Titanium Ti-6Al-4V (Grade 5), STA Bar

Subcategory: Alpha/Beta Titanium Alloy; Metal; Nonferrous Metal; Titanium Alloy

Key Words: Ti-6-4; UNS R56400; ASTM Grade 5 titanium; UNS R56401 (ELI); Ti6Al4V, biomaterials, biomedical implants, biocompatibility

Component	Wt. %
Al	6
Fe	Max 0.25
O	Max 0.2
Ti	90
V	4

Material Notes:

Information provided by Allvac and the references. Solution Treated 900-955ºC, Aged 540ºC. Alpha-Beta Alloy

Applications: Blades, discs, rings, airframe, fasteners, components. Vessels, cases, hubs, forgings.. Biomedical implants.

Biocompatibility: Excellent, especially when direct contact with tissue or bone is required. Ti-6Al-4V's poor shear strength makes it undesirable for bone screws or plates. It also has poor surface wear properties and tends to seize when in sliding contact with itself and other metals. Surface treatments such as nitriding and oxidizing can improve the surface wear properties.

Physical Properties	Metric	English	Comments
Density	4.43 g/cc	0.16 lb/in³	
Mechanical Properties			
Hardness, Brinell	360	360	Estimated from Rockwell C.
Hardness, Knoop	392	392	Estimated from Rockwell C.
Hardness, Rockwell C	39	39	
Hardness, Vickers	376	376	Estimated from Rockwell C.
Tensile Strength, Ultimate	1035 MPa	150000 psi	
Tensile Strength, Yield	965 MPa	140000 psi	

Elongation at Break	8 %	8 %	
Reduction of Area	50 %	50 %	
Modulus of Elasticity	114 GPa	16500 ksi	Average of tension and compression
Compressive Yield Strength	1070 MPa	155000 psi	
Poisson's Ratio	0.33	0.33	
Fatigue Strength	700 MPa	102000 psi	Smooth, 10,000,000 Cycles
Shear Modulus	44 GPa	6380 ksi	

Electrical Properties

Electrical Resistivity	0.000178 ohm-cm	0.000178 ohm-cm	
Magnetic Permeability	1.00005	1.00005	at 1.6 kA/m
Magnetic Susceptibility	3.3e-006	3.3e-006	cgs/g

Thermal Properties

CTE, linear 20°C	8.6 µm/m-°C	4.78 µin/in-°F	20-100ºC
CTE, linear 250°C	9.2 µm/m-°C	5.11 µin/in-°F	Average over the range 20-315ºC
CTE, linear 500°C	9.7 µm/m-°C	5.39 µin/in-°F	Average over the range 20-650ºC
Specific Heat Capacity	0.5263 J/g-°C	0.126 BTU/lb-°F	
Thermal Conductivity	6.7 W/m-K	46.5 BTU-in/hr-ft²-°F	
Melting Point	1604 - 1660 °C	2920 - 3020 °F	
Solidus	1604 °C	2920 °F	
Liquidus	1660 °C	3020 °F	
Beta Transus	980 °C	1800 °F	

References for this datasheet.

Some of the values displayed above may have been converted from their original units and/or rounded in order to display the information in a consistant format. Users requiring more precise data for scientific or engineering calculations can click on the property value to see the original value as well as raw conversions to equivalent units. We advise that you only use the original value or one of its raw conversions in your calculations to minimize rounding error.