

Tungsten fasteners are most widely used for their extreme high density. This unique feature makes them ideal for weighting and rotating parts. It also makes them radiopaque – so they show up well on x-rays. With a melting point to 3420°C, Tungsten fasteners are often used in high temperature vacuum applications, though their usable temperature limit outside a vacuum environment is much lower. Tungsten screws are available in pure tungsten and several grades of alloyed tungsten.

### Properties

Ultimate Tensile Strength	142 ksi (pure Tungsten) 94-100 ksi (alloyed Tungsten)
Yield Strength at 0.2%	109 ksi (pure Tungsten) 75 ksi (alloyed Tungsten)
Elongation %	2-10 (alloyed Tungsten)
Usable Temperature Limit	572°F / 300°C (Air) 3600 °F / 2000°C (Vacuum)

### Key Benefits

- Very high density of 19.3 gm/cc
- Radiopaque to x-rays and other radiation – even higher than lead
- Excellent high temperature strength and stability (vacuum)
- Very corrosion resistance
- Good low magnetic properties

### Chemistry & Specifications

SPECIFICATIONS: ASTM B777, Mil Spec T-21014D

Tungsten Alloy ASTM-B777	Class 1	Class 2	Class 3	Class 4	CP Tungsten
Material Composition	90% W 6% Ni 4% Cu	92.5% W 5.25% Ni 2.25% Fe	95% W 3.5% Ni 1.5% Cu	97% W 2.1% Ni 0.9% Fe	99.95% W
Density	17 gm/cc	17.5 gm/cc	18 gm/cc	18.5 gm/cc	19.3 gm/cc
Density; lbs/in3	0.6	0.6	0.7	0.7	0.697
Mil. Spec. T-21014 D	Class 1	Class 2	Class 3	Class 4	-
Type	Type II & III	Type II & III	Type II & III	Type II & III	-
Hardness; Rockwell C	24.0	26.0	27.0	28.0	31.0
Ultimate Tensile Strength; PSI	94,000	110,000	94,000	100,000	142,000
Yield Strength, .2% Offset; PSI	75,000	75,000	75,000	75,000	109,000
Modulus of Elasticity; PSI	40 x 10E6	47 x 10E6	45 x 10E6	53 x 10E6	58 x 10E6
Coefficient of Thermal Expansion x	5.4	4.6	4.4	4.5	4.2
Electrical Conductivity; %IACS	14	13	16	17	18