LOCTITE

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Technical Data Sheet
Hysol® Product E-60HP

formerly Durabond E-60HP

Industrial Version, August 2001

PRODUCT DESCRIPTION

LOCTITE® Hysol® Product E-60HP is a toughened, medium-viscosity, industrial grade epoxy adhesive with extended work life. Once mixed, the two-component epoxy cures at room temperature to form a tough, off-white, bondline which provides high peel resistance and high shear strengths. The fully cured epoxy is resistant to a wide range of chemicals and solvents, and acts as an excellent electrical insulator.

TYPICAL APPLICATIONS

The high performance epoxy provides excellent bond strengths to a wide variety of plastics and metals. Ideal for general purpose industrial applications requiring extended work life for adjusting parts during assembly.

PROPERTIES OF UNCURED MATERIAL

Resin	**Typical Value**	**Range**
Chemical Type	Epoxy	
Appearance	Pale yellow liquid	
Specific Gravity @ 25°C	1.00	0.9 to 1.1
Viscosity @ 25°C, mPa.s (cP)	67,500	50,000 to 85,000
Flash Point (TCC), °C (°F)	>93 (>200)	

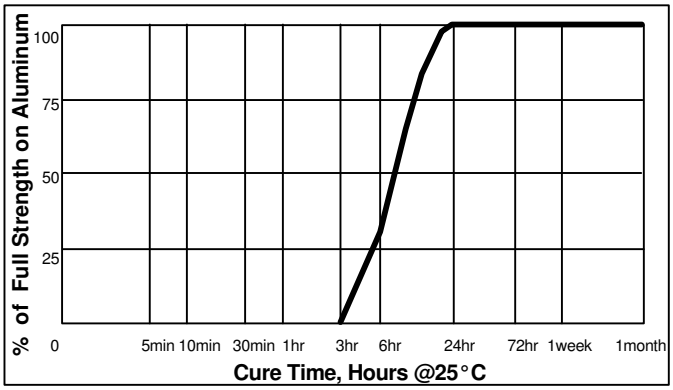
Hardener	**Typical Value**	**Range**
Chemical Type	Amine	
Appearance	Yellow liquid	
Specific Gravity @ 25°C	1.00	0.9 to 1.1
Viscosity @ 25°C, mPa.s (cP)	7,000	5,500 to 8,000
Flash Point (TCC), °C (°F)	>93 (>200)	

Mixture	**Typical Value**
Appearance	Off-white
Specific Gravity @ 25°C	1.00
Mix Ratio (R:H) by Weight	100 to 50
by Volume	2 to 1

TYPICAL CURING PERFORMANCE

Cure speed

The graph below shows the shear strength developed over time on abraded, acid etched aluminum lap shears with an average bondline gap of 3 to 9 mils and tested according to ASTM D-1002.



Curing Properties

(@ 25°C unless noted)	**Typical Value**
Working Life, minutes	60
Tack Free time, minutes	120

TYPICAL PROPERTIES OF CURED MATERIAL

(@ 25°C unless noted)

Physical Properties	**Typical Value**
Dielectric Strength, Volts/Mil	500
Tensile Strength ASTM D638, psi	5,100
Tensile Elongation ASTM D-638, %	9
Hardness ASTM D-1706, Shore D	80
Glass Transition Temperature, Tg, °C	70

PERFORMANCE OF CURED MATERIAL

Shear Strength vs Substrate

(Substrates cured for 5 days @ 22°C)

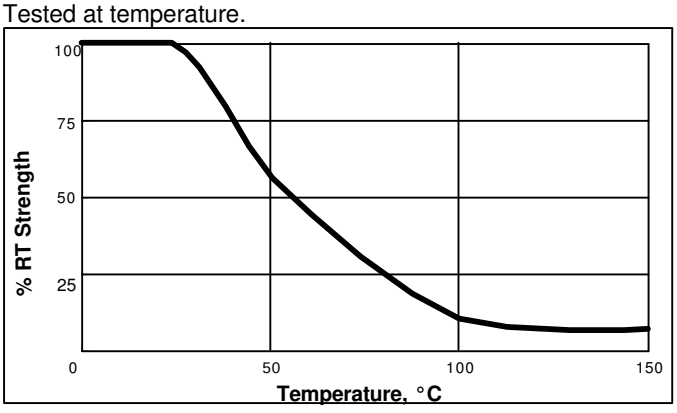
Substrate	**Typical Value**	
Lapshear	**N/mm²**	**(psi)**
Grit-Blasted Steel	29.8	4320
Aluminum (Abraded/Acid Etched, 3 to 9 mil gap)	29.9	4340
Aluminum (Anodized)	17.9	2600
Stainless Steel	26.8	3890
Polycarbonate	12.6	1830
Nylon	1.9	270
Wood (Fir)	11.3	1640
Block Shear	**N/mm²**	**(psi)**
PVC	11.8	1710
ABS	12.8	1850
Epoxy	28.8	4030
Acrylic	1.0	150
Glass	31.7	4590

TYPICAL ENVIRONMENTAL RESISTANCE

Hot Strength

Test procedure :	ASTM D-1002
Substrate:	Abraded, acid etched aluminum
Bondline gap, mils:	3 to 9
Cure procedure:	12 hours at 65°C & 4 hours at 22°C

Tested at temperature.



NOT FOR PRODUCT SPECIFICATIONS.
THE TECHNICAL DATA CONTAINED HEREIN ARE INTENDED AS REFERENCE ONLY.
PLEASE CONTACT LOCTITE CORPORATION QUALITY DEPARTMENT FOR ASSISTANCE AND RECOMMENDATIONS ON SPECIFICATIONS FOR THIS PRODUCT.
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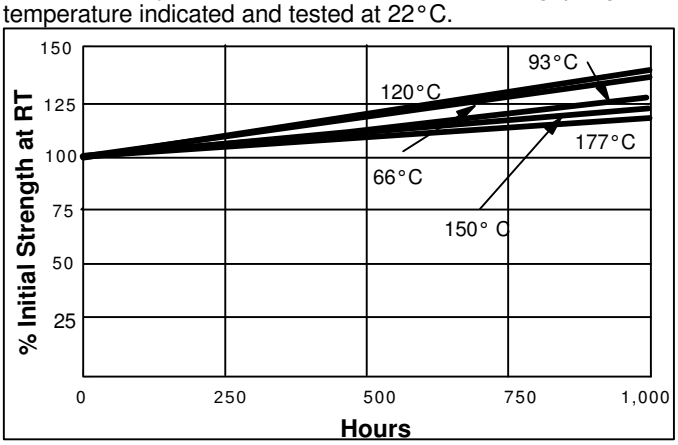
Heat Aging
Cured for 5 days at 22°C on steel with no induced gap, aged at temperature indicated and tested at 22°C.



Chemical / Solvent Resistance
Cured for 5 days at 22°C on steel with no induced gap, aged under conditions indicated and tested at 22°C.

Solvent	Temp.	% Initial Strength retained at 500 hr	1000 hr
Air	87°C	-	120
Motor Oil (10W-30)	87°C	138	146
Unleaded Gasoline	87°C	99	125
Water/Glycol (50%/50%)	87°C	102	110
Salt/Fog ASTM B-117	22°C	-	81
95% Relative Humidity	38°C	-	116
Condensing Humidity	49°C	-	94
Water	22°C	-	94
Acetone	22°C	77	93
Isopropyl Alcohol	22°C	91	104

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 Material Safety Data Sheet, (MSDS).

Directions for use
1. For high strength structural bonds, removal of surface contaminates such as paint, oxide films, oils, dust, mold release agents and all other surface contaminates.
2. Use gloves to minimize skin contact. DO NOT use solvents for cleaning hands.
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 approximately 15 seconds after uniform color is obtained. **Bulk Containers:** Mix thoroughly by weight or volume in the proportions specified in Properties of Uncured Material section. Mix vigorously approximately 15 seconds after uniform color is obtained.
4. For maximum bond strength apply adhesive evenly to both surfaces to be joined.
5. Application to the substrates should be made within 60 minutes. Larger quantities and/or higher temperatures will reduce this working time.
6. Join the adhesive coated surfaces and allow to cure at 25°C (77°F) for 24 hours for high strength. Heat up to 93°C (200°F), will speed curing.
7. Keep parts from moving during cure. Contact pressure is necessary. Maximum shear strength is obtained with a 3-9 mil bond line.
8. Excess uncured adhesive can be cleaned up with ketone type solvents.

Storage
Product shall be ideally stored in a cool, dry location in unopened containers at a temperature between 8°C to 28°C (46°F to 82°F) unless otherwise labeled. Optimal storage is at the lower half of this temperature range. To prevent contamination of unused product, do not return any material to its original container. For further specific shelf life information, contact your local Technical Service Center.

Data Ranges
The data contained herein may be reported as a typical value and/or range. Values are based on actual test data and are verified on a periodic basis.

Note
The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, **Loctite Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Loctite Corporation's products. Loctite Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Loctite Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.

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