

## WHAT IS NITREG®-C

**NITREG®-C** is a nitrocarburizing process based on the proven NITREG® potential-controlled gas nitriding technology. It incorporates the 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 superficial layer, enhancing wear and corrosion resistance, or improved fatigue resistance of treated steel or cast iron parts, without distortion of shape or dimensional changes.

**NITREG®-C lowers production costs and improves the wear resistance of treated parts without distorting its shape or dimensions.**

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



## NITREG®-C ADVANTAGE

- NITREG®-C** accelerates formation of the compound (white) layer on low-carbon unalloyed steel
- NITREG®-C** features low operational costs by utilizing more economic gas compositions
- NITREG®-C** increases and stabilizes the  $\epsilon$ -phase content in most types of steels.

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## TYPICAL APPLICATIONS



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

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

## TYPICAL APPLICATIONS

Housings manufactured from 12B10 grade free machining steel 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  $\epsilon$ -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.

Combination treatment of **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  $\epsilon$ -phase in the compound layer can bring significant advantages in specific applications.



Specifications for gas spring rods made of 1040 steel 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.

