

TUNGSTEN HIGH DENSITY ALLOYS

Description of Product:

Tungsten-based alloyed materials are outstanding due to their high density and exceptional mechanical properties characterized by ductility and hardness and whose high density is equaled only by gold, platinum, and a few other rare and expensive metals.

Tungsten alloys are exceptional for applications where maximum concentrated weight is required in the smallest possible space. The addition of chemical elements such as nickel, copper, and iron, creates a family of tungsten alloys with extremely useful properties for machining. These alloys are economically fabricated by powder metallurgy techniques and are routinely machined by conventional methods.

Tungsten alloys can be delivered both as semi-finished product for further processing by the customer or in accordance with the drawing as finished machined component. To meet the specific application of our customers we recommend the delivery of the finished machined product.

Our K1700 to K1850 materials provide a solution in a wide range of applications requiring concentrated weight or density in a limited space. These lead-free parts meet legal requirements and recommendations to protect the environment.

Twice as heavy as steel and more than 50% heavier than lead, tungsten alloys have become an essential material for a wide variety of applications in aerospace, defense, medical, and oil and gas exploration.

Range of application:

Balance weights, radiation protection, vibration absorbers, heat transfer, drilling bars. The mechanical characteristics have to guarantee the stability and strength in any application case.

The absorption of x-ray and gamma radiation is in direct proportion to the density of the shielding material. Tungsten high density composites are more than 1,5 times as effective as lead and provide extremely efficient protection, particularly where space is limited.

Standards:

Exceeds requirements of the following specifications: MIL-T-21014, ASTM B777 and AMS 7725

Kulite® is the trademark used for the Tungsten High Density Alloys manufactured in the U.S.A.

Typical properties of Tungsten High Density Alloys

Characteristics		Material					
Alloy Designation		K1700	K1701	K1750	K1800	K1801	K1850
Tungsten content (%)	(%)	90	90	92.5	95	95	97
Density	(g/cm ³)	17	17	17.5	18	18	18.5
	(lb/in ³)	0.61	0.61	0.63	0.65	0.65	0.67
Hardness	(Rc)	23	22	24	25	24	26
Ultimate Tensile Strength	(psi)	125,000	110,000	125,000	125,000	110,000	120,000
	(N/mm ²)	860	760	860	860	760	830
Yield Strength	(psi)	85,000	80,000	90,000	90,000	85,000	95,000
	(N/mm ²)	590	550	620	620	590	660
Elongation	(%)	12	4	10	8	2	6
Modulus of Elasticity	(psi x 10 ⁶)	45	40	46	48	45	50
	(kN/mm ²)	310	280	320	330	310	345
Magnetic Properties		slight	none	slight	slight	none	slight
Magnetic Permeability	(μ)	>1.05	<1.05	>1.05	>1.05	<1.05	>1.05
Thermal Expansion Coefficient	(x10 ⁻⁶ /K)(20°C-500°C)	5.1	5.4	4.9	4.8	5.0	4.8
Thermal Conductivity	(cgs)	.20	.23	.24	.27	.32	0.26
Electrical Conductivity	(% IACS)	11	14	12	15	16	16
MIL-T-21014(D)	class	1	1	2	3	3	4
ASTM B777	class	1	1	2	3	3	4

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- Mechanical Properties** Tensile properties can be supplied on request when Purchase Order is placed.
- Chemical Properties** Chemical properties can be supplied on request when Purchase Order is placed.
- Hazards identification in Advertising (REGULATION (EC) No 1272/2008 Article 48)**
none.
- Delivery Form** Tungsten alloy products can be delivered both as semi-finished products for further processing by the customer or as a finished product in accordance with drawing specifications. These lead-free products meet legal requirements and recommendations to protect the environment.
- Rejection** H.C. Starck must receive written notification of rejected material with the reason for rejection. The right is reserved to inspect rejected material at customer plant for claim validation. The material may be returned only after proper authorization.

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