

# ABD<sup>®</sup>-850AM

## Nickel-based superalloy for additive manufacturing

### MATERIAL OVERVIEW

An age-hardenable nickel-based superalloy designed specifically for use as feedstock in powder bed fusion. Excellent resistance to AM and post-heat treatment cracking. ABD<sup>®</sup>-850AM has been optimised using OxMet's Alloys-by-Design (ABD<sup>®</sup>) technology for high strength and excellent corrosion resistance, with a working temperature range up to 850°C in its age-hardened state.

Robust, repeatable manufacture of components by AM depends on the appropriate choice of material. Alloy ABD<sup>®</sup>-850AM is ideal for the manufacture of additively manufactured components within the aerospace, power, and automotive sectors, where high temperature strength, creep- and oxidation-resistance are essential, and defects are not tolerated.

#### Key properties

- Designed to be free of solidification, liquidation and strain-age cracks
- 99.9% density when printed with standard parameters e.g. Ni718
- $\gamma'$  strengthened via Ti, Nb and Ta in addition to Al
- High Cr levels for oxidation resistance

### POWDER CHARACTERISTICS

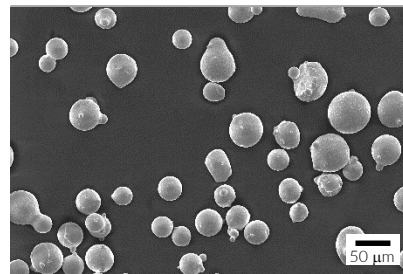
#### Particle size distributions

- Laser Beam Melting (powder bed): 15-53 $\mu$ m
- Electron beam melting (powder bed): 45-106 $\mu$ m
- Directed energy deposition (LMD): 45-106 $\mu$ m
- Customised size distributions available on request

#### Other properties

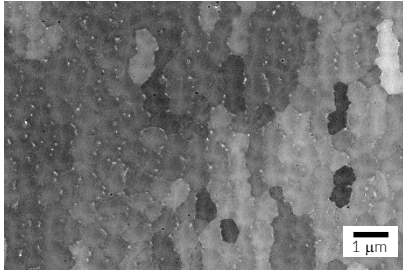
- Apparent density: 4.1g/cm<sup>3</sup>  $\pm$ 0.2
- Tap density: 5.0g/cm<sup>3</sup>  $\pm$ 0.2
- Hall flow (s/50g): 13.2
- Carney flow (s/50g): 7.6

### POWDER FEEDSTOCK

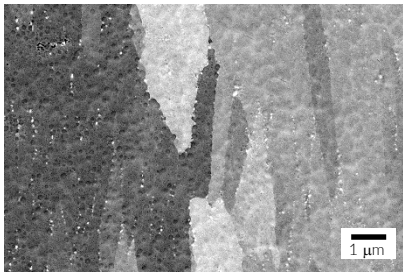


ABD<sup>®</sup>-850AM is well suited for gas atomization in an industrial manner.

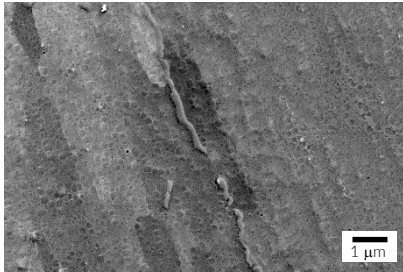
## MICROSTRUCTURE



As-printed microstructure after processing

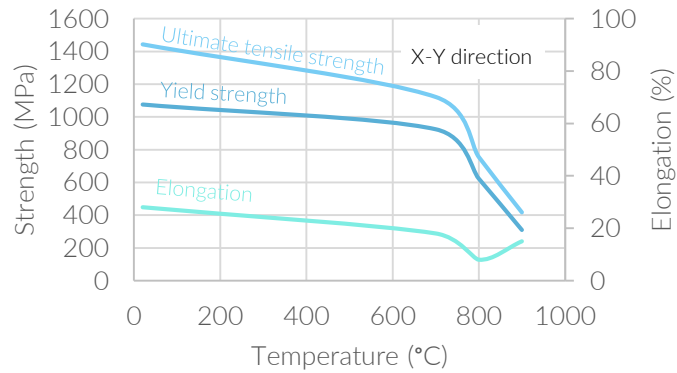
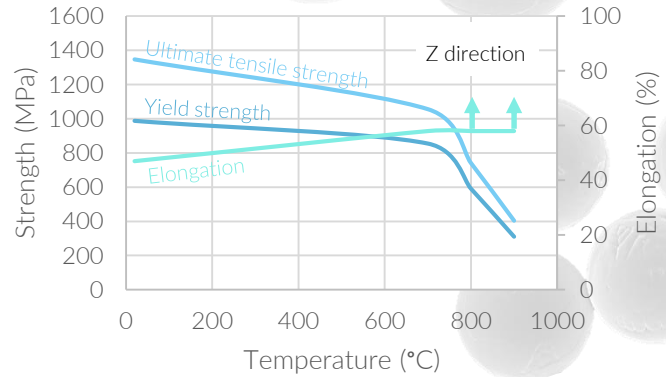


Microstructure after final heat treatment



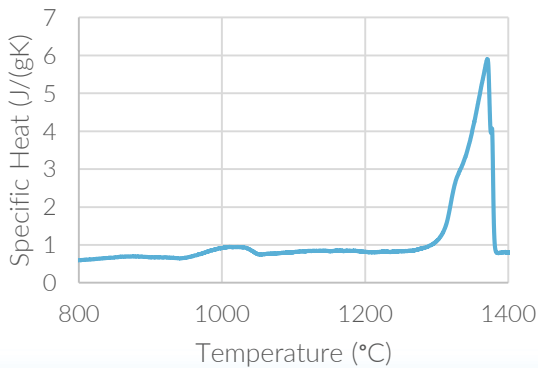
Microstructure after thermal exposure showing excellent microstructural stability

## TENSILE PROPERTIES



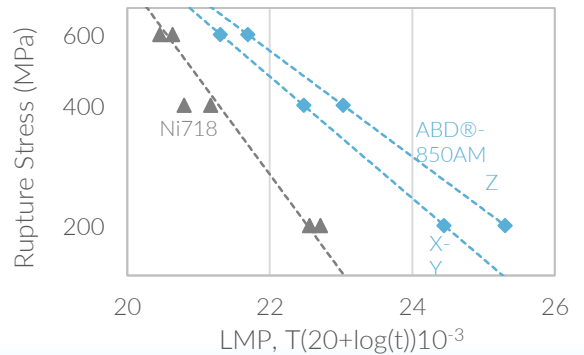
Tensile properties of ABD®-850AM after sub-solvus heat treatment. Measured in accordance to ASTM E8/E8M-16a/E21.

## SPECIFIC HEAT



ABD®-850AM in as-printed condition. Cp measured according to ASTM E1269.

## STRESS RUPTURE LIFE



Stress rupture properties of ABD®-850AM after sub-solvus heat treatment in X-Y and Z build direction. Measured in accordance to ASTM E139-11.