



## ToughMet® 2 CX Tempers Rod, Tube & Plate

ToughMet is Materion Brush Performance Alloys' solution to your severe service material problems. By applying our EquaCast® process, tailored alloying additions and spinodal hardening technology, we have engineered ToughMet to provide attributes beyond those typically found in a high-strength copper alloy. ToughMet 2 in the cast and spinodally hardened (CX) condition exhibits tensile strength in excess of 105 ksi and hardness exceeding HRC 27 with excellent machinability. This Copper-9Nickel-6Tin alloy combines low coefficient of friction with wear resistance.

- Exceptional resistance to corrosion and cavitation
- Outstanding lubricity and durability in demanding applications
- Highly uniform composition in all product forms
- Available in a wide range of continuous-cast shapes and sizes

### MECHANICAL PROPERTIES

Temper	0.2% Offset Yield Strength		Ultimate Tensile Strength		Elongation	Hardness
	ksi	MPa	ksi	MPa	(%)	HRC
T2 CX90	90	621	105	724	3	27

Typical minimum values.

### PHYSICAL PROPERTIES

<b>Young Modulus</b>	17 x 10 <sup>6</sup> psi (117 GPa)	<b>CTE (70 – 215 °F)</b>	9.0 x 10 <sup>-6</sup> /°F (16.2 x 10 <sup>-6</sup> /°C)
<b>Poisson's Ratio</b>	0.3	<b>Density</b>	0.322 lb/in <sup>3</sup> (8.91 g/cm <sup>3</sup> )
<b>Electrical Conductivity</b>	13 – 14% IACS	<b>Fatigue Limit (estimated)</b>	20 ksi (138 MPa) at R=-1*
<b>Thermal Conductivity</b>	30 Btu/ft/hr/°F (52 W/m/K)	<b>Magnetic Permeability</b>	<1.001

\*Fatigue at 10<sup>6</sup> cycles

### STANDARD AVAILABILITY

Plate: Thicknesses from ¾ to 12" (19 – 305 mm), width up to 20" (508 mm), lengths up to 60" (1.52 m).

Rod: Diameter from 2 to 12" inches (51 – 305 mm), in lengths up to 12 ft (3.66 m).

Tube: Outside diameter from 1 to 15" (25 – 381 mm), wall thicknesses approximately 10-12% of the outside diameter.

### SPECIFICATIONS AND STANDARDS

ASTM B505, UNS C96970

### RELATED INFORMATION

Related information on ToughMet 2 can be obtained by calling 1-800-375-4205

## TOLERANCES

Tube Outside Diameter	Outside Diameter Tolerance	Inside Diameter Tolerance	Out of Roundness	Straightness
Up to 3.0 in Up to 76 mm	+0.020/-0 in +0.25/-0 mm		0.025 in 0.64 mm	
Over 3.0 to 4.0 in Over 76 to 102 mm	+0.030/-0 in +0.38/-0 mm		0.040 in 1.0 mm	
Over 4.0 to 5.5" Over 102 to 140 mm	+0.040/-0 in +0.51/-0 mm		0.060 in 1.5 mm	
Over 5.5" Over 150 mm	+0.050/-0 in +0.64/-0 mm		0.075 in 1.9 mm	

### North American Service Centers – Sales Inquiries

For strip, wire and rod under 0.4" (10 mm) diameter

#### Elmhurst, IL

TOLL FREE: 800.323.2438  
LOCAL: +(1) 630.832.9650  
FAX: +(1) 630.832.9657

For plate, tube, bar, and rod 0.4" (10 mm) diameter and over

#### Warren, MI

TOLL FREE: 800.521.8800  
LOCAL: +(1) 586.772.2700  
FAX: +(1) 586.772.2472

### International Sales Offices

#### CHINA/HONG KONG

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To obtain a complete list of Materion's global distributor/agent network, visit us online at [www.materion.com/BrushAlloys/ContactUs](http://www.materion.com/BrushAlloys/ContactUs).



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#### MATERION CORPORATION

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