Material Information

Stainless Steel 306

Introduction

Stainless Steel 306 (UNS S30600) is a low-carbon, high-silicon austenitic stainless steel known for its excellent resistance to highly oxidizing environments. Its high silicon content provides particularly good corrosion resistance in concentrated nitric acid and other oxidizing chemical environments. It also offers good strength, ductility, and weldability, making it suitable for chemical processing equipment, industrial vessels, piping systems, and other components exposed to demanding chemical conditions.

Advantages

Excellent resistance to concentrated nitric acid. Very good oxidation resistance. Good strength and ductility. Low carbon content helps resist intergranular corrosion. Good weldability. Suitable for demanding chemical processing environments.

Disadvantages

Limited resistance to certain reducing acids and chloride-containing environments. Corrosion performance depends strongly on acid concentration and operating temperature. Higher alloying content may increase material costs. Machining requires appropriate cutting tools and parameters to maintain dimensional accuracy and surface quality.

Tolerance

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

Recommendation

Stainless Steel 306 is recommended for functional parts that require excellent resistance to highly oxidizing chemical environments, particularly concentrated nitric acid. It is especially suitable for chemical processing equipment, storage vessels, piping components, heat exchangers, valves, and industrial fittings used in chemical production facilities. It is a suitable choice when chemical compatibility and corrosion resistance are more important than general-purpose machinability.

Material Specifications (For reference only.)	
Tensile strength	231MPa
Elongation at Break	56%
Yield strength	154MPa

Attention

Stainless Steel 306 offers excellent corrosion resistance in concentrated nitric acid, but its performance varies significantly depending on the chemical concentration, temperature, and operating environment. It should not be assumed to provide equally good resistance to all acids, particularly reducing acids such as hydrochloric acid. During CNC machining, appropriate cutting tools, feeds, speeds, and cooling strategies should be selected to maintain machining quality. For welded components, proper cleaning, shielding, and heat-input control are important to preserve corrosion resistance.

Applications

3DSPRO finds people using Stainless Steel 306 to make functional parts and prototypes in the following industries and applications.

Chemical Processing:
Chemical processing equipment, storage tanks, reaction vessels, piping systems, valves, pumps, and fittings exposed to concentrated nitric acid.

Industrial Equipment:
Heat exchangers, pressure vessels, chemical handling equipment, fluid transfer components, and corrosion-resistant industrial fittings.

Fertilizer and Chemical Production:
Nitric acid processing equipment, chemical storage systems, transfer pipelines, and components used in oxidizing chemical production environments.

Oil and Gas:
Specialized chemical handling equipment, process piping, fluid transfer components, and industrial fittings where the specific chemical environment is compatible with the alloy.

Energy and Environmental Engineering:
Chemical treatment equipment, oxidation-resistant process components, industrial piping, and specialized equipment used in corrosive operating environments.