Datasheet
Copper alloys

Osprey® GRCop-42

Osprey® GRCop-42 is a high-conductivity, high-strength, dispersion-strengthened copper alloy, designed to withstand service temperatures above 500°C.

- Additive Manufacturing (AM)

Product description

Osprey® GRCop-42 is a high-conductivity, high-strength, dispersion-strengthened copper alloy. It is designed to withstand service temperatures above 500°C, making it ideal for certain applications in the space industry, such as liquid rocket engine combustion devices.

This metal powder is manufactured by induction melting under Vacuum Inert Gas Atomization (VIGA), 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.

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Chemical composition (nominal), %

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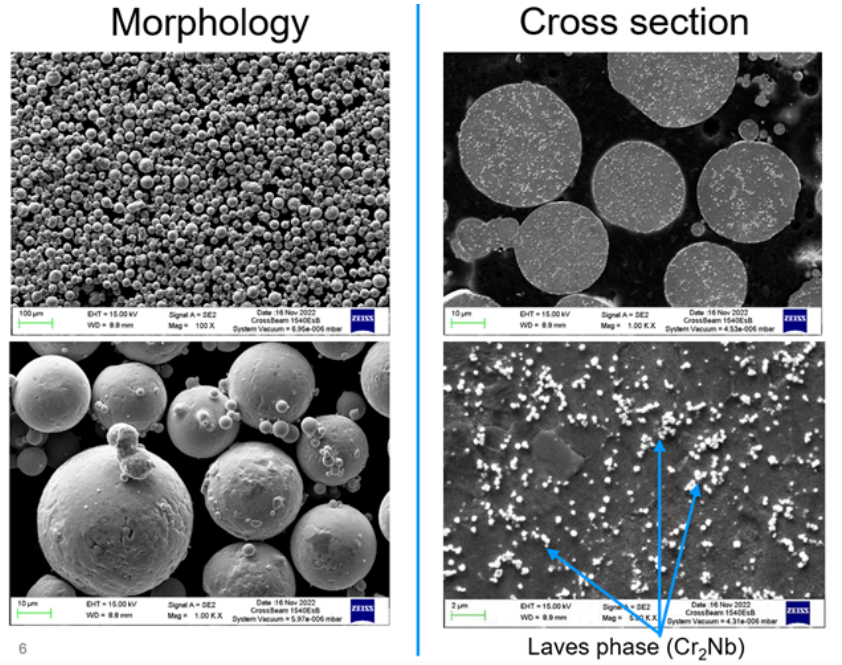
Cu	Bal.
Cr	3.1-3.4 * (1)
Nb	2.7-3.0* * (2)
Al	≤0.04
Fe	≤0.025
Si	≤0.035
O	≤0.05

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.



SEM micrographs of Osprey® GRCop-42 powder morphology, as well as cross section displaying an evenly distributed laves phase (Cr2Nb) in a sub-micron size.

Particle size distribution

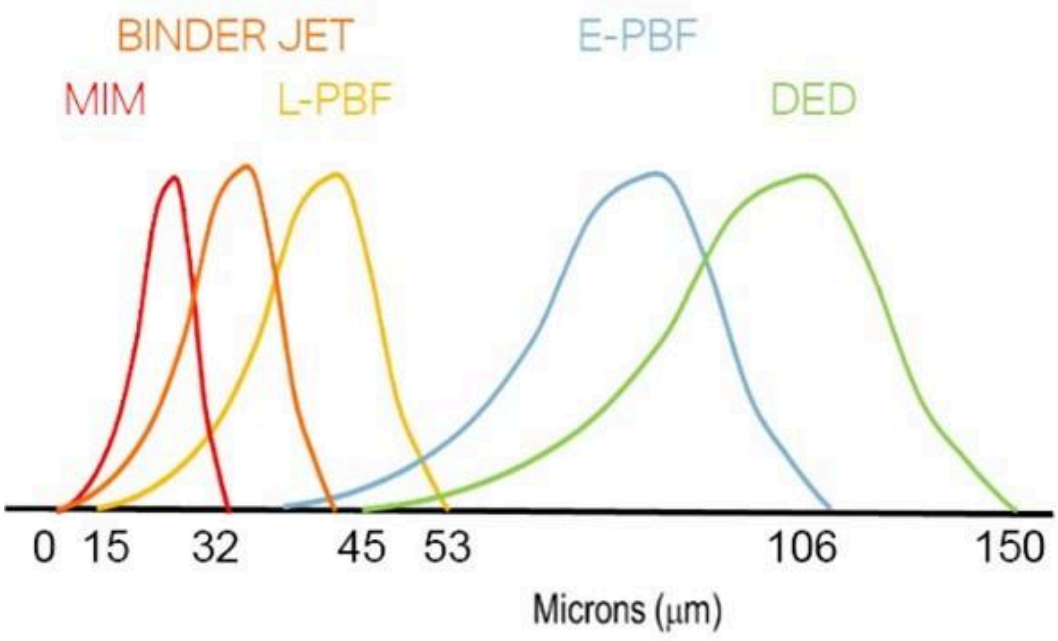
Powder for Additive Manufacturing

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.

Particle size distribution for Osprey® GRCop-42 powder sized for L-PBF*

D10 (µm)	D50 (µm)	D90 (µm)	Avalanche Energy2 (mJ/kg)	Hall-Flow (s)
20.5	31.4	47.4	36.7 ± 1	20

*Particle size measurements performed using a Malvern laser particle size analyzer, typical D10, D50 and D90 provided. Avalanche Energy2 measured in Mercury Scientific Rotating Drum.



Typical particle size distributions for Additive Manufacturing.

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

Mechanical properties

Mechanical properties for PBF-L Osprey® GRCop-42 material, evaluated at room temperature. Samples were printed on a SLM 125 HL SMT system in a collaboration with ASTRO Test Lab & MIMO Technik. After printing, the samples were HIPed at 950°C /3h/100 MPa.

Condition	Yield strength	Tensile strength	Elongation	Young's modulus
	Rp0.2	Rm	A	E
	MPa	MPa	%	GPa
L-PBF	190.3 ± 3	346.8 ± 2	36.7 ± 1	78.9

Condition	Yield strength	Tensile strength	Elongation, %	Young's modulus
	Rp0.2	Rm	A	E
	ksi	ksi	%	Msi
L-PBF	27.6 ± 0.4	50.3 ± 0.3	36.7 ± 1	11.4

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.

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