Material Information

Stainless Steel 301

Introduction

Stainless Steel 301, also known as AISI 301 or UNS S30100, is an austenitic chromium-nickel stainless steel known for its high work-hardening capability, good corrosion resistance, and good formability. Its strength can increase significantly through cold working, allowing different temper conditions to provide a wide range of strength and ductility. Stainless Steel 301 is widely used for sheet metal fabrication when a combination of formability, high strength, and lightweight construction is required.

Advantages

Good corrosion resistance, excellent work-hardening capability, and good formability make Stainless Steel 301 suitable for a wide range of sheet metal fabrication applications. It can be bent, stamped, stretched, and formed into various shapes, while cold working can significantly increase its strength.

Disadvantages

Stainless Steel 301 has a high work-hardening rate, which can make subsequent forming operations increasingly difficult as deformation progresses. Severe or multiple forming operations may require intermediate annealing to restore ductility, and the material can be susceptible to delayed cracking after severe forming. Its corrosion resistance is good but generally lower than that of 304 stainless steel, particularly in more demanding corrosive environments.

Tolerance

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

Recommendation

The combination of good corrosion resistance, high work-hardening capability, formability, and strength makes Stainless Steel 301 suitable for sheet metal fabricated parts used in automotive, industrial equipment, electrical, appliance, and general engineering applications. It is particularly appropriate for components that require high strength after cold forming, repeated flexing, or a combination of moderate corrosion resistance and lightweight construction.

Material Specifications (For reference only.)	
Tensile strength	205MPa
Fatigue strength	240MPa
Elongation at Break	40%
Hardness	217 HB
Density	8.03 g/cm^3

Attention

Stainless Steel 301 is a non-heat-treatable austenitic stainless steel, and its strength is primarily increased through cold working; as the amount of cold work increases, strength and hardness rise while ductility decreases. During bending, stamping, and forming, the selected temper and required deformation should therefore be considered carefully. For severe or multiple forming operations, intermediate annealing may be necessary to reduce the risk of cracking. Welding of heavier sections or exposure to certain heat-treatment conditions can also increase the risk of sensitization and intergranular corrosion, so the fabrication process should be selected according to the part thickness and service environment.

Applications

3DSPRO finds people using Stainless Steel 301 to make functional parts and prototypes in the following industries and applications.

Automotive and transportation:
Automotive cylinders, head-gasket components, clips, brackets, and other formed parts requiring good corrosion resistance and increased strength after cold working.

Industrial equipment:
Conveyor chains, mixer blades, press plates, springs, washers, and other fabricated components requiring strength, durability, and good forming performance.

Electrical and electronic components:
Clips, contacts, spring components, brackets, and other formed sheet metal parts where resilience, dimensional stability, and moderate corrosion resistance are important.

Appliances and general engineering:
Housings, panels, clips, fasteners, springs, brackets, and other sheet metal fabricated parts that benefit from Stainless Steel 301's combination of formability, work-hardening capability, and corrosion resistance.