DIRECT METAL LASER SINTERING

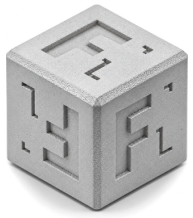
Aluminum AlSi10Mg

Lightweight High-Performance Metal Alloy

Aluminum AlSi10Mg is a versatile casting alloy optimized for DMLS additive manufacturing. Combining exceptional strength-to-weight ratio with excellent thermal conductivity and corrosion resistance, it delivers consistent mechanical properties ideal for aerospace, automotive, and industrial applications requiring lightweight, high-strength components.



SURFACE FINISHES



Standard Finish Natural

Supports are carefully removed and parts are shot peened to a uniform matte surface, which also helps relieve residual stresses. Critical features may receive light machining for tighter tolerances.



Machining & Polishing Enhanced

Precision machining and polishing enhance surface quality for critical applications, achieving tighter tolerances and a smooth, high-gloss metallic finish.



Anodizing Protective

For aluminium parts, anodizing forms a protective oxide layer that significantly improves corrosion resistance and hardness while enhancing appearance.



Performance Paint Premium

An automotive-grade coating that enhances aesthetics and durability. Each part is hand-finished with professional-grade equipment for exceptional adhesion, in matte to semi-gloss with custom colour matching.

BUILD VOLUME	LEAD TIME	LAYER HEIGHT	TOLERANCE
250 × 250 × 325 mm	From 4 business days	0.03-0.06 mm	±0.3% (min ±0.3 mm)

MECHANICAL PROPERTIES

Aluminum AlSi10Mg delivers dependable strength in the as-built condition. Its balanced mechanical profile handles demanding load conditions without turning brittle, which suits aircraft brackets, automotive engine parts and heat exchangers.

The table lists three conditions. As built gives the highest tensile strength, with some difference between the XY and Z directions, so align load paths with the build orientation. EOS T6 trades strength for higher elongation, lower variation and nearly equal properties in both directions. Stress relief stabilizes the part before it is removed from the build plate, and gives the lowest yield strength of the three. Fatigue strength depends on geometry and surface finish, and aluminum alloys have no true fatigue limit.

PROPERTY	VALUE	TEST STANDARD
Tensile Strength, As Built (XY / Z)	**461 / 466 MPa**	EN ISO 6892-1
Yield Strength (Rp0.2), As Built (XY / Z)	**270 / 233 MPa**	EN ISO 6892-1
Elongation at Break, As Built (XY / Z)	**10.2 / 6.3 %**	EN ISO 6892-1
Tensile Strength, EOS T6 (XY / Z)	**320 / 310 MPa**	EN ISO 6892-1
Yield Strength (Rp0.2), EOS T6 (XY / Z)	**260 / 250 MPa**	EN ISO 6892-1
Elongation at Break, EOS T6 (XY / Z)	**11 / 11 %**	EN ISO 6892-1
Tensile Strength, Stress Relieved (90 min at 270 °C)	**310 MPa**	EOS typical value
Yield Strength, Stress Relieved (90 min at 270 °C)	**200 MPa**	EOS typical value
Elongation at Break, Stress Relieved (90 min at 270 °C)	**9 %**	EOS typical value
Modulus of Elasticity, As Built (XY / Z)	**75 / 70 GPa**	EOS MDS 05.2014
Hardness, As Built / EOS T6	**114 / 105 HBW**	EN ISO 6506, HBW 2.5/62.5
Fatigue Strength, As Built (2×10^7 cycles, fully reversed)	**110 MPa**	ASTM E466-15

THERMAL PROPERTIES

Aluminum AlSi10Mg maintains dimensional stability through temperature swings and repeated thermal cycling, from under-hood automotive components to industrial equipment exposed to heat sources. Specify EOS T6 or stress relief, the higher-conductivity conditions in the table, for heat sinks, heat exchangers and cooled housings.

Expansion is given over three temperature ranges for fit and clearance calculations where aluminum parts mate with steel or polymer parts. Strength values are measured at room temperature, so check parts that run hot against their operating temperature.

PROPERTY	VALUE	TEST STANDARD
Thermal Conductivity, As Built (XY / Z)	**110 / 100 W/m·K**	EN ISO 22007-2
Thermal Conductivity, EOS T6 (XY / Z)	**155 / 165 W/m·K**	EN ISO 22007-2
Thermal Conductivity, Stress Relieved (XY / Z)	**165 / 160 W/m·K**	EN ISO 22007-2
Specific Heat Capacity, As Built (XY / Z)	**920 / 910 J/kg·K**	EOS MDS 05.2014
Coefficient of Thermal Expansion (25–100 / 25–200 / 25–300 °C)	**20 / 22 / 27 $\times10^{-6}$/K**	ASTM E228

PHYSICAL PROPERTIES

Consistent density keeps parts lightweight yet solid and downstream finishing predictable. The very low defect level supports strength and gas-tight walls, and EOS confirms gas tightness with a helium leak test (EN 13185) on 2 mm walls.

The as-built surface carries the texture of the powder layers. Micro shot-peening evens it out, and machining or polishing finishes sealing, sliding and mating faces so assemblies fit without rework.

PROPERTY	VALUE	TEST STANDARD
Part Density	**≥ 2.67 g/cm³**	EN ISO 3369
Average Defect Percentage	**0.04 %**	EOS method
Surface Roughness, As Built (Ra)	**12–20 µm**	ISO 4287 (EOS M 290 MDS 12.2017)
Surface Roughness, Micro Shot-Peened (Ra)	**6–15 µm**	ISO 4287 (EOS M 290 MDS 12.2017)

ELECTRICAL PROPERTIES

Electrical conductivity follows thermal conductivity and rises by about three quarters after heat treatment, which suits grounded housings, shielding features and electrically integrated metal components. Values are given in % IACS, relative to annealed copper.

PROPERTY	VALUE	TEST STANDARD
Electrical Conductivity, As Built (XY)	**25 % IACS**	ASTM E1004-17
Electrical Conductivity, EOS T6 or Stress Relieved (XY)	**44 % IACS**	ASTM E1004-17

CHEMICAL PROPERTIES

A protective oxide film gives Aluminum AlSi10Mg high corrosion resistance in the atmosphere and good resistance to seawater and weak acids, and it is compatible with motor oil, hydraulic fluids and fuels. Strong acids and alkaline solutions, including caustic cleaners, attack the oxide film.

EOS publishes no chemical resistance table for this alloy, so these ratings follow general aluminum corrosion behavior. Treat them as screening guidance and confirm them with application-specific testing before production release.

CHEMICAL	RATING
Seawater	**Good**
Atmospheric Corrosion	**Excellent**
Alkaline Solutions	**Poor**
Weak Acids	**Good**
Motor Oil	**Excellent**
Hydraulic Fluids	**Excellent**
Strong Acids (HCl, H_2SO_4)	**Poor**
Strong Bases (NaOH)	**Poor**
Organic Solvents	**Good**
Fuel Systems	**Good to Excellent**

COMPLIANCE

EOS states that the chemical composition of its AlSi10Mg parts complies with the EN AC-43000 casting alloy in DIN EN 1706 and with ASTM F3318-18 for laser powder bed fusion AlSi10Mg, so drawings that call out either composition can be matched, and the EOS documentation goes straight into your quality packet.

STANDARD	STATUS
DIN EN 1706 (EN AC-43000) EOS states the part chemistry complies with the EN AC-43000 (AlSi10Mg(a)) casting alloy composition	EOS composition statement
ASTM F3318-18 EOS states the part chemistry complies with the ASTM specification for laser powder bed fusion AlSi10Mg	EOS composition statement

MANUFACTURING

Heat treatment	**Stress relief and EOS T6, with HIP available**