Aluminum 355.0-T51, 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-T51; UNS A03550; ISO 3522: AlSi5Cu1Mg; ISO R164: AlSi5Cu1; AA355.0-T51

Physical Properties	Metric	English	Comments
Density	2.71 g/cc	0.0979 lb/in³	AA; Typical

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	50 - 80	50 - 80	AA; Typical; 500 g load; 10 mm ball
Hardness, Knoop	88	88	Estimated from Brinell Hardness.
Hardness, Vickers	75	75	Estimated from Brinell Hardness.
Tensile Strength, Ultimate	>= 172 MPa	>= 25000 psi	AA
Tensile Strength, Yield	>= 124 MPa @Strain 0.200 %	>= 18000 psi @Strain 0.200 %	AA
Elongation at Break	1.5 %	1.5 %	in 50 mm
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	165 MPa	23900 psi	
Poissons Ratio	0.33	0.33	
Fatigue Strength	55.0 MPa @# of Cycles 5.00e+8	7980 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	150 MPa	21800 psi	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.00000400 ohm-cm	0.00000400 ohm-cm	AA; Typical 43% IACS Conductivity

Thermal Properties	Metric	English	Comments
Heat of Fusion	389 J/g	167 BTU/lb	Typical for cast aluminum
CTE, linear	22.3 µm/m-°C @Temperature 20.0 - 100 °C	12.4 µin/in-°F @Temperature 68.0 - 212 °F	AA; Typical
	24.7 µm/m-°C	13.7 µin/in-°F	AA; Typical; average over range

	@Temperature 20.0 - 300 °C	@Temperature 68.0 - 572 °F	
Specific Heat Capacity	0.963 J/g-°C	0.230 BTU/lb-°F	
Thermal Conductivity	167 W/m-K	1160 BTU-in/hr-ft²-°F	AA; Typical at 25°C
Melting Point	546.1 - 621 °C	1015 - 1150 °F	AA; Typical
Solidus	546.1 °C	1015 °F	AA; Typical
Liquidus	621 °C	1150 °F	AA; Typical

Processing Properties	**Metric**	**English**	**Comments**
Melt Temperature	677 - 816 °C	1250 - 1500 °F	
Solution Temperature	521 - 527 °C	970 - 980 °F	hold at temperature for 12 hr; cool in water at 150 to 212°F
Aging Temperature	224 - 229 °C	435 - 445 °F	hold at temperature 7 - 9 hrs; cool in water at 150 - 212°F
Casting Temperature	677 - 788 °C	1250 - 1450 °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 %	