

Material Information



Stainless Steel 316L

Introduction

Stainless Steel 316L is a low-carbon version of 316 austenitic stainless steel containing chromium, nickel, and molybdenum. Its low carbon content helps minimize carbide precipitation during welding, while the molybdenum content provides excellent resistance to pitting and corrosion. These properties make 316L suitable for CNC-machined components used in demanding and corrosive environments.

Advantages

Excellent corrosion resistance, particularly against pitting and chloride-containing environments, together with good toughness, weldability, and ductility. Stainless Steel 316L also maintains good corrosion resistance after welding because its low carbon content reduces the risk of carbide precipitation.

Disadvantages

Stainless Steel 316L is more difficult to machine than free-machining stainless steels such as 303 and can work harden during machining. Its lower machinability can result in greater cutting forces and tool wear, so appropriate tooling and machining conditions are important for efficient CNC production.

Tolerance

3DSPRO can manufacture and inspect to tight tolerances, including sub +/- 0.001" tolerances, per your drawing specifications and GD&T callouts.

Recommendation

The combination of excellent corrosion resistance, weldability, toughness, and durability makes Stainless Steel 316L suitable for CNC machined components used in marine, chemical processing, medical, food and beverage, and industrial applications. It is particularly appropriate for parts that may be exposed to moisture, chlorides, or corrosive process environments.

Material Specifications (For reference only.)	
Tensile strength	205MPa

Shear modulus	74GPa
Elongation at Break	40%
Hardness	187 HB
Density	8.03 g/cm ³

Attention

Stainless Steel 316L readily work hardens during machining, so rigid tooling, suitable cutting parameters, and positive feeds are important for maintaining machining efficiency and surface quality. Its low carbon content makes it well suited to welded assemblies, although the final corrosion requirements and service environment should still be considered when selecting the material and fabrication process.

Applications

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

Marine equipment:

Marine fittings, valves, pumps, brackets, fasteners, and other components exposed to moisture and chloride-containing environments.

Chemical and industrial equipment:

Process equipment, pumps, valves, fittings, heat-transfer components, and other parts requiring strong corrosion resistance.

Medical and pharmaceutical equipment:

Medical device components, surgical equipment, laboratory components, pharmaceutical processing equipment, and precision fittings.

Food and beverage equipment:

Food processing components, tanks, sanitary fittings, brewery equipment, and other parts requiring corrosion resistance and good weldability.