

OSPREY® HX-AM SUPERALLOY FOR ADDITIVE MANUFACTURING

DATASHEET

GENERAL DESCRIPTION

Osprey® HX-AM nickel alloy is a powder manufactured by vacuum inert gas atomisation, capable of achieving good mechanical properties, including elongation and toughness and oxidation resistance at high temperature. This grade of metal powder is designed for processing by Additive Manufacturing, including Laser - Powder Bed Fusion (L-PBF), for aerospace applications including combustor components and furnace equipment.

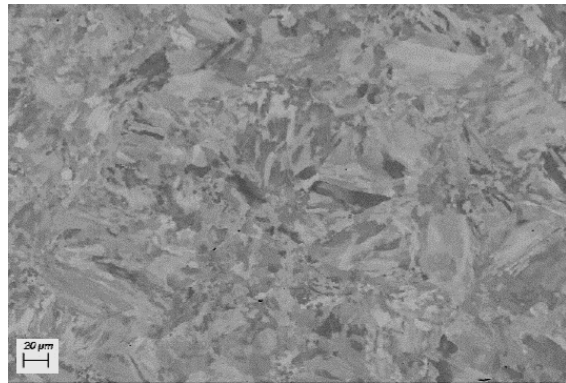
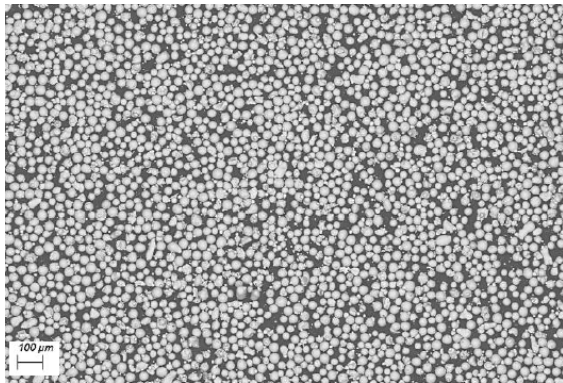
- Good mechanical strength and oxidation resistance
- Suitable for applications in aerospace and chemical process industry.

CHEMICAL COMPOSITION

Chemical composition (nominal), wt%

Ni	Cr	Fe	Mo	Co	W	Si	Mn	P	S	C
Balance	21	18	9.0	1.0	0.7	≤0.2	≤0.1	≤0.01	≤0.015	≤0.15
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POWDER MORPHOLOGY

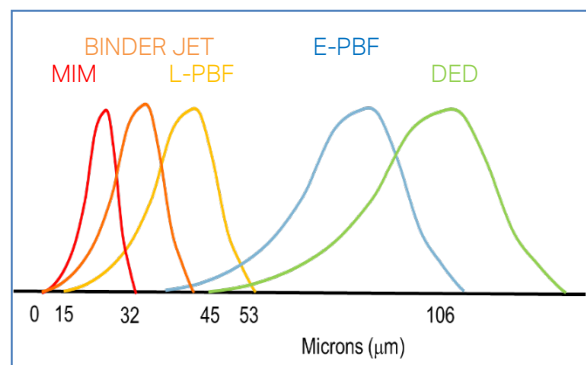


SEM micrographs of Osprey® HX-AM a) -53 +15 μm powder with a spherical morphology and b) a section through the printed L-PBF material, which notably shows the absence of cracks.

POWDER SIZE DISTRIBUTION

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

- Metal Injection Moulding (MIM)
 - < 32 μm, < 22 μm, < 16 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 of as-built Osprey® HX-AM powder L-PBF in heat treated condition (Solution annealing 1177 °C, for 15 minutes, followed by water quench) evaluated at room temperature and at high temperature (815°C).

Metric units

Condition	Direction	Proof strength	Tensile strength	E-modulus	Elongation	Impact Toughness
		R _{p0.2}	R _m			
		MPa	MPa	GPa	%	J
As built	Horizontal	627	820	194	31	105
	Vertical	522	684	171	41	156
Heat treated	Horizontal	444	770	227	40	156
	Vertical	390	637	194	52	194
As-built (tested at 815°C)	Vertical	212	292	110	21	

Imperial units

Condition	Direction	Proof strength	Tensile strength	E-modulus	Elongation	Impact Toughness
		R _{p0.2}	R _m			
		ksi	ksi	ksi	%	Ft.lbs
As built	Horizontal	91	119	28,137	31	77
	Vertical	76	99	24,802	41	115
Heat treated	Horizontal	64	112	32,924	40	115
	Vertical	57	92	28,137	52	143
As-built (tested at 815°C)	Vertical	31	42	15,954	21	

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

Condition	Hardness HV
As built	245
Heat treated	208

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.