Datasheet
Superalloys

Osprey® 718

Osprey® 718 is an age-hardenable nickel-chromium superalloy with high strength and high corrosion resistance. It has reliable and consistent mechanical properties at elevated temperatures.

UNS

N07718

EN Number

2.4668

Powder designed for

Additive Manufacturing (AM)
Metal Injection Moulding (MIM)

Product description

Osprey® 718 is an age-hardenable nickel-chromium superalloy characterized by high strength combined with high corrosion resistance. The alloy has reliable and consistent mechanical properties at elevated temperatures up to ~650°C/~923°F. It is typically used in jet and gas turbines and in oil and gas applications. Osprey® 718 is an alloy of the same type as Inconel® 718*.

This metal powder is manufactured by either induction melting under Vacuum Inert Gas Atomization (VIGA) or melting under argon prior to Inert Gas Atomization (IGA), producing a powder with a spherical morphology which provides good flow characteristics and high packing density. In addition, the powder has a low oxygen content and low impurity levels, resulting in a metallurgically clean product with enhanced mechanical performance.

*Inconel® is a trademark owned by Huntington Alloys Corporation.

Chemical composition (nominal), %

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Ni	50.0–55.0
Fe	Bal.
C	≤0.08
Cr	17.0-21.0
Mo	2.80-3.30
Al	0.20-0.80
Ti	0.65-1.15
Nb	4.75-5.50
Co	≤1.00
B	≤0.006
Mn	≤0.35
Si	≤0.35
P	≤0.015
S	≤0.015
Other	Cu ≤0.30

Powder characteristics and morphology

Powder for Additive Manufacturing

Osprey® metal powder for Additive Manufacturing is characterized by a spherical morphology and high packing density, which confer good flow properties. For powder bed processes these are essential when applying fresh powder layers to the bed to ensure uniform and consistent part build.

For blown powder processes, such as Direct Energy Deposition (DED), good flow ensures uniform build rates. Tight control of the particle size distribution also helps ensure good flowability. Low oxygen powders result in clean microstructures and low inclusion levels in the finished parts.

Powder for Metal Injection Moulding (MIM)

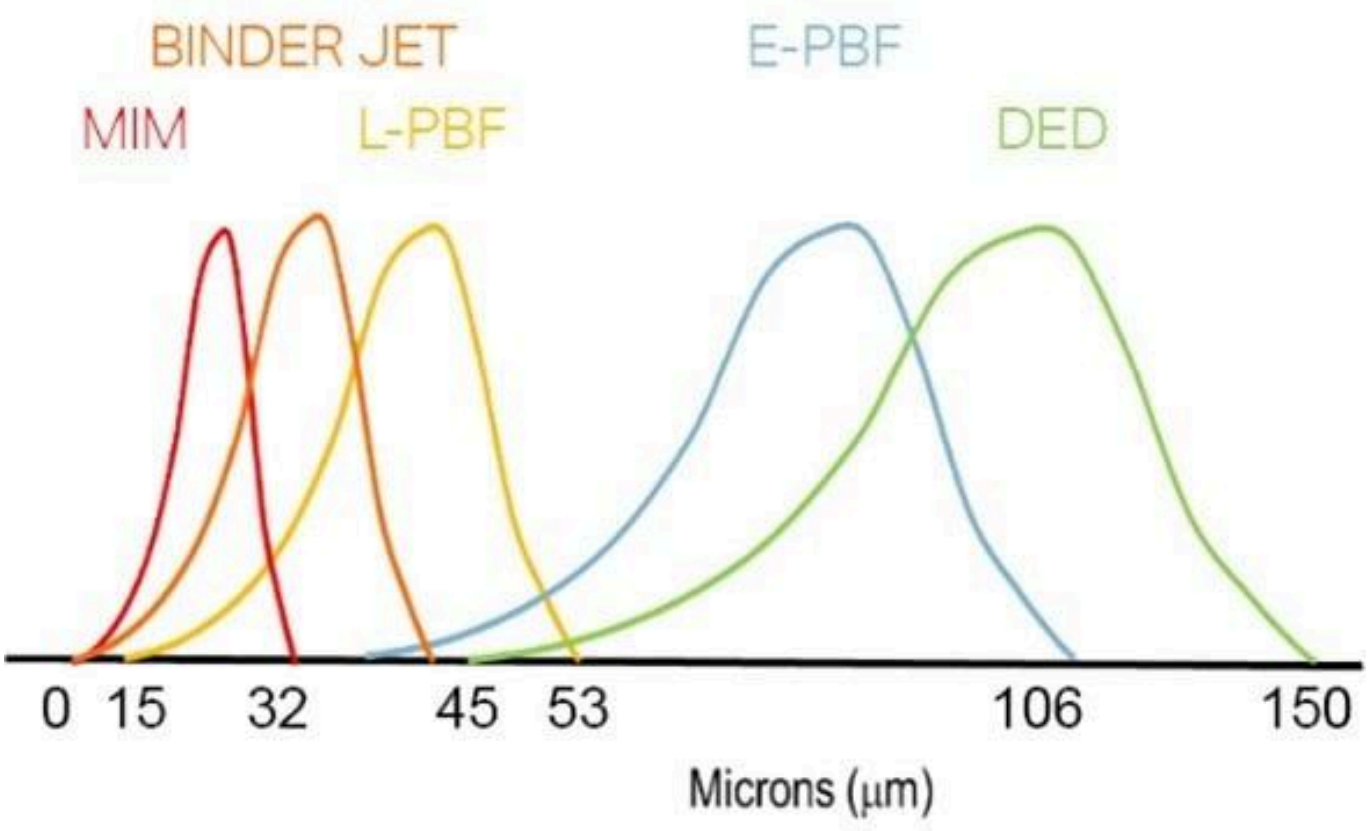
Osprey® MIM powder has a spherical morphology, resulting in high packing density. This enables the manufacture of feedstocks with high powder loading, which not only minimizes binder costs but also reduces part shrinkage during debinding and sintering. Spherical powder also has excellent flow characteristics, resulting in reduced tool wear and consistent mould filling.

Osprey® MIM powder's low oxygen content allows better control of carbon and consistency during sintering. Low oxygen levels, together with high packing density, also facilitate faster sintering.

Particle size distribution

Powder for Additive Manufacturing

Osprey® metal powder for Additive Manufacturing is available in a wide range of particle size distributions that are tailored to the individual Additive Manufacturing systems. They can also be tailored to the particular requirements of the end application, both in terms of mechanical performance and surface finish.



Process technology	Size (µm)
Binder jetting	≤ 16, ≤ 22, ≤ 32, ≤ 38, ≤ 45

Laser - Powder Bed Fusion (L-PBF)	15 to 53 and 10 to 45
Electron beam - Powder Bed Fusion (E-PBF)	45 to 106
Direct Energy Deposition (DED)	53 to 150

Powder for Metal Injection Moulding (MIM)

Osprey® metal powder for Metal Injection Moulding (MIM) is available in a wide range of particle size distributions, from under 5 µm up to 38 µm. The table shows our standard particle size distributions for MIM powders.

Size (µm)	D10 (µm)	D50 (µm)	D90 (µm)
≤ 38	5.5	13.0	31.0
≤ 32	5.0	12.0	29.0
80% ≤ 22	4.5	11.5	27.0
90% ≤ 22	4.0	10.5	22.0
90% ≤ 16	3.5	8.0	16.0

*Particle size measurements performed using a Malvern laser particle size analyzer, typical D10, D50 and D90 provided.

Tailor-made particle size distributions are available on request.Contact us to discuss your specific requirements.

Mechanical properties

Typical mechanical properties of as-built and heat-treated material produced by Laser - Powder Bed Fusion (L-PBF) evaluated in room temperature. Heat treatment: solution annealed (980°C/1,796°F for 1h, air cooled) and aged (720°C/1,328°F for 8h, furnace cooled to 620°C/ 1,148°F for 8h and air cooled).

Condition	Direction	Yield strength ($R_{p0.2}$), MPa	Tensile strength (R_m), MPa	E-modulus, GPa1)	Elongation (A), %	Impact toughness, J
As built	Horizontal	-	-	-	-	-
As built	Vertical	612	964	-	34.5	-
Heat treated	Horizontal	1,217	1,462	182	19.4	16.1

Heat treated	Vertical	1,145	1,365	166	22.3	29.3
Condition	Direction	Yield strength ($R_{p0.2}$), ksi	Tensile strength (R_m), ksi	E-modulus, ksi1)	Elongation (A), %	Impact toughness, J
As built	Horizontal	-	-	-	-	-
As built	Vertical	89	140	-	34.5	-
Heat treated	Horizontal	177	212	26	19.4	16.1
Heat treated	Vertical	166	198	24	22.3	29.3

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Typical mechanical properties for heat-treated Osprey® 718 material produced by Laser - Powder Bed Fusion (L-PBF) evaluated at 650°C/1,202°F.

Condition	Direction	Yield strength ($R_{p0.2}$), MPa	Tensile strength (R_m), MPa	E-modulus, GPa1)	Elongation (A), %
Heat treated	Horizontal	908	1,019	153	-
Heat treated	Vertical	896	1,064	129	5.3
Condition	Direction	Yield strength ($R_{p0.2}$), ksi	Tensile strength (R_m), ksi	E-modulus, ksi1)	Elongation (A), %
Heat treated2)	Horizontal	132	148	22	-
Heat treated2)	Vertical	128	161	20	5.3

1) X103

Hardness

Typical Vickers Hardness levels (ASTM E92, ISO 6507-1, JIS Z2244, GB/T 4340.1) as well as HRC values of Osprey® 718 material in the Laser - Powder Bed Fusion (L-PBF) as-built and solution-annealed conditions.

Condition	HV	HRC

As built	317	33
Solution annealed	327	34
Solution annealed and aged	478	47

Physical properties

Wrought material data, typical values

Density	8.19 g/cm³ (0.0.296 lb/in3)
Thermal conductivity	11.4 W/mK
Coefficient of thermal expansion1)	13 10-6K-1
Melting range	1,260–1,336°C (2,300–2,440°F)

1) In the range of 0–100°C (32–212°F)

Testing

All Osprey® metal powders are supplied with a certificate of analysis containing information on the chemical composition and particle size distribution. Information on other powder characteristics is available upon request.

Packaging

A wide range of packaging options is available, from 5kgs plastic bottles to 250kg metal drums.

5 kg (11 lbs) Plastic bottles
6 kg (13 lbs) Plastic bottles
10 kg (22 lbs) Plastic bottles
20 kg (44 lbs) Metal cans
100 kg (220 lbs) Steel drums
150 kg (330 lbs) Steel drums
250 kg (551 lbs) Steel drums
All packaging materials are suitable for air, sea and road freight.

Contact us for more information and to discuss your packaging requirements.