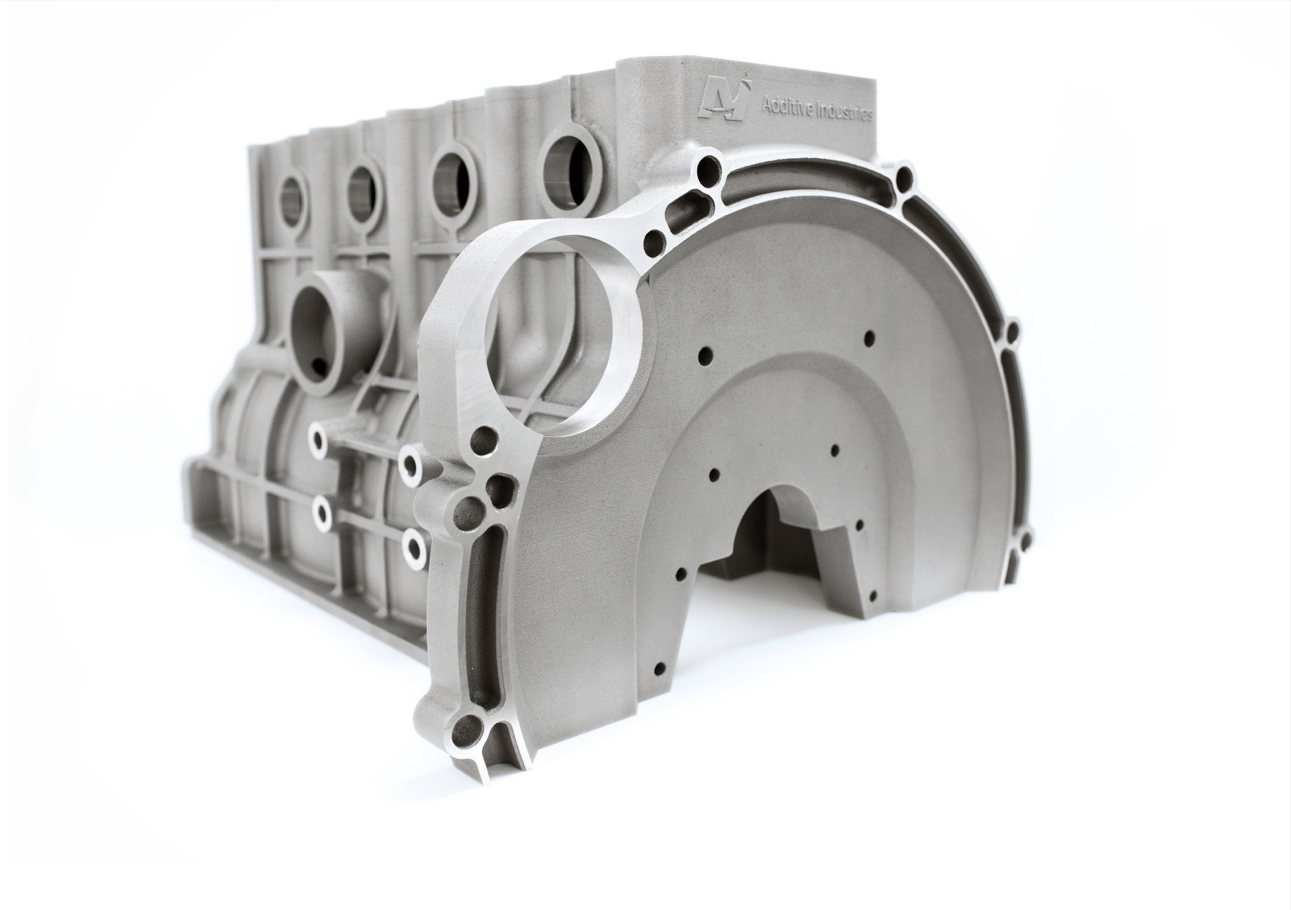
Material Data Sheet
Balanced Parameter



AlSi 10Mg

Typical Mechanical Properties
(Heat Treated)

Ultimate tensile strength	447 MPa (294 MPa)
Yield strength	281 MPa (179 MPa)
Elongation at break	9% (14%)

Process Parameter

Quality — Balanced — Productivity

Aluminium Based Alloy

An aluminium-based alloy common for laser powder bed fusion, which can be used in place of traditionally cast applications and for prototypes and functional parts.

Highlights

- Good mechanical properties
- Good corrosion resistance
- Good thermal & electrical conductivity
- Applications in aerospace, automotive and industrial sectors
- Used in place of castings and for heat management parts such as heat exchangers

- Layer thickness: 60µm
- Density >99.5%
- ASTM standard mechanical properties
- Good productivity
- Minimum controlled features 0.5mm

Process Readiness Level (PRL)

R&D				Foundation		Production		
1	2	3	4	5	6	7	8	9

Additive Industries

AlSi 10Mg

Aluminium Based Alloy

To learn more, contact us: info@additiveindustries.com

or visit: additiveindustries.com

Powder Chemistry[2,3]

Composition	Al	Si	Fe	Cu	Mn	Mg	Ni	Zn	Pb	Sn	Ti	S
Min (wt%)	Bal	9.00	-	-	-	0.20	-	-	-	-	-	-
Max (wt%)	Bal	11.0	0.55	0.05	0.45	0.45	0.05	0.10	0.05	0.05	0.15	0.05

Process details

Layer thickness	60	[µm]
Build rate[8] (per laser)	45.4	[cm3/hr]
Optical density [4]	≥ 99.5	[%]
Volumetric density [11]	≥ 2.66	[g/cm3]

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Mechanical properties [5]	Orientation	As-built (Mean)	Standard Dev.	Heat-treat (Mean)	Standard Dev.	Units
Ultimate tensile strength	Horizontal	447	5	294	5	[MPa]
	Vertical	449	10	305	5	[MPa]
Yield strength	Horizontal	281	5	179	5	[MPa]
	Vertical	236	5	180	5	[MPa]
Elongation at break	Horizontal	9	1	14	1	[%]
	Vertical	7	2	12	2	[%]
Youngs modulus	Horizontal	68	5	70	5	[GPa]
	Vertical	72	5	72	5	[GPa]
Vickers Hardness [6]		113	5	85	5	[HV10]

Surface Roughness [7]	Mean	Standard Deviation	Units
Vertical Surface Roughness (Ra)	12	3	[µm]
Vertical Surface Roughness (Rz)	64	10	[µm]
45° Surface Roughness (Ra)	15	3	[µm]
45° Surface Roughness (Rz)	84	15	[µm]

Notes

1. The material is processed under Argon shielding atmosphere.
2. Powder Chemistry as per Additive Industries specification O4867 Rev. 1.0.
3. Additive Industries consolidated material is in compliance with ASTM F3318-18.
4. Density measured by Optical Measurement Method as per internal process. This is the minimum guaranteed value that is achieved under standard processing conditions, manufactured using Additive Industries' qualification jobs.
5. Tensile test samples were produced as round blanks. These were machined to size and tested in accordance with ASTM E8m at a NADCAP approved supplier.
6. Hardness measured in accordance with DIN EN ISO6507-1:2018 as per internal process. Hardness values measured in XY and XZ planes from components manufactured using Additive Industries' qualification jobs.
7. Surface Roughness measured in as-printed condition in accordance with internal process. Roughness measurement conducted on specimens with varying unsupported manufacturing angle.
8. Build Rate stated is a typical value per laser. It is calculated using the formula: Layer Thickness x Laser Scan Speed x Hatch Distance.
9. Parameter released: AS10_60_BAL_MF1A64_INT_2.0.
10. Heat Treatment : Stress Relief Heat Treatment, conducted in accordance with ASTM F3318-18 Condition SR1 – Parts stress relieved at 285°C (±14°C), held for 120 min (±15min) and cooled at a rate equal to air cooling or faster.
11. Volumetric density measured according to ASTM B962. This is a minimum volumetric density measurement achieved on samples manufactured using Additive Industries' qualification jobs.

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Disclaimer

The data presented in this material datasheet is valid only for Additive Industries' released powder, machine, and parameter sets, processed under the defined shielding atmosphere. The properties of the printed parts have been measured on test coupons according to industry standards where available, and the data correspond to our state-of-the-art at the time of publication. These results are based on Additive Industries' signoff build layout and reflect material performance under the specified conditions; for more information, please contact Additive Industries. Users should be aware that variations in the presented values may arise due to differences in process conditions, including but not limited to thermal management, build plate temperature, job-specific heat accumulation, inter-layer time, part positioning, and overall machine calibration. The data provided do not warrant any guarantee for printed parts, and it remains the responsibility of the producer or purchaser to verify the ultimate properties of the printed material for their specific application. The listed data are subject to change without notice as we continuously strive to develop and improve our machine performance and the properties of printed materials. Users are advised to exercise caution and consider material selection, build layout, and machine configuration when interpreting and applying this information.

Specifications are subject to change without notice. Additive Industries is certified in accordance with ISO 9001

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