

Material Information



Stainless Steel 304

Introduction

Stainless Steel 304, also known as AISI 304 or UNS S30400, is an austenitic stainless steel containing approximately 18% chromium and 8% nickel. It offers a strong balance of corrosion resistance, toughness, formability, weldability, and machinability, making it one of the most widely used materials for CNC-machined parts.

Advantages

Excellent corrosion resistance, good machinability, excellent weldability, and good formability. Stainless Steel 304 also provides good resistance to many atmospheric and chemical environments and maintains useful mechanical properties over a wide range of applications.

Disadvantages

Stainless Steel 304 is more difficult to machine than free-machining stainless steels such as 303. It also has limited resistance to pitting and crevice corrosion in warm chloride-containing environments, so it may not be suitable for severe chloride exposure.

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 corrosion resistance, weldability, formability, and machinability makes Stainless Steel 304 suitable for CNC-machined components used in industrial, food and beverage, automotive, architectural, and general engineering applications. It is particularly appropriate for parts that require reliable corrosion resistance together with good mechanical and fabrication performance.

Material Specifications (For reference only.)	
Tensile strength	215MPa
Shear modulus	77GPa
Elongation at Break	70%
Hardness	123 HB

Density	8 g/cm ³
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Attention

Stainless Steel 304 readily work hardens during machining, so sharp tooling, appropriate cutting parameters, and sufficient chip control are important for achieving consistent CNC machining results. For applications involving high chloride concentrations or elevated temperatures, material selection should be evaluated carefully because pitting, crevice corrosion, and stress corrosion cracking can occur under certain conditions.

Applications

3DSPRO finds people using Stainless Steel 304 to make functional parts and prototypes in the following industries and applications.

Food and beverage equipment:

Food processing components, brewery equipment, dairy processing equipment, sinks, tanks, and sanitary fittings.

Automotive and industrial equipment:

Brackets, shafts, fasteners, fittings, machine components, housings, and other corrosion-resistant mechanical parts.

Architecture and construction:

Handrails, window frames, architectural panels, trim, fixtures, and other components exposed to indoor or outdoor environments.

Consumer and general products:

Kitchen equipment, appliances, screws, nuts, bolts, tubing, springs, and other precision components requiring corrosion resistance and durability.