Ti-6Al-4V (Grade 5)

Technical Datasheet

Titanium Alloy Service. Quality. Value.

Typical Applications

Aero-engine components, Airframe components, Marine equipment, Offshore oil & gas equipment, Power generation industry, Autosport components, Medical equipment.

Product Description

Ti-6Al-4V (Grade 5), classed as an alpha-beta alloy, is the most widely used of the high strength titanium alloys. The alloy combines its good mechanical strength and low density (4.42 kg/dm³) with excellent corrosion resistance in many media. Grade 5 titanium is fully heat treatable (solution heat treatment plus aging) in sections up to 25mm and can be employed up to around 400°C.

Ti-6Al-4V ELI (Grade 23) has a reduced oxygen content (0.13% max.) compared with Grade 5. This confers improved ductility and fracture toughness with some reduction in mechanical strength. Uses include fracture critical airframe structures and for offshore tubulars.

Availability

Bar, wire, sheet, plate, extrusions, forgings, seamless pipe/ tube.

Corrosion Resistance

Grade 5 titanium offers excellent resistance to many marine and offshore oil & gas environments. Titanium and its alloys resist a wide range of acid conditions being highly resistant to oxidising acids, possessing useful resistance to reducing acids and offering good resistance to most organic acids at lower concentrations and temperatures. Titanium should not be used with red fuming nitric acid and is rapidly attacked by hydrofluoric acid. The addition of 0.05% palladium (grade 24), 0.1% ruthenium (grade 29) or 0.05% palladium and 0.5% nickel (grade 25) significantly increases corrosion resistance in reducing acid chloride and sour environments, raising the threshold temperature to well over 200°C.

Material Specifications

- UNS R56400
- BS TA11
- AMS 4928
- ASTM B348 Grade 5
- AMS 4911
- MIL-STD-2154

Fabrication (typical values)

- Weldability - fair
- Specified bend radius for <0.070 in. x thickness - 4.5
- Specified bend radius for >0.070 in. x thickness - 5.0
- AMS 4928

Chemical Composition (Bar to ASTM B348 Grade 5)

Weight (%)	N	C	H	Fe	O	Al	V
Min						5.5	3.5
Max	0.05	0.08	0.015	0.40	0.20	6.75	4.5

Mechanical Properties (Bar to ASTM B348 Grade 5)

	Minimum	Typical
UTS, MPa	895	1,000
0.2% PS, MPa	828	910
Elongation, % in 4D	10	18
Reduction of area, %	25	-
Elastic modulus, GPa	-	114
Hardness, HRC	-	36
Charpy V-notch impact, J	-	24

Technical Assistance

Our knowledgeable staff backed up by our resident team of qualified metallurgists and engineers, will be pleased to assist further on any technical topic.

UK Service Centres:

Smiths Belfast	02895 908 897	Smiths Leeds	0113 307 5167
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Quality & Testing:

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www.smithmetal.com info@smithmetal.com