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# Technical Data Sheet

## Hysol® Product U-09FL

Industrial Version, November 2003

### PRODUCT DESCRIPTION

LOCTITE® Hysol® Product U-09FL is a low-viscosity, industrial grade urethane adhesive. Once mixed, the two-component urethane cures at room temperature to form an ultra-clear, highly flexible bondline, which provides excellent peel strength.

### TYPICAL APPLICATIONS

Ideal for bonding polycarbonate, and a variety of other plastics, as well as glass, and metal. Suited for applications requiring a clear, non-yellowing bondline.

### PROPERTIES OF UNCURED MATERIAL

Resin	Typical	
	Value	Range
Chemical Type	Polyisocyanate	
Appearance	Clear liquid	
Specific Gravity @ 25°C	1.1	1.0 to 1.2
Viscosity @ 25°C, mPa.s (cP)	7,800	5,000 to 15,000
Flash Point (TCC), °C (°F)	TBD	TBD

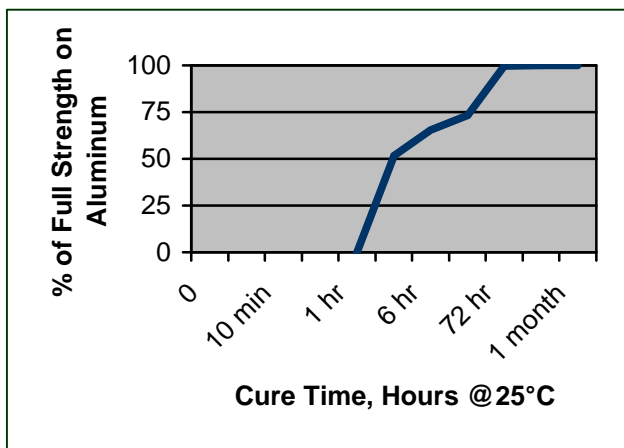
Hardener	Typical	
	Value	Range
Chemical Type	Polyol	
Appearance	Clear Liquid	
Specific Gravity @ 25°C	1.00	0.95 to 1.15
Viscosity @ 25°C, mPa.s (cP)	1,100	600 to 2,000
Flash Point (TCC), °C (°F)	TBD	TBD

Mixture	Typical Value
	Appearance
Specific Gravity @ 25°C	1.0 - 1.2
Mix Ratio (R:H) by Weight	100 to 91
by Volume	1 to 1

### TYPICAL CURING PERFORMANCE

#### Cure speed

The graph below shows the shear strength developed over time on acid etched aluminum lap shears with an average bondline gap of 3 to 9 mils and tested according to STM 700.



### Curing Properties

	Typical Value
(@ 25°C unless noted)	
Working Life, minutes	10
Tack Free time, hours	3 to 24

### TYPICAL PROPERTIES OF CURED MATERIAL

(@ 25°C unless noted)

Physical Properties	Typical Value
Dielectric Strength STM 733, Volts/Mil	841
Tensile Strength STM 708, psi	2761
Tensile Elongation STM 708, %	178
Hardness STM 707, Shore D	45
Glass Transition Temperature STM 767, Tg, °C	25.8
CTE pre Tg, STM 767	137ppm
CTE post Tg, STM 767	231ppm

### PERFORMANCE OF CURED MATERIAL

#### Shear Strength vs Substrate

Substrate (Substrates cured for 5 days @ 22°C)	Typical Value
Lapshear STM 700	N/mm <sup>2</sup> (psi)
Grit-Blasted Steel	10 1459
Aluminum (Acid Etched, 3 to 9 mil gap)	5.4 777
Aluminum (Anodized)	5.7 821
Stainless Steel	4.0 587
Polycarbonate	3.3 476
Nylon	1.6 239
Wood (Pine)	5.0 734

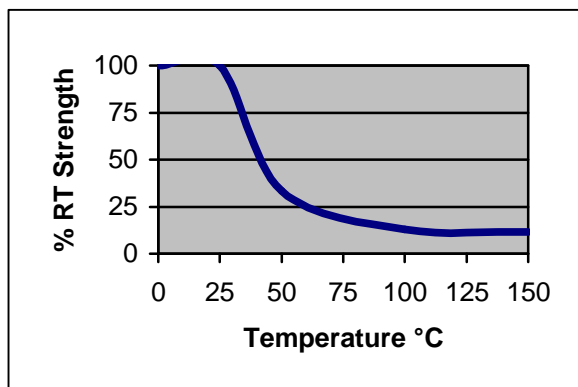
Lap Shear STM 700 (Acid Etched, 3 to 9 mil gap)	Substrate cured for	N/mm <sup>2</sup> (psi)
	3 hrs at 65°C	2.8 403
	24 hrs at 65°C	3.9 569
	72 hrs at 65°C	5.4 774
	1 week at 65°C	6.7 965

Block Shear STM 726, 5 days at RT	N/mm <sup>2</sup> (psi)
PVC	10.4 1511
ABS	1.7 252
Epoxy	16.6 2414
Acrylic	4.0 578

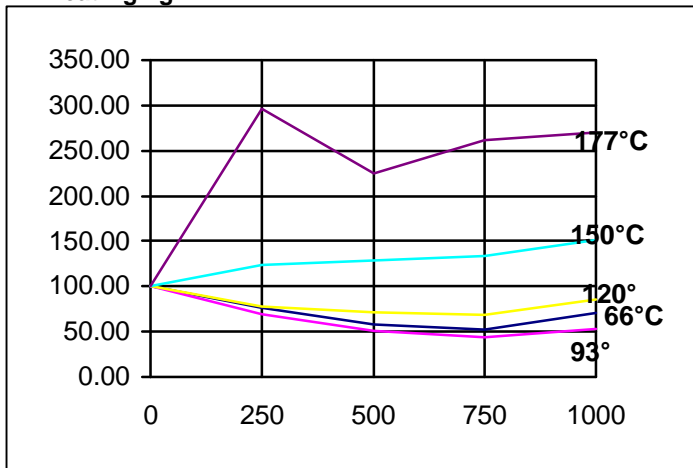
### TYPICAL ENVIRONMENTAL RESISTANCE

#### Hot Strength

Test procedure :	STM 700
Substrate:	Acid etched aluminum
Bondline gap, mils:	3 to 9
Cure procedure:	12 hours at 65°C & 4 hours at 22°C



Tested at temperature.

**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	90	140
Motor Oil (10W-30)	87°C	150	155
Unleaded Gasoline	87°C	0	0
Water/Glycol (50%/50%)	87°C	0	0
Salt/Fog ASTM B-117	22°C	0	0
95% Relative Humidity	38°C	25	20
Condensing Humidity	49°C	20	15
Water	22°C	10	25
Acetone	22°C	0	0
Isopropyl Alcohol	22°C	140	0

**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**

- For high strength structural bonds, removal of surface contaminants such as paint, oxide films, oils, dust, mold release agents and all other surface contaminants.
- Use gloves to minimize skin contact. DO NOT use solvents for cleaning hands.
- 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.

- For maximum bond strength apply adhesive evenly to both surfaces to be joined.
- Application to the substrates should be made within 10 minutes. Larger quantities and/or higher temperatures will reduce this working time.
- 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.
- Keep parts from moving during cure. Contact pressure is necessary. Maximum shear strength is obtained with a 3-9 mil bond line.
- 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.