Aluminum 2014-T6; 2014-T651	
Categories:	Metal; Nonferrous Metal; Aluminum Alloy; 2000 Series Aluminum Alloy
Material Notes:	Used in applications requiring high strength/hardness, including elevated temperature uses. Specific applications include heavy duty forgings, plate, and extrusions for aerospace fittings, wheels, tanks, and major structural components, heavy duty automotive frame and suspension componentry. 2014 exhibits poor corrosion resistance for an aluminum alloy. Data points with the AA note have been provided by the Aluminum Association, Inc. and are NOT FOR DESIGN. **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. 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)
Vendors:	No vendors are listed for this material. Please click here if you are a supplier and would like information on how to add your listing to this material.

Physical Properties	Metric	English	Comments
Density	2.80 g/cc	0.101 lb/in³	AA; Typical

Mechanical Properties	Metric	English	Comments
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	70.0 ksi	AA; Typical

Tensile Yield Strength	414 MPa	60.0 ksi	AA; Typical
Elongation at Break	13.0 %	13.0 %	AA; Typical; 1/2 in. (12.7 mm) Diameter
Modulus of Elasticity	72.4 GPa	10500 ksi	In Tension
	73.1 GPa	10600 ksi	AA; Typical; Average of tension and compression. Compression modulus is about 2% greater than tensile modulus.
Compressive Strength	470 MPa	68200 psi	
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
Poissons Ratio	0.330	0.330	
Fatigue Strength	124 MPa @# of Cycles 5.00e+8	18000 psi @# of Cycles 5.00e+8	completely reversed stress; RR Moore machine/specimen
Fracture Toughness	19.0 MPa-m½	17.3 ksi-in½	K_{IC}; TL orientation.
Machinability	70 %	70 %	0-100 Scale of Aluminum Alloys
Shear Modulus	28.0 GPa	4060 ksi	
Shear Strength	290 MPa	42000 psi	AA; Typical

Electrical Properties	**Metric**	**English**	**Comments**
Electrical Resistivity	0.00000432 ohm-cm	0.00000432 ohm-cm	AA; Typical at 68°F

Thermal Properties	**Metric**	**English**	**Comments**
CTE, linear	23.0 µm/m-°C @Temperature 20.0 - 100 °C	12.8 µin/in-°F @Temperature 68.0 - 212 °F	AA; Typical; average over range
	24.4 µm/m-°C @Temperature	13.6 µin/in-°F @Temperature	average

	20.0 - 300 °C	68.0 - 572 °F	
Specific Heat Capacity	0.880 J/g-°C	0.210 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	**Metric**	**English**	**Comments**
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
	171 °C	340 °F	Forgings; 10 hr at temperature
Material Components Properties	**Metric**	**English**	**Comments**
Aluminum, Al	90.4 - 95.0 %	90.4 - 95.0 %	As remainder
Chromium, Cr	<= 0.10 %	<= 0.10 %	
Copper, Cu	3.90 - 5.0 %	3.90 - 5.0 %	
Iron, Fe	<= 0.70 %	<= 0.70 %	
Magnesium, Mg	0.20 - 0.80 %	0.20 - 0.80 %	
Manganese, Mn	0.40 - 1.20 %	0.40 - 1.20 %	
Other, each	<= 0.050 %	<= 0.050 %	
Other, total	<= 0.15 %	<= 0.15 %	
Silicon, Si	0.50 - 1.20 %	0.50 - 1.20 %	
Titanium, Ti	<= 0.15 %	<= 0.15 %	
Zinc, Zn	<= 0.25 %	<= 0.25 %	