Technical Data Sheet

LOCTITE® EA 3476

Known as NORTH AMERICA - FIXMASTER STAINLESS STEEL PUTTY
May 2017

PRODUCT DESCRIPTION

LOCTITE® EA 3476 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 after mixing
Application	North America - Metal Repair
Specific Benefit	• 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® 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 (lbs/gal)	3.18 to 3.42 (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]

Hardener:

Weight per volume	kg/L (lbs/gal)	1.43 to 1.46[LMS] (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

Mixed:

Density @ 21 °C	2.74

Flash Point - See SDS

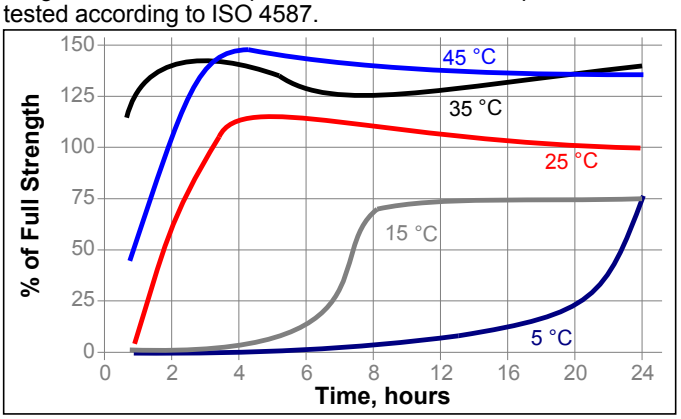
TYPICAL CURING PERFORMANCE

Curing Properties

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:

Tensile Strength, ISO 527-2	N/mm²	32
	(psi)	(4,700)
Tensile Modulus, ASTM D638	N/mm²	10,760
	(psi)	(1,560,220)
Compressive Strength, ISO 604	N/mm²	69
	(psi)	(9,920)
Compressive Modulus, ISO 604	N/mm²	3,700
	(psi)	(535,850)

Flexural strength , ASTM D790	N/mm² (psi)	46 (6,730)
Flexural modulus	N/mm² (psi)	6,660 (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^{-1}:	
Below Tg	40×10^{-06}
Above Tg	120×10^{-06}
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 1 Kg load, CS-10 wheels, Weight of Material Lost	109

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/mm² (psi)	12.4 (1,800)

TYPICAL ENVIRONMENTAL RESISTANCE

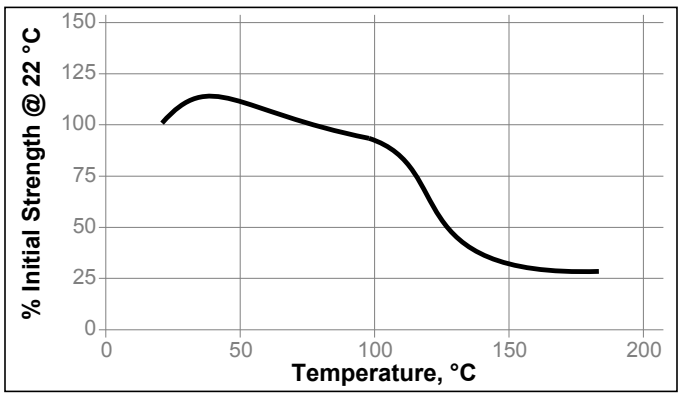
Cured for 72 hours @ 21°C

Lap Shear Strength, ISO 4587:

Grit Blasted Mild Steel (GBMS)

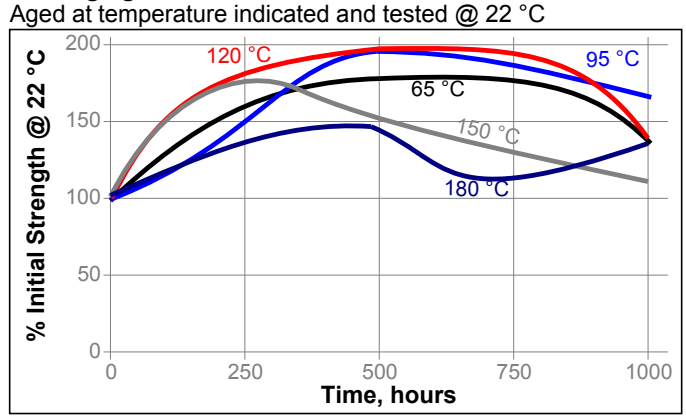
Hot Strength

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 232cm² (36in²) 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[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
(°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

Reference 0.1