



NITREG[®]-C NITROCARBURIZING

A CLEAN ALTERNATIVE TO SALT BATH

NITREG[®]-C is a nitrocarburizing process, based on the proven NITREG[®] potential-controlled gas nitriding technology, incorporating simultaneous diffusion of carbon and nitrogen into the steel surface.

NITREG[®]-C is often specified in industrial applications on the merit of its being an environmentally friendly but equivalent alternative to salt bath nitrocarburizing. NITREG[®]-C conducted in gas atmospheres can be considered a process complementary to NITREG[®] gas nitriding.

The purpose of the treatment is to create a hardened surface layer, enhancing wear and corrosion resistance, or improved fatigue resistance of treated steel or cast iron parts, without distortion of shape or dimensional changes.

When your specification calls for nitrocarburizing, Nitreg[®]-C meets all requirements with full control and repeatability.

ADVANTAGES OF THE NITREG[®]-C PROCESS

1. NITREG[®]-C accelerates formation of the compound (white) layer on low-carbon unalloyed steel.
2. NITREG[®]-C features low operational costs by utilizing more economic gas compositions.
3. NITREG[®]-C increases and stabilizes the ϵ -phase content in most types of steels.

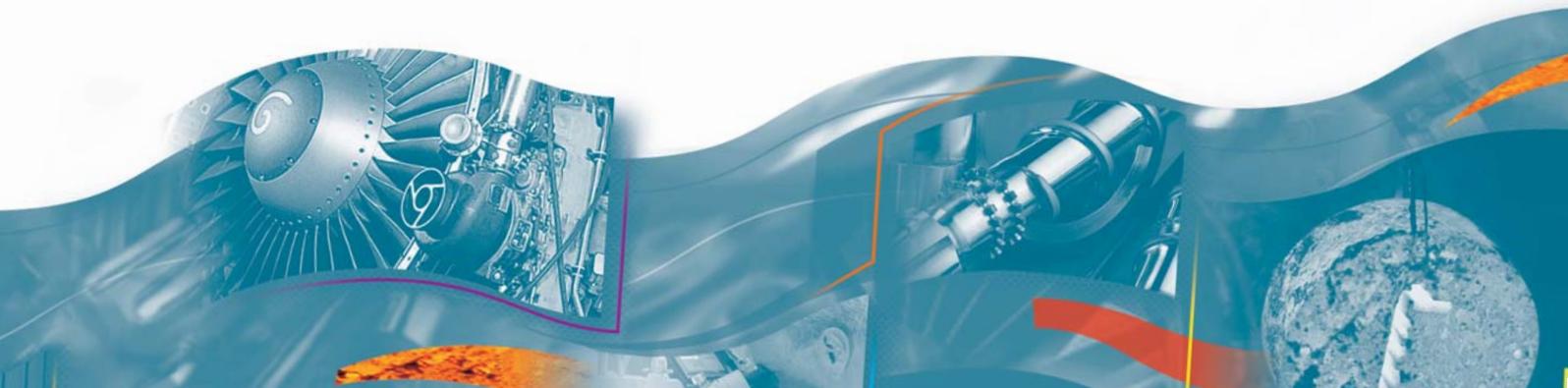
It is generally recognized that the ϵ -phase features better wear resistance than γ' . For this reason, engineering drawings sometimes require specified contents of the ϵ phase in the white layer. Therefore, stabilization of ϵ through NITREG[®]-C should be viewed as a positive effect.

Whenever your nitriding specification calls for a higher ϵ content, NITREG[®]-C is the sure answer. Synchro cones, shown in the above photograph, manufactured from a low carbon micro alloyed steel, constitute an application where the major requirement was to have more than 80% of the ϵ phase present in the white layer. Results of X-ray diffraction tests showed the ϵ content to be 97 – 98%.

Nitreg[®]-C lowers production costs, and improves the wear resistance of treated parts without distorting its shape or dimensions.

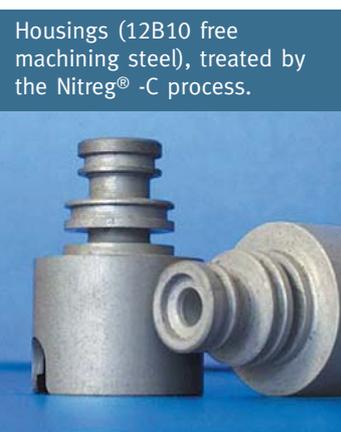


Synchro rings, (micro alloyed steel) treated by the Nitreg[®]-C process



NITREG®-C NITROCARBURIZING

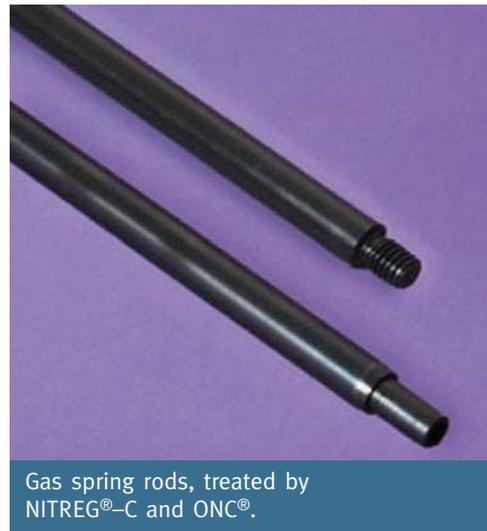
FOR SUPERIOR WEAR AND CORROSION PROPERTIES



Housings (12B10 free machining steel), treated by the Nitreg® -C process.

EXAMPLES OF TYPICAL APPLICATIONS
Housings manufactured from 12B10 grade free machining steel, shown on the photograph to the right, required a consistent and uniform white layer of 25 µm (0.0010”) on the entire surface. Uniform nitriding of this part proved to be difficult, due to a surface condition caused by machining. The NITREG®-C process was capable of producing results meeting all specification requirements with excellent uniformity.

For those applications where high ε-content, excellent wear resistance and enhanced corrosion resistance are simultaneously required, a combination of NITREG®-C and post-oxidation as in ONC® is the winning solution.



Gas spring rods, treated by NITREG®-C and ONC®.

For information regarding Nitrex technologies and systems, please contact:

Hardchrome Engineering Pty Ltd
ABN 97 005 291 083

Melbourne
175 Wellington Road
North Clayton 3168
Victoria, Australia

Telephone
+61 (0) 3 9561 9555

Facsimile
+61 (0) 3 9561 9155

Adelaide
8 Watervale Drive
Green Fields 5107
South Australia, Australia

Telephone
+61 (0) 8 8281 8733

Facsimile
+61 (0) 8 8281 8087

Email
office@hardchrome.com.au

www.hardchrome.com.au

Specifications for gas spring rods made of 1040 steel, shown on the left, required a surface hardness of over 400 HV and a corrosion resistance measured by a minimum of 144 hours in salt-spray per ASTM B117. Combination treatment by NITREG®-C and ONC® resulted in a surface hardness of 590 HV, 400 hours in salt-spray to first corrosion spot as per ASTM B117.

Because it is conducted as a fully controlled process, NITREG®-C, with its pronounced effect in promoting the ε phase in the compound layer can bring significant advantages in specific applications.

Appearance after 560 hours in salt spray as per ASTM B117



❖ Untreated

❖ Nitriding only

❖ NITREG®-C and ONC®

