

Alloy 10X⁽¹⁾ (C17500)

Smiths High Performance



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High-Temperature Performance

Copper alloys perform well at cryogenic temperatures - mechanical properties actually improve as the temperature falls.

However, copper significantly loses strength and ductility at higher operating temperatures. Alloy 10X is a copper-cobalt-beryllium-zirconium alloy explicitly developed to solve this problem.

The material bucks this trend and retains performance properties at temperatures up to 800° F (430° C). Alloy 10X is a copper-cobalt-beryllium-zirconium alloy explicitly developed to solve this problem. While retaining desirable ductility and strength levels, the product also benefits from outstanding resistance to thermal cracking and high thermal & electrical conductivity. It represents an ideal material solution for continuous operation in engineering applications requiring high strength at temperatures above 575° F (300° C).

Product Suitability:

The material performance characteristics make the alloy highly suitable for high-performance applications. For example, the motorsport sector utilises Alloy 10X in applications such as powertrains and exhaust valve seats.

Product Benefits:

- Strength and ductility retention at high temperatures
- Exceptional thermal cracking resistance
- High electrical and thermal conductivity
- Popular in high-performance applications

Availability:

We offer Alloy 10x directly from stock, including solid round bars, strips, plates and tubes. Forgings are also available on request.

About Smiths High Performance

Smiths High Performance is a leading stockholder and supplier of high-performance engineering materials. We are material supply chain partners supporting high-technology market sectors.



Applications:

- Power trains
- Automotive components
- Exhaust valve seats
- Pre-ignition chambers

Related Specifications:

ASTM B441 (C17500), RWMA Class 3

(1) Alloy 10X is a proprietary product of Materion.



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Further technical data available on the reverse of this Datasheet

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Chemical Composition (weight, %)

	Co	Be	Zr	Cu
Min:	2.00	0.40	0.12	Bal
Max:	2.70	0.70	0.40	Bal

Mechanical Properties

Temper*	Minimum 0.2% Offset Yield Strength @ 20°C	Minimum Ultimate Strength @ 20°C	Minimum Elongation 20°C	Minimum Hardness	Typical 0.2% Offset Yield Strength @ 427°C	Typical Ultimate Strength @ 427°C	Typical Elongation 427°C
TH04 (Φ < 75mm)	85 ksi 585 MPa	100 ksi 690 MPa	15%	92 HRB	65 ksi 450 MPa	75 ksi 515 MPa	5%

*Temper TF00 also available. Mechanical strength is approximately 10% lower.

Physical Properties

Elastic Modulus	Melting Point (Solidus)	Electrical Conductivity / Resistivity	Density	Thermal Expansion Coefficient	Thermal Conductivity (25°)	Heat Capacity (25°)
20,000 ksi 138 GPa	~1850 °F ~1010 °C	45 - 55% IACS 26 - 32 MS/m	0.319 lb/in ³ 8.83 g/cm ³	9.8 x 10 ⁻⁶ in/in °F 17.6x10 ⁻⁶ m/m °C	130 BTU /ft hr °F 225 W/m °C	0.099 BTU/lb °F 0.414 J/g K

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Processing:

Processing alloys containing beryllium is potentially hazardous because inhaling beryllium particles in the air may cause respiratory system damage and, in the worst-case scenario, lung disease. Thankfully, we safely process beryllium copper alloys in-house to precise tolerances, from cut billets to sawn plates and tubes.

Thanks to our unique barcoding system, our products are also fully traceable while under our care.

...where performance matters...

When you purchase high-performance materials from **Smiths High Performance**, you will join some of the biggest and best global engineering companies. We are a Tier 1 supply chain partner to the world's leading motorsport companies. Our unique business structure and ethos allow us to offer services otherwise unavailable in this market sector.

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