Bodycote

CORR-I-DUR®

Thanks to the wide range of applications Nitriding and Nitrocarburising processes are becoming more and more important.
In addition to mechanical and technological characteristics, corrosion resistance is of vital importance for the functionality of surfaces.

The CORR-I-DUR® process not only enhances wear properties, but also significantly improves the corrosion resistance.

Objectives

Optimisation of functional surfaces by:

- increasing wear resistance
- improving mechanical and dynamic characteristics
- increasing corrosion resistance

Process

Nitriding and Nitrocarburising carried out in the CORR-I-DUR® process is a combination of various thermo-chemical process steps, i.e. gas nitro carburising and oxidising.
Wear and corrosion resistant layers are created which show a dark grey to black colour.

Application

The application ranges from single components to serial products, including a wide range of materials such as unalloyed construction and case hardened steels, quenched and tempered steel can also be treated.
For many components from the automotive and hydraulic industries, engineering and mining industries,CORR-I-DUR® is an alternative to salt bath nitriding with oxidation.

Furnaces

The following furnaces are available for the process:

- retort furnaces of
  Ø 1200 mm x 2000 mm
  Ø 1200 mm x 2500 mm
  max. load weight 4000 kg
  factories: Lüdenscheid, Eching and Langenselbold

- Chamber furnaces of
  1200 x 900 x 900
  max. load weight 1500 kg
  factories: Nürnberg, Schaan

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Facts on CORR-I-DUR®

Distortion and dimensional changes

CORR-I-DUR® has very little effect on distortion and dimensional changes of components. Compared to carburising and carbonitriding, dimensional changes are significantly lower. Dimensional changes can further be positively influenced by varying the process parameter, e.g. temperature.
Due to the creation of a compound layer dimensional changes occur. These changes can be pre-compensated during the prior production process.

Corrosion resistance

The final corrosion resistance of components depends on various factors:
material, roughness, surface contamination and dimensions.
Co-operation between the customer and Bodycote prior
to heat treatment leads to optimum results.
Standard corrosion requirements of most materials (> 96h in the salt spray test DIN 50021 SS) is exceeded and CORR-I-DUR® is an environmental friendly alternative to galvanic layers.

Surface hardness and Nitriding depth

The achievable surface hardness mainly depends on the base material.
Alloying elements such as chrome and aluminium lead to higher hardness.
The Nitriding depth depends on customer requirements. Also the component's condition at delivery, i.e. distortion, heat treatment status also affect the layer parameter to be achieved.

Compound Layer and diffusion zone

By diffusion of elementary carbon and nitrogen into the surface, a diffusion zone and a compound layer are created. The components are then oxidised and a compact oxide layer is created which is mainly responsible for the corrosion resistance.
The compound layer determines the component's wear properties, while the diffusion zone influences the mechanical and dynamic properties.

Pre- and Post - treatment

At delivery, the components should be metallic blank and free of contamination or residues. Normally the components are already in their final shape before the heat treatment, additional grinding or polishing to reduce roughness after heat treatment is possible and should be discussed prior to heat treatment.

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