



C-103

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AMtrinsic®

powders that push the limits

AMtrinsic® spherical C-103 powder

Powders with the highest degree of processability

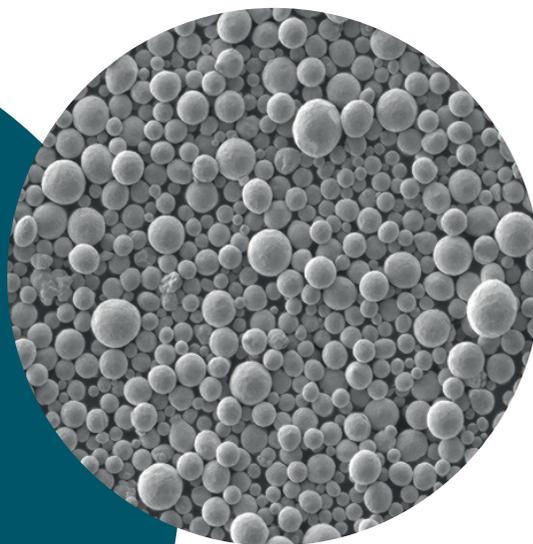
TANIOBIS has unparalleled expertise in developing and manufacturing tantalum and niobium metals. TANIOBIS developed high-temperature **gas-atomized AMtrinsic® spherical C-103 alloy powder** for use in various Additive Manufacturing Technologies. Our powder is characterized by excellent flowability, high tap density, spherical shape and narrow particle size distribution. **AMtrinsic® spherical C-103 powders** are pre-conditioned for applications in Laser Beam Powder Bed Fusion (LB-PBF), Electron Beam Powder Bed Fusion (EB-PBF) and Directed Energy Deposition (DED) or according to customer requests.

AMtrinsic® spherical C-103 powder

C-103 (Nb-10Hf-1Ti) alloy meets the requirements of space propulsion applications i.e. high-temperature strength, excellent ductility and high creep resistance. In addition to superior mechanical properties, the lower density weight of this alloy in comparison with other refractory alloys bring huge advantages in aerospace applications, and at a lower cost when compared to platinum group metals.

Key features:

- Exceptional high-temperature strength & stability
- Superior strength-to-density ratio
- Low O₂ content
- Spherical shape
- Good flowability
- Secure supply chain
- Allows AM parts according to ASTM F3635-23



TANIOBIS
inspiring metal evolution

Chemical characteristics

Nb	Bal.
Hf	9-11%
Ti	0.7-1.3%
Zr	<0.7%
Ta	<0.5%
W	<0.5%
O	<350 ppm
N	<150 ppm
H	<30 ppm
C	<100 ppm

Topologically optimised additively manufactured thruster



The figure shows the room temperature tensile curves of additively manufactured C-103. AM C-103 exhibits superior mechanical properties compared with the conventionally produced wrought material.

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Physical Properties

	Unit	LPBF	EPBF
Nominal PSD	µm	15-63	63-100
D10	µm	15-30	50-65
D50	µm	30-45	65-85
D90	µm	45-70	85-110
Tap Density	g/cm ³	>5	>5
Hall Flow 0.1	s	<14	<14
Carney Flow 0.2	s	<5	<5

* other sieve fractions are also available upon request

Advantage of C-103 for AM

C-103 alloy is widely used for the production of space propulsion systems using subtractive methods. Although C-103 alloy has excellent processability and weldability, additive manufacturing enables part count reduction and as a consequence significant weight saving which is a great advantage for aerospace applications.

Furthermore, the design freedom enabled by 3D printing technology allows the creation of complex features such as integrated cooling channels in the thrusters which can increase the thermal load capacity of C-103 engines.

