

STANALTM 400 *HEF patent*

Solid-phase metal diffusion treatment to improve the resistance to SEIZING of stainless steel parts.



Définition

Solid-phase metal diffusion treatment at 400°C. STANALTM 400 improves the resistance to SEIZING of stainless steel parts without changing their corrosion resistance.



Applications example

- Electrical connectors for aeronautics
- Hot gas swivel joints on jet engines
- Hydraulic fittings
- Stainless steel bolts for the nuclear industry
- Nuclear valve parts
- Nuclear fuel container plugs
- Submarine door hinges
- Steam turbine blade fixing pins
- Door hinges for nuclear baths in demineralized water environment
- Moving parts of robots working in hostile environments (nuclear, submarine exploration)
- Food mixers
- Meat chopper bearings
- Confectionery pistons
- Valves
- Agricultural equipment safety pins
- Perforator valves
- Distributor pistons
- Gears
- High strength steel bolts
- Martensitic chromium stainless steel bolts
- Connection pins,
- Etc..

Coating characteristics

Using a thermal cycle that never exceeds 400°C, carefully controlled diffusion phenomena create hard metal alloys that form the STANAL™ 400 layer.

Due to this thermal cycle, STANAL™ 400 can be applied to :

- Austenitic stainless steels without risk of chromium carbide precipitation, and thus not changing the steel's stainless properties.
- Structurally hardened martensitic stainless steels without changing their mechanical characteristics.



Stanal 400 on austenitic stainless steel

HARDNESS:

350-450 HV according to the steel treated

COATING THICKNESS:

5-10 microns according to the steel treated.

Treatment advantages

- Improves surface hardness.
- Improves wear resistance and resistance to seizing
- Good intrinsic resistance to oxidation and corrosion
- Excellent base for solid film lubricants

Precautions to be taken

- Complex shape parts should be stabilised for 2 hours at 400°C with slow cooling, before final machining
- When manufacturing parts, a diameter swelling of 12 ± 3 microns should be allowed for.
- No reworking should be carried out after treatment, except for surface finishing like polishing for burnishing.

Materials suitable for treatment

- **All austenitic stainless steels** : e.g. X2CrNi 18.8, X2 CrNiMo 18.10, X3CrNiMo 18. 12, X6 CrNiTi 17.12, etc..
- **Nickel chrome martensitic stainless steels**, capable of undergoing heat treatments with tempering between 400°C and 600°C, e.g. X6 CrNi 17.04, X15 CrNi 17.03, X8 CrNiMo 14.04
- **Structurally hardened stainless steels** : X12 CrNiMo 16.04, X6 CrCu 17.04
- **Refractory steels** : X12CrNiMo 25, X12, CrNiKMow20, X6 NiTiCr25

Special conditioning

- **Solid film lubricant coating** for non-lubricated friction or difficult environments, the STANAL™ 400 treatment can be completed with solid film lubricants (see technical data sheets)
- **Polishing**, STANAL™ 400 can be metal brushed for a brighter finish. However, soft brushes with stainless steel bristles must be used.
- **Decontamination**, STANAL™ 400 withstands decontamination solutions containing nitric acid.
- **Passivation**, STANAL™ 400 treated parts can be passivated



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