# Titanium Grade 2, Annealed

**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 2; UNS R50400, CP titanium, C.P. titanium alloy

| Component | Wt. % |
|---|---|
| C | Max 0.1 |
| Fe | Max 0.3 |
| H | Max 0.015 |
| N | Max 0.03 |
| O | Max 0.25 |
| Ti | 99.2 |

## Material Notes:

Information provided by Allvac and the references.

**Applications:** Airframe components, cryogenic vessels, heat exchangers, CPI equipment, condenser tubing, pickling baskets. Sample was annealed 2 hr at 700°C.

| Physical Properties | Metric | English | Comments |
|---|---|---|---|
| Density | 4.51 g/cc | 0.163 lb/in³ | |
| **Mechanical Properties** | | | |
| Hardness, Rockwell B | 98 | 98 | |
| Tensile Strength, Ultimate | 430 MPa | 62400 psi | |
| Tensile Strength, Yield | 340 MPa | 49300 psi | |
| Elongation at Break | 28 % | 28 % | |
| Modulus of Elasticity | 102 GPa | 14800 ksi | in tension. |
| Compressive Yield Strength | 340 MPa | 49300 psi | |

| | | | |
|---|---|---|---|
| Notched Tensile Strength | 720 MPa | 104000 psi | $K_t$ (stress concentration factor) = 3.0 |
| Ultimate Bearing Strength | 930 MPa | 135000 psi | e/D = 2 |
| Bearing Yield Strength | 660 MPa | 95700 psi | e/D = 2 |
| Poisson's Ratio | 0.34 | 0.34 | |
| Charpy Impact | 65 J | 47.9 ft-lb | V-notch |
| Fatigue Strength | 240 MPa | 34800 psi | at 1E+7 cycles. $K_t$ (stress concentration factor) = 2.7 |
| Fatigue Strength | 280 MPa | 40600 psi | 1E+7 cycles, Unnotched |
| Shear Modulus | 38 GPa | 5510 ksi | |
| Shear Strength | 380 MPa | 55100 psi | Ultimate shear strength |

**Electrical Properties**

| | | | |
|---|---|---|---|
| Electrical Resistivity | 5.2e-005 ohm-cm | 5.2e-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 | 20-93°C |
| CTE, linear 250°C | 9.2 µm/m-°C | 5.11 µin/in-°F | Unspecified heat treatment. Average over the range 0-315ºC |
| Specific Heat Capacity | 0.523 J/g-°C | 0.125 BTU/lb-°F | |
| Thermal Conductivity | 16.4 W/m-K | 114 BTU-in/hr-ft²-°F | |
| Melting Point | Max 1665 °C | Max 3030 °F | Liquidus |
| Liquidus | 1665 °C | 3030 °F | |
| Beta Transus | 913 °C | 1680 °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.