ToughMet® 3 CX Alloy Tempers Rod and Tube

ToughMet 3 Alloy is Materion Performance Alloys’ solution to your severe service material problems. By applying our patented technology process to create the EquaCast® microstructure, tailored alloying additions and spinodal hardening technology, we have engineered ToughMet 3 Alloy to provide attributes beyond those typically found in a high-strength copper alloy. ToughMet 3 Alloy in the cast and spinodally hardened (CX) condition exhibits tensile strength up to 120 ksi and hardness up to HRC 34 in a Copper - 15% Nickel - 8% Tin alloy with excellent machinability.

- 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

<table>
<thead>
<tr>
<th>Temper</th>
<th>Outside Diameter</th>
<th>0.2% Offset Yield Strength</th>
<th>Ultimate Tensile Strength</th>
<th>Elongation</th>
<th>Hardness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>ksi</td>
<td>MPa</td>
<td>ksi</td>
<td>MPa</td>
</tr>
<tr>
<td>CX105</td>
<td>&lt; 4” (102 mm)</td>
<td>105</td>
<td>724</td>
<td>110</td>
<td>758</td>
</tr>
<tr>
<td>CX105</td>
<td>≥ 4” (102 mm)</td>
<td>94.5</td>
<td>652</td>
<td>99</td>
<td>683</td>
</tr>
<tr>
<td>CX90</td>
<td></td>
<td>90</td>
<td>621</td>
<td>105</td>
<td>724</td>
</tr>
</tbody>
</table>

Typical minimum values.

### PHYSICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young Modulus</td>
<td>$21 \times 10^6$ psi (144 GPa)</td>
</tr>
<tr>
<td>Poisson's Ratio</td>
<td>0.3</td>
</tr>
<tr>
<td>Electrical conductivity</td>
<td>9% IACS</td>
</tr>
<tr>
<td>Thermal Conductivity</td>
<td>$22$ Btu/ft/hr/°F (38 W/m/°C)</td>
</tr>
<tr>
<td>Thermal Conductivity</td>
<td>$8.9 \times 10^6$°F (16.0 $10^6$°C)</td>
</tr>
<tr>
<td>Magnetic Permeability</td>
<td>&lt;1.001</td>
</tr>
</tbody>
</table>

*Fatigue at $10^6$ cycles

### STANDARD AVAILABILITY

See reverse side

### SPECIFICATIONS AND STANDARDS

ASTM B505, UNS C96900

### RELATED INFORMATION

Additional technical information on ToughMet 3 alloy rod or tube can be obtained by calling 800-375-4205.
For pricing and availability, phone 800-521-8800, or the local sales number listed below.

ROD STANDARD AVAILABILITY
1.5 – 3” (38.1 mm – 76.2 mm) diameter

<table>
<thead>
<tr>
<th>Outside Diameter</th>
<th>Minimum Wall</th>
<th>Minimum ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.125 – 3” (28.6 – 76.2 mm)</td>
<td>¼” (6.35 mm)</td>
<td>½” (12.7 mm)</td>
</tr>
<tr>
<td>&gt; 3 – 5” (&gt; 76.2 – 127 mm)</td>
<td>3/8” (9.5 mm)</td>
<td>1” (25.4 mm)</td>
</tr>
<tr>
<td>&gt; 5 – 7.5” (&gt; 127 – 191 mm)</td>
<td>½” (12.7 mm)</td>
<td>2” (50.8 mm)</td>
</tr>
<tr>
<td>&gt; 7.5 – 10” (&gt; 191 – 254 mm)</td>
<td>5/8” (15.9 mm)</td>
<td>3” (76.2 mm)</td>
</tr>
<tr>
<td>&gt;10” (&gt; 254 mm)</td>
<td>Consult Materion Performance Alloys sales engineer for sizes and availability.</td>
<td></td>
</tr>
</tbody>
</table>

SPECIALTY CAST SHAPES
Multi-hole cross sections and/or shapes with wall thickness greater than 0.400” (10.2 mm)

North American Service Centers – Sales Inquiries

For bar, tube, plate/sheet >0.060” (1.5 mm) thick and rod >0.5” (12.7 mm) diameter:

Warren, MI
TOLL FREE: 800-521-8800
LOCAL: +(1) 586-772-2700
FAX: +(1) 586-772-2472

For tube, bar, rod 0.4” (10 mm) diameter and over, plate 0.062” (1.57 mm) thickness and over:

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

International Sales Offices

CHINA/HONG KONG
TEL: + (852) 2318-1960 / 1907
brushalloysHK-info@materion.com

JAPAN
TEL: + (81) 33 230 2961
brushalloysJP-info@materion.com

TAIWAN, R.O.C.
TEL: + (886) 2-2747-8800 x-121
brushalloysTW-info@materion.com

CHINA/SHANGHAI
TEL: + (86) 21-5237-2328
brushalloysCN-info@materion.com

REPUBLIC OF KOREA
TEL: + (82) 2 702-2961
brushalloysKR-info@materion.com

UNITED KINGDOM & IRELAND
TEL: + (44) 118-930-3733
brushalloysUK-info@materion.com

GERMANY
TEL: + (49) 711-830-930
brushalloysDE-info@materion.com

SINGAPORE/ASEAN
TEL: + (65) 6842-4456
brushalloysSG-info@materion.com

To obtain a complete list of our global Distributor/Agent network, see our North American strip, wire and rod distributors and international strip, wire, rod distributors.