

Tungsten

Technical Datasheet

Short Name		Chemical	W
Code	Tungsten	Composition	min. 99.95 %
Material-No.(old)	-	(Reference values in %)	

Material-Properties

Tungsten is hard and brittle, his corrosion resistance to many acids is excellent, the machinability is difficult. High hardness under elevated temperatures, highest melting point of all metals, high effect against radiation.

- Applications**
- Heating elements, heat shields and parts in vacuum- and protective gas furnaces
 - Filaments and boats for the evaporation technique
 - Tungsten electrodes for TIG-welding
 - Radiation shields for x-ray technique
 - Stationary and rotating cathodes and anodes of x-ray valves

Mechanical Properties (Reference values)		Sheet-thickness 0.5 – 1.0 mm	Sheet-thickness > 1 – 5.0 mm
	Hardness 20°C (293 K)	HV 30	> 500
	Tensile strength 20 °C (293 K) ca. 85 % reduction	N/mm ²	> 1300
	Modulus of elasticity 20 °C (293 K)	kN/mm ²	410
	Modulus of rigidity 20 °C (293 K)	kN/mm ²	177

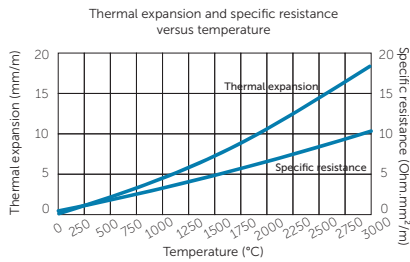
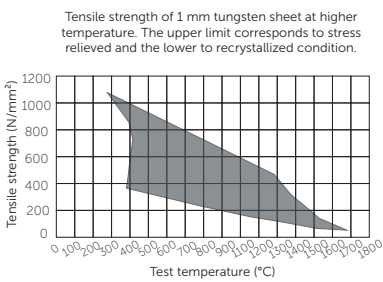
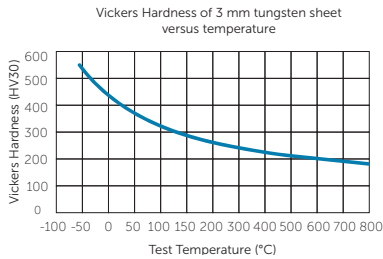
Physical Properties	Electrical conductivity 20 °C (293 K)	MS/m	18
	Electrical resistance 20 °C (293 K)	$\frac{\Omega \cdot \text{mm}^2}{\text{m}}$	0.055
	Specific heat	$\frac{\text{J}}{\text{g} \cdot \text{K}}$	0.14
	Thermal conductivity 20 °C (293 K)	$\frac{\text{W}}{\text{m} \cdot \text{K}}$	125
	Density	g/cm ³	19.3

Products

Sheets, wire, bars, machined parts.
Tensile strength properties depend on cross-section and design.

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Machining Instructions (Reference values)

In connection with machining preheating to about 200 °C (473 K) is recommended, especially at thick-walled pieces. EDM-machining (wire cutting) is possible.

Drilling	Tungsten Carbide ISO K 05	High speed Steel THYRAPID 1.3202
Cutting speed (m/min.)	20 – 25	5 – 7
Lip angle	as with steel	as with steel
Machining	dry	dry
Turning	Tungsten Carbide ISO K 05	
Cutting speed (m/min.)	30 – 50	
Rake angle	c. 25°	
Clearance angle	8 – 10°	
Lip angle	90°	
Machining	dry	
Milling	Tungsten Carbide ISO K 10 or ISO K 05	
Cutting speed (m/min.)	20 – 25	
Rake angle	10°	
Clearance angle	8°	
Lip angle	90°	
Radius	3 mm	
Feed	0.3 mm	
Depth of cut	2 mm	
Machining	dry	
Grinding	Silicon Carbide wheels old diamond wheels	
Hardness	H, J, K	
Grain size	60 – 120	
Structure	medium	
Binder	ceramic	
Cutting speed (m/sec.)	30	
Machining	intensive cooling	

All statements as to the properties or utilization of the materials and products mentioned in this datasheet are only for the purpose of description. Guarantees in respect of the existence of certain properties or utilization at the material mentioned are only valid if agreed upon in writing.