Aluminum A356.0-T6, Sand Cast

Categories: Metal; Nonferrous Metal; Aluminum Alloy; Aluminum Casting Alloy

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

Composition Notes:
Composition information provided by the Aluminum Association and is not for design.

Key Words: Aluminium A356.0-T6; UNS A13560; AAA356.0-T6

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Physical Properties	Metric	English	Comments
Density	2.67 g/cc	0.0965 lb/in³	

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	70 - 105	70 - 105	AA; Typical; 500 g load; 10 mm ball
Hardness, Knoop	112	112	Estimated from Brinell Hardness.
Hardness, Rockwell A	37	37	Estimated from Brinell Hardness.
Hardness, Rockwell B	55	55	Estimated from Brinell Hardness.
Hardness, Vickers	99	99	Estimated from Brinell Hardness.
Tensile Strength, Ultimate	>= 234 MPa	>= 34000 psi	AA
Tensile Strength, Yield	>= 165 MPa @Strain 0.200 %	>= 24000 psi @Strain 0.200 %	AA
Elongation at Break	>= 3.5 %	>= 3.5 %	AA; In 2 in. (50 mm) or 4D
Modulus of Elasticity	72.4 GPa	10500 ksi	In Tension; elastic modulus in compression is typically about 2% higher for aluminum alloys.
Poissons Ratio	0.33	0.33	
Machinability	50 %	50 %	0-100 Scale (100=best)
Shear Modulus	27.2 GPa	3950 ksi	
Shear Strength	143 MPa	20700 psi	Calculated

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.00000440 ohm-cm	0.00000440 ohm-cm	

Thermal	Metric	English	Comments

Properties			
Heat of Fusion	389 J/g	167 BTU/lb	
CTE, linear	21.4 µm/m-°C @Temperature 20.0 - 100 °C	11.9 µin/in-°F @Temperature 68.0 - 212 °F	
	23.2 µm/m-°C @Temperature 20.0 - 300 °C	12.9 µin/in-°F @Temperature 68.0 - 572 °F	
Specific Heat Capacity	0.963 J/g-°C	0.230 BTU/lb-°F	
Thermal Conductivity	151 W/m-K	1050 BTU-in/hr-ft²-°F	
Melting Point	557 - 613 °C	1030 - 1140 °F	
Solidus	557 °C	1030 °F	
Liquidus	613 °C	1140 °F	

Processing Properties	Metric	English	Comments
Melt Temperature	677 - 816 °C	1250 - 1500 °F	
Solution Temperature	535 - 540.6 °C	995 - 1005 °F	hold at temperature for 12 hr; cool in water at 150 to 212°F
Aging Temperature	152 - 157 °C	305 - 315 °F	hold at temperature 2 - 5 hrs; start with solution heat-treated material
Casting Temperature	677 - 788 °C	1250 - 1450 °F	

Component Elements Properties	Metric	English	Comments
Aluminum, Al	91.1 - 93.3 %	91.1 - 93.3 %	As remainder
Copper, Cu	<= 0.20 %	<= 0.20 %	
Iron, Fe	<= 0.20 %	<= 0.20 %	
Magnesium, Mg	0.25 - 0.45 %	0.25 - 0.45 %	
Manganese, Mn	<= 0.10 %	<= 0.10 %	
Other, each	<= 0.050 %	<= 0.050 %	
Other, total	<= 0.15 %	<= 0.15 %	
Silicon, Si	6.5 - 7.5 %	6.5 - 7.5 %	
Titanium, Ti	<= 0.20 %	<= 0.20 %	
Zinc, Zn	<= 0.10 %	<= 0.10 %	