

# NRC<sup>®</sup> TANTALUM (UNS R05200)

## Applications

High strength and excellent corrosion resistance make tantalum ideal for use in the manufacture and repair of chemical process equipment and heat exchangers. Other uses are rupture discs, cathode plates, heat shielding, ordnance, sputtering and medical applications.

## Forms Available

Foil: 0.001" to 0.006" thick by widths up to 12" wide. Sheet: 0.006" to 0.1875" thick by widths up to 40" wide. Plate 0.1875" to 1" thick in common widths. Welded Tubing 0.015" to 0.035" wall x ½" to 2" diameter. Also, rod, plate, wire, bar and customer specified specialty sizes of all materials.

## Chemical Characteristics<sup>1)</sup>

(Mass fraction in % [cg/g]; ppm [µg/g])

Element	ppm (max)	Element	ppm (max)
C	50	Ti	40
O	100	Ni	50
N	50	Mo	200
H	10	Si	10
Nb	300	W	300
Fe	50	Ta	balance

## Mechanical Properties (Design minimum)

Temp °F	Yield Strength 0.2% offset KSI	Tensile Strength (KSI)	Elongation % inch
70	20	30	20
210	14.5	29	15
390	11.6	25.4	10
480	10.1	23.2	-

## Metallurgical Characteristics

Material is single-phase tantalum. Stress relieve at 1500°F, re-crystallize at 1900°F.

1) Information on testing methods on request.

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**Physical Properties**

Atomic Number	73	
Atomic Weight	180.95	
Density	16.6	gms/cm <sup>3</sup>
Melting Point	3017	° C
Coefficient of Expansion(20° - 500° C)	3.6 X 10 <sup>-6</sup>	°F <sup>-1</sup>
Specific Heat (at 100° C)	0.0336	BTU/Lb°F
Thermal Conductivity (20° – 100°)	32	BTU/Hr-Ft °F
Electrical Resistivity (0° – 100°)	14.7	Microhm-cm
Thermal Neutron Absorption Cross Section	21.3	Barns/Atom
Typical Ultimate Tensile Strength at 20 C	35 - 45	KPSI
Typical Yield Strength at 20° C	20 - 30	KPSI
Modulus of Elasticity	27 X 10 <sup>6</sup>	PSI
Hardness as Annealed (Typical)	Vickers	80 - 120
	Rockwell B	25 - 65

**Main Products**

**Bayonet Heaters** Single and multi-tube types for use in steam heating in corrosive atmospheres.

**Heat Exchangers, Condensers and Coils**

**Thermocouple Protection Sheaths** Loose lined or machined from solid.

**Pumps, Bodies or Cases, Shafts and Impellers**

For corrosive chemical solutions.

**Paddle Stirrers and Agitators**

Solid or covered (loose-lined)

**Distillation Columns, Boilers and Condensers**
**Tantalum Clad Dip Pipes, Heaters and Chemical Plant Equipment**
**Repairs Kits**

For tanks, vats and other glass-lined containers

**Crucibles**

In standard and special shapes and sizes

**Furnaces and Furnace Parts**

For use at temperatures up to 2500° in controlled atmospheres.

**Ordnance**

For use in EFP and shaped charges

**Sputtering**
**Hazards identification in Advertising (Directive 67/548/EEC Article 26 and Directive 1999/45/EC Article 13)**

Metal powder, flammable, n.o.s.

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