



# Tantalum, UNS R05200 & R05400

Shaped, Flat, Square, Round, Fine Wire, Plated and Un-plated  
ASTM B 365, ASTM B708, ASTM F 560

R05200: Electron beam or vacuum-arc cast tantalum

R05400: Sintered tantalum

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## Tantalum Wire Description

Tantalum Alloy Description

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Tantalum is ductile, superconductive, has high-temperature strength, low thermal expansion, and high capacitance. It is tough, durable, and ductile, tantalum also offers good workability and weldability. In addition, it possesses the ability to grow uniform and stable oxides with good dielectric properties. Tantalum has excellent resistance to corrosive attack by acids and liquid metals.

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Manufacture and repair of chemical process equipment and heat exchangers

Rupture discs

Capacitors

Medical implants

Medical Devices

## Chemistry Typical

Carbon: 0.010 max

Oxygen: 0.0150 max (0.300 max for R05400)

Nitrogen: 0.010 max

Hydrogen: 0.0015 max

Niobium: 0.100 max

Iron: 0.010 max

Titanium: 0.010 max

Tungsten: 0.05 max

Molybdenum: 0.020 max

Silicon: 0.0050 max

Nickel: 0.010 max

Tantalum: Balance

## **Physical Properties**

Density: 0.6 lb/in<sup>3</sup>, 16.65 g/cm<sup>3</sup>

Specific Heat: BTU/lb-°F (J/g-°C)

At 212°F (100 °C): 0.0336 (0.141)

Thermal Conductivity: BTU-in/hr-ft<sup>2</sup>-°F (W/m•K)

68-212 °F (20-100 °C): 384 (55.3)

Mean Coefficient of Thermal Expansion: μin/in-°F (μm/m-°C)

68-932 °F (20-500 °C): 3.60 (6.48)

Modulus of Elasticity: KSI(MPa)

27 x 10<sup>3</sup> (186 x 10<sup>3</sup>) in tension

Melting Point (approx.): 5463°F (3017°C):

## **Mechanical Properties at Room Temperature**

### **Properties: Annealed Typical**

Ultimate Tensile Strength: 25 KSI min (172MPa min)

Yield Strength: 15 KSI min (103 MPa min )

Elongation: 25% min

### **Properties Tempered**

Tantalum 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 Association 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**

Tantalum is non hardenable by heat treatment.

### **Welding**

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

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