

# NITREX

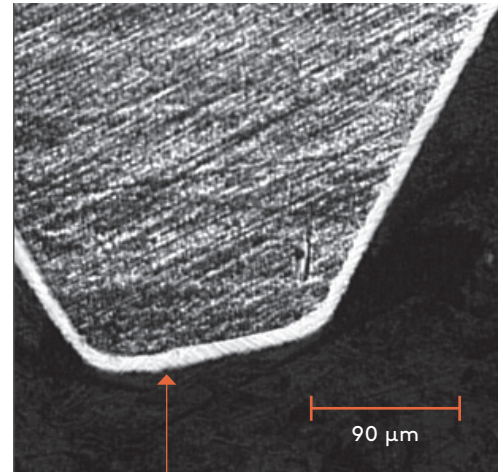
## NANO-S™ TECHNOLOGY

**Stainless steels have excellent corrosion resistance but possess relatively low strength and wear resistance. NANO-S™ can now expand their application range to include components that are subjected to intensive wear.**

NANO-S™ is a surface hardening process that improves the wear and galling resistance of stainless steel components without totally reducing their inherent corrosion resistance. The process diffuses nitrogen and/or carbon into the surface of the steel, creating a structure called expanded austenite or martensite that provides extremely high hardness. Because NANO-S™ is a fully controlled process, the formation of chromium nitrides/carbides is avoided, and consequently corrosion inhibiting properties are maintained for most stainless steels. The treatment produces a hard layer that is ductile and up to 25 µm deep (0.001”).

Achieved at low temperatures significantly below 932°F (500°C), NANO-S™ does not affect geometry or dimensions. Finished parts are uniformly hardened even inside small bores, tight grooves and at sharp edges.

**NANO-S™**  
SIGNIFICANTLY IMPROVES  
WEAR & GALLING  
RESISTANCE, & RETAINS  
CORROSION PROPERTIES  
OF STAINLESS STEELS



**The formation of expanded austenite in the layer ensures an extremely high hardness.**

NANO-S™ results in a more uniform hardened periphery irrespective of the geometry of the part. Additionally, the process does not alter the chemical composition of the alloy.

### TREATABLES MATERIALS

- Austenitic Stainless Steels
- Martensitic Stainless Steels
- Duplex Stainless Steel
- Precipitation Hardened Stainless Steels
- Please inquire about other materials

NANO-S™ is an eco-friendly technology that minimizes emissions, saves energy, and limits harmful waste products.



### PROPERTIES

Effective Hardening Case	25 µm (0.001”) maximum
Wear Resistance	Highly resistant
Corrosion Resistance	Maintained for most stainless steels
Fatigue Resistance	Improved
Roughness	Unaffected, but with dull finish
Toughness	Extremely high No crack propagation under thermo-mechanical stress
Tolerance	No dimensional change

**CANADA/USA**  
+1 514 335 7191  
nitrex@nitrex.com

**POLAND**  
+48 32 296 66 30  
nitrex.europe@nitrex.com

**CHINA**  
+86 (0) 10 6257 3050  
nitrex.china@nitrex.com

**NITREX**  
nitrex.com

# NITREX

## NANO-S™ APPLICATIONS

**NANO-S™ enables a substantial reduction of service-induced wear of stainless steel parts in a variety of applications and industries.**

### AEROSPACE APPLICATION

#### GEAR

NANO-S™ improves the mechanical strength of small, fine gears without affecting dimensional accuracy.



### AEROSPACE APPLICATION

#### LANDING GEAR LOCK

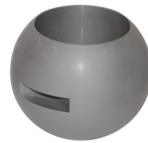
NANO-S™ enhances the lock's structural performance which is subjected to high impact forces during take-off and landing.



### REFINERY APPLICATION

#### BALL VALVE

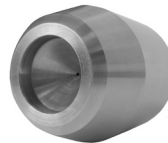
Frictional wear caused by metal to metal contact is significantly reduced with NANO-S™.



### PETROLEUM APPLICATION

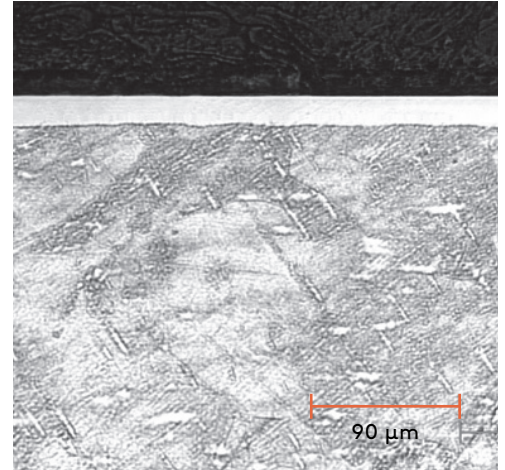
#### INJECTOR

NANO-S™ reduces premature wearing of injector hole caused by abrasive particles flowing through during high pressure process.



## NANO-S™

SIGNIFICANTLY IMPROVES WEAR & GALLING RESISTANCE, & RETAINS CORROSION PROPERTIES OF STAINLESS STEELS



### Appearance of AISI 316 after etching with Marble's reagent

NANO-S™ also improves the corrosion resistance of the layer produced resulting in a surface capable of resisting a chemical etching better than the base material.

## NANO-S™ ADVANTAGE

- Attains excellent wear resistance
- Improves fatigue strength
- Retains the intrinsic corrosion properties of most stainless steels
- Prevents galling
- Does not alter chemical composition of alloy
- Dimensional stability
- Uniformly hardened even small bores, tight grooves and sharp edges
- Eco-friendly technology that minimizes emissions and saves energy

## INDUSTRIES

- Aerospace
- Chemical & Refineries
- Food Processing
- Medical Tools & Instruments
- Nuclear
- Pharmaceutical
- Pulp & Paper
- Tool & Die

### CANADA/USA

+1 514 335 7191  
nitrex@nitrex.com

### POLAND

+48 32 296 66 30  
nitrex.europe@nitrex.com

### CHINA

+86 (0) 10 6257 3050  
nitrex.china@nitrex.com

**NITREX**  
nitrex.com