



Material data sheet – FlexLine

EOS Aluminium AlSi10Mg

EOS Aluminium AlSi10Mg is an aluminium metal alloy powder intended for processing on EOS DMLS™ systems.

This document contains information and data for building parts using

- EOS powder: EOS Aluminium AlSi10Mg (EOS part no. 9011-0024)
- EOS laser sinter machine: EOS M 400
 - HSS Recoater Blade (EOS art. -no 300007610)
 - DirectBase AL40 building platform (EOS art. no. 300005789)
 - 90 µm mesh for powder sieving recommended (EOS art.-no. 300000493 for IPCM M extra Sieving Module or EOS art.-no. 200001061 for IPM M Powder Station)
 - Nitrogen atmosphere
 - EOSYSTEM V2.6 or newer
- EOS Software:
 - EOSPRINT: V1.6 (EOS art. no. 7501-4031) or newer plus RP Tools V6.2 (EOS art.-no. 7012-0215)
- EOS Process:
 - AlSi10Mg ParameterEditor (EOS art. -no 7500-3033)
 - Name of default job on machine: AlSi10Mg_090_FlexM400_101.eosjob

Material data sheet – FlexLine

Description

The alloy AlSi10Mg is characterised by good strength and hardness, as well as high dynamic load bearing capacity, and it is therefore also used for parts subjected to high loads. It is typically used for cast parts with thin walls and complex geometry. Parts made of EOS Aluminium AlSi10Mg are ideal for applications that require a combination of good thermal properties and low weight. They can be machined, wire eroded and electrical discharge machined, welded, micro-blasted, polished and coated.

Laser sintering process is extremely fast melting and re-solidification. Due to building in layers the parts have anisotropic properties. Suitable heat treatment can be used for further improvement of part properties and reduction of anisotropy. Suggestion for a stress relieve heat treatment [6] is given with tensile data. Conventionally cast components in this type of aluminium alloy are often heat treated to improve the mechanical properties, for example using the T6 cycle of solution annealing, quenching and age hardening.

Material data sheet – FlexLine

Technical data

Powder properties

The chemical composition of the powder corresponds to the standard DIN EN 1706 (EN AC–43000)

Material composition (wt%)

Element	Min	Max
Al	Rest	
Si	9.0	11.0
Fe	---	0.55
Cu	---	0.05
Mn	---	0.45
Mg	0.20	0.45
Ni	---	0.05
Zn	---	0.10
Pb	---	0.05
Sn	---	0.05
Ti	---	0.15

Particle size

> 90 µm

<0.5 wt.%

Material data sheet – FlexLine

General process data

Layer thickness	90 µm
Volume rate [1]	27.8 mm ³ /s (100.3 cm ³ /h)

[1] The volume rate is a measure of the building speed during the exposure of the skin region. The total building speed is dependent on further factors such as the exposure parameters for contours, supports, Upskin and Downskin, the duration of the recoating, the home-in and LPM settings.

Physical and chemical properties of the parts

Part Density, typical [2]	2.64 g/cm ³
Roughness after microblasting [3]	Ra 11 µm; Rz 64 µm

[2] Weighing in air and water in accordance with ISO 3369.

[3] Measurement of roughness as per ISO 4287. The values were determined on the vertical surface of a cube, as well as on the horizontal surface facing upward. Due to the layering, the surface structure is heavily dependent on the orientation of the surface, for instance a stepped effect is to be seen on inclined and round surfaces.

Mechanical properties at room temperature [4, 5]

	As built	After heat treatment [6]
Tensile strength, Rm	395 MPa	290 MPa
Yield strength, Rp0.2	244 MPa	165 MPa
Ultimate strain, A	3.2 %	7.3 %

[4] The stated values are average values and were determined on samples with vertical and horizontal orientation.

[5] Tensile testing according to ISO 6892-1 B10, proportional test pieces, diameter of the neck area 5 mm (0.2 inch), original gauge length 25 mm (1 inch).

[6] Heat treatment: 300 °C / 2 h.



Material data sheet – FlexLine

Abbreviations

Min. Minimum

Max. Maximum

Wt. Weight

The quoted values refer to the use of this material with above specified EOS DMLS system, PSW version / EOSYSTEM software version, parameter set and operation in compliance with parameter sheet and operating instructions. All measured values are average numbers. Part properties are measured with specified measurement methods using defined test geometries and procedures. Further details of the test procedures used by EOS are available on request. Any deviation from these standard settings may affect the measured properties.

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