Aluminum 2014-T6; 2014-T651

Subcategory: 2000 Series Aluminum Alloy; Aluminum Alloy; Metal; Nonferrous Metal

Close Analogs:

Composition Notes:
A Zr + Ti limit of 0.20 percent maximum may be used with this alloy designation for extruded and forged products only, but only when the supplier or producer and the purchaser have mutually so agreed. Agreement may be indicated, for example, by reference to a standard, by letter, by order note, or other means which allow the Zr + Ti limit.
Aluminum content reported is calculated as remainder.
Composition information provided by the Aluminum Association and is not for design.

Key Words: Aluminium 2014-T651; UNS A92014; ISO AlCu4SiMg; BS H15 (UK); CSA CS41N (Canada); AA2014-T651, DIN AlCuSiMn; NF A-U4SG (France)

Component	Wt. %	Component	Wt. %	Component	Wt. %
Al	90.4 - 95	Mg	0.2 - 0.8	Si	0.5 - 1.2
Cr	Max 0.1	Mn	0.4 - 1.2	Ti	Max 0.15
Cu	3.9 - 5	Other, each	Max 0.05	Zn	Max 0.25
Fe	Max 0.7	Other, total	Max 0.15		

Material Notes:
Data points with the AA note have been provided by the Aluminum Association, Inc. and are NOT FOR DESIGN.

Physical Properties	Metric	English	Comments
Density	2.8 g/cc	0.101 lb/in³	AA; Typical
Mechanical Properties			
Hardness, Brinell	135	135	AA; Typical; 500 g load; 10 mm ball
Hardness, Knoop	170	170	Converted from Brinell Hardness Value
Hardness, Rockwell A	50.5	50.5	Converted from Rockwell B
Hardness, Rockwell B	82	82	-

Hardness, Vickers	155	155	Converted from Brinell Hardness Value
Ultimate Tensile Strength	483 MPa	70000 psi	AA; Typical
Tensile Yield Strength	414 MPa	60000 psi	AA; Typical
Elongation at Break	13 %	13 %	AA; Typical; 1/2 in. (12.7 mm) Diameter
Modulus of Elasticity	72.4 GPa	10500 ksi	In Tension
Modulus of Elasticity	73.1 GPa	10600 ksi	AA; Typical; Average of tension and compression. Compression modulus is about 2% greater than tensile modulus.
Compressive Modulus	73.8 GPa	10700 ksi	
Notched Tensile Strength	414 MPa	60000 psi	2.5 cm width x 0.16 cm thick side-notched specimen, K_t = 17.
Ultimate Bearing Strength	889 MPa	129000 psi	Edge distance/pin diameter = 2.0
Bearing Yield Strength	662 MPa	96000 psi	Edge distance/pin diameter = 2.0
Poisson's Ratio	0.33	0.33	
Fatigue Strength	124 MPa	18000 psi	AA; 500,000,000 cycles completely reversed stress; RR Moore machine/specimen
Fracture Toughness	19 MPa-m½	17.3 ksi-in½	K_{IC}; TL orientation.
Machinability	70 %	70 %	0-100 Scale of Aluminum Alloys
Shear Modulus	28 GPa	4060 ksi	
Shear Strength	290 MPa	42000 psi	AA; Typical

Electrical Properties

Electrical Resistivity	4.32e-006 ohm-cm	4.32e-006 ohm-cm	AA; Typical at 68°F

Thermal Properties

CTE, linear 68°F	23 µm/m-°C	12.8 µin/in-°F	AA; Typical; Average over 68-212°F range.
CTE, linear 250°C	24.4 µm/m-°C	13.6 µin/in-°F	Average over the range 20-300ºC
Specific Heat Capacity	0.88 J/g-°C	0.21 BTU/lb-°F	Estimated from trends in similar Al alloys.
Thermal Conductivity	154 W/m-K	1070 BTU-in/hr-ft²-°F	AA; Typical at 77°F
Melting Point	507 - 638 °C	945 - 1180 °F	AA; Typical range based on typical composition for wrought products 1/4 inch thickness or greater. Eutectic melting is not eliminated by homogenization.
Solidus	507 °C	945 °F	AA; Typical
Liquidus	638 °C	1180 °F	AA; Typical

Processing Properties

Annealing Temperature	413 °C	775 °F	
Solution Temperature	502 °C	935 °F	
Aging Temperature	160 °C	320 °F	Sheet, plate, wire, rod, bar, shapes, tube; 18 hr at temperature

Aging Temperature	171 °C	340 °F	Forgings; 10 hr at temperature

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.