

LOCTITE® EA 3478™

Known as NORTH AMERICA - SUPERIORMETAL
November 2016

PRODUCT DESCRIPTION

LOCTITE® EA 3478™ provides the following product characteristics:

Technology	Epoxy
Chemical Type	Epoxy
Appearance - Part A	Metallic gray ^{LMS}
Appearance - Part B	White ^{LMS}
Appearance (Mixed)	Gray
Components	Two part - Resin & Hardener
Mix Ratio, by volume - Resin : Hardener	4 : 1
Mix Ratio, by weight - Resin : Hardener	7.25 : 1
Cure	Room temperature cure after mixing
Application	North America - Surface Repair
Application Temperature	15 to 30°C (59 to 86°F)
Specific Benefit	<ul style="list-style-type: none"> Resurfaces and repairs worn or corroded metal parts Excellent machinability Ferro-silicon filled system - cures to metal-like finish Rebuilds worn parts fast - limits downtime Resists corrosion, abrasion, and chemicals

LOCTITE® EA 3478™ is a two-part ferro-silicon filled, 100% solid epoxy resin system. It is ideal for restoring parts worn by mechanical impact and/or corrosion. Typical applications are restoring tolerances to worn shafts, repairing worn keyways, repairing damaged housings, filling pitted surfaces in worn machinery, and restoring fit to bearing housings.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Resin:

Specific Gravity @ 25 °C	2.5 to 2.71 ^{LMS}
Viscosity, Brookfield - DVT, 25 °C, mPa·s (cP):	
Spindle 7, speed 100 rpm	1,200,000 to 2,100,000 ^{LMS}

Hardener:

Specific Gravity @ 25 °C	1.42 to 1.48 ^{LMS}
Viscosity, Brookfield - DVT, 25 °C, mPa·s (cP):	
Spindle 7, speed 100 rpm	1,800,000 to 3,000,000 ^{LMS}

Mixed:

Specific Gravity @ 25 °C	2.13
Viscosity, Cone & Plate @ 25°C, mPa·s (cP):	3,194,000

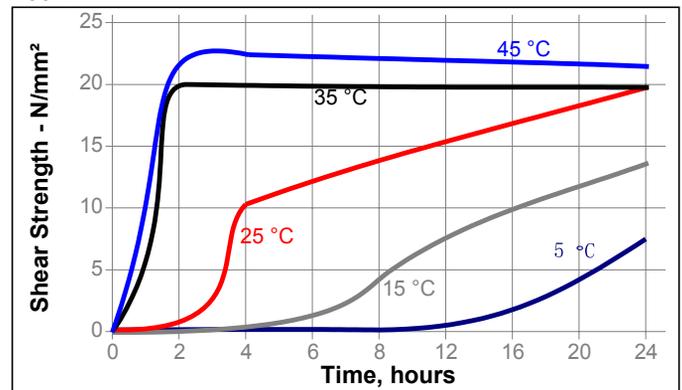
TYPICAL CURING PERFORMANCE

Curing Properties

Working life, mins 20

Cure Speed vs. Temperature

The graph below shows the shear strength developed with time on grit blasted mild steel shears and tested according to ISO 4587.



TYPICAL PROPERTIES OF CURED MATERIAL

Cured for 7 days @ 25 °C

Physical Properties:

Tensile Strength, ISO 527-2	N/mm² 27 (psi) 3,900
Tensile Modulus, ISO 527-2	N/mm² 8,770 (psi) 1,271,900
Compressive Strength, @65°C, ISO 604	N/mm² 134 (psi) 19,490
Compressive Modulus, @65°C, ISO 604	N/mm² 7,530 (psi) 1,077,616
Glass Transition Temperature (Tg), TMA, ISO 11359-2, °C	67
Coefficient of Thermal Expansion, ISO 11359-2 K ⁻¹ :	
Below Tg	47×10 ⁻⁶
Above Tg	161×10 ⁻⁶
Shore Hardness, ISO 868, Durometer D	86
Elongation, ASTM D638, %	0.35
Volume Shrinkage, ISO 1675, %	5
Coefficient of Thermal Conductivity ISO 8302, W/(m·K)	0.52



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TYPICAL PERFORMANCE OF CURED MATERIAL**Physical Properties:**

Abrasion Resistance, ASTM D4060: mg 127
1 Kg load, CS-10 wheels, Weight of Material Lost

Electrical Properties:

Surface Resistivity, IEC 60093, ohms 470×10^{-12}
Volume Resistivity, IEC 60093, ohm-cm 210×10^{-12}

Adhesive Properties:

Lap Shear Strength, ISO 4587:
Mild steel (grit blasted) N/mm² 19.5
(psi) 2,820

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.
5. Mix 4 part resin to 1 part hardener by volume (7.25 to 1 by weight) or transfer entire kit onto a clean and dry mixing surface and mix thoroughly until color is consistent.
6. Apply fully mixed material to prepared surface.
7. If using to rebuild shaft, the following applies:
 - Machine the worn area down 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.

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 323 cm² (36 in²) for .45 kg (1 lb), 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® SF 7611™ 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, the faster the cure.

To speed the cure of epoxies at low temperatures:

- Store epoxy at room temperature or warm resin/hardener component(s) prior to mixing. Never use open flame.
- Pre-heat repair surface until warm to the touch.
- Tent working area to achieve suitable environmental conditions.

To slow the cure of epoxies at high temperatures:

- Store epoxy at room temperature or cool resin/hardener component(s) prior to mixing.
- Work during cool, morning hours and shade area from direct sun.

Loctite Material Specification^{LMS}

LMS dated April 28, 2001 (Part A) and LMS dated April 3, 2001 (Part B). 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.



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Storage

Store product in the unopened container in a dry location. Material removed from containers may be contaminated during use. Do not return liquid to original container. 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.** Henkel cannot assume responsibility for product which has been contaminated or stored under conditions other than those recommended. 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.

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