



# NANO-S™ TECHNOLOGY

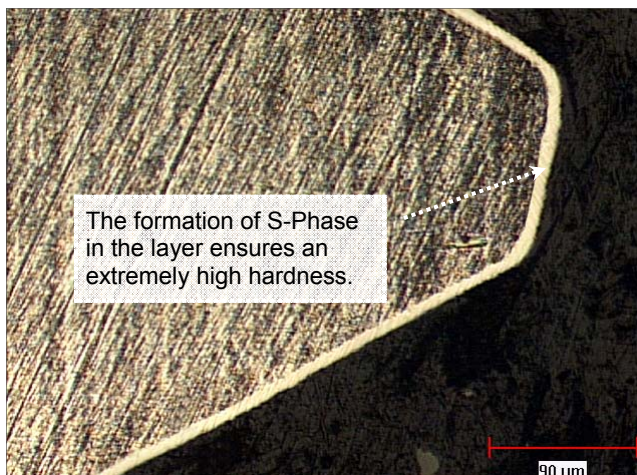
**IMPROVES ANTI-WEAR & RETAINS CORROSION PROPERTIES OF STAINLESS STEELS**

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 affecting the inherent corrosion resistance. The process diffuses nitrogen and/or carbon into the surface of the steel, creating a new phase structure, the S-Phase, that provides extremely high hardness. Because **NANO-S™** is a fully controlled process, there is no formation of chromium nitrides/carbides and consequently no loss of corrosion inhibiting properties. The treatment produces a hardened layer that is ductile and up to 25 µm deep (0.001”).

Achieved at low temperatures less than 932°F (500°C), **NANO-S™** does not induce distortion, which eliminates final machining. Finished parts are uniformly hardened even inside small bores, tight grooves and at sharp edges.

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



The formation of S-Phase 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.*

PROPERTIES OF NANO-S™	
Surface Hardness	> 1400 HV
Effective Hardening Case	25 µm (0.001”) maximum
Wear Resistance	Highly resistant
Corrosion Resistance	Unaffected
Roughness	Unaffected
Ductility	Unaffected
Toughness	Extremely high No crack propagation under thermo-mechanical stress
Color / Shape	No change in color, shape or size

### Treatable Materials

- Austenitic Stainless Steels
- Martensitic Stainless Steels
- A286
- Custom 465
- Duplex Stainless Steel
- Hastelloy C22 and C276
- Inconel 625 and 718
- > Inquire about other materials

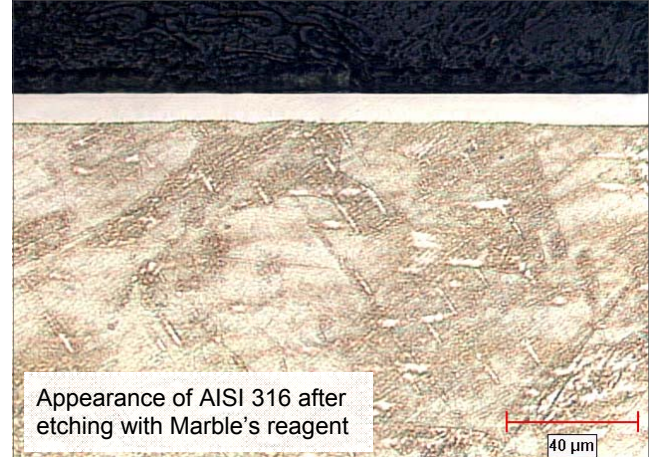


# NANO-S™ TECHNOLOGY

**IMPROVES ANTI-WEAR & RETAINS CORROSION PROPERTIES OF STAINLESS STEELS**

## NANO-S™ Advantage

- Attains excellent wear resistance
- Improves fatigue strength
- Retains intrinsic corrosion properties
- Prevents galling
- Does not alter chemical composition of alloy
- Has no effect on the steel's non-magnetic nature
- No change in the color, shape or size
- Uniformly hardened even small bores, tight grooves and sharp edges
- Green technology, no waste pollution



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.

## Applications

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



### **Gear Aerospace application**

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



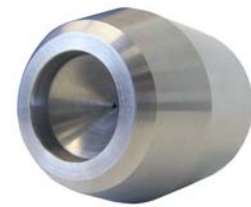
### **Landing Gear Lock Aerospace application**

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



### **Ball Valve Refinery application**

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



### **Injector Petroleum application**

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

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