Material Information

Stainless Steel 316L

Introduction

Stainless Steel 316L, also known as AISI 316L or UNS S31603, is a low-carbon molybdenum-alloyed austenitic stainless steel known for its excellent corrosion resistance, good formability, and good weldability. The addition of molybdenum improves resistance to pitting and crevice corrosion, while the low carbon content helps reduce the risk of sensitization during welding. Stainless Steel 316L is widely used for sheet metal fabrication when enhanced corrosion resistance and reliable welded performance are required.

Advantages

Excellent corrosion resistance, good formability, and good weldability make Stainless Steel 316L suitable for a wide range of sheet metal fabrication applications. It can be readily bent, stamped, drawn, and formed using conventional fabrication processes. Its improved resistance to chloride-containing environments and good welded corrosion resistance also make it suitable for equipment exposed to moisture, chemicals, and demanding service conditions.

Disadvantages

Stainless Steel 316L has a relatively high work-hardening rate, which can make extensive forming more difficult and may require suitable tooling or intermediate annealing for severe deformation. It is also generally more expensive than Stainless Steel 304 because of its molybdenum content. Although 316L offers strong corrosion resistance, it can still experience localized corrosion in severe chloride or highly corrosive 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 durable performance makes Stainless Steel 316L suitable for sheet metal fabricated parts used in chemical processing, food and beverage, pharmaceutical, medical, marine, and industrial applications. It is particularly appropriate for welded enclosures, tanks, panels, housings, brackets, and

other components exposed to moisture, chlorides, or corrosive process environments.

Material Specifications (For reference only.)	
Tensile strength	170 to 290MPa
Fatigue strength	240 to 290MPa
Elongation at Break	40% to 50%
Hardness	140 to 190 HB
Density	7.9 g/cm^3

Attention

Stainless Steel 316L is a non-heat-treatable austenitic stainless steel, and its strength is primarily influenced by cold working. During bending, stamping, and deep drawing, work hardening and springback should be considered when selecting tooling and forming parameters. The low carbon content of 316L reduces the risk of carbide precipitation and sensitization during welding, but appropriate welding procedures and surface cleaning are still important to maintain corrosion resistance. Contamination from carbon steel tools or particles should also be avoided during fabrication.

Applications

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

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

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

Marine and water-related applications:
Marine enclosures, brackets, panels, fittings, covers, and other sheet metal components exposed to moisture or chloride-containing environments.

Medical and general engineering:
Medical equipment components, cabinets, housings, brackets, heat-transfer components, and other sheet metal fabricated parts that benefit from 316L's combination of corrosion resistance, formability, and weldability.