

# LOCTITE® EA 3476

Known as NORTH AMERICA - FIXMASTER STAINLESS STEEL PUTTY  
May 2017

## PRODUCT DESCRIPTION

LOCTITE® EA 3476 provides the following product characteristics:

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

LOCTITE® EA 3476 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 <sup>LMS</sup> )
Viscosity, Brookfield - RVDV, 25 °C, mPa·s (cP):		
	Spindle TF, speed 2.5 rpm	2,000,000 to 3,000,000 <sup>LMS</sup>

### Hardener:

Weight per volume	kg/L	1.43 to 1.46 <sup>LMS</sup>
	(lbs/gal)	(11.9 to 12.2 <sup>LMS</sup> )

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

### Mixed:

Density @ 21 °C 2.74

Flash Point - See SDS

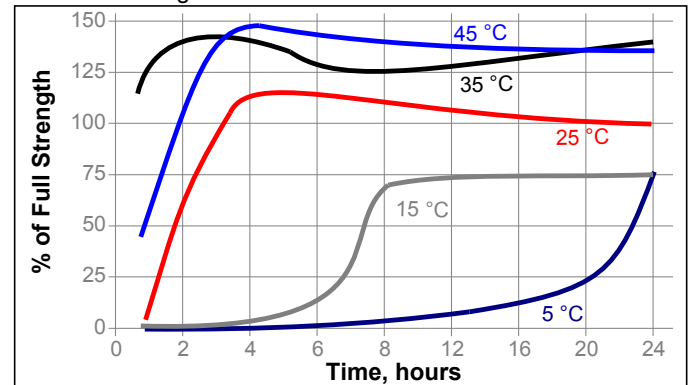
## TYPICAL CURING PERFORMANCE

### Curing Properties

Gel Time @ 25 °C, minutes	40 to 50 <sup>LMS</sup>
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:

Tensile Strength, ISO 527-2	N/mm <sup>2</sup>	32
	(psi)	(4,700)
Tensile Modulus, ASTM D638	N/mm <sup>2</sup>	10,760
	(psi)	(1,560,220)
Compressive Strength, ISO 604	N/mm <sup>2</sup>	69
	(psi)	(9,920)
Compressive Modulus, ISO 604	N/mm <sup>2</sup>	3,700
	(psi)	(535,850)

Flexural strength, ASTM D790	N/mm <sup>2</sup>	46
	(psi)	(6,730)
Flexural modulus	N/mm <sup>2</sup>	6,660
	(psi)	(965,320)

Shore Hardness, ISO 868, Shore D	86
Glass Transition Temperature, ASTM E 1640, °C	68
Coefficient of Thermal Expansion, ISO 11359-2 K <sup>-1</sup> :	
Below Tg	40×10 <sup>-06</sup>
Above Tg	120×10 <sup>-06</sup>
Elongation, ISO 527-2, %	0.32
Volume Shrinkage, %	5.7
Coefficient of Thermal Conductivity ASTM F 433, W/(m·K)	0.8
Abrasion Resistance, ASTM D4060: mg	109
1 Kg load, CS-10 wheels, Weight of Material Lost	

**Electrical Properties:**

Volume Resistivity, IEC 60093, ohm-cm	0.39×10 <sup>15</sup>
Surface Resistivity, IEC 60093, ohms	1.25×10 <sup>15</sup>

**TYPICAL PERFORMANCE OF CURED MATERIAL****Shear Strength**

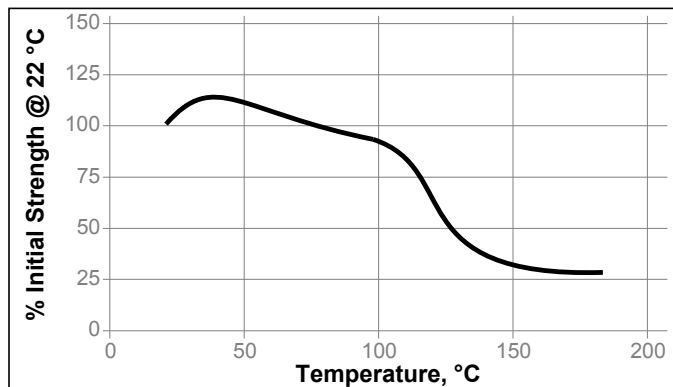
Lap Shear Strength, ISO 4587:	
Grit Blasted Mild Steel (GBMS)	N/mm <sup>2</sup> 12.4
	(psi) (1,800)

**TYPICAL ENVIRONMENTAL RESISTANCE**

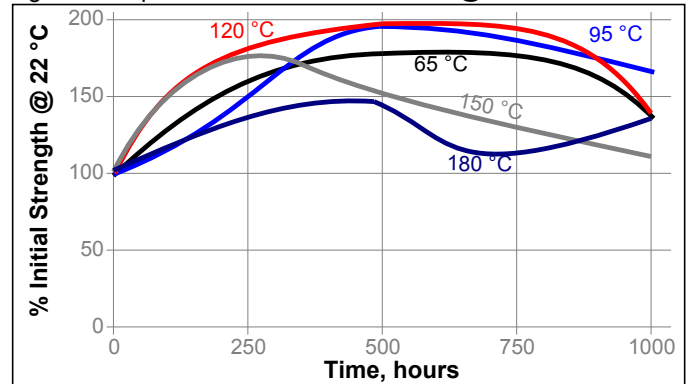
Cured for 72 hours @ 21°C
Lap Shear Strength, ISO 4587:
Grit Blasted Mild Steel (GBMS)

**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 Safety Data Sheet (SDS).

**Surface Preparation**

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

**Directions for use:**

1. Remove dirt, oil, grease, etc. with a suitable cleaner, e.g. high pressure water cleaning system using Loctite® SF 7840™ (Loctite® Natural Blue® cleaner/degreaser).
2. Blast all surfaces to be coated with a sharp edged angular grit to a depth of profile of 75 to 100 microns and a degree of cleanliness of Near White Metal (SIS SA 2½ /SSPC-SP 10).
3. After blasting, metal surfaces should be cleaned with waterless cleaner, e.g. with Loctite® SF 7611™ (Loctite® Pro Strength Parts Cleaner), and be coated before any oxidation or contamination takes place.
4. Metal that has been in contact with salt solutions, e.g. seawater, should be grit blasted, high-pressure water blasted, and left for 24 hours to allow any salts in the metal to sweat to the surface. A test for chloride contamination should be performed. The procedure should be repeated until chloride concentration on the surface is below 40 ppm.

**Application**

1. Mix resin and hardener according to mix ratios listed or transfer entire kit onto a clean and dry mixing surface and mix material vigorously until a uniform color is obtained.
2. Apply material to prepared surface by first forcing a thin layer deep into the texture of the substrate.
3. Then Immediately build up to the desired finished thickness.
4. If using to rebuild shaft, the following applies:
  - Machine the worn area down 3 mm (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.

### Inspection

- Visually inspect for pinholes and misses just after application.
- Once the coating has cured, repeat visual inspection to confirm it is free from pinholes, misses and mechanical damages.
- Control thickness of the coating, especially in the critical points.
- Perform a test with a holiday detector to confirm coating continuity.

### Coverage

To achieve a 6 mm (.25 in) thickness, the coverage rate will be 232cm<sup>2</sup> (36in<sup>2</sup>) for 0.45kg (1lb), excluding overthickness, repairs, etc.

### Repairs

Any voids, pinholes, or low thickness areas found in the coating should be repaired by lightly abrading, cleaning, and applying further product.

### Clean-up

Immediately after use clean tools with suitable cleaner, e.g. Loctite® 7070™ or a solvent such as acetone or isopropyl alcohol. Once cured, the material can only be removed mechanically

### Technical Tips for Working With Epoxies

#### Environmental Conditions

- Relative humidity: <85%
- Ambient temperature: >15°C (60F) and rising
- Substrate temperature must always be 3°C (7F) higher than the dew point to avoid condensing moisture on parts.

#### 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<sup>LMS</sup>

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

$$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$$

$$\text{kV/mm} \times 25.4 = \text{V/mil}$$

$$\text{mm} / 25.4 = \text{inches}$$

$$\mu\text{m} / 25.4 = \text{mil}$$

$$\text{N} \times 0.225 = \text{lb}$$

$$\text{N/mm} \times 5.71 = \text{lb/in}$$

$$\text{N/mm}^2 \times 145 = \text{psi}$$

$$\text{MPa} \times 145 = \text{psi}$$

$$\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$$

$$\text{N}\cdot\text{m} \times 0.738 = \text{lb}\cdot\text{ft}$$

$$\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$$

$$\text{mPa}\cdot\text{s} = \text{cP}$$

### 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 and/or registered trademarks of Henkel and its affiliates in the U.S. and elsewhere.

Reference 0.1