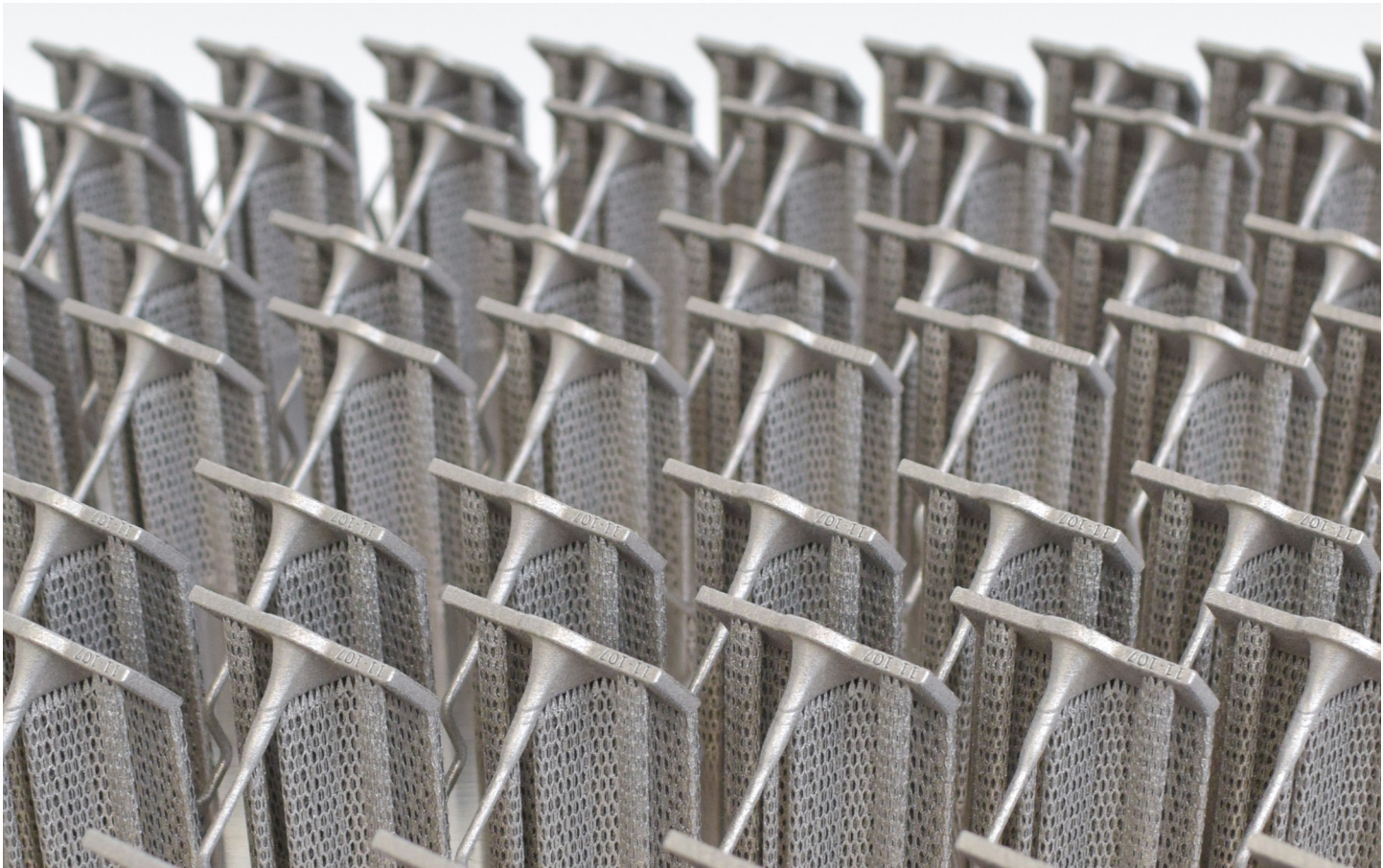


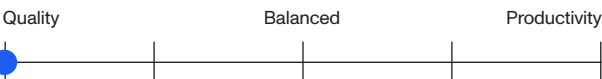


# M789 AMPO (N<sub>2</sub>)

## Typical Mechanical Properties

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

## Process Parameter



## 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

## Process Readiness Level (PRL)



# M789 AMPO

## Tool Steel Alloy

To learn more,  
contact us: [info@  
additiveindustries.com](mailto:info@additiveindustries.com)

or visit:  
[additiveindustries.com](https://additiveindustries.com)

### Powder Chemistry<sup>[8]</sup>

| 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 <sup>[3]</sup> (per laser) | 9.72   | [cm <sup>3</sup> /hr] |
| Optical density <sup>[2]</sup>        | ≥ 99.7 | [%]                   |
| Volumetric density                    | 7.70   | [g/cm <sup>3</sup> ]  |

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Specifications are  
subject to change  
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Additive Industries  
is certified in  
accordance with  
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Additive Industries  
B.V. Headquarters,  
Eindhoven,  
The Netherlands  
T: +31 (0)40 2180660

Additive Industries  
North America, Inc.  
Camarillo, United  
States of America  
T: +1 805 530 6080

| Mechanical properties <sup>[4]</sup> | 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 <sup>[6]</sup> | 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

- The material is processed under Nitrogen shielding atmosphere.
- Powder Chemistry as per Additive Industries specification O1098
- Additive Industries consolidated material is in line with the literature
- 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.
- 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. 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.
- Hardness measured in accordance with DIN EN ISO 6507-1:2018 as per internal process. Hardness values measured in XY and XZ planes from components.
- Surface Roughness measured in as-printed condition in accordance with internal process. Roughness measurement conducted on specimens with varying unsupported manufacturing angle.
- Build Rate stated is a typical value per laser. It is calculated using the formula: Layer Thickness x Laser Scan Speed x Hatch Distance
- Parameter released: M789\_30\_QUAL\_MF1N55\_INT\_1.0
- Heat Treatment : NA
- Volumetric density measured according to ASTM B962. This is a minimum volumetric density measurement achieved on samples manufactured using Additive Industries' qualification jobs.
- 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



## 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.

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Additive Industries B.V. Headquarters, Eindhoven,  
The Netherlands  
T: +31 (0)40 2180660

Additive Industries  
North America, Inc.  
Camarillo, United States of America  
T: +1 805 530 6080

To learn more,  
contact us: [info@additiveindustries.com](mailto:info@additiveindustries.com)

or visit:  
[additiveindustries.com](https://additiveindustries.com)