

Material Guide 316 Stainless Steel



316 Stainless Steel is a high-performance alloy that is widely recognized for its superior corrosion resistance, particularly in marine and chemical environments. It is an austenitic stainless steel, similar to 304 stainless steel, but with the addition of molybdenum, which enhances its resistance to chlorides and other corrosive agents. Here's an overview of the characteristics and benefits of 316 stainless steel:

CHARACTERISTICS of 316 STAINLESS STEEL:

- **Composition:**
 - Iron (Fe): The base metal.
 - Chromium (Cr): 16–18% — provides corrosion resistance and hardness.
 - Nickel (Ni): 10–14% — improves formability, toughness, and corrosion resistance.
 - Molybdenum (Mo): 2–3% — enhances resistance to chlorides and pitting, especially in marine and saline environments.
 - Manganese (Mn): 2% max — enhances toughness and strength.
 - Silicon (Si): 0.75% max — increases strength and oxidation resistance.
- **Corrosion Resistance:**
 - 316 stainless steel has its exceptional resistance to corrosion, especially in chloride-rich environments like seawater, brine, and other aggressive chemicals. The molybdenum content in 316 makes it highly resistant to pitting, crevice corrosion, and general corrosion.
- **Temperature Resistance:**
 - 316 stainless steel maintains its strength and corrosion resistance at higher temperatures, making it suitable for use in environments with temperatures up to 870°C (1,600°F) in intermittent service and up to 925°C (1,700°F) in continuous service.
- **Magnetic Properties:**
 - Like 304 stainless steel, 316 is generally non-magnetic in its annealed state. However, cold working can induce a slight magnetic response.
- **Appearance:**
 - The #4 brushed finish is both functional and aesthetically pleasing.

APPLICATIONS for 316 STAINLESS STEEL:

- **Marine and Coastal Applications:**
 - Marine hardware tags
 - Offshore equipment plates
 - ID Tags for submerged infrastructure
 - Mark piping, valves in water treatment plants
- **Chemical Processing:**
 - Pipe and valve ID tags, Hose Tags
 - Equipment tags for pumps, tanks, and machinery
 - Asset management tags
- **Food and Beverage Industry:**
 - ID tags for pumps, fans and equipment
 - Piping and valve tags to prevent contamination
 - Labeling conveyor systems, storage and refrigeration
- **Pharmaceuticals and Medical Devices:**
 - Labeling surgical equipment in pharmaceutical clean rooms
 - Equipment and asset tracking with barcodes
 - Labeling equipment that receives chemical sterilization
 - Labeling identify laboratory benches and lab equipment
 - ID tags for carts, trays and baskets in high-temp sterilization
- **Heat Exchangers and Boilers:**
 - Equipment ID tags to identify heat exchangers and boilers
 - Compliance and safety warnings mandated by ASME standards
- **Oil and Gas:**
 - Tags for offshore platforms, pipelines and structural elements
 - ID tags for pumps, motors, compressors, and machinery
 - Tags for refineries and chemical plants
- **Water Treatment:**
 - Tags for filtration systems, pumps and water treatment facilities

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BENEFITS of 316 STAINLESS STEEL:

- **Superior Corrosion Resistance**

316 stainless steel offers significantly better corrosion resistance compared to 304 stainless steel, particularly in environments exposed to chlorides, such as seawater, acidic environments, and salt-laden air. This makes it the preferred choice in marine, chemical, and food processing industries.

- **Resistance to Pitting and Crevice Corrosion**

The molybdenum content in 316 stainless steel gives it enhanced protection against pitting and crevice corrosion, which are common in environments that contain chlorides. This makes 316 ideal for use in harsh or marine environments where these types of corrosion can be problematic.

- **Increased Durability**

316 stainless steel is more durable than many other materials, offering superior strength, hardness, and long-lasting performance, even under challenging conditions. It can withstand heavy use without significant wear or degradation.

- **Sustainability**

Like other stainless steels, 316 stainless steel is 100% recyclable, making it an environmentally friendly choice for a wide range of applications.

- **Heat Resistance**

316 stainless steel can perform well under high temperatures, retaining its structural integrity and corrosion resistance in both continuous and intermittent high-temperature applications.

- **Hygienic and Easy to Clean**

Like 304 stainless steel, 316 stainless steel has a smooth, non-porous surface that is easy to clean and maintain. This is especially important in industries where hygiene is critical, such as food and pharmaceuticals.

- **Non-Reactive**

316 stainless steel is non-reactive to most acids, alkalis, and salts, which is particularly important in the food, medical, and pharmaceutical industries where contamination or alteration of products is a concern.

- **Aesthetic Appeal**

316 stainless steel has an attractive finish that maintains its appearance over time. It is used for both functional and decorative purposes, providing a sleek and modern look in various applications.

- **Long-Term Cost Effectiveness**

Though 316 stainless steel can be slightly more expensive initially than 304 stainless steel, its longer lifespan, superior performance in corrosive environments, and lower maintenance requirements make it a more cost-effective option in the long run for many industries.



Contact us today to Quote your 316 Stainless Project

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