

## Datasheet

Austenitic stainless steel

# Osprey® 304L

Osprey® 304L is an austenitic chromium-nickel steel with a low carbon content. It has good corrosion resistance and is essentially non-magnetic.

UNS

S30400, S30403

ASTM, AISI

304, 304L

EN Name

X 5 CrNi 18-10, X 2 CrNi 18-9

EN Number

1.4301, 1.4307

## Powder designed for

- Additive Manufacturing (AM)
- Cold spray
- Hot Isostatic Pressing (HIP)
- Metal Injection Moulding (MIM)
- Sintered metal filters and foams



## Product description

Osprey® 304L is an austenitic chromium-nickel steel with a low carbon content. The alloy has good corrosion resistance and is essentially non-magnetic.

This metal powder is manufactured by 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.

## Chemical composition (nominal), %

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Fe	Bal.
C	0.03
Cr	18.0-20.0
Ni	8.0-12.0
Si	1.0
Mn	2.0
S	0.03
P	0.045

## 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 Cold spray**

Osprey® metal powder for cold spray is characterized by a spherical morphology and good flow properties. Accurate control of the powder composition and particle size distribution ensure consistent performance both throughout a single batch as well as between different batches of the same alloy.

### **Powder for Hot Isostatic Pressing (HIP)**

Osprey® HIP powder has a spherical morphology, resulting in 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.

### **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.

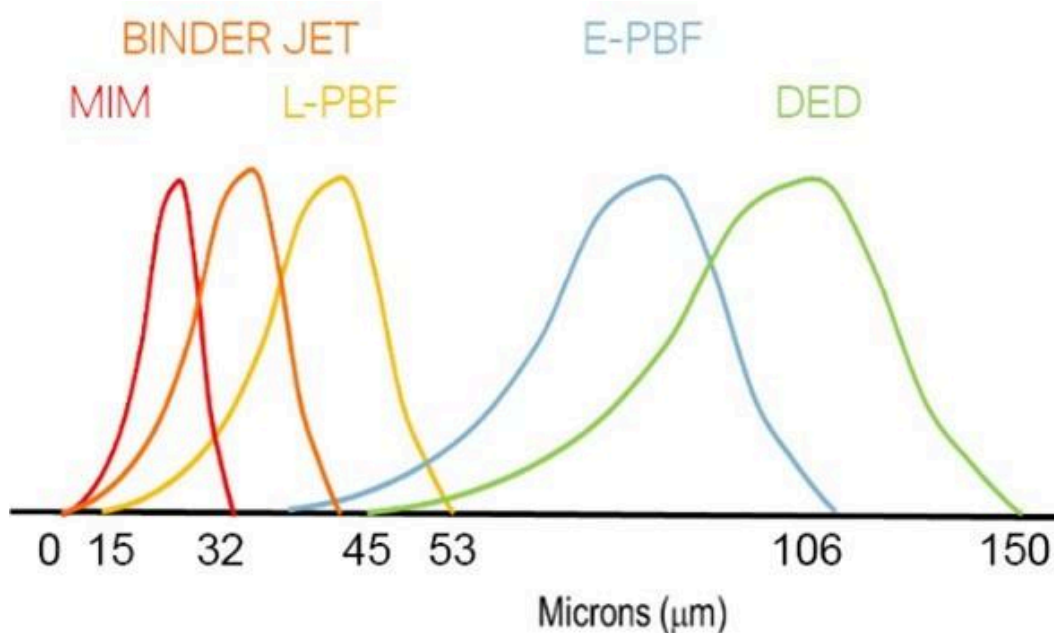
### **Powder for sintered metal filters and foams**

Osprey® metal powder for sintered metal filters and foams is characterized by a spherical morphology, which results in excellent packing density during processing. Accurate control of the powder composition and particle size distribution ensure consistent performance both throughout a single batch as well as between different batches of the same alloy.

## 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.



*Typical particle size distributions for Additive Manufacturing.*

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 Cold spray

Osprey® metal powder for Cold spray is available in a wide range of particle size distributions, from 5 µm to 45 µm. Our standard range of Cold spray powder includes the following particle size distributions:

- 20 to 45 µm

- 15 to 38  $\mu\text{m}$
- 10 to 32  $\mu\text{m}$
- 5 to 25  $\mu\text{m}$

### **Powder for Hot Isostatic Pressing (HIP)**

Osprey® powder for Hot Isostatic Pressing (HIP) is available in a broad size range, typically <250 microns, resulting in a high packing density and tap density. Low oxygen levels, together with high packing density, also facilitate faster sintering.

### **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  $\mu\text{m}$  up to 38  $\mu\text{m}$ . The table shows our standard particle size distributions for MIM powders.

Size ( $\mu\text{m}$ )	D10 ( $\mu\text{m}$ )	D50 ( $\mu\text{m}$ )	D90 ( $\mu\text{m}$ )
$\leq 38$	5.5	13.0	31.0
$\leq 32$	5.0	12.0	29.0
$80\% \leq 22$	4.5	11.5	27.0
$90\% \leq 22$	4.0	10.5	22.0
$90\% \leq 16$	3.5	8.0	16.0

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

### **Powder for sintered metal filters and foams**

Osprey® powder for sintered metal filters and foams is available in a wide range of particle size distributions tailored to the requirements.

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

## 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 are available, from 1 kg (2.2 lb) to 200 kg (440 lb)\*.

Contact our team who can support you with selecting the right packaging for your product and application.

\*Some packaging options may not be available for all products due to international shipping regulations.