



Tungsten Alloy

Balancing Weights

T&D Materials manufactures and supplies **tungsten alloy balancing weights for oscillations, weight transfers, imbalances and vibrations**, create or shift centers of gravity and more generally ensure the optimum balance. Tungsten is heavier than both Uranium and Gold while costing significantly less. *The only metals that weight more are Platinum, Iridium, and Osmium.*

Type	Weight (lbs./PCI)
Tungsten	0.098
Aluminum	0.283
Steel	0.409
Lead	0.700

Thanks to their high densities of up to 18.80 g/cm³, our tungsten heavy metal alloys offer outstanding performance wherever a lot of weight has to be packed into tiny spaces.

Our tungsten heavy metal composite materials are used as balancing weights on crankshafts or in balance shafts in formula 1 racing cars or large diesel engines. In addition, due to their high density, high modulus of elasticity and optimized ease of mechanical processing, our tungsten heavy metal alloys are ideally suited for use as damper and absorber components in the drive train. In the aviation and aerospace industries, our tungsten composite materials provide outstanding performance, for example, in propeller and helicopter blades, rudders, radar equipment and avionics systems.



Balancing weights are crucial components in many different applications. They help reduce the loads that parts are exposed to and consequently increase their service life.

Here are a few examples:

Aviation and aerospace: propeller and helicopter blades

Automotive industry: crankshaft counterweights and chassis weights

Watch industry: bobs on watch rotors

Sports equipment: golf clubs

Optical industry: microscopes and measuring instrument

Oil and gas drilling: down hole logging tools

Because pure tungsten is very brittle, we add nickel and iron to our composite materials and apply the molten material in a liquid-phase sintering process. The nickel-iron phase binds the tungsten grains and consequently guarantees high ductility. **The advantage: Our material offers optimized mechanical processing capabilities and is also able to withstand high loads.** Both easily processed and offering high densities, our balancing weights are ideally suited for applications in the watch industry. For example, machined weights made of non-magnetic materials are used as bobs on watch rotors. With their complex geometries, our weights are also used to balance microscopes and high-precision optical instruments as well as for other products in the semiconductor industry.

Most of T&D high density alloys have a tungsten content of over 90 %. We add nickel-iron or nickel-copper as a binder. Whether you want a higher density or greater elasticity, a weakly ferromagnetic or a paramagnetic product: our range of materials contains the right solution for your application. We would be delighted to help you make your choice.



	90%W 6% NI 4%Cu	90%W 7% NI 3.0% Fe	92.5%W 5.25 Ni 2.25 Fe	93%W Balance NI Fe Mo	95%W 3.5% Ni 1.5%Cu	95%W 3.5% Ni 1.5%Fe	97%W 2.1% NI .9%Fe
AMS T 21014D	Class I	Class 1	Class 2	Chip Resistant	Class 3	Class 3	Class 4
SAE AMS	7725B5	7725B					
ASTM-B-777-87	Class 1	Class 1	Class 2		Class 3	Class 3	Class 4
Density Gms/cc	17	17	17.5	17.7	18	18	18.5
Density Lbs/Cu. In	0.614	0.614	0.632	0.639	0.65	0.65	0.888
Hardness Rc	24	25	26	32	27	27	28
UTS (Psi)	110,000	120,000	114,000	125,000	110,000	120,000	123,000
Yield .2% Offset (Psi)	80,000	88,000	84,000	95,000	85,000	90,000	85,000
Elongation-% in 1"	6	10	7	4	7	7	5
Proportional Elastic Limit (psi)	45,000	52,000	46,000	60,000	45,000	44,000	45,000
Modulus/Elasticity (Psi)	40x10	45x10 ₆	47x10 ₆	53x10 ₆	45x10 ₆	50xi0 ₆	53x10 ₆
Coefficient of Thermal Expansion x 10-61C (20400C)	5.4	4.61	4.62	4.5	4.43	4.6	4.5
Thermal Cond (CGS)	0.23	0.18	.2	0.27	0.33	0.26	0.3
Elec Conductivity (%IACS)	14	10	13	14	16	13	17
Magnetic Properties	Nil	Slightly	Slightly	Slightly	Nil	Slightly	Slightly