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.

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™

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Hardness</td>
<td>&gt; 1400 HV</td>
</tr>
<tr>
<td>Effective Hardening Case</td>
<td>25 μm (0.001”) maximum</td>
</tr>
<tr>
<td>Wear Resistance</td>
<td>Highly resistant</td>
</tr>
<tr>
<td>Corrosion Resistance</td>
<td>Unaffected</td>
</tr>
<tr>
<td>Roughness</td>
<td>Unaffected</td>
</tr>
<tr>
<td>Ductility</td>
<td>Unaffected</td>
</tr>
<tr>
<td>Toughness</td>
<td>Extremely high</td>
</tr>
<tr>
<td></td>
<td>No crack propagation under thermo-mechanical stress</td>
</tr>
<tr>
<td>Color / Shape</td>
<td>No change in color, shape or size</td>
</tr>
</tbody>
</table>

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

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

NANO-S™ IMPROVES ANTI-WEAR & RETAINS CORROSION PROPERTIES OF STAINLESS STEELS

Applications

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

Industrial Applications

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

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

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