LOCTITE® Fixmaster® Aluminum Putty

May 2013

PRODUCT DESCRIPTION

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

Technology	Epoxy
Chemical Type	Epoxy
Appearance (Resin)	Gray[LMS]
Appearance (Hardener)	Silver[LMS]
Appearance (Mixed)	Aluminum gray paste
Components	Two components - requires mixing
Mix Ratio, by volume - Resin : Hardener	4 : 1
Mix Ratio, by weight - Resin : Hardener	6.3 : 1
Cure	Room temperature cure
Application	Bonding
Specific Benefit	• Will not sag or shrink • Easy to mix and use • Rebuilds worn parts fast - limits downtime • Forms a non-rusting aluminum-like finish • Superior adhesion - forms a solid bond

LOCTITE® Fixmaster® Aluminum Putty is a two-part epoxy system heavily reinforced with aluminum powder. Ideal for repairing non structural defects in aluminum castings, or for use where an aluminum finish is desired. This product is typically used in applications with an operating range of 30 °C to 95 °C (20F to 200F). Typical applications include repairing aluminum castings and worn aluminum parts, making models and jigs for odd shaped parts and making aluminum dies.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Resin:

Weight per volume	kg/L (lbs/gal)	1.69 to 1.76 (14.1 to 14.7[LMS])

Viscosity, Brookfield - RVDV, 25 °C, mPa·s (cP):
Spindle TF, speed 2.5 rpm, 1,900,000 to 2,600,000[LMS]

Flash Point - See MSDS

Hardener:

Weight per volume	kg/L (lbs/gal)	1.08 to 1.12 (9.0 to 9.3[LMS])

Viscosity, Brookfield - RVDV, 25 °C, mPa·s (cP):
Spindle TF, speed 2.5 rpm, 1,500,000 to 2,500,000

Flash Point - See MSDS

Mixed:

Density @ 21 °C	1.49
Coverage	464 cm² @ 6 mm thick per 0.45 kg kit (72 in² @ 0.25 in thick per 1 lb kit)

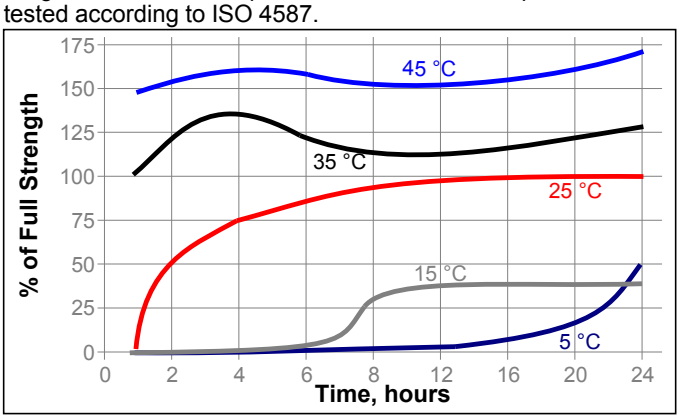
TYPICAL CURING PERFORMANCE

Curing Properties

Cure Time @ 25 °C, hours	6
Gel Time @ 25 °C, minutes	60 to 80[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 1 Kg load, CS-10 wheels, Weight of Material Lost		122
Shore Hardness, ISO 868, Shore D		84
Volume Shrinkage, %		0.84
Flexural strength , ASTM D790	N/mm² (psi)	58 (8,450)
Flexural modulus	N/mm² (psi)	5,640 (817,220)

Compressive Strength, ISO 604	N/mm² (psi)	62 (9,000)
Compressive Modulus, ISO 604	N/mm² (psi)	2,820 (408,840)
Tensile Strength, ISO 527-2	N/mm² (psi)	29.2 (4,230)
Tensile Modulus, ASTM D638	N/mm² (psi)	8,700 (1,261,000)
Elongation, ISO 527-2, %		0.41
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		47×10^{-06}
Above Tg		134×10^{-06}

Electrical Properties:

Volume Resistivity, IEC 60093, ohm-cm	0.41×10^{15}
Surface Resistivity, IEC 60093, ohms	36×10^{15}

TYPICAL PERFORMANCE OF CURED MATERIAL

Shear Strength

Lap Shear Strength, ISO 4587:

Grit Blasted Mild Steel (GBMS)	N/mm² (psi)	13.9 (2,015)

TYPICAL ENVIRONMENTAL RESISTANCE

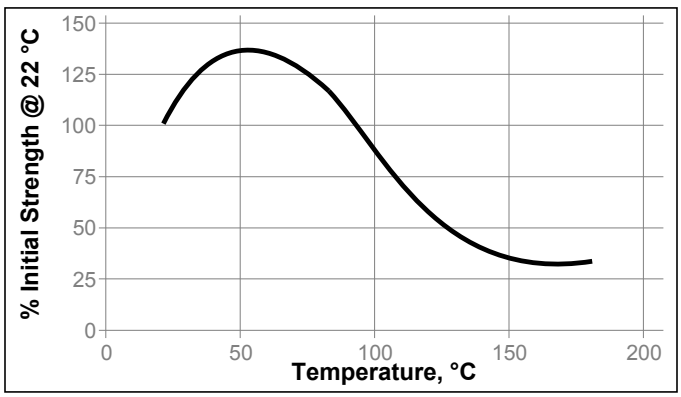
Cured for 72 hours @ 21 °C

Lap Shear Strength, ISO 4587:

Grit Blasted Mild Steel (GBMS)

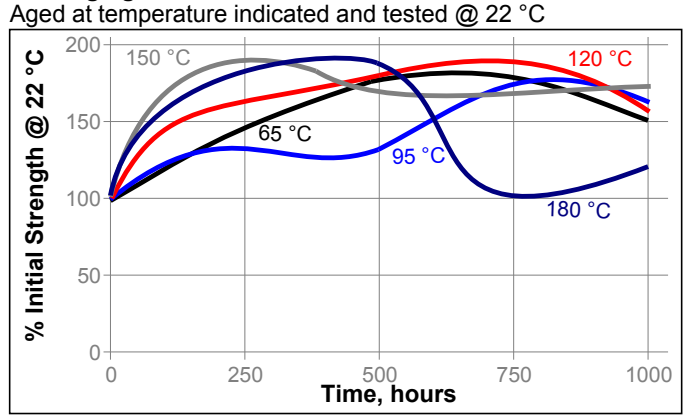
Hot Strength

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:

1. 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.
2. Solvent cleaning with a residue-free solvent is recommended at the final step to aid in adhesion.

Mixing:

1. Mix 4 parts resin to 1 part hardener by volume (6.3 to 1 by weight), or transfer entire kit onto a clean and dry mixing surface and mix thoroughly until color is consistent.

Application:

1. Apply fully mixed material to the prepared surface .
2. At 25 °C working time is 20 minutes and functional cure time is 6 hours.

If using to rebuild shaft, the following applies:

1. 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.
2. Machine a spiral cut in bottom of area to be repaired to provide mechanical keying into surface.
3. Apply excess product to ensure small shrinkage during cure does not produce depression.

4. 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 June 25, 2001 (Resin) and LMS dated June 20, 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

(°C x 1.8) + 32 = °F
kV/mm x 25.4 = V/mil
mm / 25.4 = inches
µm / 25.4 = mil
N x 0.225 = lb
N/mm x 5.71 = lb/in
N/mm² x 145 = psi
MPa x 145 = psi
N·m x 8.851 = lb·in
N·m x 0.738 = lb·ft
N·mm x 0.142 = oz·in
mPa·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 0.0