



OSPREY[®] 420 FOR ADDITIVE MANUFACTURING

DATASHEET

GENERAL DESCRIPTION

Osprey[®] 420 is a stainless-steel powder manufactured by inert gas atomization, which is capable of achieving a high level of mechanical strength, hardness and notably corrosion resistance. This grade benefits from a simple heat treatment, which can result in a Transformation Induced Plasticity (TRIP) effect, during loading that significantly increase the elongation. Osprey[®] 420 is suitable for processing by Additive Manufacturing including Powder Bed Fusion by laser, achieving a high density (> 99.8%) when using optimized build conditions and process parameters. Osprey[®] 420 does not contain nickel or cobalt and therefore provides a cost-effective material, which is suitable for applications that demand high levels of performance, including conformal cooled injection mold tools, medical instruments and knives. The alloy can be heat treated to relieve induced stress during the build process and stabilize the microstructure.

- High mechanical strength and hardness (51 HRC)
- Suitable of applications in plastic mould tools
- High strength applications demanding corrosion resistance

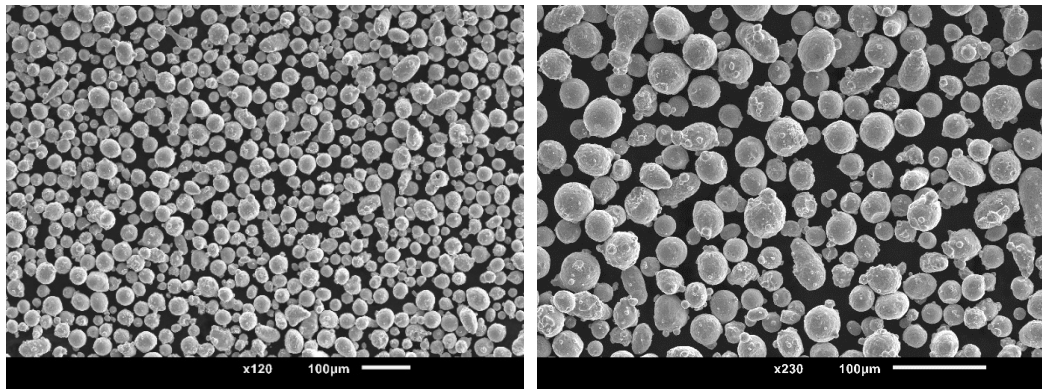
CHEMICAL COMPOSITION

Chemical composition (nominal), wt%

Fe	Cr	Mn	Si	C	P	S
Balance	13.0	<1.0	<1.0	0.3	<0.04	<0.03

POWDER MORPHOLOGY

The powder morphology of Osprey[®] 420 alloy powder is typically spherical in morphology, with smooth surface and low level of powder satellites.



SEM micrographs of a) -45 +15 µm powder with spherical morphology, b) smooth surface and low level of powder satellites.

Data source: University of Louisville

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)

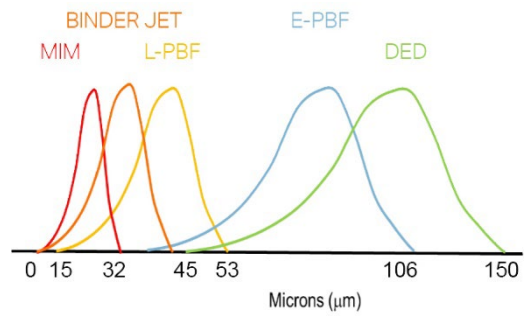
e.g. 53 to 15 µm, and 45 to 20 µm

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 of Osprey® 420 powder designed for L-PBF in as-built condition, evaluated at room temperature.

Metric units

Condition	Direction	Proof strength	Tensile strength	Elongation	Hardness
		Rp0.2	Rm	A	
		MPa	MPa	%	HRC
As built	Standard	900	1050	2.5	55
	Optimum	1050	1340	4.0	52

Imperial units

Condition	Direction	Proof strength	Tensile strength	Elongation	Hardness
		Rp0.2	Rm	A	
		ksi	ksi	%	HRC
As built	Standard	131	152	2.5	55
	Optimum	152	194	4.0	52

Typical mechanical properties of as-built Osprey® 420 L-PBF in heat-treated condition, 315°C for 2 hours followed by air cooling. Typical Rockwell Hardness levels (ASTM E18, ISO 6508-1, JIS Z2245, GB/T 230), in the L-PBF as-built and heat-treated conditions.

Metric units

Condition	Direction	Proof strength	Tensile strength	Elongation	Hardness
		Rp0.2	Rm	A	
		MPa	MPa	%	HRC
As built	Standard	950	1520	6.3	53
	Optimum	1280	1750	9.0	51

Imperial units

Condition	Direction	Proof strength	Tensile strength	Elongation	Hardness
		Rp0.2	Rm	A	
		ksi	ksi	%	HRC
As built	Standard	138	220	6.3	53
	Optimum	186	254	9.0	51