

Niobium

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Refractory Metals and Alloys

41

Nb

92.91

Niobium

Niobium, also known as Columbium, is a shiny grey metal with a hardness similar to pure titanium and a ductility comparable to iron. Niobium is physiologically inert, hypoallergenic, and can be heated then anodized to produce iridescent colors making it a desirable property for prosthetics, implants and jewelry. Niobium becomes a superconductor at cryogenic temperatures and has the greatest magnetic penetration depth of any element. Niobium oxidizes at temperatures above 400°C. The element's reactivity with oxygen requires it to be worked in a vacuum or inert atmosphere.

The majority of mined Niobium is used as a micro-alloying element for steel. Also, Niobium quantities, as great as 6.5%, are added to nickel, cobalt, and iron to produce super alloys.

APPLICATIONS

Capacitors, arc-tube seals of sodium vapor lamps, high voltage wire for reactor modules, nuclear reactors, superconducting magnets.

Typical Physical Properties

Density	lb/in ³	0.31
	g/cm ³	8.60
Melting Point	°F	4474
	°C	2468
Electrical Resistivity	Micro-ohm-cm	15.1
Thermal Conductivity	BTU-in/hr-ft ² · °F (@68°F)	363
	W/m-K (@20°C)	52.3
Specific Heat Capacity	BTU/lb · °F 0.065	0.065
Coefficient of Linear Thermal Expansion	µin/in · °F (@68 - 212°F)	3.94
	µm/m · °C (@20 - 100°C)	7.10

Typical Mechanical Properties

Ultimate Tensile Strength

Rod 0.125" to 2.5"	psi (MPa), Min	1800 (125)
Wire 0.020" to 0.124"		1800 (125)
Strip, Sheet, Plate*		1800 (125)

Yield Strength

Rod 0.125" to 2.5"	psi (MPa)	10500 (73)
Strip, Sheet, Plate*		10500 (73)

Elongation

Rod 0.125" to 2.5"		25
Wire 0.020" to 0.124"	min % mma	20
Strip, Sheet, Plate*	min % in 1" length	
≥ 0.010" < 0.010"		20(15)

Source ASTM B392-18 Table 3, *ASTM B393-18 Table 4. Types 1&2, Annealed Condition (90% Minimum Recrystallized). 10 in. (254 mm) gage length to 0.050 in. (1.27 mm) diameter, and 1 in. (25.4 mm) or 2.0 in. (50.8 mm) gage length equal to or over 0.050 in. (1.27 mm).

Forms | Sizes Available

Plate	0.1875"- 1.000"
Round Bar Rod	0.030"- 4.000"
Sheet	0.010"- 0.125"
Strip Coil	0.005"- 0.015"
Wire	0.001"- 0.100"

If you do not see the size you require listed above, please call us

Typical Application



CHEMISTRY

99.6 Niobium (Nb) Minimum



Specifications

ASTM 7850, ASTM B392-18 (Bar, Rod & Wire) | B393-18 (Strip, Sheet, & Plate)
Types 1 & 2, UNS R04200, UNS R04210