Xometry

Datasheet

TC4

Description

TC4 (Ti-6Al-4V Grade 5) is a medium-strength (α+β) duplex titanium alloy containing 6% of the α-stabilizing element aluminum (Al) and 4% of the β-stabilizing element vanadium (V). It is the most widely used titanium alloy designation. It corresponds to the Chinese standard TC4 and the American standard Ti-6Al-4V, with a maximum long-term service temperature generally around 400°C.

Features

TC4 offers lightweight high strength, with a density only 60% that of steel while achieving strength close to that of alloy steel. It has exceptional corrosion resistance, withstanding seawater, acids, alkalis, and oxidation—far surpassing stainless steel in corrosive environments. Excellent heat resistance; can be used continuously at temperatures up to 400℃. With excellent toughness and fatigue resistance, it performs well against impact, vibration, and crack propagation. It is non-magnetic and biocompatible, making it suitable for human implants and medical devices. It has good weldability, allowing for argon arc welding and plasma welding, resulting in high welding strength.

With its combination of high strength, good toughness, and excellent weldability, it has been successfully applied in aerospace, petrochemical, shipbuilding, automotive, and medical industries.

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Parameters

Component Elements Properties	Metric
Aluminum, Al	5.5 - 6.75 %
Carbon, C	<= 0.080 %
Hydrogen, H	<= 0.015%
Iron, Fe	<= 0.40 %
Nitrogen, N	<= 0.030 %
Other, each	<= 0.050 %
Other, total	<= 0.30 %
Oxygen, O	<= 0.20 %
Titanium, Ti	87.725 - 91 %
Vanadium, V	3.5-4.5%

Physical Properties	Metric
Density	4.43 g/cc

Mechanical Properties	Metric
Hardness, Brinell	379
Hardness, Knoop	414
Hardness, Rockwell C	41
Hardness, Vickers	396
Tensile Strength, Ultimate	1170 MPa
Tensile Strength, Yield	1100 MPa
Elongation at Break	10%
Creep Strength	210 MPa