**PRODUCT DESCRIPTION**

LOCTITE® Fixmaster® Metal Magic Steel™ provides the following product characteristics:

<table>
<thead>
<tr>
<th>Technology</th>
<th>Epoxy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Type</td>
<td>Epoxy</td>
</tr>
<tr>
<td>Appearance (uncured)</td>
<td>Metallic black&lt;sup&gt;LMS&lt;/sup&gt;</td>
</tr>
<tr>
<td>Appearance (form)</td>
<td>Stick</td>
</tr>
<tr>
<td>Components</td>
<td>Two component - requires mixing</td>
</tr>
<tr>
<td>Cure</td>
<td>Room temperature cure</td>
</tr>
<tr>
<td>Application</td>
<td>Bonding</td>
</tr>
</tbody>
</table>
| Specific Benefit | - Cures under water and will adhere to most damp surfaces  
|                 | - Adheres to most types of clean surfaces  
|                 | - Cures in 10 minutes for fast repairs  
|                 | - Epoxy adhesive stick applies like putty and cures to a steel-like finish |

LOCTITE® Fixmaster® Metal Magic Steel™ is a versatile, dual component, easy to use, steel filled epoxy repair putty. It is applied like a putty and when cured it has a high compressive strength and good adhesion to most surfaces. This product stops leaks in pipes and tanks, fills oversized bolt holes, smooths welds, and repairs non-structural defects in castings holes in tanks. This product is typically used in applications with an operating range of -30 °C to 120 °C.

**NSF International**

Certified to ANSI/NSF Standard 61 for use in commercial and residential potable water systems not exceeding 82° C.

**TYPICAL PROPERTIES OF UNCURED MATERIAL**

| Coverage | 40 cm² @ 6 mm thick per tube (16 in² @ 0.25 in thick per tube) |

**TYPICAL CURING PERFORMANCE**

| Curing Properties | Cure Time @ 25 °C, minutes | 10 |
|                   | Gel Time @ 25 °C, minutes  | 2.5 to 3.5 |
|                   | Working Time @ 25 °C, minutes | 2.5 to 5<sup>LMS</sup> |

**Cure Speed vs. Temperature**

The graph below shows the shear strength developed with time on grit blasted steel lap shears at different temperatures and tested according to ISO 4587.

**TYPICAL PROPERTIES OF CURED MATERIAL**

**Physical Properties:**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shore Hardness, ISO 868, Shore D</td>
<td>&gt;70&lt;sup&gt;LMS&lt;/sup&gt;</td>
</tr>
<tr>
<td>Abrasion Resistance, ASTM D4060: mg</td>
<td>200</td>
</tr>
<tr>
<td>1 Kg load, CS-10 wheels, Weight of Material Lost</td>
<td></td>
</tr>
<tr>
<td>Coefficient of Thermal Conductivity ASTM F 433, W/(m·K)</td>
<td>1.016</td>
</tr>
<tr>
<td>Glass Transition Temperature ISO 11359-2, °C</td>
<td>54</td>
</tr>
<tr>
<td>Coefficient of Thermal Expansion, ISO 11359-2, K&lt;sup&gt;1&lt;/sup&gt;:</td>
<td></td>
</tr>
<tr>
<td>Below Tg</td>
<td>29×10&lt;sup&gt;LMS&lt;/sup&gt;</td>
</tr>
<tr>
<td>Above Tg</td>
<td>115×10&lt;sup&gt;LMS&lt;/sup&gt;</td>
</tr>
<tr>
<td>Compressive Strength, ISO 604 N/mm² (psi)</td>
<td>50 (7,200)</td>
</tr>
<tr>
<td>Compressive Modulus, ISO 604 N/mm² (psi)</td>
<td>6,120 (887,700)</td>
</tr>
<tr>
<td>Tensile Strength, ISO 527-2 N/mm² (psi)</td>
<td>18.8 (2,730)</td>
</tr>
<tr>
<td>Tensile Modulus, ISO 527-2 N/mm² (psi)</td>
<td>105 (15,000)</td>
</tr>
<tr>
<td>Elongation at break, %</td>
<td>0.3</td>
</tr>
<tr>
<td>Flexural strength, ASTM D790 N/mm² (psi)</td>
<td>37 (5,430)</td>
</tr>
<tr>
<td>Flexural modulus, ASTM D790 N/mm² (psi)</td>
<td>7.820 (1,134,200)</td>
</tr>
<tr>
<td>Electrical Properties:</td>
<td></td>
</tr>
<tr>
<td>Volume Resistivity, IEC 60093, ohm-cm</td>
<td>46×10&lt;sup&gt;12&lt;/sup&gt;</td>
</tr>
<tr>
<td>Surface Resistivity, IEC 60093, ohms</td>
<td>110×10&lt;sup&gt;12&lt;/sup&gt;</td>
</tr>
</tbody>
</table>
TYPICAL PERFORMANCE OF CURED MATERIAL
Lap Shear Strength, ISO 4587:
Grit Blasted Mild Steel (GBMS)  \( N/mm^2 \geq 3.45 \text{LMS} \) (\( \geq 500 \) psi)

TYPICAL ENVIRONMENTAL RESISTANCE
Lap Shear Strength, ISO 4587:
Grit Blasted Mild Steel (GBMS)

Hot Strength
Tested at temperature

Heat Aging
Aged at temperature indicated and tested @ 22 °C

GENERAL INFORMATION
This product is not recommended for use in pure oxygen and/or oxygen rich systems and should not be selected as a sealant for chlorine or other strong oxidizing materials.

For safe handling information on this product, consult the Material Safety Data Sheet (MSDS).

Directions for use:
1. CAUTION: Do not apply to surfaces above 66 °C (150F).

2. Apply to clean and dry surface for best strength. LOCTITE® Fixmaster® Metal Magic Steel™ can be applied to wet surfaces, but bond strength will be lower.

3. For maximum adhesion, clean and sand surface.

4. Use gloves; do not mix with bare hands.

5. Cut required amount of material from stick. Remove clear plastic wrapper from cut section.

6. To mix, first twist the material to produce a spiral pattern of resin and hardener. Next, knead material for 2-3 minutes or until a uniform color is achieved.

7. Firmly apply for patch, repair or bonding.

8. For a smooth finish, wet a cloth or gloved finger with water and smooth.

Technical Tips for Working With Epoxies
Working time and cure depends on temperature and mass:
- The higher the temperature, the faster the cure.
- The larger the mass of material, the faster the cure.

To speed the cure of epoxies at low temperatures:
- Store epoxy at room temperature.
- Pre-heat repair surface until warm to the touch.

To slow the cure of epoxies at high temperatures:
- Mix epoxy in small masses to prevent rapid curing.
- Cool resin/hardener component(s).

Loctite Material SpecificationLMS
LMS dated January 22, 2002. Test reports for each batch are available for the indicated properties. LMS test reports include selected QC test parameters considered appropriate to specifications for customer use. Additionally, comprehensive controls are in place to assure product quality and consistency. Special customer specification requirements may be coordinated through Henkel Quality.

Storage
Store product in the unopened container in a dry location. Material removed from containers may be contaminated during use. Do not return liquid to original container. Storage information may be indicated on the product container labeling.

Optimal Storage: 8 °C to 21 °C. Storage below 8 °C or greater than 28 °C can adversely affect product properties. Henkel cannot assume responsibility for product which has been contaminated or stored under conditions other than those recommended. If additional information is required, please contact your local Technical Service Center or Customer Service Representative.

Conversions
\( ^\circ C \times 1.8 + 32 = ^\circ F \)
\( kV/mm \times 25.4 = V/mil \)
\( mm / 25.4 = \text{inches} \)
\( \mu m / 25.4 = \text{mil} \)
\( N \times 0.225 = \text{lb} \)
\( N/mm \times 5.71 = \text{lb/in} \)
\( N/mm^2 \times 145 = \text{psi} \)
\( MPa \times 145 = \text{psi} \)
\( N \cdot m \times 8.851 = \text{lb-ft} \)
\( N \cdot m \times 0.738 = \text{lb-ft} \)
\( N \cdot mm \times 0.142 = \text{oz-in} \)
\( mPa\cdot s = cP \)

For the most direct access to local sales and technical support visit: www.henkel.com/industrial
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