Titanium Grade 3

Subcategory: Metal; Nonferrous Metal; Titanium Alloy; Unalloyed/Modified Titanium

Close Analogs: Titanium Grades 1,2,3,4,7,11,and 12 are all considered unalloyed and have similar mechanical properties.

Key Words: ASTM Grade 3; UNS R50550, CP titanium, C.P. titanium alloy

Component	Wt. %
C	Max 0.1
Fe	Max 0.3
H	Max 0.015
N	Max 0.05
O	Max 0.35
Ti	99.1

Material Notes:

Information provided by Allvac and the references.

Applications: Airframe skin, heat exchangers, cryogenic vessels, components for CPI equipment, condenser tubing, exhaust pipe shrouds.

Physical Properties	Metric	English	Comments
Density	4.5 g/cc	0.163 lb/in³	
Mechanical Properties			
Hardness, Brinell	225	225	annealed
Hardness, Knoop	175	175	unwelded sample
Hardness, Knoop	220	220	welded
Hardness, Rockwell B	90	90	annealed
Hardness, Rockwell C	16	16	Estimated from Brinell.
Tensile Strength, Ultimate	440 MPa	63800 psi	

Tensile Strength, Yield	377 - 520 MPa	54700 - 75400 psi	
Elongation at Break	18 %	18 %	
Reduction of Area	35 %	35 %	
Modulus of Elasticity	105 GPa	15200 ksi	In Tension
Compressive Yield Strength	450 MPa	65300 psi	
Compressive Modulus	110 GPa	16000 ksi	
Ultimate Bearing Strength	1000 MPa	145000 psi	Cold Worked
Bearing Yield Strength	900 MPa	131000 psi	Cold Worked
Poisson's Ratio	0.37	0.37	
Charpy Impact	30 - 66 J	22.1 - 48.7 ft-lb	V-notch; also reported as 40 J
Fatigue Strength	240 MPa	34800 psi	at 1E+7 cycles. R = -1
Fatigue Strength	289 MPa	41900 psi	1,000,000 Cycles
Fracture Toughness	79 MPa-m½	71.9 ksi-in½	for K(Q) after anneal
Shear Modulus	45 GPa	6530 ksi	

Electrical Properties

Electrical Resistivity	5.4e-005 ohm-cm	5.4e-005 ohm-cm	

Thermal Properties

Heat of Fusion	325 J/g	140 BTU/lb	High Purity Ti.
CTE, linear 20°C	8.6 µm/m-°C	4.78 µin/in-°F	0-100ºC
CTE, linear 250°C	9.2 µm/m-°C	5.11 µin/in-°F	Average over the range 0-315ºC
CTE, linear 500°C	9.7 µm/m-°C	5.39 µin/in-°F	0-540ºC; CTE is higher perpendicular to the c-axis
Specific Heat Capacity	0.523 J/g-°C	0.125 BTU/lb-°F	value is 0.67 J/g-ºC at 540ºC
Thermal Conductivity	19.9 W/m-K	138 BTU-in/hr-ft²-°F	
Melting Point	Max 1660 °C	Max 3020 °F	Liquidus
Liquidus	1660 °C	3020 °F	
Beta Transus	920 °C	1690 °F	

Optical Properties

Emissivity (0-1)	0.3	0.3	High purity Ti at 710°C
Reflection Coefficient, Visible (0-1)	0.56	0.56	High purity Ti; visible light.

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.