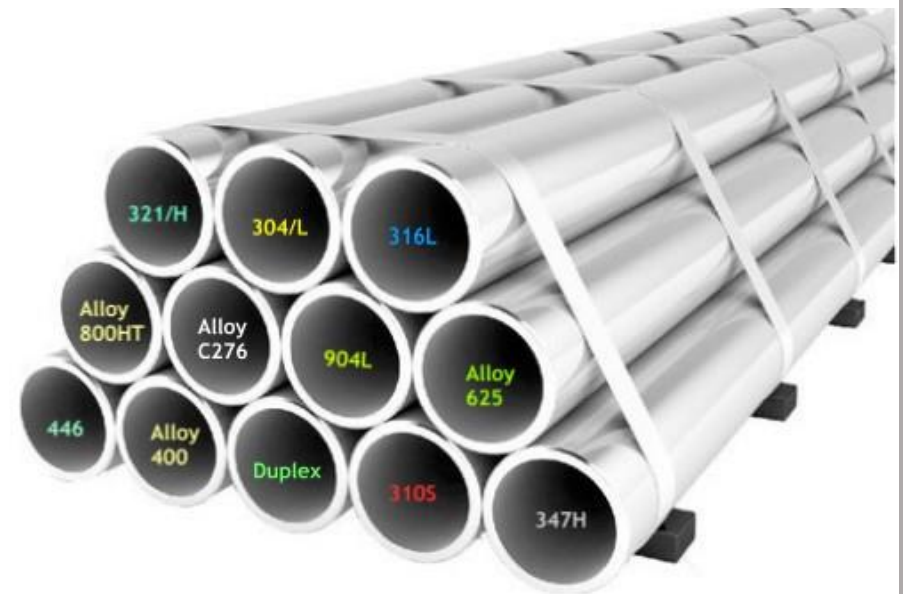


TANTALUM

Datasheet for Tantalum

- Pipes & Tubes
- Sheets & Plates
- Bars & Rods, Forgings
- Fittings & Flanges
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Datasheet for Tantalum

R05200 (Ta1), R05252 (Ta2.5W), R05255 (Ta10W), R05240 (TaNb40)

What is Tantalum?

Tantalum is a chemical element with symbol Ta and atomic number 73. Previously known as tantalium, its name comes from Tantalus, a hero from Greek mythology. Tantalum (Ta) is a dark blue-gray metal that is very heavy, ductile, and hard and has high corrosion resistance. Tantalum is especially resistant to chemicals at temperatures below 150 °C and can only be dissolved with hydrofluoric acid. It has the fourth-highest melting point of all metals and is able to form extremely thin and protective oxide layers for high-quality capacitors, making it an excellent material for tubes. It is part of the refractory metals group, which are widely used as minor components in alloys. The chemical inertness of tantalum makes it a valuable substance for laboratory equipment and a substitute for platinum. Tantalum is also used for medical implants and bone repair. Its main use today is in tantalum capacitors in electronic equipment such as mobile phones, DVD players, video game systems and computers. Tantalum, always together with the chemically similar niobium, occurs in the minerals tantalite, columbite and coltan (a mix of columbite and tantalite). Tantalum is a rare metal, comprising just $8 \times 10^{-9}\%$ of the universe, making it fifteen times less abundant in the universe than gold (which makes up $6 \times 10^{-8}\%$). Tantalum also comprises just $1.5 \times 10^{-4}\%$ of the earth's crust, making it more abundant than other metals in the sixth period, such as rhenium (abundance $2.6 \times 10^{-7}\%$), osmium (abundance $1.8 \times 10^{-7}\%$), or iridium (abundance $4 \times 10^{-8}\%$), but not as abundant as barium (abundance $3.4 \times 10^{-2}\%$).

Product Forms and Standards of Tantalum

- UNS Grade R05200—Unalloyed tantalum, vacuum melted.
- UNS Grade R05400—Unalloyed tantalum, powder-metallurgy consolidation.
- UNS Grade R05252—Tantalum+2.5% tungsten alloy, vacuum melted.
- UNS Grade R05255—Tantalum+10% tungsten alloy, vacuum melted.
- UNS Grade R05240—Tantalum alloy, 60% tantalum, 40% niobium, electron-beam furnace or vacuum arc melt, or both.

Tantalum	Bar, Rod, Tube, Plate, Sheet, Strip, Foil, Machined Components, Powder
ATI Ta10W™	Billet, Bar, Rod, Tube, Plate, Machined Components
ATI Ta2.5W™	Sheet, Tube, Machined Components

ATI Ta40Nb™

Billet, Bar, Rod, Tube, Plate

Chemical Properties of Tantalum

Element	R05200 (%Max)	R05400 (%Max)
C	0.01	0.01
O	0.015	0.03
N	0.01	0.01
H	0.0015	0.0015
Fe	0.01	0.01
Mo	0.02	0.02
Nb	0.1	0.1
Ni	0.01	0.01
Si	0.005	0.005
Ti	0.01	0.01
W	0.05	0.05

Mechanical and Thermal Properties of Tantalum

Properties	Metric	Imperial
Tensile strength	900 MPa	131000 psi

Poisson's ratio	0.35	0.35
Modulus of elasticity	186 GPa	27000 ksi
Shear modulus	69 GPa	10000 ksi
Hardness, Vickers	200	200
Hardness, Brinell	195	195
Hardness, Rockwell A	56	56
Hardness, Rockwell B	92	92
Hardness, Rockwell C	12	12
Thermal expansion co-efficient (@20°C/68°F)	6.50 $\mu\text{m}/\text{m}^\circ\text{C}$	3.61 $\mu\text{in}/\text{in}^\circ\text{F}$
Thermal conductivity	54.4 W/mK	378 BTU in/hr.ft ² .°F

Physical Properties of Tantalum

Atomic number	73
Atomic weight	180.95
Relative abundance in Earth's crust, %	2.1×10^{-4}
Crystal structure	Body-centered cubic
Lattice constant, nm	$a = 0.33025$
Density, g/cm ³	16.6
Melting point, °C	2,996

Boiling point, °C	5,425
Heat of fusion, kJ/mol	28.5
Heat of vaporization at 3,273 K, kJ mol ⁻¹	78.1
Specific heat capacity at 20°C, J mol ⁻¹ K ⁻¹	25.41
Linear coefficient of thermal expansion at 20°C, K ⁻¹	6.5 × 10 ⁻⁶
Thermal conductivity at 20°C, W m ⁻¹ K ⁻¹	54.4
Specific electrical conductivity at 20°C, Ω ⁻¹ cm ⁻¹	0.081
Superconductivity, K	4.3
Temperature coefficient (0–100°C)	0.00383

- The mechanical properties of the metal are strongly dependent on its purity, structure, and crystal defects, as is the case with almost all refractory metals.
- Even low concentrations of interstitial impurities increase the hardness and reduce the ductility.
- The yield strength is strongly temperature dependent, the value at 200°C being ca. 30% of that at 20°C.

Tantalum Product Specification

Grade	R05200 (Ta1), R05252 (Ta2.5W), R05255 (Ta10W), R05240 (TaNb40)
Standard	ASTM B521-98, ASTM B521-2012, ASTM B708-92, ASTM B365, JISH4708, GB/T3463-1995, ASTM B365-2004
Purity	99.95%, 99.99%, Tantalum alloy
Test Certificates	Manufacturer Test Certificate as per EN 10204 / 3.1B, Raw Materials Certificate, 100% Radiography Test Report, Third Party Inspection Report
Outer Diameter(mm)	1.0~150mm

Thickness(mm)	0.02~5.0mm
Length(mm)	200~6000mm
Surface	Grounded, Polished, Bright Polishing and Machined Surface
Color	Metallic color
Processing	Hot forging, Linear cutting, Water jet cutting
Melting point	2996°C
Boiling point	5425°C
Density	16.65g/cm ³
State	Annealing or Hard state

- **Trademark Notice:** Some names are trade names and/or trademarks of specific manufacturers. We are not affiliated with any manufacturer(s). Orders will be filled to meet specifications from any available source(s). Names are listed solely for reference to help identify products consistent with listed specifications.
- We can also cut, thread, and groove Tantalum Pipes to meet your specifications.
- We can provide round bar, square bar, hexagonal bar, eight square bar, flat bar etc.

Properties of Tantalum

- Resistance to high temperature
- Strong corrosion resistance
- Good ductility
- Low Density and High Strength
- Good resistance to effect of heat
- Excellent Bearing to cryogenic property

- Nonmagnetic and Non-toxic
- Good thermal properties
- Low Modulus of Elasticity

Manufacturing Process of Tantalum

The manufacture of seamless tantalum tubes/pipes is to use extrusion, tube reduction, or deep-drawing with sheet metal. The manufacturing method of welded tantalum tubes/pipes is to first form a strip, then make it into a tube shape, and then weld the joint with gas tungsten arc welding.

Applications of Tantalum

- Industrial furnace
- Chemical industry
- Aerospace
- Marine
- Healthcare industry
- Solid electrolytic capacitor
- Radar
- Aircraft
- Electronic computer
- Used for heat exchanger pipes, condensers, bayonet heaters, helical coils, thermocouple, and protective tubes, etc.
- Part of reactive tank
- Electronic transmitting tube
- Part of high temperature electronic tube
- Bone plate for medical, bolt for medical, suture needles
- Used for the manufacturing of reaction vessels.

Types of Tantalum Products

Tantalum Hollow Pipe	R05200 (Ta1) Pipe
Tantalum Seamless Pipe	Tantalum Heat Exchanger Tube

Tantalum Bush Hex Pipe	ASTM B521-98 Tantalum Pipe
Tantalum Round Pipe	Tantalum Welded Pipe
Ta Grade Tantalum Alloy Round Pipe	ASTM B708-92 Tantalum Pipe
Tantalum Aero engine tube	Tantalum Custom Pipe
Ta Grade Tantalum Alloy Custom Pipe	Tantalum Thick Wall Pipe
Tantalum Elliptical and Oval Tube	Tantalum Thin Wall Pipe
Tantalum Pipe Fittings	Tantalum Forging
R05252 (Ta2.5W) Tantalum Pipes/Tubes	Tantalum Fasteners
Tantalum flex pipe	Tantalum Plates, Sheets and Bars
Ta Grade Tantalum Alloy Polished Pipe	UNS Tantalum lined pipe
Tantalum Exhaust Pipe	Tantalum Micro Tube
Tantalum Bar/Billet	Tantalum Wire/Welding Wire
Tantalum Boiler Tube	Tantalum Coil Tubing
Tantalum Capillary Tube	Tantalum U Shaped Tube
R05255 (Ta10W) Tantalum Pipes	Precision Tantalum Tubing
R05240 (TaNb40) Suppliers	Tantalum Pipe Manufacturers

Our Key Products

Tantalum Sheet	Tantalum Plate Cuttings/Profiles	Tantalum Nuts, Bolts and Fasteners
Tantalum Plate	Tantalum Foil, Coil	Tantalum Wire
Tantalum Blocks/Slabs	Tantalum Strip	Tantalum Ingot
Tantalum Rod/Bar	Tantalum Pipes and Tubes	Tantalum Forgings and Castings
Tantalum Flanges	Tantalum Forged Fittings	Tantalum Butt Weld Fittings

About Metallica Metals – The Steel Pipes Factory

- Established in 1975, the Metallica Metals Group (The Steel Pipes Factory) has its operations spread across major cities in India. We are a pioneer in the stainless steel pipes, nickel alloy products, titanium products, carbon steel pipes and alloy steel pipes manufacturing and processing industry. Our products including pipe fittings, flanges, pipes, sheet plates and valves are exported to over 70 countries across the world, while in India we have supplied to even the remote areas. With over 250 tons of sale in stainless steel and carbon steel pipes every day, Metallica has emerged as a prominent vendor for many buyers in India and Overseas
- More than 3000 tons ready from stock and new production ready in just a few weeks.
- Feel free to contact us on - Email: info@metallicametals.com | Tel: +91 8928722715 | +91-22-66581538, +91-22-67436694, +91-22-66109768

Our Key Products

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[Incoloy Alloys \(Ni-Cr-Fe\)](#)
[Hastelloy Alloys](#)
[Stainless Steel 304/304L](#)
[Stainless Steel 309S/309H](#)

INSTRUMENTATION TUBES & FITTINGS

[Instrumentation Tube](#)
[Hydraulic Tubing](#)
[Seamless Tubing](#)
[Instrumentation Tube Fittings](#)
[Double Compression Tube Fittings](#)
[Precision Pipe Fittings](#)
[Needle & Gauge Valves](#)

PRODUCTS

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[Steel Coil & Strip](#)
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[Steel Tubes](#)
[Electropolish Tube](#)
[Heat Exchanger Tubes](#)
[Steel Bars/Rods & Wire](#)

Stainless Steel 310/310S

Stainless Steel 316/316L

Stainless Steel 316Ti

Stainless Steel 317/317L

Stainless Steel 321/321H

Stainless Steel 347/347H

Stainless Steel 904L

Duplex Steels (UNS S32205, UNS S31803)

Super Duplex Steels (UNS S32760 / UNS
S32750)

Stainless Steel 254 SMO (UNS S31254 / 1.4547)

Manifold Valves

Fasteners (Nut, Bolt, Washer)

Steel Angle Bars

Hex Steel Bars

Round Steel Bars & Rod

Flat Steel Bars

Forgings, Rings & Forged Blocks

Stainless Steel Pipe

Stainless Steel Seamless Pipe

Stainless Steel Welded Pipe

Stainless Steel Tubes

Stainless Steel Furnace Tubes

Stainless Steel Seamless Tubing

Stainless Steel Heat Exchanger Tubes

Large Diameter Pipe

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