

Ti-6Al-4V (Grade 5)

Product Data Sheet

High Strength Titanium

The most widely used high strength titanium, Ti-6Al-4V (grade 5) is an alpha-beta alloy

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.

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

The alloy is easily welded in the annealed condition or in the solution and partially aged condition, with aging being completed during the post weld heat treatment. Precautions must be taken to prevent oxygen, nitrogen and hydrogen contamination. Fusion welding can be done in inert gas welding of the molten metal and the adjacent heated zones using a trailing shield. Spot, seam and flash welding can be performed without resorting to protective atmospheres.

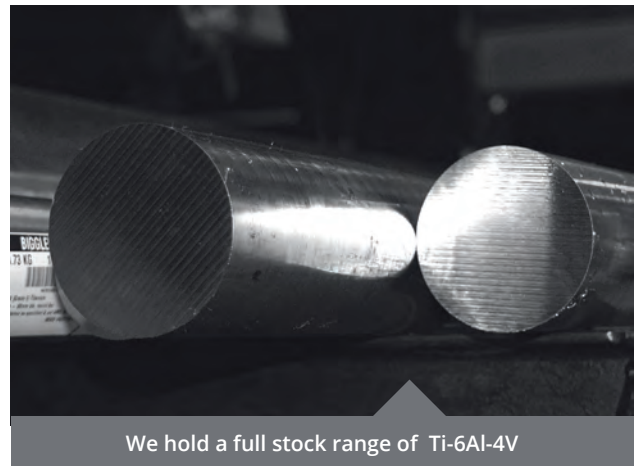
Typical Applications

- Motorsport components
- Aero-engine components
- Airframe components
- Offshore oil & gas equipment

About Smiths High Performance

Smiths High Performance is a leading stockholder and supplier of high performance engineering materials to the global motorsport sector. We are supply partners in a range of specialist motorsport markets including Formula 1, Formula E, NASCAR, MOTO GP, WEC & WRC.

Further technical data available on the reverse of this Datasheet



Availability

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

Chemical Composition

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

	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

Corrosive Resistance

Grade 5 titanium offers excellent resistance to many marine and offshore oil & gas environments. It resists 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.

The alloy should not be used with red fuming nitric acid and is rapidly attacked by hydrofluoric acid.

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

Material Specifications

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

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