

OSPREY® ALLOY 718-AM VIGA POWDER FOR ADDITIVE MANUFACTURING

DATASHEET

GENERAL DESCRIPTION

Osprey® Alloy 718-AM is a nickel base precipitation hardened superalloy, manufactured by melting under vacuum as powder by Inert Gas Atomisation, for advanced applications with demand on extremely low concentrations residual elements.

- High mechanical strength in combination with high corrosion resistance
- Attractive mechanical properties at elevated temperatures up to ~650°C

TYPICAL USES/APPLICATIONS

- Jet turbines
- Gas turbines
- Oil and gas

STANDARDS

- ASTM: F3055 14a
- UNS: N07718

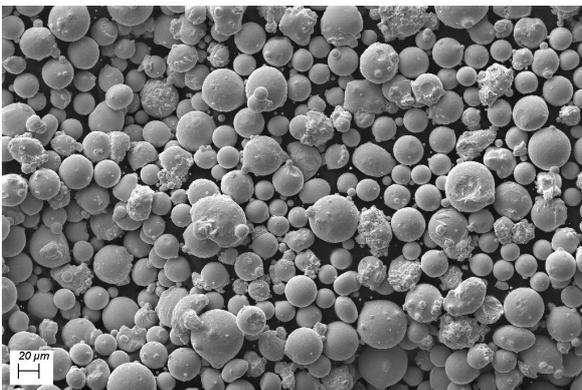
CHEMICAL COMPOSITION

Chemical composition (nominal), wt% if not other given

| | | | | | | | | |
|-------------|-------------|---------|-----------|-----------|-----------|-----------|----------------|----------------|
| Ni | Cr | Fe | Nb | Mo | Ti | Al | Co | |
| 50.00-55.00 | 17.00-21.00 | Balance | 4.75-5.50 | 2.80-3.30 | 0.65-1.15 | 0.20-0.80 | < 1.00 | |
| C | Mn | Si | P | S | B | Cu | O ¹ | N ¹ |
| < 0.08 | < 0.35 | < 0.35 | < 0.015 | < 0.015 | < 0.006 | < 0.30 | < 250 ppm | < 250 ppm |

1) Typical levels for Vacuum Inert Gas Atomised powder

POWDER MORPHOLOGY

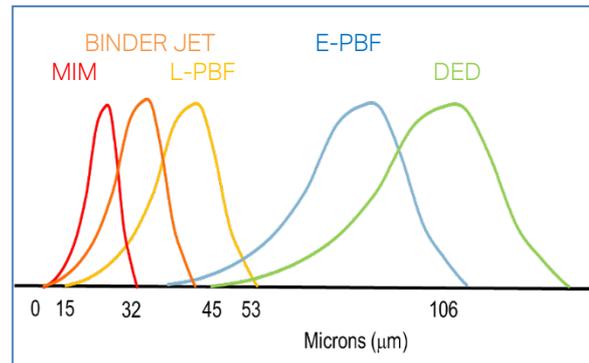


The powder morphology of Osprey® 718-AM alloy powder is typically spherical in morphology, with smooth surface and low level of powder satellites.

POWDER SIZE DISTRIBUTION

Available in a range of customised powder sizes suitable for different applications and AM platforms:

- Metal Injection Moulding
 - < 32 μm , < 22 μm , <16 μm , < 10 μm & < 5 μm
- Binder Jet
 - <45 μm , <38 μm , <22 μm , <16 μm
- Laser beam - Powder Bed Fusion, (L-PBF)
 - e.g. 53 to 15 μm & 45 to 20 μm
- Electron Beam - Powder Bed Fusion, (E-PBF)
 - 106 to 45 μm
- Direct Energy Deposition (DED)
 - 150 to 53 μm & 90 to 45 μm



Other powder size range distributions are available by request.

MECHANICAL PROPERTIES

Typical mechanical properties for as-built and heat treated condition for Laser- Powder Bed Fusion (L-PBF) IN718 material evaluated in room temperature. Heat treatment; Solution Anneal (980 °C for 1 hour, air cooled) and Aged (720°C for 8 hours, furnace cooled to 620 °C for 8 hours and air cooled).

Metric units

| Condition | Direction | Proof strength | Tensile strength | E-modulus | Elongation | Impact Toughness |
|--------------|------------|----------------|------------------|-------------------|------------|------------------|
| | | $R_{p0.2}$ | R_m | | A | J |
| | | MPa | MPa | MPa ¹⁾ | % | |
| As built | Horizontal | 790 | 1040 | 174 | 50 | |
| | Vertical | 660 | 930 | 158 | 61 | |
| Heat Treated | Horizontal | 1217 | 1462 | 182 | 19.4 | 16.1 |
| | Vertical | 1145 | 1365 | 166 | 18.6 | 29.3 |

¹⁾ $\times 10^3$

Imperial units

| Condition | Direction | Proof strength | Tensile strength | E-modulus | Elongation | Impact Toughness |
|--------------|------------|----------------|------------------|-------------------|------------|------------------|
| | | $R_{p0.2}$ | R_m | | A | J |
| | | ksi | ksi | ksi ¹⁾ | % | |
| As built | Horizontal | 115 | 165 | 25 | 50 | |
| | Vertical | 96 | 135 | 23 | 61 | |
| Heat Treated | Horizontal | 177 | 212 | 26 | 19.4 | 16.1 |
| | Vertical | 166 | 198 | 24 | 18.6 | 29.3 |

¹⁾ $\times 10^3$

Typical mechanical properties for heat treated Laser- Powder Bed Fusion (L-PBF) IN718 material evaluated at 650 °C.

Metric units

| Condition | Direction | Proof strength | Tensile strength | E-modulus | Elongation |
|--------------|------------|-------------------|------------------|-------------------|------------|
| | | R _{p0.2} | R _m | | A |
| | | MPa | MPa | MPa ¹⁾ | % |
| Heat Treated | Horizontal | 908 | 1019 | 153 | 1.9 |
| | Vertical | 885 | 1111 | 141 | 5.3 |

¹⁾X10³

Imperial units

| Condition | Direction | Proof strength | Tensile strength | E-modulus | Elongation |
|--------------|------------|-------------------|------------------|-------------------|------------|
| | | R _{p0.2} | R _m | | A |
| | | ksi | ksi | ksi ¹⁾ | % |
| Heat Treated | Horizontal | 132 | 148 | 22 | 2 |
| | Vertical | 128 | 161 | 20 | 5 |

¹⁾X10³

Typical Vicker's Hardness levels (ASTM E92, ISO 6507-1, JIS Z2244, GB/T 4340.1), in the L-PBF IN718.

| Condition | Hardness HV |
|--------------------------|-------------|
| As-Built | 317 |
| Solution Annealed | 327 |
| Solution Annealed & Aged | 478 |

PHYSICAL PROPERTIES

Wrought material data:

Density, 8.19 g/cm³, 0.0.296 lb/in³

Thermal conductivity, 11.4 W/mK

Melting range, 1260°C to 1336°C; (2300°F to 2440°F)

Coefficient of thermal expansion¹⁾, 13 10⁻⁶K⁻¹

1) In the range of 0 °C to 100 °C; (32°F to 212°F)

Disclaimer: Data and recommendations are provided for information and guidance only, and the performance or suitability of the material for specific applications are not warranted or guaranteed. Continuous development may necessitate changes in technical data without notice. This datasheet is only valid for Sandvik materials.

