

POWDERRANGE AlSi10Mg

Applicable specifications: AMS7018

Associated specifications: ASTM F3318, DIN EN 1706, EN AC-43000

Type analysis

Single figures are nominal except where noted.

Aluminum	Balance	Silicon	9.00–11.00 %	Iron	0.55 %
Manganese	0.45 %	Magnesium	0.20–0.45 %	Titanium	0.15 %
Oxygen	0.10 %	Zinc	0.10 %	Copper	0.05 %
Lead	0.05 %	Nickel	0.05 %	Nitrogen	0.05 %
Tin	0.05 %				

Description

PowderRange AlSi10Mg is ideal for components requiring a combination of lightweight, complex geometries with good thermal properties. The combined silicon and magnesium for this alloy offers increased strength and hardness with the flexibility for the material to be spark-eroded, welded, micro shot-peened, polished, and coated if required.

Conventionally cast components are heat treated to improve the mechanical properties, for example using the T6 cycle of solution annealing, quenching, and age hardening. This can also be used after the additive build. PowderRange AlSi10Mg has excellent weldability in laser additive manufacturing processes.

Key Properties:

- Lightweight alloy
- High thermal conductivity
- Good corrosion resistance

Markets:

- Aerospace
- Automotive

Applications:

- Brackets
- Valves
- Waveguides
- Ducts
- Heat Exchangers

> POWDERRANGE AlSi10Mg

Powder properties

PART NUMBER	PowderRange AlSi10Mg F
APPLICATION	L-PBF ¹
MAXIMUM PARTICLE SIZE	Max 10 wt% > 63 μm ²
MINIMUM PARTICLE SIZE	Max 10 vol% < 20 μm ³
LSD PERCENTILE	D10, D50, D90 ³ , reported
ATOMIZATION	Vacuum Induction Melted, Nitrogen Gas Atomized
APPARENT DENSITY (G/CM³)	Measured according to ASTM B212 ⁴ and reported
CARNEY FLOW	Measured according to ASTM B964 and reported

¹ ASTM/ISO 52900: Laser — Powder Bed Fusion (L-PBF), Electron-Beam Powder Bed Fusion (EB-PBF), Directed Energy Deposition (DED)

² ASTM B214 Standard Test Method for Sieve Analysis for Metal Powders

³ ASTM B822 Standard Test Method for Particle Size Distribution of Metal Powders and Related Compounds by Light Scattering

⁴ ASTM B212 Standard Test Method for Apparent Density of Free-Flowing Metal Powders Using the Hall Flowmeter Funnel
Testing of powder will fulfill certification requirements to Nadcap Materials Testing and ISO/IEC 17025 Chemical, per relevant ASTM procedures

Typical achievable mechanical properties

ROOM TEMPERATURE MECHANICAL PROPERTIES							
FORM	ORIENTATION	0.2% YIELD STRENGTH $\sigma_{0.2\%}$		ULTIMATE TENSILE STRENGTH σ_{UTS}		ELONGATION IN 4D	REDUCTION OF AREA
		ksi	MPa	ksi	MPa	%	%
Post heat treatment, L-PBF	X and Y	26.4	182	41.2	284	19	40
	Z	26.1	180	42.1	290	15	32

**For additional information, please
contact your nearest sales office:**

info@carpenteradditive.com | 610 208 2000

The mechanical and physical properties of any additively-manufactured material are strongly dependent on the processing conditions used to produce the final part. Significantly differing properties can be obtained by utilizing different equipment, different process parameters, different build rates and different geometries. The properties listed are intended as a guide only and should not be used as design data.

The information and data presented herein are typical or average values and are not a guarantee of maximum or minimum values. Applications specifically suggested for material described herein are made solely for the purpose of illustration to enable the reader to make his/her own evaluation and are not intended as warranties, either express or implied, of fitness for these or other purposes. There is no representation that the recipient of this literature will receive updated editions as they become available.

Unless otherwise specified, registered trademarks are property of CRS Holdings Inc., a subsidiary of Carpenter Technology Corporation.
