

LOCTITE® Fixmaster® Steel Putty

May 2013

PRODUCT DESCRIPTION

LOCTITE® Fixmaster® Steel Putty provides the following product characteristics:

Technology	Epoxy
Chemical Type	Epoxy
Appearance (uncured)	Steel Colored Paste
Components	Two components - requires mixing
Mix Ratio, by volume - Resin : Hardener	2.5 : 1
Mix Ratio, by weight - Resin : Hardener	6.25 : 1
Cure	Room temperature cure
Application	Bonding
Specific Benefit	<ul style="list-style-type: none"> • Will not sag or shrink • Rebuilds worn parts fast - limits downtime • High steel content - cures to a metal-like finish • Superior adhesion - bonds well to all metal substrates

LOCTITE® Fixmaster® Steel Putty is a steel reinforced, two-part epoxy repair putty that cures to a metal-like finish and can be machined, drilled, tapped or filed. Typical applications include repairing non-structural defects in castings, making jigs and fixtures, sealing vessels, tanks and valves, resurfacing worn air seals and filling cavitated areas. This product is typically used in applications with an operating range of -30 °C to 105 °C.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Resin:

Density @ 22 °C 2.43

Flash Point - See MSDS

Hardener:

Density @ 22 °C 1.08

Flash Point - See MSDS

Mixed:

Weight per volume kg/L 2.64 to 2.76
(lbs/gal) (22 to 23)

Coverage 278 cm² @ 6 mm thick per 0.45 kg kit
(43 in² @ 0.25 in thick per 1 lb kit)

Flash Point - See MSDS

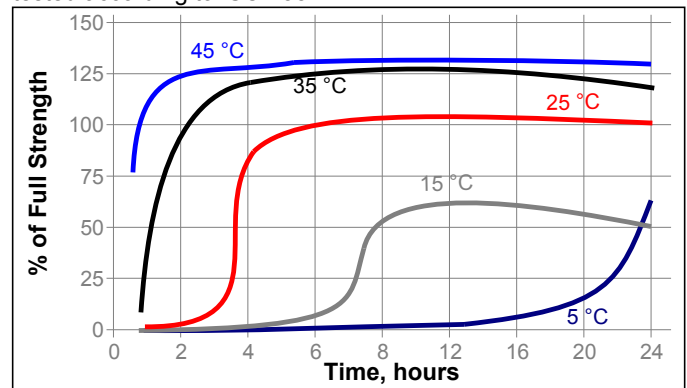
TYPICAL CURING PERFORMANCE

Curing Properties

Cure Time @ 25 °C, hours	6
Gel Time @ 21 °C, minutes	35 to 40
Working life, minutes	30

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

Cured @ 25 °C except where noted

Physical Properties:

Abrasion Resistance, ASTM D4060: mg 1 Kg load, CS-10 wheels, Weight of Material Lost	156
Shore Hardness, ISO 868, Shore D	82
Volume Shrinkage, %	1.63
Elongation, ISO 527-2, %	0.49
Compressive Strength, ISO 604	N/mm ² 61.7 (psi) (8,940)
Compressive Modulus, ISO 604	N/mm ² 3,400 (psi) (521,740)
Tensile Strength, ISO 527-2	N/mm ² 27.8 (psi) (4,040)
Tensile Modulus, ASTM D638	N/mm ² 9,360 (psi) (1,357,180)
Flexural strength, ASTM D790	N/mm ² 56.4 (psi) (8,190)
Flexural modulus	N/mm ² 3,500 (psi) (507,540)
Coefficient of Thermal Conductivity ASTM F 433, W/(m·K)	0.523
Glass Transition Temperature, ASTM E 1640, °C	60



Coefficient of Thermal Expansion, ISO 11359-2 K ⁻¹ :	
Below Tg	43×10 ⁻⁰⁶
Above Tg	125×10 ⁻⁰⁶

Electrical Properties:

Volume Resistivity, IEC 60093, ohm-cm	1.1×10 ¹⁵
Surface Resistivity, IEC 60093, ohms	3.1×10 ¹⁵

TYPICAL PERFORMANCE OF CURED MATERIAL**Shear Strength**

Lap Shear Strength, ISO 4587:	
Grit Blasted Mild Steel (GBMS)	N/mm ² 9.6 (psi) (1,395)

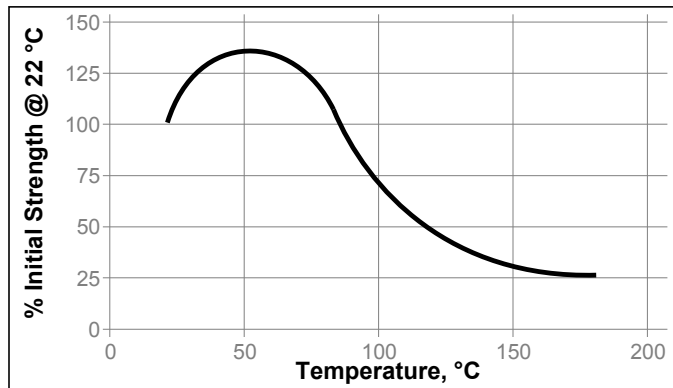
TYPICAL ENVIRONMENTAL RESISTANCE

Cured for 72 hours @ 21 °C

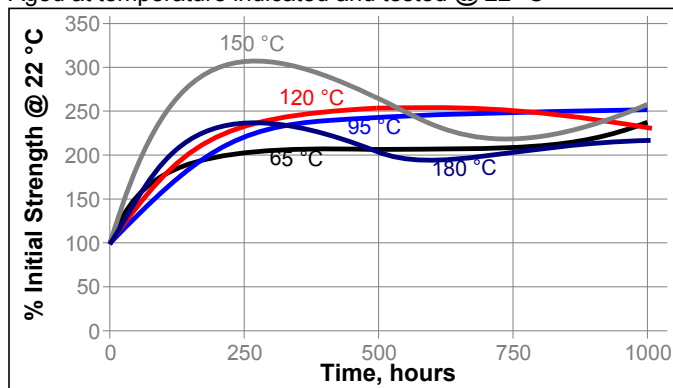
Lap Shear Strength, ISO 4587:	
Grit Blasted Mild Steel (GBMS)	

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:**Surface Preparation**

Proper surface preparation is critical to the long-term performance of this product. The exact requirements vary with the severity of the application, expected service life, and initial substrate conditions.

Metal:

- Clean, dry and abrade application surface. The more thorough the degree of surface preparation the better the performance of the application. If possible, it is recommended that the surface be grit-blasted to a Near White Metal (SSPC-SP10/NACE No. 2) Standard. For less severe applications, roughening the surface with hand tools or grinding is suitable.
- Solvent cleaning with a residue-free solvent is recommended at the final step to aid in adhesion.

Mixing:

- Mix 2.5 parts resin to 1 part hardener by volume (6.25 to 1 by weight), or transfer entire kit onto a clean and dry mixing surface and mix thoroughly until color is consistent.

Application:

- Apply fully mixed material to the prepared surface .
- At 25 °C working time is 30 minutes and functional cure time is 6 hours.

If using to rebuild shaft, the following applies:

- Machine the worn area down 0.3mm (0.125 in) to produce a square shoulder on part. The material is stronger with a square edge versus a feathered edge.
- Machine a spiral cut in bottom of area to be repaired to provide mechanical keying into surface.
- Apply excess product to ensure small shrinkage during cure does not produce depression.
- Machine the surface to original dimensions prior to full cure, as the product is very wear resistant.

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 mixed, 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).

Not for product specifications

The technical data contained herein are intended as reference only. Please contact your local quality department for assistance and recommendations on specifications for this product.

Storage

Store product in the unopened container in a dry location. 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.

Material removed from containers may be contaminated during use. Do not return product to the original container. Henkel Corporation cannot assume responsibility for product which has been contaminated or stored under conditions other than those previously indicated. If additional information is required, please contact your local Technical Service Center or Customer Service Representative.

Conversions

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

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Reference 0.0