

ALSi10MG

Aluminum (AlSi10Mg) – 3D Printing Material

Laser Powder Bed Fusion Metal (LPBF-M)

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Material info

About Aluminum (AlSi10Mg) – 3D Printing Material

Aluminum 3D printing material is both lightweight and strong, recommended for functional parts requiring durability, stiffness, and high accuracy. Aluminum 3D printing relies on Selective Laser Melting (SLM) technology. Aluminum or 3D printed aluminum (alloy AlSi10Mg, 10% Silicon 0.5% Mg) offers great corrosion resistance, making it an ideal material for outdoor applications, also providing high electrical and thermal conductivity. 3D printed aluminum can be machined, milled, and tapped too.

Color & Finishes



Standard

In certain areas the surface of 3D printed aluminum can be slightly rougher than others, due to where supports were added.

Technology

Laser Powder Bed Fusion Metal (LPBF-M)

Technical Documents

Material Data Sheet Aluminum (<https://www.shapeways.com/wp-content/uploads/2020/12/Material-Data-SheetAluminum.pdf>)

Material Properties

Tensile strength (ASTM E8)	442 MPa ±6 MPa (XY), 417 MPa ±27 MPa (Z)
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Elongation at break (ASTM E8)	9% ±1% (XY), 6% ±2% (Z)
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Hardness (Vickers) (ASTM F704-11)	110 HV0.5 ±5
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Description

Material Highlights	3D printed aluminum provides high strength & lightweight properties, good corrosion resistance, and high electrical & thermal conductivity.
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Handling and Care	3D printed aluminum is skin-friendly, has good electrical conductivity, and is heatproof.
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Hardness (Vickers) (ASTM E384-11)	HV0.5 ±2
	HV0.5 (XY), 123 HV0.5 ±2
	HV0.5 (Z)

Surface roughness (Ra) (ISO 97)	5 µm to 9 µm (as built after bead blasting)
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to 570c/1058f.

Design Guidelines

Bounding Box

Bounding Box Max

250 x 250 x 200 mm

Bounding Box Min

X + Y + Z > 30 mm

The bounding box is a 3D imaginary outline of a box that encloses the smallest area occupied by your model. Your model must be within the minimum and maximum bounding box sizes. If the size of the model is close to the maximum bounding box, then the printing orientation will be restricted.

Walls

Supported Wall Thickness Min

1.0 mm

Unsupported Wall Thickness Min

1.0 mm

A supported wall is connected at least on two sides of the wall, while an unsupported wall is connected only on one side of the wall. Walls that do not meet the minimum requirements may not survive printing and cleaning processes. Additionally, models may still be rejected based on the wall geometry of the model. Please consider the size of your model and reinforce the walls or add support structures as needed as minimum guidelines will not always be adequate for large models.

Wires

Supported Wires Min

1.5 mm

Unsupported Wires Min

1.5 mm

A wire is a circular, rectangular or even triangular feature that is thinner in its unconnected directions than its length. A supported wire is connected at least on two sides of the model, while an unsupported wire is connected on one side of the model. Wires that do not meet the minimum requirements may not survive printing and cleaning processes. Additionally, models may still be rejected based on the wire geometry of the model. Please consider the size of your model and reinforce the wires or add support structures as needed as minimum guidelines will not always be adequate for large models.

Details

Details Min Embossed

0.4 mm high & wide

0.5 mm high and 0.8 mm wide for readable text and clear

Details Min Engraved

0.4 mm high & wide

0.5 mm high and 1.0 mm wide for readable text and clear

For text, the ratio between width and depth, should be 1:1 and sans-serif fonts are preferred for line weight consistency.

Escape Holes

Single Escape Hole Diameter (Min)

4.0 mm

Multiple Escape Hole Diameter (Min)

2.0 mm

Escape holes are necessary to empty the support material of a hollow model. Two escape holes at the opposite ends of the model is optimal for the support removal process. Please consider the size of your model and make the escape holes bigger or add more escape holes as needed as minimum guidelines will not always be adequate for large models.

A single escape hole at the end of a cavity will not allow material in the corners near the escape hole to fully escape. So we recommend multiple escape holes at both ends of the cavity.

Clearance

Min

0.6 mm

Clearance is the space between two individual parts in a model. If the space among the individual parts do not meet the minimum clearance, then parts can fuse together or can be difficult to clean. This is important for movable pieces like hinges, gears, etc.

Interlocking & Enclosed Parts

Interlocking

Yes

Enclosed

No

Parts in File

Max

1 per model

Accuracy

Accuracy \pm 0.2 mm for 3D printed aluminum products under 10mm in all dimensions, \pm 1.5% for 3D printed aluminum products over 10 mm in any dimension. For example: a product with dimensions of 50 x 50 x 100 mm can be 0.015×100 mm = 1.5 mm bigger or smaller in any direction.

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