

# Pearl<sup>®</sup> Micro ABD<sup>®</sup>-900AM

## Powder for Additive Manufacturing



### MATERIAL OVERVIEW

- An age-hardenable nickel-based superalloy designed specifically for use as feedstock in powder bed fusion. ABD<sup>®</sup>-900AM is optimised for high creep and tensile strength, and corrosion/oxidation resistance, with a working temperature range up to 900°C in its age-hardened state.
- The new alloy has excellent creep strength – similar to alloy 939 and alloy 738 – while having superior resistance to cracking during manufacture and heat treatment.

ABD<sup>®</sup>-900AM is designed to be free of solidification, liquidation and strain-age cracks and showcases exceptional printability for such a high temperature  $\gamma'$  strengthened alloy. It is suitable for complex components within the Aerospace, Power, Automotive and Space industries.

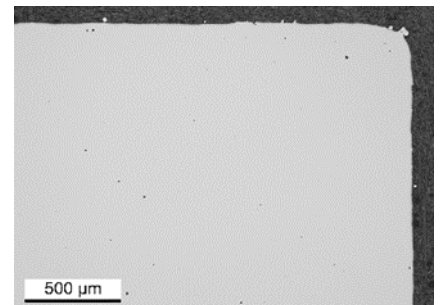
### KEY PROPERTIES

Mechanical (800°C)	Yield strength (MPa)	777 ± 44
	Ultimate tensile strength (MPa)	848 ± 22
Thermophysical (25-1200°C)	Thermal conductivity (W(m°C) <sup>-1</sup> )	11.0– 30.1

All measurements are for the fully heat treated alloy printed with a layer thickness of 30 µm.

### PRINTABILITY

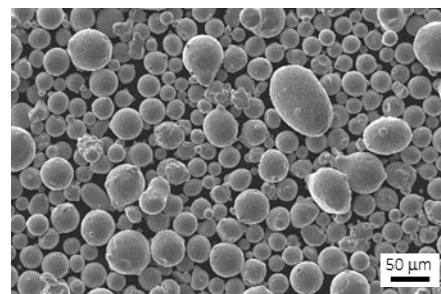
ABD<sup>®</sup>-900AM shows high part density and no cracking when printed with standard alloy 718 parameters.



### POWDER CHARACTERISTICS

Particle size distributions:

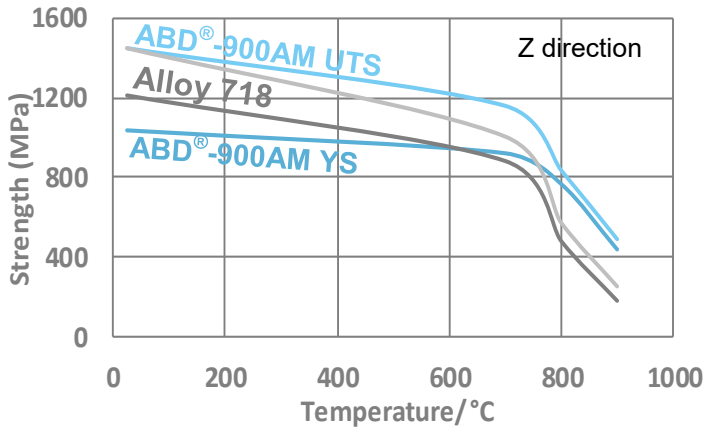
- Laser Beam Melting (powder bed): 15-53 µm
- Electron Beam Melting (powder bed): 45-106 µm
- Directed energy deposition (LMD): 45-106 µm
- Custom size distributions available on request



ABD<sup>®</sup>-900AM is well suited for gas atomisation

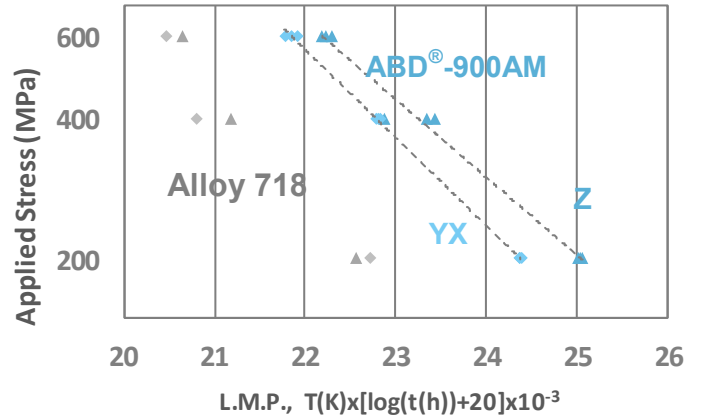
ABD<sup>®</sup>-900AM is available in batch sizes suitable for R&T and full production.

### TENSILE PROPERTIES



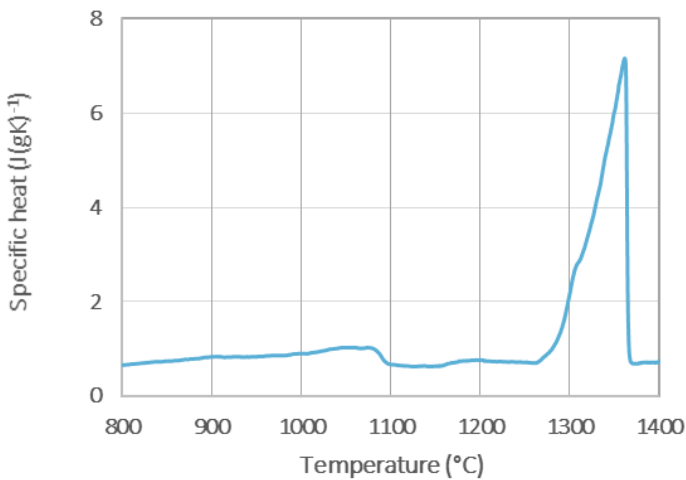
Tensile properties of ABD<sup>®</sup>-900AM after sub-solvus heat treatment.

### CREEP LIFE



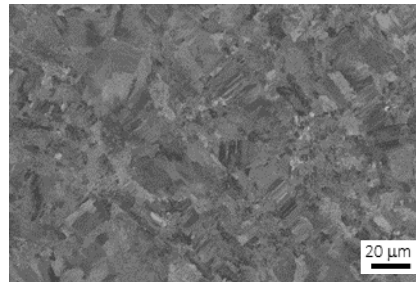
Stress rupture properties of ABD<sup>®</sup>-900AM after sub-solvus heat treatment.

### SPECIFIC HEAT

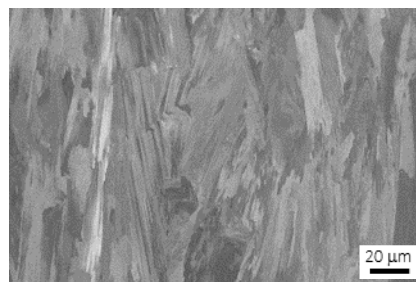


ABD<sup>®</sup>-900AM in as-printed condition.  
C<sub>p</sub> measured according to ASTM E1269.

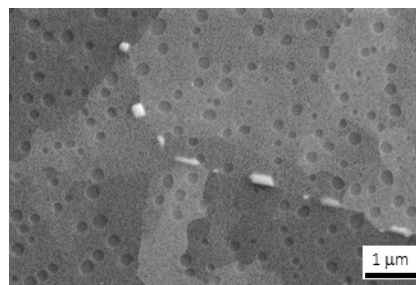
### MICROSTRUCTURE



As-printed XY-plane microstructure after processing with 30 μm layer thickness and 2D energy density of 2.5 Jmm<sup>-2</sup>.



As-printed XZ-plane microstructure for the same conditions



Microstructure after final heat treatment