

Aluminum 355.0-T6, Sand Cast


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

Composition Notes:

If iron exceeds 0.45%, manganese content shall not be less than one-half iron content.
Composition information provided by the Aluminum Association and is not for design.

Key Words: Aluminium 355.0-T6; UNS A03550; ISO 3522: AISi5Cu1Mg; ISO R164: AISi5Cu1; AA355.0-T6

Physical Properties	Metric	English	Comments
Density	2.71 g/cc	0.0979 lb/in ³	AA; Typical
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	>= 221 MPa	>= 32000 psi	AA
Tensile Strength, Yield	>= 138 MPa @Strain 0.200 %	>= 20000 psi @Strain 0.200 %	AA
Elongation at Break	>= 2.0 %	>= 2.0 %	AA; in 2 in. (50 mm) or 4D
Modulus of Elasticity	70.3 GPa	10200 ksi	In Tension; elastic modulus in compression is typically about 2% higher for aluminum alloys.
Compressive Yield Strength	180 MPa	26100 psi	
Poissons Ratio	0.33	0.33	
Fatigue Strength	62.0 MPa @# of Cycles 5.00e+8	8990 psi @# of Cycles 5.00e+8	Notch Status unknown, R.R. Moore Test
Machinability	50 %	50 %	0-100 Scale (100=best)
Shear Modulus	26.2 GPa	3800 ksi	
Shear Strength	195 MPa	28300 psi	
Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.00000480 ohm-cm	0.00000480 ohm-cm	AA; Typical 36% IACS Conductivity
Thermal Properties	Metric	English	Comments

Heat of Fusion	389 J/g	167 BTU/lb	Typical for cast aluminum
CTE, linear 	22.3 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$ @Temperature 20.0 - 100 $^\circ\text{C}$	12.4 $\mu\text{in}/\text{in}\cdot^\circ\text{F}$ @Temperature 68.0 - 212 $^\circ\text{F}$	AA; Typical
	24.7 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$ @Temperature 20.0 - 300 $^\circ\text{C}$	13.7 $\mu\text{in}/\text{in}\cdot^\circ\text{F}$ @Temperature 68.0 - 572 $^\circ\text{F}$	AA; Typical; average over range
Specific Heat Capacity	0.963 J/g $^\circ\text{C}$	0.230 BTU/lb $^\circ\text{F}$	
Thermal Conductivity	142 W/m-K	986 BTU-in/hr-ft $^2\cdot^\circ\text{F}$	AA; Typical at 25 $^\circ\text{C}$
Melting Point	546.1 - 621 $^\circ\text{C}$	1015 - 1150 $^\circ\text{F}$	AA; Typical
Solidus	546.1 $^\circ\text{C}$	1015 $^\circ\text{F}$	AA; Typical
Liquidus	621 $^\circ\text{C}$	1150 $^\circ\text{F}$	AA; Typical

Processing Properties	Metric	English	Comments
Melt Temperature	677 - 816 $^\circ\text{C}$	1250 - 1500 $^\circ\text{F}$	
Solution Temperature	521 - 527 $^\circ\text{C}$	970 - 980 $^\circ\text{F}$	hold at temperature for 12 hr; cool in water at 150 to 212 $^\circ\text{F}$
Aging Temperature	149 - 157 $^\circ\text{C}$	300 - 315 $^\circ\text{F}$	hold at temperature 3 - 5 hrs; start with solution heat-treated material
Casting Temperature	677 - 788 $^\circ\text{C}$	1250 - 1450 $^\circ\text{F}$	

Component Elements Properties	Metric	English	Comments
Aluminum, Al	90.3 - 94.1 %	90.3 - 94.1 %	As remainder
Chromium, Cr	<= 0.25 %	<= 0.25 %	
Copper, Cu	1.0 - 1.5 %	1.0 - 1.5 %	
Iron, Fe	<= 0.60 %	<= 0.60 %	
Magnesium, Mg	0.40 - 0.60 %	0.40 - 0.60 %	
Manganese, Mn	<= 0.50 %	<= 0.50 %	
Other, each	<= 0.050 %	<= 0.050 %	
Other, total	<= 0.15 %	<= 0.15 %	
Silicon, Si	4.5 - 5.5 %	4.5 - 5.5 %	
Titanium, Ti	<= 0.25 %	<= 0.25 %	
Zinc, Zn	<= 0.35 %	<= 0.35 %	