SURFACE TREATMENT

FERRIC NITRO-CARBURISING

DSF 1.1.8

Definition:

Ferric Nitro-carburising is a salt bath nitro-carburizing treatment. This is a low temperature, low distortion 'thermochemical' heat treatment process which can be applied to most finished or near finished ferrous materials. It improves the service life of steel, sintered & cast iron components by the high resistance to wear, scuffing, galling & seizure plus an increase to hardness & fatigue strength and corrosion resistance. It can be used as a cost effective alternative to other surface treatments such as case hardening or hard chromium plating with equal or improved results. Useful as an upgrade method for low/ medium carbon non alloy steels.

Treatment Information:

The engineering drawing will identify the area to be treated, the compound layer thickness & surface hardness.
Alloy steels benefit most from being nitro-carburised in the hardened and tempered condition whilst non-alloy/low-carbon steels are usually nitro-carburised in the normalised condition.
Stress relieving before final machining is advisable in order to minimise distortion in nitro-carburising.
Nitro-carburising, involves enrichment of the surface with both nitrogen (7-9%) and carbon (1%)to impart a thin iron-carbonitride "compound layer" typically 12.5 - 20µm thick supported by a much thicker nitrogen-bearing "diffusion zone".
Components must not be ground after nitro-carburising as this will remove the beneficial thin compound layer. For load-bearing surfaces, a light lapping or buffing is often used to improve the surface finish which tends to roughen slightly during treatment.

Appearance:

The finished article shall be free from visible plating defects such as blisters, pits or un-plated areas.
The treatment will be smooth and adherent, clean and free from damage.

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Description:

Tufftride® is a low temperature process which can be used with most ferrous materials with minimal distortion. A two layer surface coat is formed, namely an Iron nitride outer (compound layer) & a diffused nitrogen inner (diffused zone) layer. This treatment is used to improve the service life of steel & cast iron components.

Tufftride® TF1-AB1
Components are subjected to intermediate cooling which offers benefits such as, improvements in corrosion resistance, better wear & sliding properties and improved surface appearance.

Tufftride® QPQ:
An increase in corrosion resistance can be achieved further by post-oxidation treatment which imparts an aesthetically-pleasing black finish; additional polishing and oxidation steps can yield a surface finish rivalling hard chrome plating, in terms of high corrosion resistance combined with low coefficient of friction.

Properties:

- Nitrogen in the diffusion layer inhibits the formation of cracks, improving fatigue resistance.
- Nitride rich compound layer reduces stiction of the surface improving the frictional wear properties.
- Withstands bending & torsional stresses.
- There is compelling evidence that nitro-carburized components have a longer service life than other chemical and thermal surface treatments.

ASM (DEK) Applications:

For steel components requiring the benefits of improved sliding & running properties combined with higher wear & fatigue resistance.
The preferred method is **Tufftride® TF1-AB1.**