Aluminum 356.0-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 356.0-T51; UNS A03560; ISO 3522 and R2147 AlSi7Mg; AA356.0-T51

Physical Properties	Metric	English	Comments
Density	2.68 g/cc	0.0968 lb/in³	AA; Typical

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	45 - 75	45 - 75	AA; Typical; 500 g load; 10 mm ball
Hardness, Knoop	83	83	Estimated from Brinell Hardness.
Hardness, Vickers	70	70	Estimated from Brinell Hardness.
Tensile Strength, Ultimate	>= 159 MPa	>= 23000 psi	AA
Tensile Strength, Yield	>= 110 MPa @Strain 0.200 %	>= 16000 psi @Strain 0.200 %	AA
Elongation at Break	2.0 %	2.0 %	in 50 mm
Modulus of Elasticity	72.4 GPa	10500 ksi	In Tension; elastic modulus in compression is typically about 2% higher for aluminum alloys.
Compressive Yield Strength	145 MPa	21000 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	27.2 GPa	3950 ksi	
Shear Strength	140 MPa	20300 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	
CTE, linear	21.4 µm/m-°C @Temperature 20.0 - 100 °C	11.9 µin/in-°F @Temperature 68.0 - 212 °F	AA; Typical
	23.2 µm/m-°C	12.9 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	557.2 - 612.8 °C	1035 - 1135 °F	AA; Typical
Solidus	557.2 °C	1035 °F	AA; Typical
Liquidus	612.8 °C	1135 °F	AA; Typical

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	224 - 229 °C	435 - 445 °F	hold at temperature 7 - 9 hrs; no solution heat treatment
Casting Temperature	677 - 788 °C	1250 - 1450 °F	

Component Elements Properties	**Metric**	**English**	**Comments**
Aluminum, Al	90.1 - 93.3 %	90.1 - 93.3 %	As remainder
Copper, Cu	<= 0.25 %	<= 0.25 %	
Iron, Fe	<= 0.60 %	<= 0.60 %	
Magnesium, Mg	0.20 - 0.45 %	0.20 - 0.45 %	
Manganese, Mn	<= 0.35 %	<= 0.35 %	
Other, each	<= 0.050 %	<= 0.050 %	
Other, total	<= 0.15 %	<= 0.15 %	
Silicon, Si	6.5 - 7.5 %	6.5 - 7.5 %	
Titanium, Ti	<= 0.25 %	<= 0.25 %	
Zinc, Zn	<= 0.35 %	<= 0.35 %	