

LOCTITE® Fixmaster® Metal Magic Steel™

February 2013

PRODUCT DESCRIPTION

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

Technology	Epoxy
Chemical Type	Epoxy
Appearance (uncured)	Metallic black ^{LMS}
Appearance (form)	Stick
Components	Two component - requires mixing
Cure	Room temperature cure
Application	Bonding
Specific Benefit	<ul style="list-style-type: none"> • 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, smoothes 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)

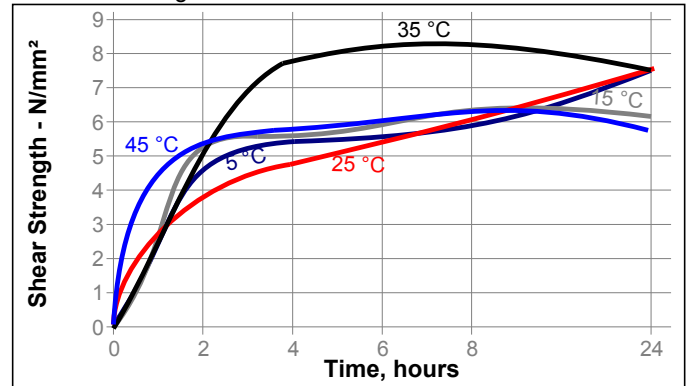
TYPICAL CURING PERFORMANCE

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^{LMS}

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:

Shore Hardness, ISO 868, Shore D >70^{LMS}
Abrasion Resistance, ASTM D4060: mg 200
1 Kg load, CS-10 wheels, Weight of Material Lost
Coefficient of Thermal Conductivity ASTM F 433, W/(m·K) 1.016
Glass Transition Temperature ISO 11359-2, °C 54
Coefficient of Thermal Expansion, ISO 11359-2, K⁻¹:
Below Tg 29×10⁻⁰⁶
Above Tg 115×10⁻⁰⁶

Compressive Strength, ISO 604 N/mm² 50
(psi) (7,200)
Compressive Modulus, ISO 604 N/mm² 6,120
(psi) (887,700)
Tensile Strength, ISO 527-2 N/mm² 18.8
(psi) (2,730)
Tensile Modulus, ISO 527-2 N/mm² 105
(psi) (15,000)
Elongation at break, % 0.3
Flexural strength, ASTM D790 N/mm² 37
(psi) (5,430)
Flexural modulus, ASTM D790 N/mm² 7,820
(psi) (1,134,200)

Electrical Properties:

Volume Resistivity, IEC 60093, ohm-cm 46×10¹²
Surface Resistivity, IEC 60093, ohms 110×10¹²



TYPICAL PERFORMANCE OF CURED MATERIAL

Lap Shear Strength, ISO 4587:

Grit Blasted Mild Steel (GBMS)

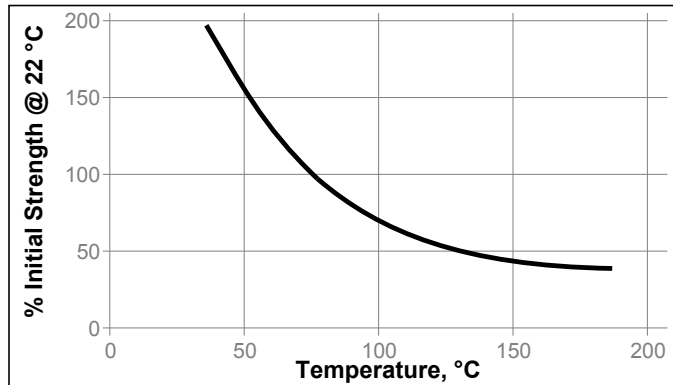
 $N/mm^2 \geq 3.45^{LMS}$
 (psi) (≥ 500)
TYPICAL ENVIRONMENTAL RESISTANCE

Lap Shear Strength, ISO 4587:

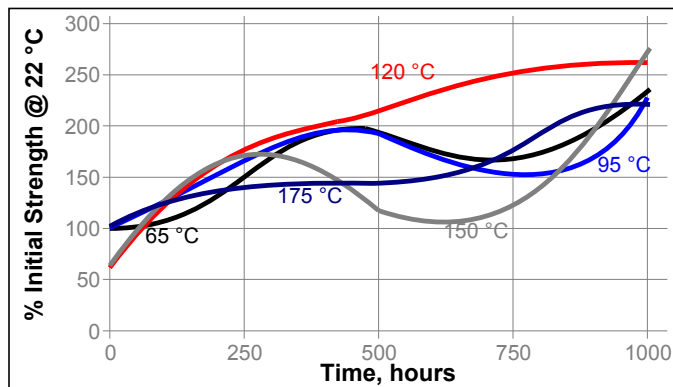
Grit Blasted Mild Steel (GBMS)

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:

- CAUTION:** Do not apply to surfaces above 66 °C (150F).
- 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.

- For maximum adhesion, clean and sand surface.
- Use gloves; do not mix with bare hands.
- Cut required amount of material from stick. Remove clear plastic wrapper from cut section.
- 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.
- Firmly apply for patch, repair or bonding.
- 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 Specification^{LMS}

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

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

Disclaimer

Note:

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.

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Reference 1.2