Material Information

Titanium Grade 2

Introduction

Titanium Grade 2, also known as Commercially Pure (CP) Titanium Grade 2, UNS R50400, or W.Nr. 3.7035, is an unalloyed titanium offering a superior balance of moderate strength, high ductility, lightweight performance, and outstanding corrosion resistance. It features an exceptional strength-to-weight ratio, a density approximately 45% lower than steel, and high resistance to oxidation. In sheet metal fabrication, Titanium Grade 2 is widely recognized as the workhorse of commercially pure titanium, making it the premier choice for chemical processing, marine applications, aerospace components, and medical devices.

Advantages

Titanium Grade 2 exhibits exceptional corrosion resistance across a broad range of aggressive media, including saltwater, marine splash zones, chlorides, wet chlorine gas, organic acids, and oxidizing environments. It offers an excellent strength-to-weight ratio, allowing significant weight savings compared to stainless steel while maintaining robust structural integrity. Furthermore, it possesses superior biocompatibility, excellent cold formability, and good weldability compared to higher-strength titanium alloys.

Disadvantages

Titanium Grade 2 has significantly lower tensile and yield strength compared to alloyed titanium grades (such as Titanium Grade 5 / Ti-6Al-4V), making it less suitable for extreme structural load-bearing applications. Its raw material cost is substantially higher than standard stainless steel and aluminum alloys. Additionally, titanium is prone to galling and adhesive wear when subjected to sliding contact against other metals and experiences rapid strength loss at temperatures above 600°F (315°C).

Tolerance

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

Recommendation

The combination of lightweight construction, excellent formability, corrosion resistance, thermal and electrical conductivity, and good weldability makes Aluminum 1100 suitable for sheet metal fabricated parts used in electrical, heat-transfer, food-processing, chemical, lighting, and general industrial applications. It is particularly appropriate for parts with relatively low structural loads that require extensive bending or forming.

Material Specifications (For reference only.)	
Tensile strength	>345MPa
Yield strength	275 to 450MPa
Elongation at Break	20%
Density	4.51 g/cm^3

Attention

When specifying Titanium Grade 2, product designers and engineers should evaluate structural load requirements: if high-stress mechanical performance or elevated-temperature strength above 600°F (315°C) is required, Grade 5 (Ti-6Al-4V) or another titanium alloy should be considered instead. Designers must account for Titanium Grade 2's relatively low modulus of elasticity (roughly half that of steel), which results in greater elastic springback during sheet forming and requires attention to part stiffness under bending loads. To prevent galling and wear in moving assemblies, sliding titanium surfaces should be specified with anti-galling coatings, anodizing, or protective bushings. Additionally, Titanium Grade 2 should not be used in dry chlorine gas or concentrated fuming nitric acid environments due to severe corrosion and fire hazard risks.

Applications

3DSPRO finds people using Titanium Grade 2 to make functional parts and prototypes in the following industries and applications.

Chemical and petrochemical processing:
Heat exchangers, chlor-alkali cell components, reaction vessels, piping manifolds, storage tanks, and valve bodies handling chlorides, organic acids, and oxidizing solutions.

Marine and naval engineering:
Desalination plant components, seawater piping systems, submarine hull fittings, sonar fairings, and offshore platform hardware exposed to salt spray and submerged environments.

Aerospace and defense:

Aircraft skin panels, environmental control ducting, engine heat shields, firewalls, and non-structural airframe brackets requiring high strength-to-weight efficiency.

Medical, architectural, and consumer products:
Surgical tray enclosures, medical hardware housings, high-end automotive exhaust components, architectural cladding, and premium consumer products.