

LOCTITE[®] EA E-120HP

LOCTITE[®] Hysol[®] E-120HP™
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PRODUCT DESCRIPTION

LOCTITE[®] EA E-120HP provides the following product characteristics:

| | |
|-----------------------------------------|------------------------------------------|
| Technology | Epoxy |
| Chemical Type (Resin) | Epoxy |
| Chemical Type (Hardener) | Polyamide |
| Appearance (Resin) | Off-white to beige liquid ^{LMS} |
| Appearance (Hardener) | Amber liquid ^{LMS} |
| Appearance (Mixture) | Amber-Beige |
| Components | Two component - requires mixing |
| Viscosity | High |
| Mix Ratio, by volume - Resin : Hardener | 2 : 1 |
| Mix Ratio, by weight - Resin : Hardener | 100 : 46 |
| Cure | Room temperature cure after mixing |
| Application | Bonding |

LOCTITE[®] EA E-120HP is a high viscosity industrial grade epoxy adhesive with extended work life. Once mixed, the two component epoxy cures at room temperature to form a tough, amber-beige bondline with excellent resistance to peel and impact forces. When fully cured, the epoxy offers superior thermal shock resistance, excellent mechanical and electrical properties, and withstands exposure to a wide variety of solvents and chemicals. Typical applications include bonding nose cones in aerospace applications. It is also suitable for low stress, general industrial applications which require high impact and high peel strength. Bonds dissimilar materials including aluminum, steel, and other metals, as well as a variety of plastics and ceramics.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Resin:

| | |
|-------------------------------------------------|---------------------------------|
| Specific Gravity @ 25 °C | 1.1 |
| Flash Point - See SDS | |
| Viscosity, Brookfield - RVT, 25 °C, mPa·s (cP): | |
| Spindle 7., speed 50 rpm, | 41,000 to 61,000 ^{LMS} |

Hardener:

| | |
|-------------------------------------------------|-------------------------------|
| Specific Gravity @ 25 °C | 1.0 |
| Flash Point - See SDS | |
| Viscosity, Brookfield - RVT, 25 °C, mPa·s (cP): | |
| Spindle 5, speed 50 rpm, | 2,000 to 4,000 ^{LMS} |

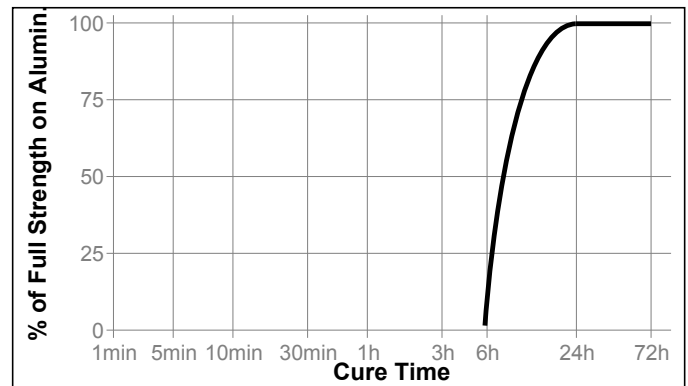
Mixed:

| | |
|----------------------------------------|-----|
| Specific Gravity @ 25 °C | 1.1 |
| Working life, minutes | 120 |
| Tack Free Time (low humidity), minutes | 140 |

TYPICAL CURING PERFORMANCE

Cure Speed vs. Time

The graph below shows shear strength developed with time on abraded, acid etched aluminum lapshears @ 25 °C with an average bondline gap of 0.1 to 0.2 mm and tested according to ISO 4587.



TYPICAL PROPERTIES OF CURED MATERIAL

Cured for 7 days @ 22 °C

Physical Properties:

| | |
|--------------------------------------------------------------|-------------------------|
| Glass Transition Temperature, ASTM E 1640, °C | 90 |
| Shore Hardness, ISO 868, Durometer D: | |
| Cured @ 22 °C for 16 to 18 hours followed by 2 hours @ 65 °C | 76 to 90 ^{LMS} |

| | |
|-----------------------------|---------------------------------------|
| Elongation, ISO 527-2, % | 10 |
| Tensile Strength, ISO 527-3 | N/mm ² 41 (psi) (5,900) |

Electrical Properties:

| | |
|---------------------------------------------------|----|
| Dielectric Breakdown Strength, IEC 60243-1, kV/mm | 25 |
|---------------------------------------------------|----|

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured for 2 hours @ 65 °C
Lap Shear Strength, ISO 4587:
Aluminum (acid etched)

N/mm² ≥13.7^{LMS}
(psi) (≥1,986)

Cured for 12 hours @ 65 °C
Lap Shear Strength, ISO 4587:
Steel (grit blasted)

N/mm² 30
(psi) (4,300)

Aluminum (acid etched & abraded),
0.1 to 0.2 mm gap

N/mm² 33
(psi) (4,800)

Aluminum (anodised)

N/mm² 14
(psi) (2,100)

Stainless steel

N/mm² 23
(psi) (3,400)

Polycarbonate

N/mm² 6.9
(psi) (1,000)

Nylon

N/mm² 2.3
(psi) (330)

Wood (Fir)

N/mm² 11.3
(psi) (1,600)

Block Shear Strength, ISO 13445:

PVC

N/mm² 12
(psi) (1,700)

ABS

N/mm² 7.6
(psi) (1,100)

Epoxy

N/mm² 20
(psi) (2,900)

Acrylic

N/mm² 1.5
(psi) (220)

Glass

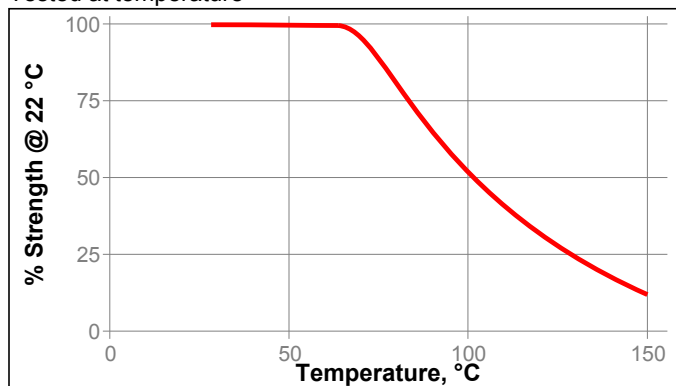
N/mm² 23
(psi) (3,300)

TYPICAL ENVIRONMENTAL RESISTANCE

Cured for 12 hours @ 65 °C followed by 4 hours @ 22 °C
Lap Shear Strength, ISO 4587:
Aluminum (acid etched & abraded), 0.1 to 0.2 mm gap

Hot Strength

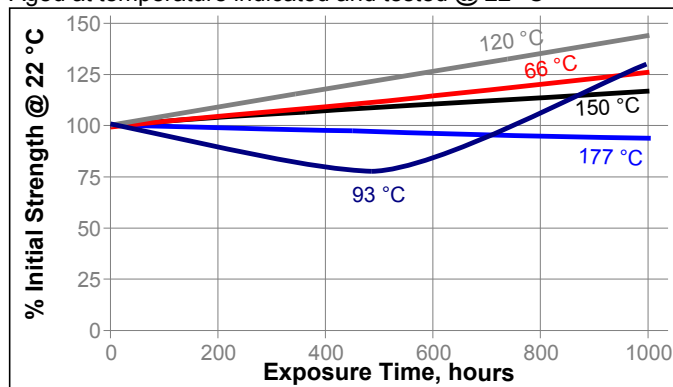
Tested at temperature



Cured for 5 days @ 22 °C
Lap Shear Strength, ISO 4587:
Steel

Heat Aging

Aged at temperature indicated and tested @ 22 °C



Chemical/Solvent Resistance

Aged under conditions indicated and tested @ 22 °C.

| Environment | °C | % of initial strength | |
|---------------------|----|-----------------------|--------|
| | | 500 h | 1000 h |
| Air | 87 | --- | 100 |
| Motor oil (10W30) | 87 | 125 | 120 |
| Unleaded gasoline | 87 | --- | 105 |
| Water/glycol 50/50 | 87 | 90 | 90 |
| Salt fog | 22 | --- | 45 |
| 95% RH | 38 | --- | 80 |
| Condensing Humidity | 49 | --- | 60 |
| Water | 22 | --- | 70 |
| Acetone | 22 | --- | 100 |
| Isopropanol | 22 | --- | 110 |

GENERAL INFORMATION

For safe handling information on this product, consult the Safety Data Sheet (SDS).

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.

Directions for use:

1. For best performance part surfaces should be clean and free of grease.
2. For high strength structural bonds, remove surface contaminants such as paint, oxide films, oils, dust, mold release agents and all other surface contaminants.
3. **Dual Cartridges:** To use simply insert the cartridge into the application gun and start the plunger into the cylinders using light pressure on the trigger. Next, remove the cartridge cap and expel a small amount of adhesive to be sure both sides are flowing evenly and freely. If automatic mixing of resin and hardener is desired, attach the mixing nozzle to the end of the cartridge and begin dispensing the adhesive. For hand mixing, expel the desired amount of the adhesive and mix thoroughly. Mix for approximately 15 seconds after uniform color is obtained.

Bulk Containers: Mix thoroughly by weight or volume in

the proportions specified in Product Description section. Mix vigorously, approximately 15 seconds after uniform color is obtained.

4. Do not mix quantities greater than 4 kg as excessive heat build-up can occur. Mixing smaller quantities will minimise the heat build-up.
5. 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.
6. Keep assembled parts from moving during cure. The bond should be allowed to cure 24 hours 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 dispensing equipment should be cleaned with hot soapy water.

Loctite Material Specification^{LMS}

LMS dated April 10, 2006. 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 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.

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Reference 1.2