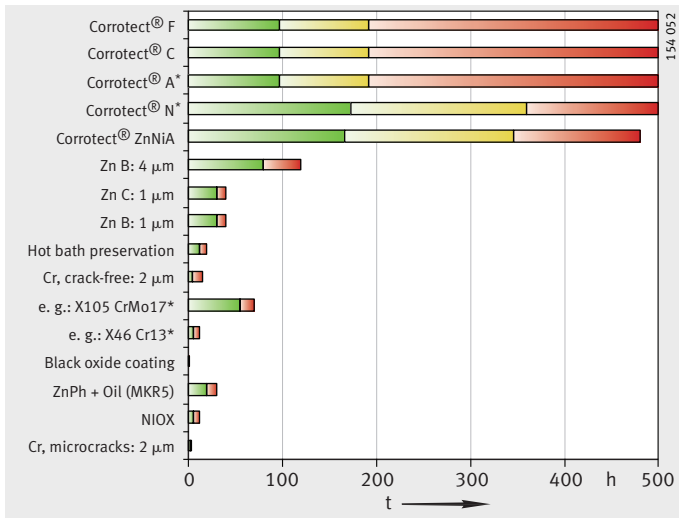


Figure 4
Transition from overrolled area to area not subjected to load

Comparison of coatings

Corrotect® offers good protection against corrosion. The resistance (parts coated on a frame) with tempering for quenched and tempered parts is shown in green, *Figure 5*. Without tempering, the moderate levels of resistance shown in yellow are achieved. The red bars give some indication of how resistant the coating can be.



t = hours until appearance of red rust
A* = thick layer passivation
B = blue passivation
C = iridescent chromate coating
F = black chromate coating
N* = nanoparticle-backed thick layer passivation
* = in the case of corrosion-resistant alloy steels, special criteria apply that are not fulfilled by coating

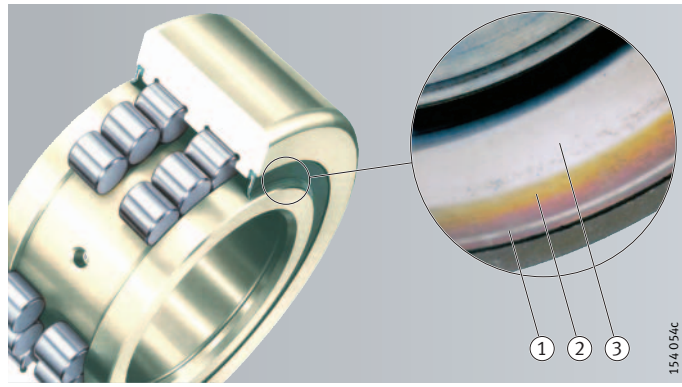
Figure 5
Corrosion resistance of selected coatings

Guidelines on the handling and use of Corrotect®-coated parts

Further characteristics of the special coating:

- Before pressing in coated parts, light greasing is recommended in order to reduce the press-in forces.
- As with all zinc and zinc alloy coatings, the anti-corrosion protection is impaired in temperature ranges above +120 °C.
- Even if there is no indication that the grease operating life will be impaired, the interaction between the coating and the lubricant should be checked in each case and the relubrication intervals adapted as appropriate.

In the area of the seal lips, running-in of the extremely thin layer occurs, forming an optically bright surface. In contact with moisture or corrosive media, the formation of rust on this bright surface is prevented in the long term by the remote effect of the cathodic protection mechanism, *Figure 6*.



① Seal running surface
② Coated surface
③ Coated raceway with overrolling

Figure 6
Seal running surface

Applications

In principle, almost all bearings can be coated with Corrotect®.

The primary areas of application are those where appropriate requirements for anti-corrosion protection are present, for example:

- in crane production (bearing arrangements of cable sheaves with cylindrical roller bearings and slewing rings)
- in fork lift trucks (guide rollers)
- in car washes
- in machine tools and
- in multi-roll rolling mills.

The Schaeffler Group carries out plating not only of bearings but also of other parts.

Attention! Nanoparticle-backed thick layer passivation is not suitable for all applications. Our technical department dealing with coatings should be consulted as to its suitability before the coating is defined.

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