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NIOBIUM TYPE 1 & 2, UNS R04300, UNS R04210

Shaped, Flat, Square, Round, Fine Wire, Plated and Un-plated
ASTM B393

NIOB1 (Type 1 Reactor Grade Unalloyed)

NIOB2 (Type 2 Commercial Grade Unalloyed)

Applications

Type 1 and Type 2:
Used in jewelry, super-abrasives, thin film deposition (glass), high-energy physics, springs and superconducting magnets for aerospace, consumer electronics, medical and superconducting applications.

Description

Niobium is refractory metal with an extremely high melting point and corrosive resistant properties. High thermal/electric conductivity, easily fabricated and bio-compatible.

Chemistry: Ingot

Element	Type 1 Reactor Grade	Type 2 Commercial Grade
Niobium	Balance	Balance
Carbon	0.01	0.01
Nitrogen	0.01	0.01
Oxygen	0.015	0.025
Hydrogen	0.0015	0.0015
Zirconium	0.02	0.02
Tantalum	0.1	0.3
Iron	0.005	0.005
Silicon	0.005	0.005
Tungsten	0.03	0.05

Element	Type 1 Reactor Grade	Type 2 Commercial Grade
Nickel	0.005	0.005
Molybdenum	0.020	0.020
Hafnium	0.02	0.02
Titanium	0.02	0.02
Below Elements When Specified:		
Boron	2ppm	---
Aluminum	0.002	0.005
Beryllium	0.005	---
Chromium	0.002	---
Cobalt	0.002	---

Physical Properties

Density: 0.310 lbs/in³, 8.66 g/cm³

Mean Coefficient of Thermal Expansion, in/in/°F (mm/m/°C)
70 - 212 °F (20 - 100 °C): 4.05 x 10^{-6} (7.3)

Thermal Conductivity: (W/m-°K)
(21 °C): 53.7

Modulus of Elasticity, ksi (MPa)
1.52 x 10³ (104.9 x 10³) in tension

Melting Point: 4490 °F (2477 °C)

Mechanical Properties at Room Temperature

Annealed: Typical

Ultimate Tensile Strength: 18 KSI min (124 MPa min)
Yield Strength (0.2% offset): 10.5 KSI min (72 MPa min)
Elongation:
Gauges: less than 0.010 inches: 15% min
Gauges: 0.010 inches and greater: 20% min

Properties Tempered

Niobium Type 1 and Type 2 can be cold rolled to achieve the temper properties required by specific customers and/or manufacturing requirements. Contact Ulbrich Wire for details.

Additional Properties

Corrosion Resistance

Refer to NACE (National Associate of Corrosion Engineers) for recommendations.

Standard Wire Finishes

Extra Clean: (XC) Extra clean is also referred to as “bright annealed” or “bright annealed and cold rolled”

Grease (round wire only): Drawn in a heavy grease produces an “Ultra bright” finish for decorative applications

Soap (round wire only): Soap is used as a lubricant in the drawing process and is not removed. It acts as a lubricant during customer part forming operation. A soap finish is available in tempered products.

Plated: Many plating options are available.

** Special finishes are available: Contact Ulbrich Wire Sales with special finish and plating requests.*

Forms:

Continuous Coils
Cut to lengths
Precision cutting

Heat Treatment

Niobium Type 1 and Type 2 are non hardenable by heat treatment.

Welding

For best results refer to: SSINA’s “Welding of Stainless Steels and Other Joining Methods”.