

## Materion moldMAX XL Spinodally Hardened Copper-Nickel-Tin Alloy

Category : Metal , Nonferrous Metal , Copper Alloy

### Material Notes:

moldMAX XL is a unique spinodally hardened copper-nickel-tin alloy that combines high strength and high thermal conductivity. Available in large plate thickness up to 12 and in rounds up to 23.5, moldMAX XL can be used as a direct replacement for P-20 tool steels. moldMAX XL provides an exciting combination of strength and thermal conductivity the strength of prehardened tool steels and the high conductivity of copper in larger cross sections for bigger molds. For large tools, this combination provides unbeatable economic value for the molder, and the excellent machinability means metal removal rates are high as well. Machines 5 times faster than P-20 steel. The high strength and hardness ensures that moldMAX XL tools will provide durability as well as efficiency. Information supplied by Brush Wellman Engineered Materials. Brush Engineered Materials Inc. changed its name to Materion Corporation in March 2011.

Order this product through the following link:

[http://www.lookpolymers.com/polymer\\_Materion-moldMAX-XL-Spinodally-Hardened-Copper-Nickel-Tin-Alloy.php](http://www.lookpolymers.com/polymer_Materion-moldMAX-XL-Spinodally-Hardened-Copper-Nickel-Tin-Alloy.php)

Physical Properties	Metric	English	Comments
Density	8.91 g/cc	0.322 lb/in <sup>3</sup>	

Mechanical Properties	Metric	English	Comments
Hardness, Rockwell C	28 - 32	28 - 32	
Tensile Strength, Ultimate	758 MPa	110000 psi	
Tensile Strength, Yield	689 MPa @Strain 0.200 %	100000 psi @Strain 0.200 %	
Elongation at Break	4 %	4 %	in 2"
Modulus of Elasticity	117 GPa	17000 ksi	
Charpy Impact	13.6 - 20.3 J	10.0 - 15.0 ft-lb	V-Notch

Thermal Properties	Metric	English	Comments
CTE, linear	16.7 $\mu\text{m}/\text{m}\cdot\text{Å}^\circ\text{C}$ @Temperature 20.0 $\text{Å}^\circ\text{C}$	9.30 $\mu\text{in}/\text{in}\cdot\text{Å}^\circ\text{F}$ @Temperature 68.0 $\text{Å}^\circ\text{F}$	
Specific Heat Capacity	0.381 J/g- $\text{Å}^\circ\text{C}$	0.0910 BTU/lb- $\text{Å}^\circ\text{F}$	
Thermal Conductivity	60.5 - 69.2 W/m-K	420 - 480 BTU-in/hr-ft <sup>2</sup> - $\text{Å}^\circ\text{F}$	
Maximum Service Temperature, Air	316 $\text{Å}^\circ\text{C}$	600 $\text{Å}^\circ\text{F}$	Continuous

Component Elements Properties	Metric	English	Comments
Copper, Cu	90 %	90 %	
Nickel, Ni	9.0 %	9.0 %	
Tin, Sn	1.0 %	1.0 %	

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