

## TAILORED TO YOUR NEEDS

If you wish to achieve perfect nitriding results that meet difficult and challenging specifications, and if you require consistency from load to load, NITREG® is the most likely solution for your needs.

NITREG® fully automated process control technology applies individually customized processes to different parts, applications and materials for ideal results.

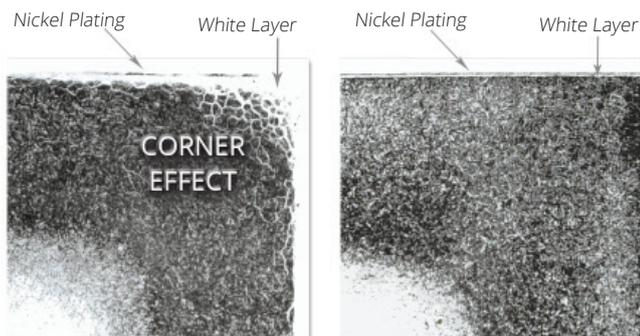
It represents a unique approach, based on the nitriding potential as the principal controlling parameter. The nitriding potential, denoted by  $K_N$ , is a thermodynamical parameter directly linked to the surface concentration of nitrogen in steel. Nitrogen concentration is responsible for the properties of the nitrided surface.



NITREG® technology means economical processing for the provider of nitriding services and extended service life of parts and tooling, due to their superior properties.

## THE 'CORNER EFFECT' PROBLEM

A common problem in traditional nitriding is the "corner effect", an over-saturation of nitrogen in the white layer and in the diffusion layer which leads to spalling. NITREG® prevents this effect by appropriately reducing the nitriding potential ( $K_N$ ) during treatment. The concentration of nitrogen in the corner will be lowered sufficiently to prevent over-saturation.



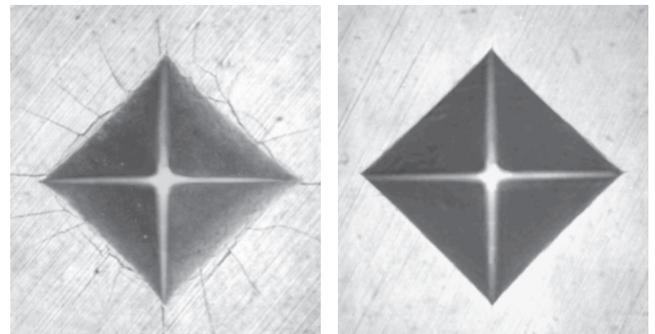
Conventional nitriding process

NITREG® nitriding process

## CONTROL OF $K_N$

Superior case toughness of the nitrided layer is achieved by precise control of  $K_N$ . This is shown by two 30 kg Vickers hardness indentations produced on a part nitrided without  $K_N$  control and on a NITREG® treated part. The part nitrided without  $K_N$  control is brittle as shown by the network of cracks. The Nitreg® treated component is ductile with high white layer toughness, as evidenced by the absence of cracks.

Vickers indentations (load of 30 kg) on a 4340 steel, nitrided to the same specification



Conventional nitriding process

NITREG® nitriding process

## NITREG® ADVANTAGE

- control of the thickness of the compound (white) layer and its properties
- elimination of closed nitride networks within the diffusion zone
- control of case depth
- control of surface hardness
- no distortion, minimal and predictable growth
- fool-proof operation
- low operating costs
- supervision reduced to a minimum
- no cleaning requirements after processing

\* AMS 2759/12 compliance optional

## NITREG® TECHNOLOGY

NITREG® is the trade name of our modern nitriding technology. It involves state-of-the-art equipment and a user friendly software program, allowing full automation of all functions, process stages, and safety procedures with closed-loop processing parameters.

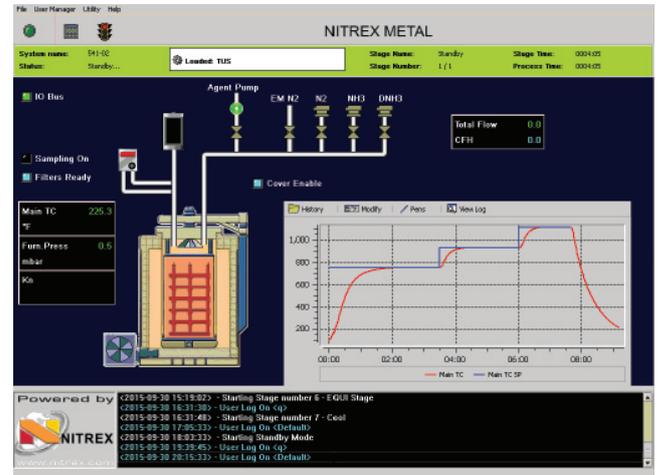


Example of a Nitreg® Turnkey System

## COMPLETE PACKAGE

The NITREX controlled nitriding system complete with NITREG® technology is a comprehensive approach to solving all your nitriding problems. It includes:

- a furnace
- a control system
- software
- an effluent gas neutralizer (optional)
- know-how
- support



User friendly screen

## WORRY-FREE OPERATION

Nitrex delivers and installs computerized and fully automated, turnkey nitriding systems, developed and thoroughly tested worldwide over the past 30 years. As described earlier, control of nitriding potential ( $K_N$ ) is the key parameter. Our systems are capable of maintaining the preset values of  $K_N$ , as desired for each processing stage, by continuous self correction, taking into account such factors as load size and/or surface condition, which may differ from charge to charge. From start to finish, the process requires no manual adjustments.

NITREG® is a proven economical and technically viable alternative to salt-bath and ion (plasma) nitriding for most nitriding applications.