Niobium C-103(1)

Smiths High Performance

For Space Exploration Applications

Designed to perform under high stress at elevated operating temperatures.

Niobium C-103 is an alloy containing niobium, hafnium and titanium, which is ideal for engineering applications in the space technology sector.

From spacecraft, launch vehicles, and rocket delivery systems to aerospace, Niobium C-103 alloy is a versatile material with attractive performance characteristics. It is ideal for various engineering applications in the space technology sector. The alloy is capable of withstanding high stresses at elevated temperatures, is readily weldable and provides excellent fabricability. Compared to other engineering raw materials, the material is relatively easy to work with. The alloy also withstands high-frequency vibrations at cryogenic temperatures due to the product's low ductile-to-brittle transition temperature.

Low Density:

Niobium C-103 affords the lowest density of refractory metals while being highly ductile at room temperature. The alloy also benefits from excellent thermal conductivity. The product is ideal for applications requiring excellent load-bearing capabilities at high temperatures.

Product Benefits:

- High stress resistance at elevated temperatures
- Excellent fabricability
- Readily weldable
- Low ductile-to-brittle transition temperature for cryogenic applications (-150˚C)

Applications:

- Satellites
- Rockets
- Steering (vectoring) nozzles for missiles
- Jet engine afterburner flaps

Availability:

Niobium C-103 is available in plate, sheet, bar and rod.

Related Specifications:

ASTM B652, B654,B655, AMS 7852, AMS 7857

About Smiths High Performance

Smiths High Performance is a leading stockholder and supplier of high-performance engineering materials. We are material supply chain partners supporting **high-technology market sectors**.

(1) Niobium C-103 is a proprietary product of Materion.

Further technical data available on the reverse of this Datasheet

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* Mechanical Properties (minimum)

Type	Atmosphere	UTS, ksi (MPa)	YS, ksi (MPa)	Elongation (%)
RT	Air	56 (386)	40 (276)	20
1000˚F (538˚C)	Vacuum	41 (283)	25 (172)	19
1200˚F (649˚C)	Vacuum	41 (283)	23 (159)	15
1400˚F (760˚C)	Vacuum	41 (283)	21 (145)	16
1600˚F (871˚C)	Vacuum	41 (283)	19 (131)	30
2000˚F (1093˚C)	Vacuum	25 (172)	18 (124)	30
2500˚F (1371˚C)	Vacuum	11 (76)	8 (55)	50

*Room and elevated temperatures for tensile testing, when fully recrystallized.

Physical Properties

Density	Melting Point
0.320 lb./cubic in 8.850 gm/cubic cm	4260 ± 90˚F 2350 ± 50˚C

Thermal Properties

Temperature	Thermal Conductivity K*
1600˚F (811˚C)	22.0 (38.1)
2035˚F (1113˚C)	23.5 (40.7)
2380˚F (1304˚C)	25.8 (44.7)

*K = Btu/hr - ft2 - ˚F/ft (W/m˚C)

Sizes & Forms

Niobium C-103	Dimensions (“)	Dimensions (cm)
Bar and Rod	1.50” - 6.50” diameter	3.81 – 16.51 cm
Sheet	0.024” - 0.1875” thick, up to 24” width	0.60 – 0.48 cm, up to 61 cm width
Plate	0.1875” - 1” thick, common widths	0.60 - 2.54 cm
Ingots	Up to 9.50” diameter	Up to 24.10 cm
Slabs	On request	On request

...where performance matters...

When you purchase high-performance materials from **Smiths High Performance**, you will join some of the biggest and best global engineering companies. We are a Tier 1 supply chain partner to the world’s leading motorsport companies. Our unique business structure and ethos allow us to offer services otherwise unavailable in this market sector.

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