

MATERIAL DATA SHEET · REFRACTORY METAL

Tungsten (W)

Atomic Number 74 | Period 6 | Group 6 | CAS 7440-33-7

Tungsten has the highest melting point of all metals (3,422 °C), making it indispensable for high-temperature applications in aerospace, the semiconductor industry, nuclear fusion and medical technology. Refracore supplies tungsten in all common purities and delivery forms – as semi-finished material, custom part or application-specific component – from leading manufacturers such as Plansee, HC Starck and ATTL.

3,422 °C Melting Point	19.3 g/cm³ Density	411 GPa Young's Modulus	173 W/(m·K) Thermal Conductivity
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Melting Point Compared to Standard Materials

Melting point in °C — tungsten clearly exceeds all standard engineering materials.

Aluminium	660 °C
Copper	1,085 °C
Nickel-Base Superalloy	1,336 °C
Stainless Steel 1.4301	1,450 °C
Structural Steel S235	1,500 °C
Titanium	1,668 °C
Tungsten (W)	3,422 °C

Physical & Mechanical Properties

Melting Point	3,422 °C	Boiling Point	5,555 °C
Density (pure)	19.3 g/cm³	Young's Modulus	411 GPa
Vickers Hardness (annealed)	310–390 HV	Tensile Strength (annealed)	550–620 MPa
Thermal Conductivity	173 W/(m·K)	Thermal Expansion (20–500°C)	4.5 µm/m·K
Electrical Resistivity	5.4 µΩ·cm	Recrystallisation	1,100–1,400 °C
Purity (Standard)	≥ 99.97 %	Purity (High-Purity)	≥ 99.99 %

Standards & Specifications: ASTM B760 (sheet), ASTM B777 (heavy metal), ASTM B387 (rod), ISO 6848 (TIG electrodes)

Available Alloys & Variants

DESIGNATION	COMPOSITION	SPECIAL FEATURE / ADVANTAGE
Pure W	≥ 99.97% W	Standard grade for all high-temperature applications
W-Re	W-3/5/25/26% Re	No brittle fracture (DBTT), higher ductility, Type C/D thermocouples
W-La (WL10/15/20)	W + 0.4–0.6% La ₂ O ₃	Longer service life, better ignition characteristics, ODS alloy
W-Cu	W72Cu25 / W80Cu20	High thermal conductivity + CTE-matched for electronics packaging
WNiFe	W90-97 + Ni + Fe	Heavy alloy, high density, radiation shielding and ballast weights
WNiCu	W90-97 + Ni + Cu	Non-magnetic, MRI-compatible, like WNiFe but non-magnetic
W-Ce / W-Y	W + CeO ₂ / Y ₂ O ₃	ODS variants for TIG electrodes and ion sources

Delivery Forms & Dimensions

DELIVERY FORM	DIMENSIONS / DETAILS
Sheet / Foil	0.05–12 mm thickness, width up to 400 mm
Rod / Bar	Ø 1–100 mm, length up to 2,000 mm
Tube / Sleeve	Outer Ø 5–120 mm, wall thickness 1–15 mm
Disc	Ø 10–300 mm, thickness as required
Wire / Filament	Ø 0.01–3 mm
Sputtering Target	Round / rectangular, ≥ 99.99%, > 99.5% TD
Crucible / Custom Part	Custom geometry made to drawing
AM Powder (spherical)	SLM: 10–45 µm, EBM: 45–150 µm

Applications & Industries

INDUSTRY / APPLICATION	TYPICAL COMPONENTS / PRODUCTS
Aerospace	Engine components, heat shields, blades, rocket nozzles
Semiconductors / LED	Sputtering targets, MOCVD heaters, thermal field tubes, crucibles
Nuclear Fusion / Energy	Divertor components (ITER), neutron shielding
Medical Technology	Radiation shielding, collimators, counterweights
Glass Technology	Melting crucibles, stirrer heads, bushing plates
Electronics / Packaging	W-Cu heat sinks, substrates, hermetic packages
Welding Technology	TIG electrodes (W, W-La, W-Ce), plasma welding

Note: Tungsten is brittle at room temperature. Machining requires adapted tools and cutting parameters. W-Re and W-La significantly improve ductility. We're happy to advise on material selection at no cost.

Quality & Certificates

ISO 9001

3.1 Mill Certificate to EN 10204

RoHS-Compliant

REACH-Compliant

Consultation in German & English

Inquiry & Consultation

Material, alloy, dimensions, tolerances and certificates – we advise free of charge and prepare your quote within 1–2 business days.

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