

Niobium C-103 alloy Mill Products *PRODUCTS*

Number PD-7054
Issue 0-15.05.2018

Niobium C-103 Alloy Bar & Rod Products

Applications High-performance rocket nozzle applications where high stresses and temperatures up to 2700°F (1482°C) are encountered. Applications where high frequency vibrations occur at cryogenic temperatures. Aerospace applications such as afterburner liners & seals.

Forms Available Rod: 1.5" to 6.5" diameter.

Chemical Characteristics¹⁾

(Mass fraction in % [cg/g]; ppm [µg/g])

Nb	balance
Hf	9.0 to 11.0 wt%
Ti	0.7 to 1.3 wt%
Ta	max. 0.5 wt%
W	max. 0.5 wt%
Zr	max. 0.7 wt%
C	max. 150 ppm
H	max. 10 ppm
N	max. 150 ppm
O	max. 225 ppm
Total Other Elements	max. 3000 ppm

Structure Bar and rod will be supplied in a fully recrystallized condition unless otherwise requested.

Mechanical Properties Tensile properties can be supplied on request when Purchase Order is placed.

Temp °F (°C)	Yield Strength 0.2% offset KSI	Tensile Strength (KSI)	Elongation % inch
70 (25)	38	54	20
2000 (1093)	16	21	20

Metallurgical Characteristics

Material is a single-phase niobium alloy with all elements in solid solution.

Stress relieve as requested
Re-crystallize at 2300°F

1) Information on testing methods on request.

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Physical Properties

Density		0.32	lb/in ³
Melting Point		2350	°C
Coefficient of Expansion (90° - 1200° C)		3.8 to 4.5	10 ⁻⁶ °F ⁻¹
Specific Heat (at 100° C)		0.082	BTU/Lb°F
Thermal Conductivity (870° – 1300°C)		22 to 26	BTU/Hr-Ft °F
Modulus of Elasticity	(20°C)	13 X 10 ⁶	PSI
	(1200°C)	9.3 X 10 ⁶	PSI
Emissivity	(816°C)	0.28	
	(1093°C)	0.23	

Physical Characteristics

Dimensional Variations for Bar and Rod

Diameter	Tolerance +/- inch
1.000 to 1.500 excl.	0.015
1.500 to 2.000 excl.	0.020
2.000 to 4.000 excl.	0.030
4.000 to 6.500 excl.	0.040

Surface Condition

Sheet is supplied with a matte or bright finish to 0.030 inch thickness. A matte finish will be supplied for sheet over 0.030 inch thick. The sheet will be of uniform quality, clean, and free from foreign matter. It will be essentially free from edge delaminations as determined by visual examination.

Hazards identification in Advertising (Directive 67/548/EEC Article 26 and Directive 1999/45/EC Article 13)

None.

Identification

The material will be identified with appropriate specification number, ingot or lot number, and nominal size. Shipping containers will be marked with the name of the customer and the purchase order number.

Rejection

H.C. Starck must receive written notification of rejected material with the reason for rejection. The right is reserved to inspect rejected material at customer plant for claim validation. The material may be returned only after proper authorization.

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