

## Alloy 10X – CuCoBeZr

Materion's Alloy 10X is a copper-cobalt-beryllium-zirconium alloy developed for improved high temperature strength and ductility. Most high-strength copper alloys lose significant strength and ductility at elevated temperature, but Alloy 10X retains those properties at temperatures up to 800°F/430°C. With its combination of desirable elevated-temperature strength and conductivity, it has superior resistance to thermal cracking. It is the copper alloy of choice for operation above 575°F/300°C where high strength is required.

### Chemical Composition (Weight Percent)

Alloy	Cobalt	Beryllium	Zirconium	Copper
10X	2.0 - 2.7	0.4 - 0.7	0.12 - 0.4	Balance

### Physical Properties

Elastic Modulus	Melting Point (Solidus)	Electrical Conductivity/ Resistivity	Density	Thermal Expansion Coefficient	Thermal Conductivity (25 °C)	Heat Capacity (25°C)
20,000 ksi 138 GPa	~1850 °F ~1010 °C	45 - 55% IACS 26 - 32 MS/m	0.319 lb/in <sup>3</sup> 8.83 g/cm <sup>3</sup>	9.8 x 10 <sup>-6</sup> in/in °F 17.6 x 10 <sup>-6</sup> m/m °C	130 BTU/ft hr °F 225 W/m °C	.099 BTU/lb °F 0.414 J/g K

### 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%	92HRB	65 ksi 450 MPa	75 ksi 515 MPa	5%

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

### Forms Available

Rounds, square and rectangular bars with < 75mm section thickness available in TH04 temper. Tube in the TH04 temper is available in 0.375" to 3" (9.5 mm to 76 mm) outside diameters. Wall thickness is typically 10 to 20% of the outside diameter, subject to certain maximum and minimum constraints. Thicker sections and larger diameters available in TF00 temper.

## Industry Standards and Specifications

ASTM B441 (C17500), RWMA Class 3

## Additional Information

Additional technical information on Alloy 10X may be obtained by phoning the Customer Technical Service Department at +1.800.375.4205. For pricing and availability, phone +1.800.521.8800.

## Health and Safety

Processing beryllium-containing alloys poses a health risk if safe practices are not followed. Inhalation of airborne beryllium can cause serious lung diseases in some individuals. Occupational safety and health regulatory agencies worldwide have set mandatory limits on occupational respiratory exposures. Read and follow the guidance in the Safety Data Sheet (SDS) before working with this material. The SDS and additional important beryllium health and safety information and guidance can be found at [berylliumsafety.com](http://berylliumsafety.com), [berylliumsafety.eu](http://berylliumsafety.eu) and [Materion.com](http://Materion.com). For questions on safe practices for beryllium-containing alloys, contact the Materion Product Stewardship Group at +1.800.862.4118 or contact us by e mail at [Materion-PS@Materion.com](mailto:Materion-PS@Materion.com).

### Disclaimer:

Only the buyer can determine the appropriateness of any processing practice, end-product or application. Materion does not make any warranty regarding its recommendations, the suitability of Materion's product, or its processing suggestions for buyer's end product, application or equipment.

The properties presented on this data sheet are for reference purposes only, intended only to initiate the material selection process. They do not constitute, nor are they intended to constitute, a material specification. Material will be produced to one of the applicable industry standards, if any, listed in the Industry Standards and Specification section.

Actual properties may vary by thickness and/or part number. Please contact your local sales engineer for detailed properties to be used in simulation.

Any properties marked as preliminary are subject to change at any time as the manufacturing process is further refined.