

LOCTITE[®] EA 9464

Known as Hysol 9464
April 2016

PRODUCT DESCRIPTION

LOCTITE[®] EA 9464 provides the following product characteristics:

| | |
|--|---|
| Technology | Epoxy |
| Chemical Type | Epoxy |
| Appearance (Resin) | White opaque paste |
| Appearance (Hardener) | Black opaque paste |
| Appearance (Mixture) | Gray opaque paste |
| Viscosity | Thixotropic |
| Components | Two part - Resin & Hardener |
| Mix Ratio, by volume - Resin : Hardener | 1 : 1 |
| Mix Ratio, by weight - Resin : Hardener | 100 : 100 |
| Cure | Room temperature cure after mixing |
| Application | Bonding |
| Specific Benefit | <ul style="list-style-type: none"> Shortened pot life Fast handling strength Non-sag slump resistance Easy to mix and use Good tensile shear strength Good peel strength Heat accelerated cure |
| Key Substrates | Metals , Phenolic plastics, Polyester, Hard boards & forestry products, Ceramics, Rubbers, Masonry materials and other construction materials |

LOCTITE[®] EA 9464 is a faster cure version of Loctite[®] EA 9461™. The fixture time and pot life are reduced by approximately 50% while maintaining most of the performance of Loctite[®] EA 9461™.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Resin Properties

| | |
|-----------------------------------|---------|
| Specific Gravity @ 25 °C | 1.35 |
| Viscosity, DIN 54453, mPa·s (cP): | |
| Shear rate 10 s ⁻¹ | 138,000 |
| Shear rate 100 s ⁻¹ | 40,000 |
| Thixotropic Index | 3.5 |

Flash Point - See SDS

Hardener Properties

| | |
|--------------------------|-----|
| Specific Gravity @ 25 °C | 1.3 |
|--------------------------|-----|

Viscosity, DIN 54453, mPa·s (cP):

| | |
|--------------------------------|--------|
| Shear rate 10 s ⁻¹ | 55,000 |
| Shear rate 100 s ⁻¹ | 35,000 |

Thixotropic Index

1.6

Flash Point - See SDS

Mixed Properties

Pot Life @ 22 °C, minutes:

| | |
|------------|----------|
| 100 g mass | 15 to 20 |
|------------|----------|

TYPICAL CURING PERFORMANCE

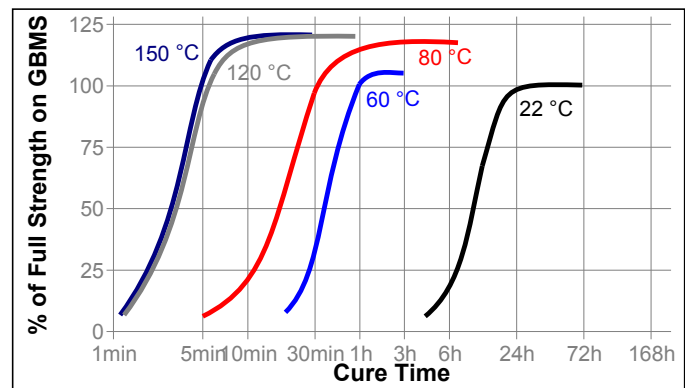
Fixture Time

Fixture time is defined as the time to develop a shear strength of 0.1 N/mm².

| | |
|---------------------------------------|-----|
| Fixture Time, mixed, @ 22 °C, minutes | 180 |
|---------------------------------------|-----|

Cure Speed vs. Time/Temperature

LOCTITE[®] EA 9464 will achieve handling strength in 3 to 4 hours at room temperature (note: this can vary with different bond configurations and ambient temperatures). Elevated temperatures may be used to accelerate the cure. The following graph indicates development of shear strength on mild steel (grit blasted) lapshears as a function of time and temperature tested according to ISO 4587.



TYPICAL PROPERTIES OF CURED MATERIAL

Cured for 7 days @ 22 °C, 1.2 mm thick samples.

Physical Properties :

| | |
|--|--|
| Coefficient of Thermal Conductivity, ISO 8302, W/(m-K) | 0.6 |
| Shore Hardness, ISO 868, Durometer D | 80 |
| Glass Transition Temperature, ASTM D 1640, °C | 50 |
| Compressive Strength, ISO 604 | N/mm ² 50 (psi) (7,300) |
| Tensile Modulus, ISO 527-2 | N/mm ² 700 (psi) (101,000) |

Electrical Properties:

Dielectric Constant / Dissipation Factor, IEC 60250:

| | |
|--------|----------------------------|
| 1 kHz | 4.4 / 3.1×10^{-3} |
| 1 MHz | 3.8 / 4.7×10^{-2} |
| 10 MHz | 3.5 / 6.2×10^{-2} |

| | |
|---|----------------------|
| Surface Resistivity, IEC 60093, Ω | 1.7×10^{15} |
| Volume Resistivity, IEC 60093, $\Omega \cdot \text{cm}$ | 5.8×10^{14} |

TYPICAL PERFORMANCE OF CURED MATERIAL**Adhesive Properties**

Cured for 7 days @ 22 °C

Lap Shear Strength, ISO 4587:

| | |
|---|---------------------------------------|
| Mild steel (grit blasted) | N/mm ² 22 (psi) (3,200) |
| Aluminum (abraded) (Silicon Carbide Paper, A166 grit, P400A grade) | N/mm ² 18 (psi) (2,600) |
| Aluminum (etched in acidic ferric sulphate) | N/mm ² 22 (psi) (3,200) |
| Stainless steel | N/mm ² 18 (psi) (2,600) |
| Brass | N/mm ² 9 (psi) (1,300) |
| Zinc dichromate | N/mm ² 15 (psi) (2,200) |
| Galvanized Steel (Hot Dipped) | N/mm ² 20 (psi) (2,900) |
| Polycarbonate | N/mm ² 4 (psi) (550) |
| ABS | N/mm ² 5 (psi) (700) |
| GRP (Polyester resin matrix) | N/mm ² 5 (psi) (680) |

180° Peel Strength, ISO 8510-2:

| | |
|---------------------------|---------------------------|
| Mild steel (grit blasted) | N/mm 10.5 (lb/in) (60) |
| Aluminum (acid etched) | N/mm 7 (lb/in) (40) |

IZOD Impact Resistance, ISO 9653 J/m²:

| | |
|-------------------------|-----|
| Grit Blasted Mild Steel | 9.5 |
|-------------------------|-----|

TYPICAL ENVIRONMENTAL RESISTANCE

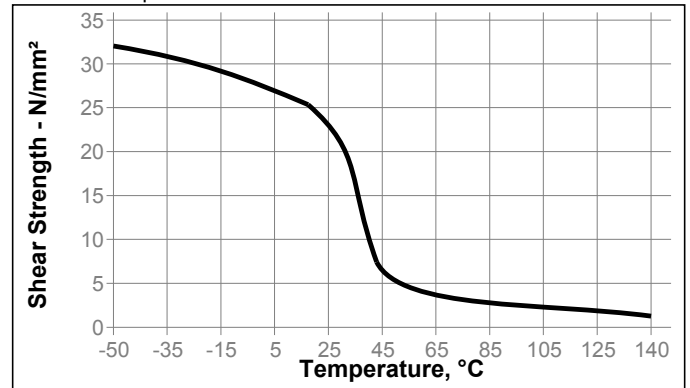
Cured for 7 days @ 22 °C

Lap Shear Strength, ISO 4587:

Mild Steel (grit blasted)

Hot Strength

Tested at temperature

**Heat Aging**

Aged under conditions indicated and tested at 22 °C.

| Temperature | % Initial strength retained after | | |
|-------------|-----------------------------------|---------|---------|
| | 500 h | 1,000 h | 3,000 h |
| 50 °C | 150 | 115 | 140 |
| 80 °C | 130 | 125 | 145 |
| 100 °C | 125 | 130 | 135 |
| 120 °C | 130 | 135 | 135 |
| 150 °C | 150 | 140 | 140 |

Chemical/Solvent Resistance

Immersed in conditions indicated and tested at 22 °C.

| Environment | °C | % of initial strength | | |
|---------------------------|----|-----------------------|--------|--------|
| | | 500 h | 1000 h | 3000 h |
| Motor oil | 22 | 100 | 100 | 100 |
| Unleaded gasoline | 22 | 95 | 75 | 60 |
| Water/glycol 50/50 | 87 | 60 | 60 | 50 |
| Sodium hydroxide, 4% | 22 | 50 | 55 | 50 |
| 98% RH | 40 | 65 | 50 | 45 |
| Water | 21 | 80 | 75 | 70 |
| Acetone | 22 | 85 | 35 | 15 |
| Acetic Acid, 10% | 22 | 80 | 70 | 45 |
| Salt water solution, 7.5% | 22 | 90 | 85 | 80 |

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).

Where aqueous washing systems are used to clean the surfaces before bonding, it is important to check for compatibility of the washing solution with the adhesive. In some cases these aqueous washes can affect the cure and performance of the adhesive.

Directions for use

1. For best performance surfaces for bonding should be clean, dry and free of grease. For high strength structural

bonds, special surface treatments can increase the bond strength and durability.

2. To use, resin and hardener must be blended. Product can be applied directly from dual cartridges by dispensing through the mixer head supplied. Discard the first 3 to 5 cm of bead dispensed. Using bulk containers, mix thoroughly by weight or volume in the proportions specified in the Product Description Matrix. For hand mixing, weigh or measure out the desired amount of resin and hardener and mix thoroughly. Mix approximately 15 seconds after uniform color is obtained.
3. It is recommended that this product is not mixed and cured in bulk quantities of greater than 1 kg as excessive heat build-up can occur. Mixing smaller quantities will minimize the heat build-up.
4. Apply the adhesive as quickly as possible after mixing to one surface to be joined. For maximum bond strength apply adhesive evenly to both surfaces. Parts should be assembled immediately after mixed adhesive has been applied.
5. For working life please see section 'Typical Properties of Uncured Material'. Higher temperatures and larger quantities will shorten this working time.
6. Keep the assembled parts from moving during cure. The joint should be allowed to develop full strength before subjecting to any service loads.
7. Excess uncured adhesive can be wiped away with organic solvent (e.g. Acetone).
8. After use and before adhesive hardens, mixing and application equipment should be cleaned with hot soapy water.

Not for product specifications

The technical data contained herein are intended as reference only. Please contact your local quality department for assistance and recommendations on specifications for this product.

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

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

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.

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Reference 1.3