



# OSPREY® 718 FOR ADDITIVE MANUFACTURING

## DATASHEET

### GENERAL DESCRIPTION

Osprey® 718 is a nickel-based precipitation hardened superalloy, manufactured by melting under vacuum as powder by Inert Gas Atomization, 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

### APPLICATIONS

- Jet turbines
- Gas turbines
- Oil and gas

### STANDARDS

- ASTM: F3055 14a
- UNS: N07718

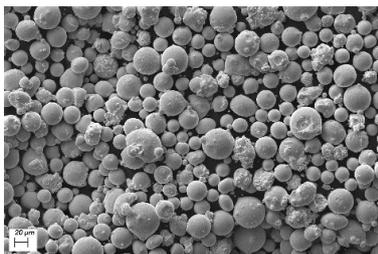
### CHEMICAL COMPOSITION

Chemical composition (nominal), wt%

Ni	Cr	Fe	Nb	Mo	Ti	Al	Co	C	Mn
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	<1.0	<0.08	<0.35
Si	P	S	B	Cu					
<0.35	<0.015	<0.015	<0.006	<0.30					

Powder manufactured by Vacuum Inert Gas Atomization typically has an oxygen and nitrogen level both <250 ppm.

### POWDER MORPHOLOGY



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

## POWDER SIZE DISTRIBUTION

Available in a range of customized powder sizes suitable for different applications and AM platforms.

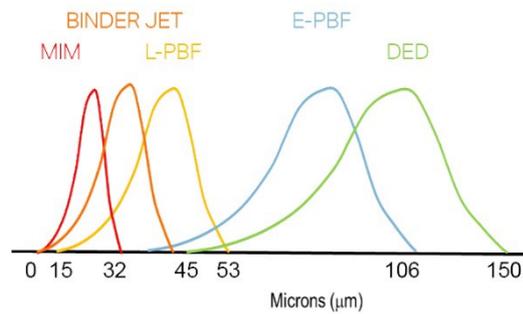
Metal Injection Moulding  
 <32 µm, <22 µm, <16 µm, <10 µm, <5 µm

Binder Jet  
 <45 µm, <38 µm, <22 µm, <16 µm

Laser Powder Bed Fusion (L-PBF)  
 e.g. 53 to 15 µm, and 45 to 20 µm

Electron Beam Powder Bed Fusion (E-PBF)  
 106 to 45 µm

Direct Energy Deposition (DED)  
 150 to 53 µm and 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) 718 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 <sub>p0.2</sub>	R <sub>m</sub>		A	J
		MPa	MPa	MPa <sup>1)</sup>	%	
As built	Horizontal					
	Vertical	612	964		34.5	
Heat treated	Horizontal	1217	1462	182	19.4	16.1
	Vertical	1145	1365	166	22.3	29.3

Imperial units

Condition	Direction	Proof strength	Tensile strength	E-modulus	Elongation	Impact toughness
		R <sub>p0.2</sub>	R <sub>m</sub>		A	J
		ksi	ksi	ksi <sup>1)</sup>	%	
As built	Horizontal					
	Vertical	89	140		34.5	
Heat Treated	Horizontal	177	212	26	19.4	16.1
	Vertical	166	198	24	22.3	29.3

1) X10<sup>3</sup>

Typical mechanical properties for heat-treated Laser-Powder Bed Fusion (L-PBF) 718 material evaluated at 650°C.

Metric units

Condition	Direction	Proof strength	Tensile strength	E-modulus	Elongation
		R <sub>p0.2</sub>	R <sub>m</sub>		A
		MPa	MPa	MPa <sup>1)</sup>	%
Heat treated	Horizontal	908	1019	153	
	Vertical	896	1064	129	5.3

Imperial units

Condition	Direction	Proof strength	Tensile strength	E-modulus	Elongation
		R <sub>p0.2</sub>	R <sub>m</sub>		A
		ksi	ksi	ksi <sup>1)</sup>	%
Heat Treated	Horizontal	132	148	22	
	Vertical	128	161	20	5.3

1) X10<sup>3</sup>

Typical Vicker's Hardness levels (ASTM E92, ISO 6507-1, JIS Z2244, GB/T 4340.1) of Osprey® 718 L-PBF material.

Condition	Hardness HV
As built	317
Solution annealed	327
Solution annealed and aged	478

## PHYSICAL PROPERTIES

Wrought material

Density: 8.19 g/cm<sup>3</sup>, 0.296 lb/in<sup>3</sup>

Thermal conductivity: 11.4 W/mK

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

Coefficient of thermal expansion<sup>1</sup>: 13 10<sup>-6</sup>K<sup>-1</sup>

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

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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.