

Material Data Sheet

AlSi10Mg

Printer Process Specifications

Material	AlSi10Mg (UNS A03590, 3.2381)
Layer Thickness (µm)	30
Laser Power (W)	154
Additive Manufacturing System	XM200C
Print Parameters	AlSi10Mg-C-30-210615

Material Description

AlSi10Mg is an aluminum casting alloy with excellent castability. Its ease of casting makes it ideal for parts with thin walls or complex geometries. It has good mechanical properties, with good strength and hardness to hold up to high loads. AlSi10Mg also has a much lower weight than most ferrous, nickel, or even titanium alloys. These properties, along with its good thermal properties and flexible post-processing possibilities make it attractive for many industries.

Material Properties

- High strength to weight ratio
- Good thermal properties
- Flexible post-processing
- Good harness

Applications

- Structural automotive components
- Aerospace applications
- Air ducting systems
- Engine components

General Wrought Material Data ⁽¹⁾

Density [g/cc]	2.67
Thermal Conductivity [W/m*K]	170
Melting Range [°C]	570
Coefficient of Thermal Expansion (0 to 100 °C) [K ⁻¹]	2.0x10 ⁻⁵

⁽¹⁾ From Zare Materials

Chemical Composition ⁽²⁾

Element	Mass %
Al	Balance
Si	9.0 - 11.0
Mg	0.20 - 0.45
Fe	0.55 Max
Mn	0.1 Max
Cu	0.1 Max
Sn	0.1 Max
Zn	0.1 Max
Ni	0.1 Max
Pb	0.1 Max
Ti	0.15 Max

⁽²⁾ From IMR Metal Powder Technologies

Heat Treatment

Testing samples were stress relieved at 200 °C for 2 hours and air cooled.

Mechanical Properties

	Mean Value	Standard Deviation
Component Density [g/cc]	2.66	--
Percentage of Theoretical density	99.6%	--
Ultimate Tensile Strength (UTS) - ASTM E8		
Horizontal (XY) [ksi (MPa)]	46.9 (323)	0.440 (3.03)
Vertical (Z) [ksi (MPa)]	37.0 (255)	0.793 (5.47)
Yield Strength - ASTM E8		
Horizontal (XY) [ksi (MPa)]	27.7 (191)	0.173 (1.19)
Vertical (Z) [ksi (MPa)]	21.9 (151)	0.670 (4.62)
Elongation at Break - ASTM E8		
Horizontal (XY)	6.57	0.06
Vertical (Z)	3.85	0.75
Hardness (Rockwell) - ASTM E18	51 HRB	1.0 HRB



Powder Particle Size Distribution ⁽³⁾

Per ASTM B822 (Using Microtrac)	Min	Max
d10 (microns)	31.6	32.1
d50 (microns)	44.4	45.4
d90 (microns)	62.4	63.9

⁽³⁾ From [Reiner et. al., 2021](#)

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