3T additive manufacturing

DATA SHEET

Aluminium AlSi10Mg

Material description

AlSi10Mg is a lightweight alloy used widely in the AM industry. It comprises of 9-11 wt% Si and 0.25-0.45wt% Mg with these two giving rise to the strengthening phase, Mg_2Si. Applications are widely varied between prototypes, functional parts and small runs of cast equivalent types such as LM9.

Physical properties[1]

Density (based on 2.67 g/cm³ theoretical density)	> 99%
Pore size	< 100 µm
Porosity rate	< 1%
Hardness	min. 80 HV10

Mechanical properties

	As Built	Stress Relieved[2]
Tensile strength Horizontal (XY) Vertical (Z)	 302 MPa ± 50 MPa 302 MPa ± 50 MPa	 257 MPa ± 18 MPa 257 MPa ± 18 MPa
Proof strength (Rp 0.2%) Horizontal (XY) Vertical (Z)	 177 MPa ± 50 MPa 177 MPa ± 50 MPa	 154 MPa ± 21 MPa 154 MPa ± 21 MPa
Modulus of elasticity Horizontal (XY) Vertical (Z)	 65 ± 8.5 GPa 65 ± 8.5 GPa	 70 ± 14 GPa 70 ± 14 GPa
Elongation at break Horizontal (XY) Vertical (Z)	 4.5 ± 2.1% 4.5 ± 2.1%	 11.6 ± 6.5% 11.6 ± 6.5%

[1] All data gathered using ASTM E8M flat un-machined specimens that were wire EDM to profile with cross section of 2mmx6mm at the gauge section.

[2] Stress relief at 300°C for 2 hours in a convection air furnace with specimens on build plate. Please contact us for bespoke heat treatment to achieve different mechanical properties.

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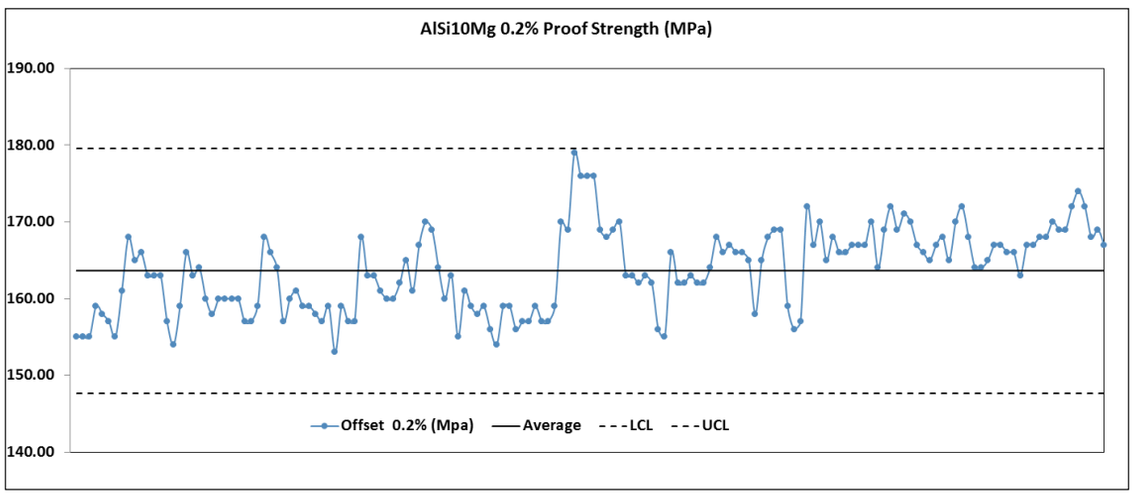
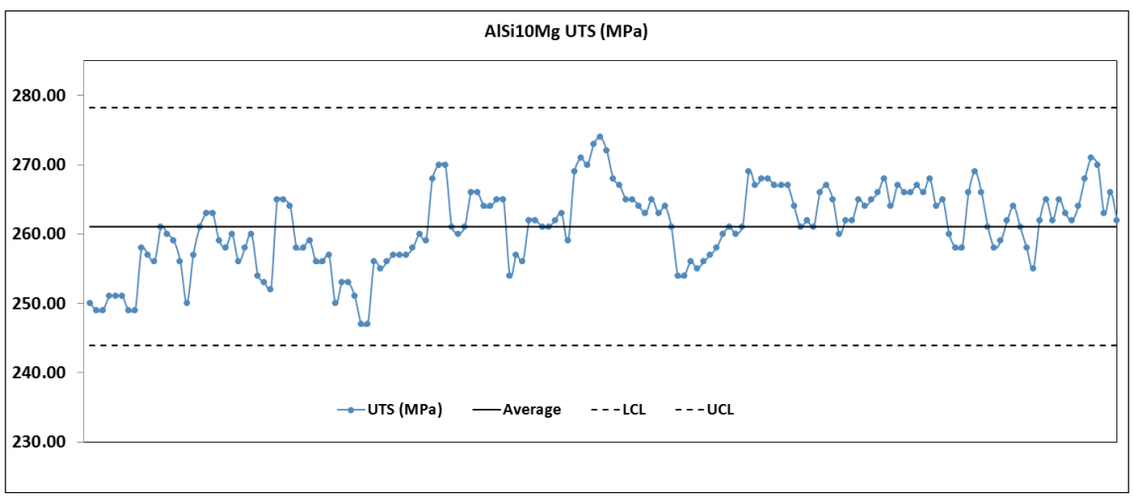
Chemical properties

Material composition wt%	Al	Balance	Mn	0.45 max	Pb	0.05 max
	Si	9.00-11.00	Mg	0.20-0.45	Sn	0.15 max
	Fe	0.55 max	Ni	0.05 max	Ti	0.05 max
	Cu	0.05 max	Zn	0.10 max		

Statistical Process Control Charts[3]





Material Properties	Applications	Finishes	Industries
• Corrosion Resistant • Lightweight • High Thermal Conductivity • High Electrical Conductivity	• Prototyping • Engineering • Lightweight Enclosures	• Machined • Spark-eroded • Anodised • Micro shot-peened • Polished	• Automotive • Motorsport • Aerospace

[3] Data generated in a production environment through calibration builds, production builds and testing of powders during the goods in procedure. Specimen geometry is ASTM E8M flat with cross section of 2mmx6mm at the gauge section.