



**MATERION**



**MOLDMAX®**



## MOLDMAX® THERMAL MANAGEMENT SOLUTIONS

### High Strength, High Conductivity Alloys for the Plastics Mold Industry

All MoldMAX products are high performance alloys specifically designed for the plastic processing industry. These alloys offer a unique combination of thermal conductivity and strength that provides significant advantages for the molding process, including:

- 15 – 50 % shorter cycle time
- Improved plastic part dimensional control
- Better parting line maintenance
- Corrosion and wear resistance
- Excellent machinability



The MoldMAX product line offers a variety of mold alloys that can fit any application requirement:

**MoldMAX HH® • MoldMAX LH® • MoldMAX XL®**  
**MoldMAX V® • PROtherm®**

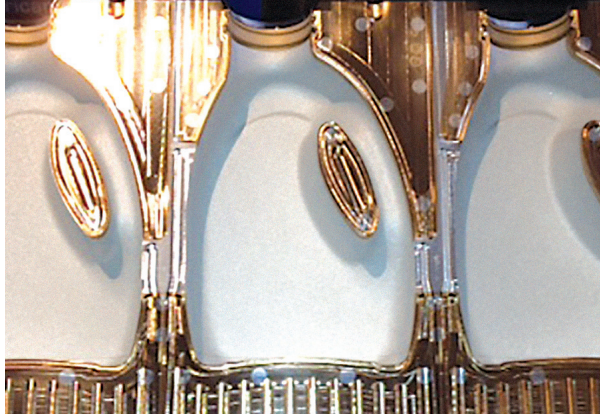
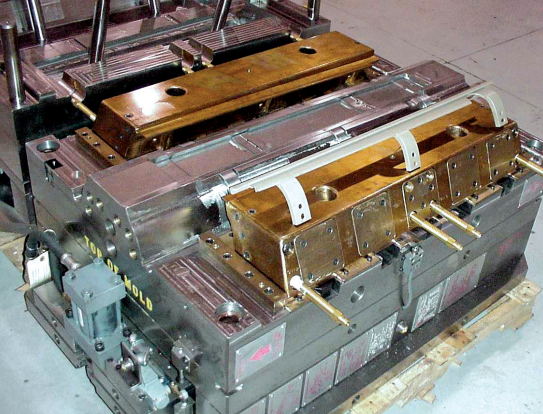
## COMPARE MOLDMAX AND OTHER PLASTIC TOOLING ALLOYS

Plastic Tooling Materials	Rockwell Hardness (HRC)	Thermal Conductivity (BTU/ft hr °F)	Charpy V-Notch Impact Strength	Yield Strength (ksi)	Tensile Strength (ksi)	Expansion Coefficient (10-6/in/in/°F)
420 Stainless	50	10	5-10	200	250	6.1
H-13 Tool Steel	45-50	15	8-14	200	250	7.1
<b>MoldMAX HH®</b>	<b>40</b>	<b>75</b>	<b>4</b>	<b>145</b>	<b>170</b>	<b>9.7</b>
<b>MoldMAX XL®</b>	<b>30</b>	<b>40</b>	<b>15</b>	<b>105</b>	<b>115</b>	<b>9.3</b>
<b>MoldMAX LH®</b>	<b>30</b>	<b>90</b>	<b>12</b>	<b>110</b>	<b>140</b>	<b>9.7</b>
<b>MoldMAX V®</b>	<b>28</b>	<b>92</b>	<b>8</b>	<b>105</b>	<b>125</b>	<b>9.7</b>
P-20 Tool Steel	30	17	25	120	140	7.1
<b>PROtherm®</b>	<b>20</b>	<b>145</b>	<b>40</b>	<b>90</b>	<b>105</b>	<b>9.8</b>
Cl8000	16	120	35	65	96	9.7
Alumold® *	B88	95	30	75	80	12.9
QC-10® **	B90	92.2		66-76	74-80	13.7

*H-13 and 420 SS achieve hardness after heat treatment. All the other materials are supplied in the hardness indicated.*

\*Registered trademark of Constellium

\*\*Registered trademark of Arconic Inc.



## THERMAL CONDUCTIVITY ADVANTAGE

Mold designs that optimize the superior combination of thermal conductivity and strength of MoldMAX alloys will provide rapid, uniform and controlled heat removal from the plastic part.

The immediate benefit is less in-mold and post-mold warpage of plastic parts, as well as shorter cycle time and better dimensional control.

In addition, hot runner and manifold designs that include MoldMAX alloys will result in more uniform temperature control of the plastic melt and higher quality plastic parts.

## THE MOLDMAX® ADVANTAGE IN INJECTION MOLDING

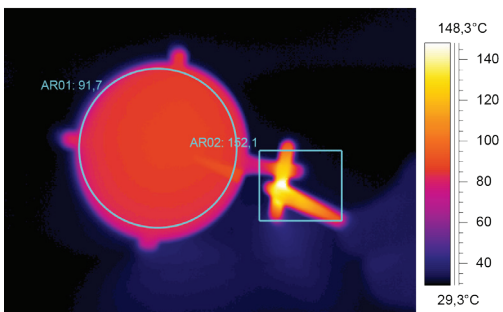
MoldMAX is engineered for use as the core material in concert with steel mold bases and cavities. One of the most important functions of an injection mold is to act as a heat exchanger. The core performs the majority of the heat removal in the typical mold. MoldMAX with up to 10 times the thermal conductivity of tool steel, reduces cycle time 15 – 50%. The cost savings of these reductions can be substantial.

## HEALTH & SAFETY

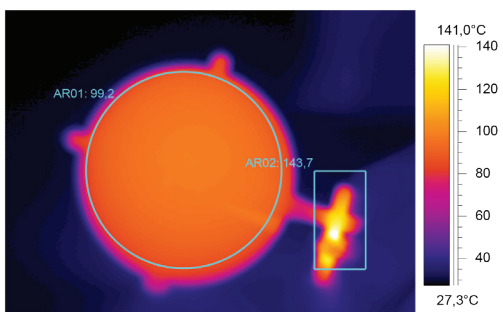
Handling copper beryllium in solid form poses no special health risk. Like many industrial materials, beryllium-containing materials may pose a health risk if recommended safe handling practices are not followed. Inhalation of airborne beryllium may cause a serious lung disorder in susceptible individuals. The Occupational Safety and Health Administration (OSHA) has set mandatory limits on occupational respiratory exposures. Read and follow the guidance in the Material Safety DataSheet (MSDS) before working with this material. For additional information on safe handling practices or technical data on copper beryllium, contact Materion Performance Alloys, Technical Service Department at 800.375.4205.



### Cooling Time Comparison Steel vs. MoldMAX HH®



Mold Cooling Time: 10 sec. MoldMAX HH® Tool (part temperature = 92°C)



Mold Cooling Time: 25 sec. hll Tool (part temperature = 99°C)

*“MoldMAX with up to 10 times the thermal conductivity of tool steel, reduces cycle time 15 – 50%.”*



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## ABOUT MATERION

Materion is among the world's premier providers of advanced materials solutions and services. Materion is aligned to deliver a broader scope of products, services and expertise needed to drive our customers' growth and profitability and become their first choice in a partner. Materion Corporation common stock trades on the New York Stock Exchange under the symbol MTRN.

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## MATERION PERFORMANCE ALLOYS

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