

MATERIAL DATA SHEET

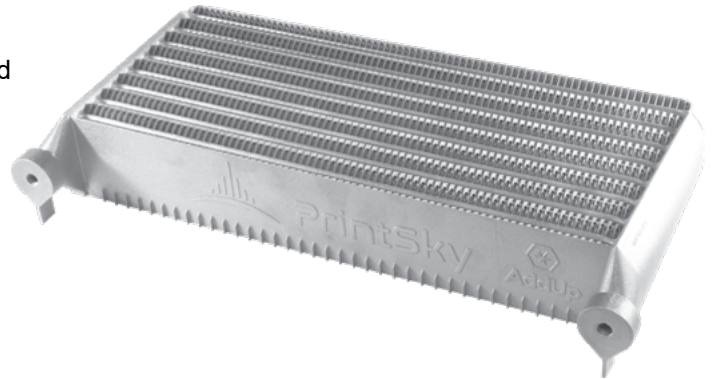
AISi10Mg

The alloy chemical composition complies with ASTM F3318 and EN AC-43000

General Material and Process Specification

AISi10Mg is a widely used Al alloy with silicon and magnesium as alloying elements. This material offers high corrosion resistance and thermal conductivity. It has good strength and dynamic properties with high weldability. It is a suitable material for applications requiring low weight, high strength and load bearing components. It is widely used in the aerospace and automotive industries.

This data sheet specifies the expected mechanical properties and characteristics of this alloy when manufactured on a FormUp 350 system. All data is based on parts built with AddUp standard 50 µm layer thickness parameters, using 20-63 µm spherical powder.



Physical Properties	Results
Density (%) ¹	Typical 99.5
Theoretical density (g/cm ³) ²	2.67

¹ Relative density measured using optical microscopy

² Values based on literature

Surface Roughness Ra ^{3,4,5}	As-built	Bead blasted ⁵
Vertical surface	6 to 8	4 to 7

³ Depends on orientation and testing method

⁴ Tested using optical profilometer, cutoff wavelength λc=2.5 mm -Average of front, side and back surface

⁵ Surface treatment performed with glass blasting medium at 2 bar

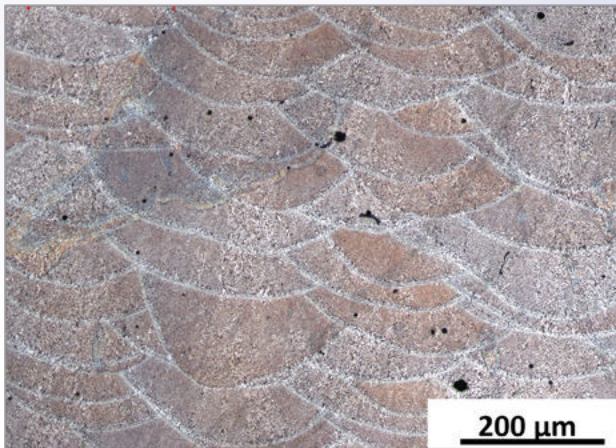
Mechanical Properties ⁶	Test Method	Thermal State	
		As-built	Stress relieved ⁷
Tensile strength (MPa)	ASTM E8		
Horizontal direction (XY)		412±38	363±7
Vertical direction (Z)		425±30	396±20
Yield strength (MPa)	ASTM E8		
Horizontal direction (XY)		275±8	232±2
Vertical direction (Z)		239±3	230±6
Elongation at failure (%)	ASTM E8		
Horizontal direction (XY)		5±2	7±2
Vertical direction (Z)		5±2	4±1
Reduction of area (%)	ASTM E8		
Horizontal direction (XY)		7±2	10±2
Vertical direction (Z)		7±2	7±3

Mechanical Properties ⁶ (cont.)	Test Method	Thermal State	
		As-built	Stress relieved ⁷
Modulus of Elasticity (GPa)	ASTM E8		
Horizontal direction (XY)		72±3	77±4
Vertical direction (Z)		71±5	79±7
Rockwell hardness (HRB)	ASTM E18		
Horizontal direction (XY)		62±8	55±8
Vertical direction (Z)		59±4	51±5

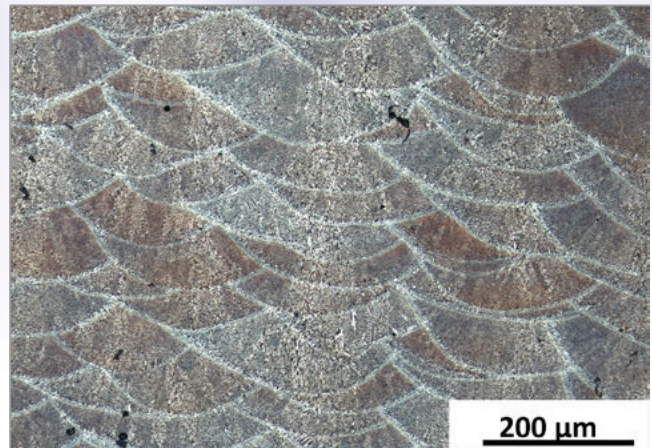
⁶ Tested at ambient temperature to ASTM E8. Machined before testing. Values based on a sample size of a minimum 27 across the build plate

⁷ Specimens were stress relieved at 210°C for 2 hours in air

Microstructures



As-built



Stress relieved

Generic Data⁸

Thermal and Electrical Properties

	Results
Thermal conductivity (W/m.k) at 25°C	120-160
Electrical resistivity (Ωm) [x10 ⁻⁶]	0.05 to 0.06
Melting range (°C)	550-600
Coefficient of thermal expansion (μm/(m .°C)) at 20 to 100°C	21

⁸ Based on the literature data

Chemical Composition⁹

Element	Al	Si	Fe	Mg	Mn	Ti	Zn	Sn, Pb, Ni	Cu	S	Other each	Other total
Weight (%)	Balance	9.0-11.0	≤0.55	0.20-0.45	≤0.40	≤0.15	≤0.10	≤0.05	≤0.03	≤0.01	≤0.05	≤0.15

⁹ Based on the manufacturer material datasheet

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