Aluminum 319.0-T5, 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:
Composition information provided by the Aluminum Association and is not for design.

Key Words: Aluminium 319.0-T5; UNS A03190; AA319.0-T5, ISO 3522: AlSi5Cu3, AlSi5Cu3Mn; AlSi6Cu4; AlSi6Cu4Mn. ISO R164: AlSi5Cu3; AlSi5Cu3Fe; AlSi6Cu4; ISO 3522: AlSi5Cu3

Physical Properties	Metric	English	Comments
Density	2.79 g/cc	0.101 lb/in³	

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	65 - 95	65 - 95	AA; Typical; 500 g load; 10 mm ball
Hardness, Knoop	103	103	Estimated from Brinell Hardness.
Hardness, Rockwell B	49	49	Estimated from Brinell Hardness.
Hardness, Vickers	90	90	Estimated from Brinell Hardness.
Tensile Strength, Ultimate	>= 172 MPa	>= 25000 psi	AA
Modulus of Elasticity	74.0 GPa	10700 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	28.0 GPa	4060 ksi	
Shear Strength	107 MPa	15500 psi	Calculated

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.00000640 ohm-cm	0.00000640 ohm-cm	

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	
	22.9 µm/m-°C @Temperature 20.0 - 300 °C	12.7 µin/in-°F @Temperature 68.0 - 572 °F	
Specific Heat Capacity	0.963 J/g-°C	0.230 BTU/lb-°F	
Thermal Conductivity	109 W/m-K	756 BTU-in/hr-ft²-°F	

Melting Point	516 - 604 °C	961 - 1120 °F	
Solidus	516 °C	961 °F	
Liquidus	604 °C	1120 °F	

Processing Properties	Metric	English	Comments
Melt Temperature	677 - 816 °C	1250 - 1500 °F	
Solution Temperature	502 - 507 °C	935 - 945 °F	hold at temperature 12 hr, cool in water at 150 to 212°F
Casting Temperature	677 - 788 °C	1250 - 1450 °F	

Component Elements Properties	Metric	English	Comments
Aluminum, Al	85.8 - 91.5 %	85.8 - 91.5 %	As remainder
Copper, Cu	3.0 - 4.0 %	3.0 - 4.0 %	
Iron, Fe	<= 1.0 %	<= 1.0 %	
Magnesium, Mg	<= 0.10 %	<= 0.10 %	
Manganese, Mn	<= 0.50 %	<= 0.50 %	
Nickel, Ni	<= 0.35 %	<= 0.35 %	
Other, total	<= 0.50 %	<= 0.50 %	
Silicon, Si	5.5 - 6.5 %	5.5 - 6.5 %	
Titanium, Ti	<= 0.25 %	<= 0.25 %	
Zinc, Zn	<= 1.0 %	<= 1.0 %	