



LOCTITE[®] Fixmaster[®] Stainless Steel Putty

May 2013

PRODUCT DESCRIPTION

LOCTITE[®] Fixmaster[®] Stainless Steel Putty provides the following product characteristics:

Technology	Epoxy
Chemical Type	Epoxy
Appearance (Resin)	Steel Gray ^{LMS}
Appearance (Hardener)	White ^{LMS}
Appearance (Mixed)	Metallic gray paste
Components	Two components - requires mixing
Mix Ratio, by volume - Resin : Hardener	4 : 1
Mix Ratio, by weight - Resin : Hardener	9 : 1
Cure	Room temperature cure
Application	Bonding
Specific Benefit	<ul style="list-style-type: none"> Resists rust and corrosion - for long lasting repairs Rebuilds worn parts fast - limits downtime High stainless steel content - for durability Superior adhesion - forms a solid bond to steel, cast iron, stainless steel, concrete, wood and clean and abraded bronze, copper and aluminum Non-sag putty - allows application versatility by conforming to unusual shapes

LOCTITE[®] Fixmaster[®] Stainless Steel Putty is a stainless steel filled, two-part epoxy repair putty. It repairs parts where a stainless steel finish is desired. Once hardened, it can be machined, drilled, tapped or filed just like the original metal. This product is typically used in applications with an operating range of 30 °C to 105 °C (20F to 225F). Typical application includes renewing, rebuilding, resurfacing and repairing stainless steel equipment and parts like pumps, shafts, and castings. It can also be used for making stainless steel molds.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Resin:

Weight per volume	kg/L	3.18 to 3.42
	(lbs/gal)	(26.5 to 28.5 ^{LMS})
Viscosity, Brookfield - RVDV, 25 °C, mPa·s (cP):		
	Spindle TF, speed 2.5 rpm,	2,000,000 to 3,000,000 ^{LMS}

Flash Point - See MSDS

Hardener:

Weight per volume	kg/L	1.43 to 1.46 ^{LMS}
	(lbs/gal)	(11.9 to 12.2 ^{LMS})

Viscosity, Brookfield - RVDV, 25 °C, mPa·s (cP):
Spindle TF, speed 2.5 rpm, 2,000,000 to 2,800,000

Flash Point - See MSDS

Mixed:

Density @ 21 °C	2.74
Coverage	232 cm ² @ 6 mm thick per 0.45 kg kit (36 in ² @ 0.25 in thick per 1 lb kit)

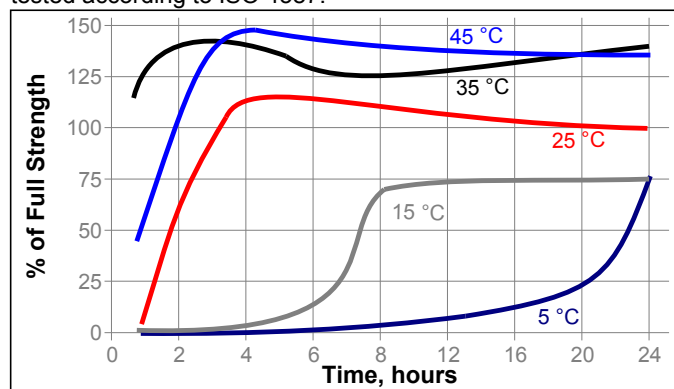
TYPICAL CURING PERFORMANCE

Curing Properties

Cure Time @ 25 °C, hours	6
Gel Time @ 25 °C, minutes	40 to 50 ^{LMS}
Working life, minutes	20

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	109
1 Kg load, CS-10 wheels, Weight of Material Lost	
Shore Hardness, ISO 868, Shore D	86
Volume Shrinkage, %	5.7
Flexural strength, ASTM D790	N/mm ² 46 (psi) (6,730)



Flexural modulus	N/mm ² 6,660 (psi) (965,320)
Compressive Strength, ISO 604	N/mm ² 69 (psi) (9,920)
Compressive Modulus, ISO 604	N/mm ² 3,700 (psi) (535,850)
Tensile Strength, ISO 527-2	N/mm ² 32 (psi) (4,700)
Tensile Modulus, ASTM D638	N/mm ² 10,760 (psi) (1,560,220)
Elongation, ISO 527-2, %	0.32
Coefficient of Thermal Conductivity ASTM F 433, W/(m·K)	0.8
Glass Transition Temperature, ASTM E 1640, °C	68
Coefficient of Thermal Expansion, ISO 11359-2 K ⁻¹ :	
Below Tg	40×10 ⁻⁶
Above Tg	120×10 ⁻⁶
Electrical Properties:	
Volume Resistivity, IEC 60093, ohm-cm	0.39×10 ¹⁵
Surface Resistivity, IEC 60093, ohms	1.25×10 ¹⁵

TYPICAL PERFORMANCE OF CURED MATERIAL

Shear Strength

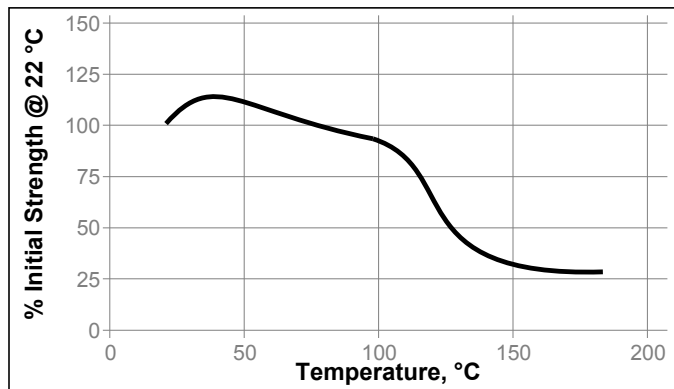
Lap Shear Strength, ISO 4587:	
Grit Blasted Mild Steel (GBMS)	N/mm ² 12.4 (psi) (1,800)

TYPICAL ENVIRONMENTAL RESISTANCE

Cured for 72 hours @ 21 °C
 Lap Shear Strength, ISO 4587:
 Grit Blasted Mild Steel (GBMS)

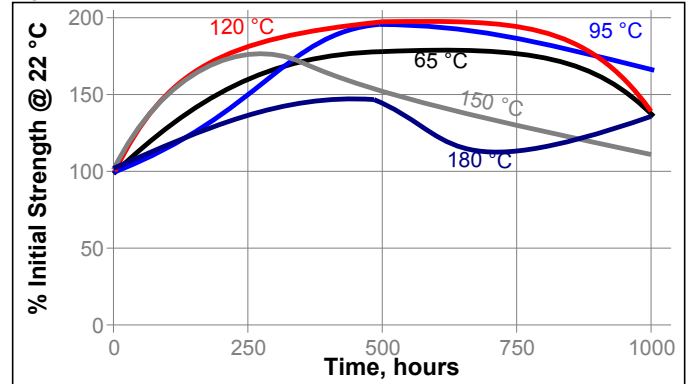
Hot Strength

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 4 parts resin to 1 part hardener by volume (9 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 20 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).

Loctite Material Specification^{LMS}

LMS dated January 20, 2001 (Resin) and LMS dated October 16, 2001 (Hardener). 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 Loctite Quality.

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

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

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.

Any liability in respect of the information in the Technical Data Sheet or any other written or oral recommendation(s) regarding the concerned product is excluded, except if otherwise explicitly agreed and except in relation to death or personal injury caused by our negligence and any liability under any applicable mandatory product liability law.

In case products are delivered by Henkel Belgium NV, Henkel Electronic Materials NV, Henkel Nederland BV, Henkel Technologies France SAS and

Henkel France SA please additionally note the following:

In case Henkel would be nevertheless held liable, on whatever legal ground, Henkel's liability will in no event exceed the amount of the concerned delivery.

In case products are delivered by Henkel Colombiana, S.A.S. the following disclaimer is applicable:

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. 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.

Any liability in respect of the information in the Technical Data Sheet or any other written or oral recommendation(s) regarding the concerned product is excluded, except if otherwise explicitly agreed and except in relation to death or personal injury caused by our negligence and any liability under any applicable mandatory product liability law.

In case products are delivered by Henkel Corporation, Resin Technology Group, Inc., or Henkel Canada Corporation, the following disclaimer is applicable:

The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, **Henkel Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Henkel Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.

Trademark usage

Except as otherwise noted, all trademarks in this document are trademarks of Henkel Corporation in the U.S. and elsewhere. ® denotes a trademark registered in the U.S. Patent and Trademark Office.

Reference 0.0