



ASM Aerospace Specification Metals Inc.



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Titanium Grade 1

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: UNS R50250; ASTM Grade 1, CP titanium, C.P. titanium alloy

Component	Wt. %
C	Max 0.1
Fe	Max 0.2
H	Max 0.015
N	Max 0.03
O	Max 0.18
Ti	99.5

Material Notes:

Information provided by Allvac and the references.

Applications: Airframe components, cryogenic vessels, heat exchangers, CPI equipment, condenser tubing, pickling baskets.

Physical Properties	Metric	English	Comments
Density	<u>4.51 g/cc</u>	0.163 lb/in ³	

Mechanical Properties

Hardness, Brinell	120	120	annealed
Hardness, Knoop	132	132	Estimated from Brinell.
Hardness, Rockwell B	70	70	annealed
Hardness, Vickers	122	122	Estimated from Brinell.
Tensile Strength, Ultimate	<u>240 MPa</u>	34800 psi	
Tensile Strength, Yield	170 - 310 MPa	24700 - 45000 psi	
Elongation at Break	<u>24 %</u>	24 %	

Reduction of Area	<u>35 %</u>	35 %	
Modulus of Elasticity	<u>105 GPa</u>	15200 ksi	In Tension
Compressive Modulus	<u>110 GPa</u>	16000 ksi	
Poisson's Ratio	0.37	0.37	
Charpy Impact	<u>310 J</u>	229 ft-lb	V-notch
Shear Modulus	<u>45 GPa</u>	6530 ksi	

Electrical Properties

Electrical Resistivity	<u>4.5e-005 ohm-cm</u>	4.5e-005 ohm-cm	
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Thermal Properties

Heat of Fusion	<u>325 J/g</u>	140 BTU/lb	High Purity Ti.
CTE, linear 20°C	<u>8.6 μm/m-°C</u>	4.78 μin/in-°F	0-100°C
CTE, linear 250°C	<u>9.2 μm/m-°C</u>	5.11 μin/in-°F	Average over the range 0--315°C
CTE, linear 500°C	<u>9.7 μm/m-°C</u>	5.39 μin/in-°F	0-540°C; CTE is higher perpendicular to the c-axis
Specific Heat Capacity	<u>0.52 J/g-°C</u>	0.124 BTU/lb-°F	Heat Capacity at 540°C is 0.67 J/g-°C
Thermal Conductivity	<u>16 W/m-K</u>	111 BTU-in/hr-ft ² -°F	annealed
Melting Point	<u>Max 1670 °C</u>	Max 3040 °F	Liquidus
Liquidus	<u>1670 °C</u>	3040 °F	
Beta Transus	<u>888 °C</u>	1630 °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 consistent 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.