

## **NITROSTEEL FAQ's**

### **Section 1: Machining & Saw Cutting (Bar Product)**

- NitroSteel products and chrome-plated products utilize the same base metals and would be machined in a similar fashion. The hardened surface wear layer and light shallow case of NitroSteel's diffusion zone requires standard carbide tooling.
- Ceramic tools are not needed.
- Once through the hard, thin surface, high-speed tooling can be used if preferred. NitroSteel products are highly polished so hard steel chucks, collets, or vises should be avoided. Brass, bronze plastics or soft composites are commonly used.
- This is case-hardened material. Like any hardened steel, 90° corners and sharp leading edges should be rounded. Oblique angles (rounded corners) should be applied to the edges of cross-drilled holes. Remove the hardened surface layer prior to cross drilling.
- When sawing NitroSteel products, carbide toothed blades work well and give significantly better saw blade life compared to high-speed steel blades. Abrasive cut off wheels work very well.
- Wet fiber tubes must be removed from the steel. As with chrome plated products, saw cutting in fiber tubes (cardboard packaging sleeves) help eliminate handling damage but water-soluble cutting fluids can soak the cardboard and release paper acids that can cause corrosion.
- Within 1" on one end of each bar there is small cross drilled hole. This hole is used to hang steel in the furnace and should be avoided by saw blades and machining tools.

### **Section 2: Welding**

- NitroSteel products are being welded in the same fashion as chrome plated steel. The laying of a weld bead directly on the wear surface should be avoided.
- The nitrogen-enriched surface should be removed at the weld site (machine, chamfer, or grind) to create a groove for the weldment ("J" groove).

- Welding techniques suitable for the specific grade of steel should be utilized. NitroSteel treated products are ideally suited for friction/inertia welding.
- Like chrome, a heat affected zone 1/8" to 1/4" immediately adjacent to the weld site can reduce both hardness and corrosion resistance. This area is not considered a wear site and is usually painted along with the clevis or rod end.

### Section 3: Wear Characteristics

- The high surface hardness of NitroSteel products (64 HRC to 71 HRC), the surface smoothness (16 Ra max for standard NitroSteel), and the layer depth (approximately 0.001") gives the product exceptional wear and impact resistance.
- Product wear is further enhanced by the dimensional uniformity of NitroSteel bars. NitroSteel products are free of high and low spots common in chrome plating. Layer depth is consistent side-to-side and end-to-end.

### Section 4: Corrosion Resistance

- NitroSteel products are inherently more corrosion resistant than chrome plating. No corrosion will be evident in NitroSteel samples tested to a minimum 150 hours of ASTM B-117 Neutral Salt Spray. Bars are routinely tested to 500+ hours. The outstanding corrosion resistance stems from a synergy of four unique characteristics of the NitroSteel surface:
  1. The iron nitride wear layer is a true "non-metallic" and exhibits excellent corrosion resistance.
  2. A black iron oxide film then permeates the nitride layer's porous zone, which effectively seals the surface. Iron oxide, magnetite, is extremely corrosion resistant.
  3. The porous outer surface helps carry oil, which contributes to lubricity, reduces wear, and further adds to corrosion resistance.
  4. The corrosion-resistant layer is diffused into the steel it does not chip, flake, or peel as chrome-plated or painted surfaces do.

## Section 5: Additional Application Considerations

- The use of distilled solvents (e.g., acetone) are not considered acceptable cleaning agents for nonmetallic surfaces.
- NitroSteel should not be used in environments above 500° Fahrenheit (260° Celsius).
- Being a surface hardened product, NitroSteel bars and tubes are not suitable for bending.
- NitroSteel surfaces are not resistant to sulfuric or hydrochloric acids.