LOCTITE® Hysol® E-120HP™

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PRODUCT DESCRIPTION

LOCTITE® Hysol® 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 (Mixed)	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® Hysol® E-120HP™ is a high viscosity, non-sagging 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 MSDS	
Viscosity, Brookfield - RVT, 25 °C, mPa·s (cP):	
Spindle 7, speed 50 rpm	31,000 to 51,000[LMS]

Hardener:

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

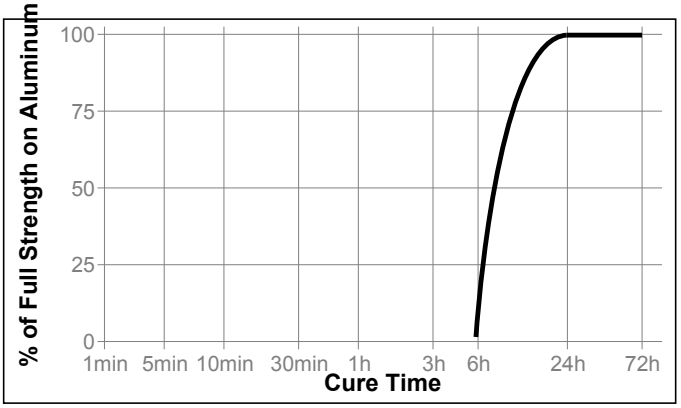
Mixed:

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		76 to 90[LMS]
Elongation, ISO 527-2, %		10
Tensile Strength, ISO 527-3	N/mm² (psi)	41 (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 (psi)	≥13.7[LMS] (≥1,986)

Cured for 12 hours @ 65 °C

Lap Shear Strength, ISO 4587:

Steel (grit blasted)	N/mm² (psi)	30 (4,300)
Aluminum (acid etched & abraded), 0.1 to 0.2 mm gap	N/mm² (psi)	33 (4,800)
Aluminum (anodised)	N/mm² (psi)	14 (2,100)
Stainless steel	N/mm² (psi)	23 (3,400)

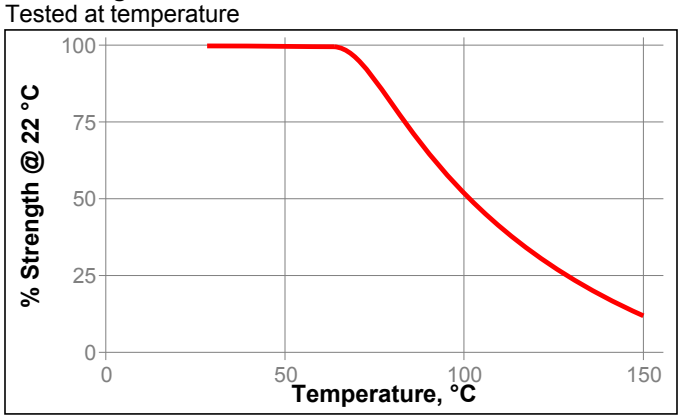
Polycarbonate	N/mm² (psi)	6.9 (1,000)
Nylon	N/mm² (psi)	2.3 (330)
Wood (Fir)	N/mm² (psi)	11.3 (1,600)
Block Shear Strength, ISO 13445:		
PVC	N/mm² (psi)	12 (1,700)
ABS	N/mm² (psi)	7.6 (1,100)
Epoxy	N/mm² (psi)	20 (2,900)
Acrylic	N/mm² (psi)	1.5 (220)
Glass	N/mm² (psi)	23 (3,300)

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

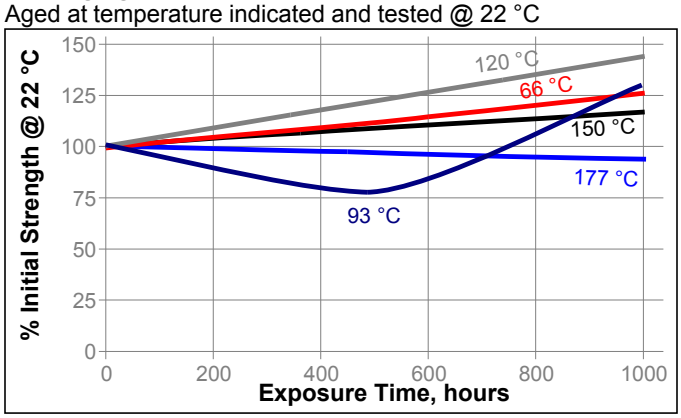
Tested at temperature



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.

		% of initial strength	
Environment	**°C**	**500 h**	**1000 h**
Air	87	---	100
Motor oil (10W-30)	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
IPA	22	---	110

GENERAL INFORMATION

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

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 bild-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 December 07, 1999 (Resin) and LMS dated July 19 , 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

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Reference 1.0