

TANTALUM



TANTALUM (UNS R05200)

Unalloyed Tantalum is supplied to ASTM F560 – R05200 composition limits. Tantalum is selected for its corrosion resistance, thermal conductivity, high melting point, and ability to form a dielectric oxide film.

GENERAL INFORMATION

Tantalum is very ductile and can be readily cold formed due to a low work hardening rate. Welding can be accomplished via resistance, TIG, or electron beam methods, with care taken to protect the weld and heat affected zone from air during welding. Because of the potential for hydrogen embrittlement, Tantalum can not be used for extended service in air or other oxidizing atmospheres above 260°C unless a protective inert atmosphere or vacuum is provided.

AVAILABILITY

Tantalum is available from Hamilton Precision Metals as strip product from 0.0005" to 0.035" (0.0127 mm to 0.889 mm) in widths up to 12.0" (304.8 mm). The material conforms to UNS R05200 and meets the requirements of ASTM F560 and ASTM B708.



Technical Data

TYPICAL MECHANICAL PROPERTIES ¹		
	ANNEALED	COLD ROLLED (90%)
Ultimate Tensile Strength	40,000 PSI	125,000 PSI
Yield Strength (0.2% Offset)	26,000 PSI	118,000 PSI
Elongation in 2" *	50%	2%
Modulus of Elasticity (Tension)	26 X 10 ⁶ PSI	-
Hardness	35 HRb	20 HRc

Tantalum can also be provided in the cold rolled and stress relieved condition to ASTM F560 limits.

*The measured elongation will be less as thickness decreases to 0.002" and less.

¹ These values may be adjusted by control of process variables – consult HPM for desired values.

PHYSICAL PROPERTIES ²	
Density	0.602 lb/in ³
Melting Point	2996°C
Electrical Resistivity @ R.T.	12.5 Microhm · cm
Thermal Conductivity @ R.T.	54.4 W/m · K
Thermal Expansion Coefficient	
(20 to 500°C)	6.7 X 10 ⁻⁶ /°C
(20 to 1000°C)	6.96 X 10 ⁻⁶ /°C
Temperature Coefficient of Resistivity	3820 ppm/°C

² Typical values to guide alloy selection but are not a guarantee of minimum or maximum.

NOMINAL COMPOSITION	
Carbon	0.010%
Oxygen	0.0150%
Nitrogen	0.010%
Hydrogen	0.0015%
Niobium	0.100%
Iron	0.010%
Titanium	0.010%
Tungsten	0.05%
Molybdenum	0.020%
Silicon	0.0050%
Nickel	0.010%
Tantalum	Balance