

# ABD<sup>®</sup>-900AM

Nickel-based superalloy 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, liquitation 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.

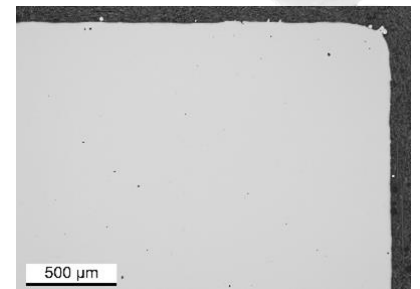
## KEY PROPERTIES

Mechanical <sup>1</sup> (800°C)	Yield strength (MPa)	777 ± 44
	Ultimate tensile strength (MPa)	848 ± 22
	Elongation at failure (%)	17 Z, 6 XY
	Area reduction at failure (%)	36 Z, 8 XY
Thermo-physical (25-1200°C)	Thermal Conductivity (W(m°C) <sup>-1</sup> )	11.0 – 30.1
	CTE (Linear) (x10 <sup>-6</sup> °C <sup>-1</sup> )	11.4 – 19.2
Physical	Density (g cm <sup>-3</sup> )	8.40
	Melting range <sup>2</sup> (°C)	1305 - 1380

All measurements are for the fully heat treated alloy printed with a layer thickness of 30 µm. <sup>1</sup>strain rate of 10<sup>-3</sup> s<sup>-1</sup>, <sup>2</sup>as-printed

## PRINTABILITY

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

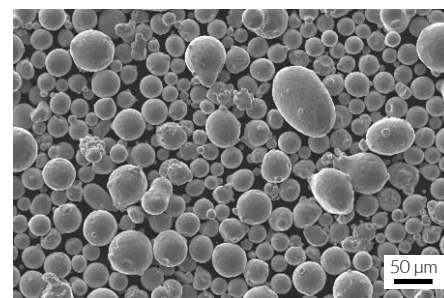


## POWDER CHARACTERISTICS

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.



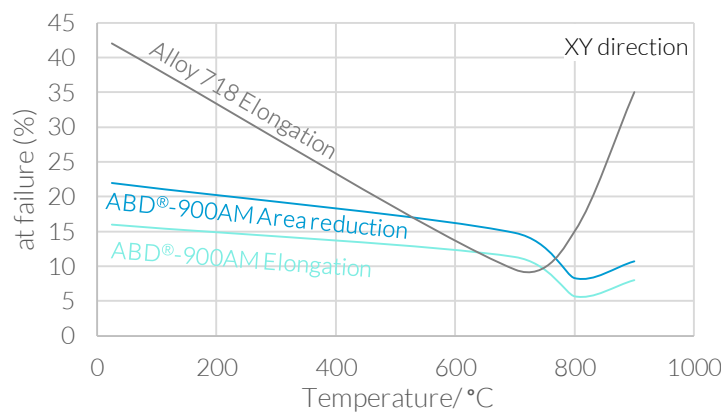
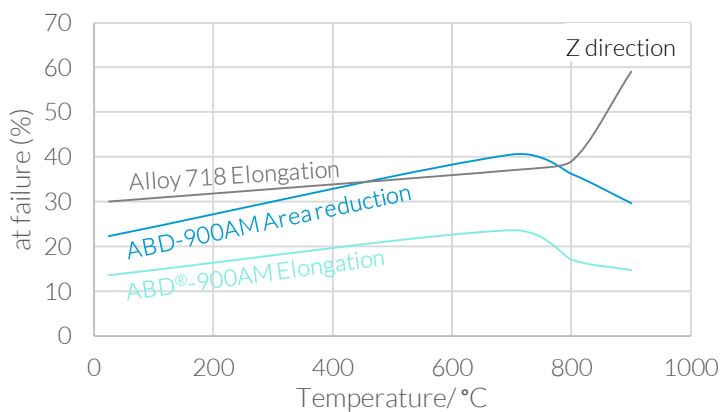
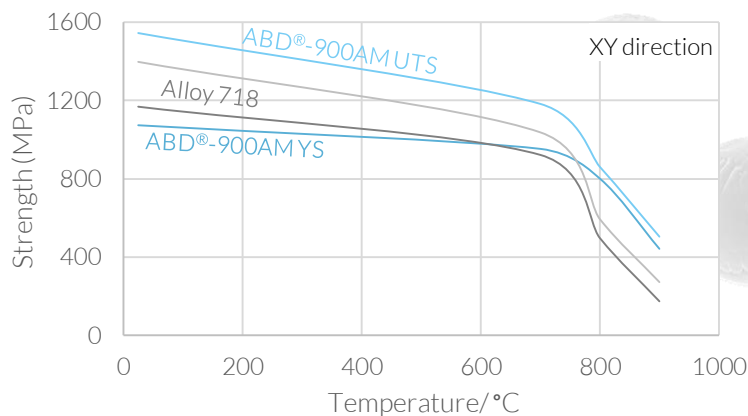
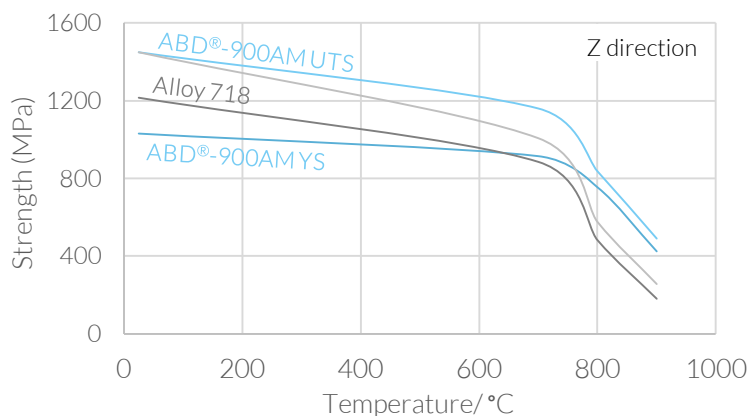
**ABD<sup>®</sup>-900AM is part of Aubert&Duval's Pearl<sup>®</sup>Micro powder portfolio – to make an enquiry please get in touch using the details below**



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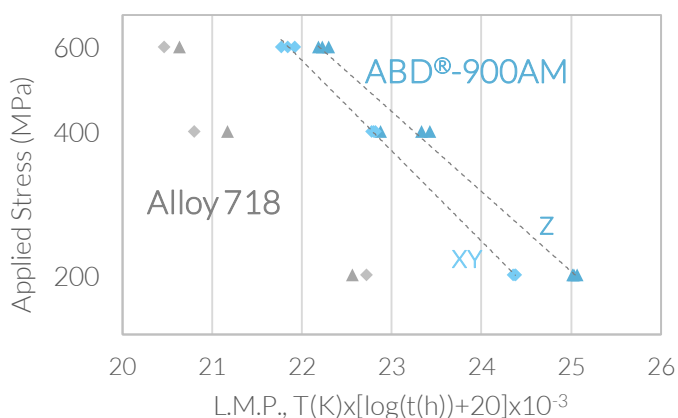
This data is for information only. ABD<sup>®</sup> is a registered trademark of OxMet Technologies.

## TENSILE PROPERTIES



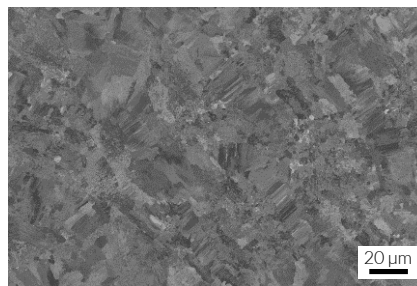
Tensile properties of ABD®-900AM after sub-solvus heat treatment. Measured in accordance to ASTM E8/E8M-16a/E21 for a strain rate of  $10^{-3} \text{ s}^{-1}$ .

## CREEP LIFE

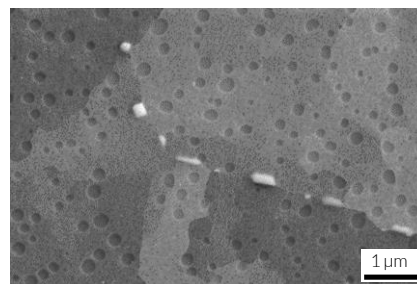


Stress rupture properties of ABD®-900AM after sub-solvus heat treatment. Measured in accordance to ASTM E139

## MICROSTRUCTURE



As-printed XY-plane microstructure after processing with  $30 \mu\text{m}$  layer thickness and 2D energy density of  $2.5 \text{ Jmm}^{-2}$



Microstructure after final heat treatment