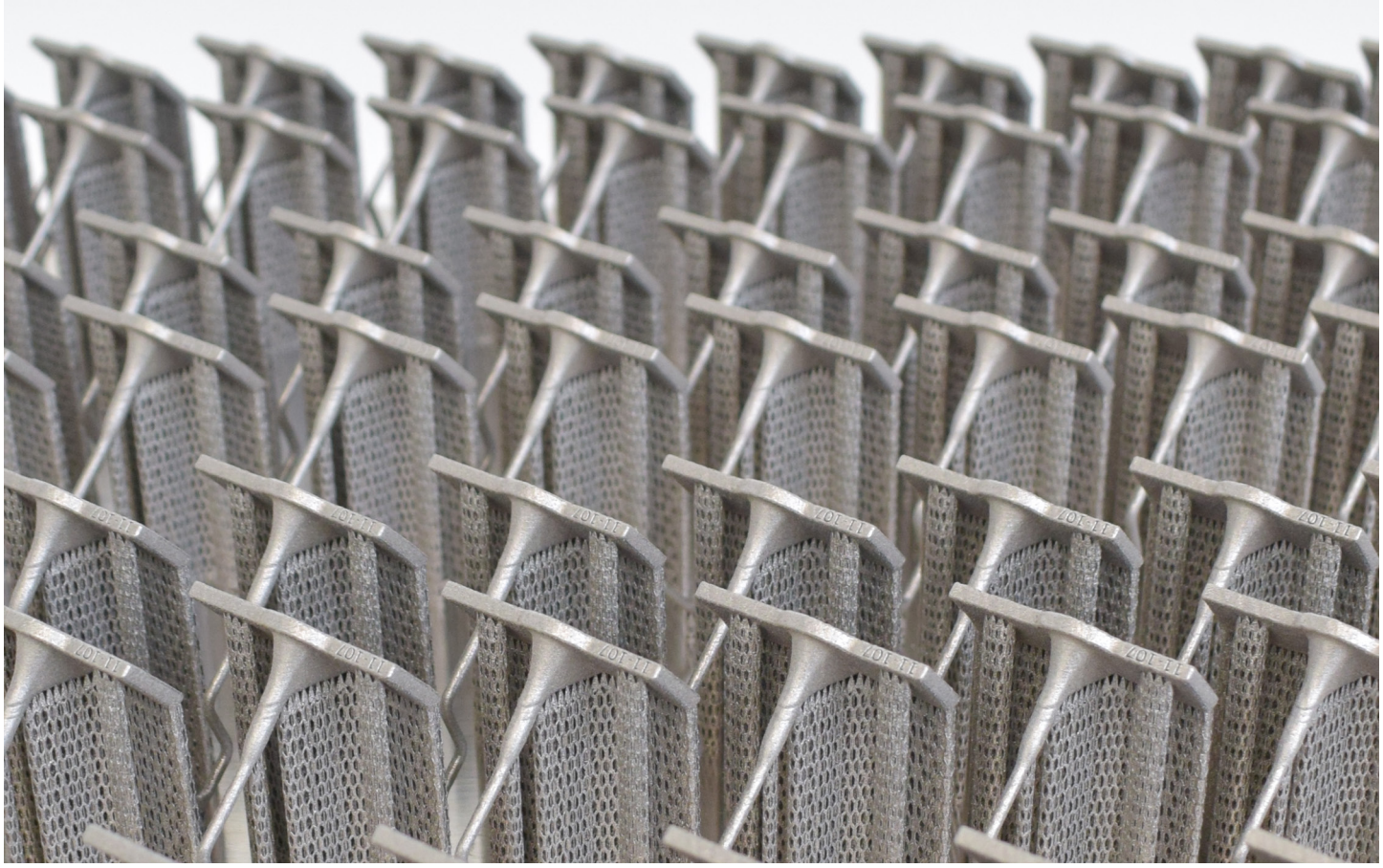
Material Data Sheet
Quality Parameter



M789 AMPO (N_2)

Typical Mechanical Properties

Ultimate tensile strength	1021 MPa
Yield strength	704 MPa
Elongation at break	19%

Process Parameter

Quality — Balanced — Productivity

Tool Steel Alloy

Böhler maraging steel alloy which combines the mechanical properties of M300/1.2709 with the corrosion resistance of stainless steel 17-4PH. Suited to a wide range of mold & die tooling applications and various engineering parts.

Highlights

- High strength, ductility and toughness
- Very high corrosion resistance
- Easily heat treated to achieve 52 HRC
- Suitable for tooling applications where corrosion resistance is important i.e. mould tools with conformal cooling channels

- Layer thickness: 30µm
- Density >99.7%
- Excellent surface finish
- Good fine feature resolution
- Minimum controlled features 0.2mm

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Process Readiness Level (PRL)

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

M789 AMPO

Tool Steel Alloy

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

or visit: additiveindustries.com

Powder Chemistry[8]

Composition	Fe	Ni	Cr	Mo	Ti	Al	C	P	S	Other	Ti	S
Min (wt%)	Bal	9.0	-	-	-	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	30	[µm]
Build rate[3] (per laser)	9.72	[cm3/hr]
Optical density [2]	≥ 99.7	[%]
Volumetric density	7.70	[g/cm3]

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Mechanical properties [4]	Orientation	As-built (Mean)	Standard Dev.	Heat-treat (Mean)	Standard Dev.	Units
Ultimate tensile strength	Horizontal	1021	10	-	-	[MPa]
	Vertical	1023	5	-	-	[MPa]
Yield strength	Horizontal	704	10	-	-	[MPa]
	Vertical	666	5	-	-	[MPa]
Elongation at break	Horizontal	18.6	1	-	-	[%]
	Vertical	18.0	1	-	-	[%]
Youngs modulus	Horizontal	182	10	-	-	[GPa]
	Vertical	179	5	-	-	[GPa]

Surface Roughness [6]	Mean	Standard Deviation	Units
Vertical Surface Roughness (Ra)	9	3	[µm]
Vertical Surface Roughness (Rz)	51	15	[µm]
45° Surface Roughness (Ra)	23	8	[µm]
45° Surface Roughness (Rz)	108	30	[µm]

Notes

1. The material is processed under Nitrogen shielding atmosphere.
2. Powder Chemistry as per Additive Industries specification O1098
3. Additive Industries consolidated material is in line with the literature
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 supplierTensile 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.
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: M789_30_QUAL_MF1N55_INT_1.0
10. Heat Treatment : NA
11. Volumetric density measured according to ASTM B962. This is a minimum volumetric density measurement achieved on samples manufactured using Additive Industries' qualification jobs.
12. The data presented in this material datasheet have been collected based on build layout reported herein. The information presented herein is intended to offer insights into the performance characteristics of the material produced under the specified conditions. Variation in the values presented above, could be induced

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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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