

## Niobium

The melting point of niobium is 2468°C, and the density of it is 8.6 g/cm<sup>3</sup>. With the characteristics of corrosion resistance, high temperature resistance and malleability, niobium is widely used in electronics industry, steel industry, chemical industry, optics, gemstone manufacturing, superconducting technology, aerospace technology and other fields. Niobium sheet and plate is the most common form of Nb products.

### Significant Characteristics and Applications

Excellent chemical resistance to concentrated acids and liquid alkali metals

Very tough and therefore easily deformable without cutting

Good heat resistance and high melting point

Low thermal neutrons

### ASTM Standard Specifications

ASTM B392 (Nb en Nb-alloys – bars, rods, wires)

ASTM B393 (Nb en Nb-alloys – plate, strip)

ASTM B394 (Nb en Nb-alloys – tubes, seamless and welded)

ASTM B391 (Nb en Nb-alloys – ingots, cubes)

ASTM B652/B652M (niobium hafnium-alloys – ingots)

ASTM B655/B655M (niobium hafnium-alloys – wires)

### Physical Properties

Niobium and Niobium Alloys Sheet Chemical Composition				
Element	Type 1 (Reactor Grade Unalloyed Niobium) R04200	Type 2 (Commercial Grade Unalloyed Niobium) R04210	Type 3 (Reactor Grade Niobium- 1%Zirconium) R04251	Type 4 (Commercial Grade Niobium- 1%Zirconium) R04261
Max Weight % (Except Where Otherwise Specified)				
C	0.01	0.01	0.01	0.01
N	0.01	0.01	0.01	0.01
O	0.015	0.025	0.015	0.025
H	0.0015	0.0015	0.0015	0.0015
Zr	0.02	0.02	0.8 - 1.2	0.8 - 1.2
Ta	0.1	0.3	0.1	0.5
Fe	0.005	0.01	0.005	0.01
Si	0.005	0.005	0.005	0.005
W	0.03	0.05	0.03	0.05
Ni	0.005	0.005	0.005	0.005
Mo	0.010	0.020	0.010	0.050
Hf	0.02	0.02	0.02	0.02
Ti	0.02	0.03	0.02	0.03

Niobium and Niobium Alloys Sheet Mechanical Property				
Grade	Ultimate Tensile Strength, min,psi(MPa)	Yield Strength(0.2 % offset), min, psi (MPa)	Elongation in 1-in. (25.4-mm) gage length, min, %	
			0.010 in. or Greater	Less Than 0.010 in.
Types 1 and 2	18 000 (125)	10 500 (73)	20	15
Types 3 and 4	28 000 (195)	18 000 (125)	20	15