Material Information

Stainless Steel 316

Introduction

Stainless Steel 316, also known as AISI 316 or UNS S31600, is a molybdenum-alloyed austenitic stainless steel known for its excellent corrosion resistance, good formability, and good weldability. The addition of molybdenum improves its resistance to pitting and crevice corrosion, particularly in chloride-containing environments, compared with Stainless Steel 304. Stainless Steel 316 is widely used for sheet metal fabrication when enhanced corrosion resistance and reliable fabrication performance are required.

Advantages

Excellent corrosion resistance, good formability, and good weldability make Stainless Steel 316 suitable for a wide range of sheet metal fabrication applications. It can be bent, stamped, drawn, and formed using conventional fabrication processes while maintaining good durability. Its enhanced resistance to chloride-containing environments also makes it suitable for applications exposed to moisture, chemicals, and other corrosive conditions.

Disadvantages

Stainless Steel 316 has a relatively high work-hardening rate, which can make extensive forming progressively more difficult and may require appropriate tooling or intermediate annealing for severe forming operations. It is also generally more expensive than Stainless Steel 304 because of its alloying content. Although it has better resistance to chloride-induced corrosion than 304, 316 can still be susceptible to pitting and crevice corrosion in warm or highly concentrated chloride environments.

Tolerance

We offer tolerances as tight as +/- 0.005". Tighter tolerances are available upon manual review.

Recommendation

The combination of excellent corrosion resistance, good formability, weldability, and durability makes Stainless Steel 316 suitable for sheet metal fabricated parts used in chemical processing, food and beverage, marine-related, pharmaceutical, medical, industrial, and general engineering applications. It is particularly appropriate for components exposed to

moisture, chlorides, or corrosive process environments where enhanced corrosion resistance is required.

Material Specifications (For reference only.)	
Tensile strength	290MPa
Elongation at Break	50%
Hardness	217 HB
Shear modulus	74GPa
Density	8 g/cm^3

Attention

Stainless Steel 316 is a non-heat-treatable austenitic stainless steel, so its strength cannot be increased through conventional heat treatment and is primarily affected by cold working. During bending, stamping, and deep drawing, the material's work-hardening behavior and springback should be considered when selecting tooling and forming parameters. Standard 316 is also susceptible to sensitization under certain welding and thermal exposure conditions; for welded components where resistance to intergranular corrosion is critical, 316L may be preferable because of its lower carbon content.

Applications

3DSPRO finds people using Stainless Steel 316 to make functional parts and prototypes in the following industries and applications.

Chemical and industrial equipment:
Process equipment, tanks, covers, panels, brackets, valves, and other fabricated components requiring high corrosion resistance and reliable performance in demanding environments.

Food, beverage, and pharmaceutical equipment:
Processing equipment, housings, panels, trays, enclosures, and other fabricated parts requiring corrosion resistance, durability, and suitable surface performance.

Marine and water-related applications:
Enclosures, brackets, panels, fittings, and other sheet metal components exposed to moisture or chloride-containing environments where improved corrosion resistance is required.

General engineering and process applications:

Heat exchanger components, flanges, valves, housings, cabinets, brackets, and other sheet metal fabricated parts that benefit from Stainless Steel 316's combination of corrosion resistance, formability, and weldability.