

Ti-6Al-4V (Grade 5)

Smiths High Performance



Revision: SHP/english/datasheets/ti-6al-4v/11.02.2025

Page: 1 of 2

High Strength Titanium

The alpha-beta alloy is the most widely used commercial high-strength titanium.

The alloy combines good mechanical strength and low density (4.42 kg/dm³) with excellent corrosion resistance in many media. Grade 5 titanium is entirely heat treatable (solution heat treatment plus ageing) in sections up to 25mm, and can be employed up to around 400° C.

Machinability:

The alloy can be machined using practices for austenitic steels with slow speeds, heavy feeds, rigid tooling and large amounts of non-chlorinated cutting fluid.

Weldability:

Welding in the annealed or solution/partially aged condition is good, with ageing completed during the post-weld heat treatment. An inert gas shield must protect the workable area of the weld, heat-affected zone (HAZ) and cooling weld bead from oxidation (oxygen, nitrogen and hydrogen). Fusion welding is achieved by inert gas welding of the molten metal and the adjacent heated zones using a trailing shield. Protective atmospheres are not required when spot, seam and flash welding.

Typical Applications:

- Engine components
- Connecting rods
- Fasteners
- Subframes

About Smiths High Performance

Smiths High Performance is a leading stockholder and supplier of high-performance engineering materials. We are material supply chain partners supporting high-technology market sectors.



Availability:

Bar, wire, sheet, plate, extrusions, forgings, seamless pipe/tube. Processing options are also available in-house.



SCAN ME

Further technical data available on the reverse of this Datasheet

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Page: 2 of 2

*Chemical Composition (weight, %)

	N	C	H	Fe	O	Al	V	Y
Min.						5.50	3.50	
Max.	0.05	0.08	0.0125	0.30	0.20	6.75	4.50	0.005

* Properties as per AMS 4928

*Mechanical Properties

Nominal Diameter or least distance between parallel sides (in mm)	Tensile Strength MPA	Yield Strength at 0.2% offset MPa	Elongation in 50.8mm or 4D % Long	Elongation in 50.8mm or 4D % L.T.	Elongation in 50.8mm or 4D % S.T.	Reduction of area % Long	Reduction of area % L.T.	Reduction of area % S.T. (2)
Up to 50.80, incl (1)	931	862	10	10	---	25	20	---
Over 50.80 to 101.60, incl	896	827	10	10	10	25	20	15
Over 101.60 to 152.40, incl (3)	896	827	10	10	8	20	20	15
Over 152.40 to 254.00, incl	896	820	10	10	8	20	20	15

* Properties as per AMS 4928

Corrosive Resistance:

Grade 5 titanium offers excellent resistance to marine and offshore oil & gas environments. It resists a wide range of acid conditions being highly resistant to oxidising acids, possessing impressive resilience to reducing acids and offering superior resistance to most organic acids at lower concentrations and temperatures.

Hydrofluoric acid rapidly attacks the alloy, and use with red-fuming nitric acid is prohibited.

Grade 5 has broad commercial engineering use and is popular in above-sea and sub-sea applications.

Fabrication (typical values)

Weldability – fair

Specified bend radius for < 0.070-inch x thickness - 4.5

Specified bend radius for >0.070-inch x thickness - 5.0

Material Specifications:

- UNS R56400
- ASTM B348 Grade 5
- BS 3TA11
- AMS 4911
- AMS 4928
- MIL-STD-2154

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When you purchase high-performance materials from **Smiths High Performance**, you will join some of the biggest and best global engineering companies. We are a Tier 1 supply chain partner to the world's leading motorsport companies. Our unique business structure and ethos allow us to offer services otherwise unavailable in this market sector.

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