

## Aluminum 6061-T6; 6061-T651

**Subcategory:** 6000 Series Aluminum Alloy; Aluminum Alloy; Metal; Nonferrous Metal

**Close Analogs:**

**Composition Notes:**

Aluminum content reported is calculated as remainder.  
Composition information provided by the Aluminum Association and is not for design.

**Key Words:** al6061, UNS A96061; ISO AIMg1SiCu; Aluminium 6061-T6, AD-33 (Russia); AA6061-T6; 6061T6, UNS A96061; ISO AIMg1SiCu; Aluminium 6061-T651, AD-33 (Russia); AA6061-T651

Component	Wt. %	Component	Wt. %	Component	Wt. %
Al	95.8 - 98.6	Mg	0.8 - 1.2	Si	0.4 - 0.8
Cr	0.04 - 0.35	Mn	Max 0.15	Ti	Max 0.15
Cu	0.15 - 0.4	Other, each	Max 0.05	Zn	Max 0.25
Fe	Max 0.7	Other, total	Max 0.15		

**Material Notes:**

Information provided by Alcoa, Starmet and the references. General 6061 characteristics and uses: Excellent joining characteristics, good acceptance of applied coatings. Combines relatively high strength, good workability, and high resistance to corrosion; widely available. The T8 and T9 tempers offer better chipping characteristics over the T6 temper.

**Applications:** Aircraft fittings, camera lens mounts, couplings, marines fittings and hardware, electrical fittings and connectors, decorative or misc. hardware, hinge pins, magneto parts, brake pistons, hydraulic pistons, appliance fittings, valves and valve parts; bike frames.

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	<u>2.7 g/cc</u>	0.0975 lb/in <sup>3</sup>	AA; Typical

Hardness, Brinell	95	95	AA; Typical; 500 g load; 10 mm ball
Hardness, Knoop	120	120	Converted from Brinell Hardness Value
Hardness, Rockwell A	40	40	Converted from Brinell Hardness Value

Hardness, Rockwell B	60	60	Converted from Brinell Hardness Value
Hardness, Vickers	107	107	Converted from Brinell Hardness Value
Ultimate Tensile Strength	<u>310 MPa</u>	45000 psi	AA; Typical
Tensile Yield Strength	<u>276 MPa</u>	40000 psi	AA; Typical
Elongation at Break	<u>12 %</u>	12 %	AA; Typical; 1/16 in. (1.6 mm) Thickness
Elongation at Break	<u>17 %</u>	17 %	AA; Typical; 1/2 in. (12.7 mm) Diameter
Modulus of Elasticity	<u>68.9 GPa</u>	10000 ksi	AA; Typical; Average of tension and compression. Compression modulus is about 2% greater than tensile modulus.
Notched Tensile Strength	<u>324 MPa</u>	47000 psi	2.5 cm width x 0.16 cm thick side-notched specimen, $K_t = 17$ .
Ultimate Bearing Strength	<u>607 MPa</u>	88000 psi	Edge distance/pin diameter = 2.0
Bearing Yield Strength	<u>386 MPa</u>	56000 psi	Edge distance/pin diameter = 2.0
Poisson's Ratio	0.33	0.33	Estimated from trends in similar Al alloys.
Fatigue Strength	<u>96.5 MPa</u>	14000 psi	AA; 500,000,000 cycles completely reversed stress; RR Moore machine/specimen
Fracture Toughness	<u>29 MPa-m<sup>1/2</sup></u>	26.4 ksi-in <sup>1/2</sup>	$K_{IC}$ ; TL orientation.
Machinability	<u>50 %</u>	50 %	0-100 Scale of Aluminum Alloys
Shear Modulus	<u>26 GPa</u>	3770 ksi	Estimated from similar Al alloys.
Shear Strength	<u>207 MPa</u>	30000 psi	AA; Typical

Electrical Resistivity	<u>3.99e-006 ohm-cm</u>	3.99e-006 ohm-cm	AA; Typical at 68°F
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CTE, linear 68°F	<u>23.6 <math>\mu\text{m}/\text{m}\cdot^\circ\text{C}</math></u>	13.1 $\mu\text{in}/\text{in}\cdot^\circ\text{F}$	AA; Typical; Average over 68-212°F range.
CTE, linear 250°C	<u>25.2 <math>\mu\text{m}/\text{m}\cdot^\circ\text{C}</math></u>	14 $\mu\text{in}/\text{in}\cdot^\circ\text{F}$	Estimated from trends in similar Al alloys. 20-300°C.
Specific Heat Capacity	<u>0.896 J/g·°C</u>	0.214 BTU/lb·°F	
Thermal Conductivity	<u>167 W/m·K</u>	1160 BTU-in/hr-ft <sup>2</sup> ·°F	AA; Typical at 77°F
Melting Point	582 - 652 °C	1080 - 1205 °F	AA; Typical range based on typical composition for wrought products 1/4 inch thickness or greater; Eutectic melting can be completely eliminated by homogenization.
Solidus	<u>582 °C</u>	1080 °F	AA; Typical
Liquidus	<u>652 °C</u>	1205 °F	AA; Typical

Solution Temperature	<u>529 °C</u>	985 °F	
Aging Temperature	<u>160 °C</u>	320 °F	Rolled or drawn products; hold at temperature for 18 hr
Aging Temperature	<u>177 °C</u>	350 °F	Extrusions or forgings; hold at temperature for 8 hr