



Research, Development & Engineering

Tallaght Business Park,
Dublin, Ireland

Product Description Sheet Hysol® 9455

PRELIMINARY

24th January 2003

PRODUCT DESCRIPTION

Loctite Hysol 9455 is a fast-curing, toughened, low viscosity, industrial grade epoxy adhesive. Once mixed, the two-component epoxy cures at room temperature with low shrinkage and forms an ultra clear bondline with excellent peel resistance. When fully cured, the epoxy is resistant to a wide range of chemicals and solvents, and acts as an excellent electrical insulator.

TYPICAL APPLICATIONS

Ideal for bonding plastic, metal, glass, wood, ceramic and rubber materials where flexibility is needed. Ideal for bonding and potting of optical components like sensors and lenses.

PROPERTIES OF UNCURED MATERIAL

Resin	Typical Value
Chemical Type	Epoxy
Appearance	Clear liquid
Specific Gravity @ 25°C	1.1
Brookfield Viscosity @ 25°C, mPas Spindle 5 @ 50 rpm	1,200 – 1,500
Thixotropic Index	1
Flash Point (TCC), °C (?F)	>93 (>200)

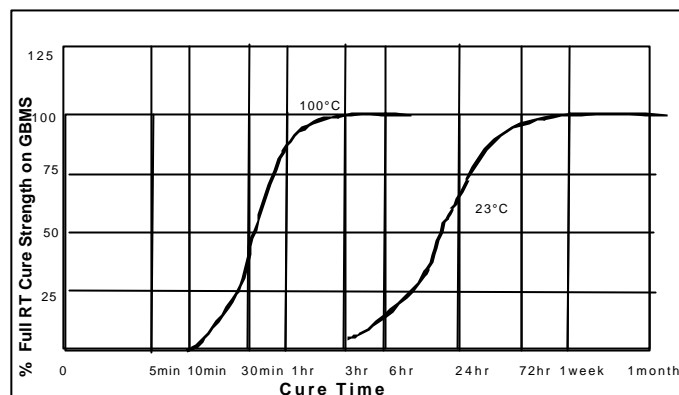
Hardener	Typical Value
Chemical Type	Mercaptan
Appearance	Clear liquid
Specific Gravity @ 25°C	1.15
Brookfield Viscosity @ 25°C, mPas Spindle 5 @ 20 rpm	1,500 – 4,500
Thixotropic Index	1
Flash Point (TCC), °C (?F)	>93 (>200)

Mixed Adhesive	Typical Value
Appearance	Ultra Clear Liquid
Mix Ratio by Volume (Resin/Hardener)	1:1
Mix Ratio by Weight (Resin/Hardener)	100:105
Brookfield Viscosity, @ 25°C, mPas HBT Spindle with Helipath	1,300 – 4,000
Maximum open gap fill (mm)	1
Working Life of mixed adhesive @ 25°C (100g mix), minutes	3
Fixture Time (light handling, 0.1N/mm ²) @23°C, minutes	15

TYPICAL CURING PERFORMANCE

Cure Speed vs. time/temperature

Hysol 9455 develops high strength at room temperature within 3 to 6 hours. The assembled parts will be fixtured for light handling (0.1N/mm²) after 15 minutes at room temperature in a 0.05mm gap. Elevated temperatures may be used to accelerate the cure. The following graph indicates development of shear strength on a steel lap shear with 0.05mm gap as a function of time and temperature, tested according to ASTM D-1002/EN 1465.



TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties	Typical Value
Tensile Strength (ASTM D882)	N/mm ² 1.3
Young's Modulus (ASTM D882)	N/mm ² 60
Elongation (ASTM D-882),	% 80
Coefficient of Thermal Expansion (ASTM E831-93) (-15° - 26°) (47° - 199°)	µm/m/°C 38 191
Hardness (ASTM D-1706),	Shore D 65

Electrical Properties	Typical Value
Dielectric Strength, (ASTM D149)	kV/mm 15.6

PERFORMANCE OF CURED MATERIAL

(Cured for 5 days @23°C)

Shear Strength, ASTM D1002/EN 1465 (0.05mm gap unless otherwise stated)		
Substrate	Typical Value	
	N/mm ²	psi
Steel, Grit Blasted Mild Steel (GBMS)	16	2320
Aluminium, abraded	9.4	1363
Aluminium, abraded +acid etched, 0.15mm gap	2.5	360
Aluminium, anodised	5.2	750
Stainless Steel	11	1595
Polycarbonate	1.7	247
Nylon	0.3	40
Wood (Fir)	2.6	380
Tensile Strength, (ASTM D2095/EN 26922) cured for 7 days at 23°C GBMS pin to soda glass	N/mm ² 11.5	 1668
180° Rigid Peel Strength, (ASTM D1876) cured for 7 days at 23°C Grit Blasted Mild Steel (GBMS)	N/mm 1.8	Pli 20
Impact Resistance (ISO 9653/ASTM D950-98) GBMS block	kJ/m ² 3.5	Ft/lbs/ in ² 1.7

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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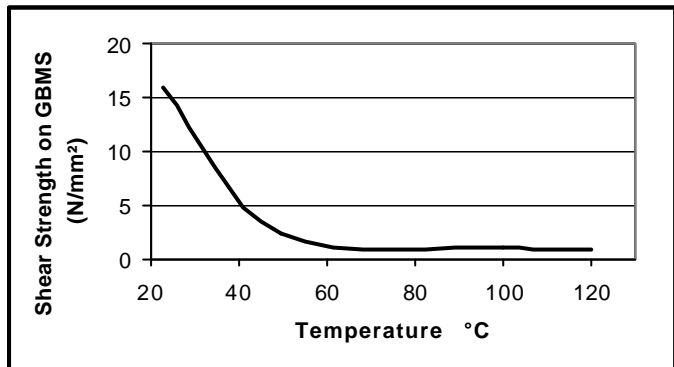
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TYPICAL ENVIRONMENTAL RESISTANCE

Test procedure :	ASTM D-1002/EN 1465
Substrate:	Steel, Grit blasted mild steel (GBMS)
Bond line gap, mm:	0.05mm
Cure procedure:	7 days at 23°C

Hot Strength

Tested at temperature.

**Temperature Storage**

Cured for 5 days at 23°C on GBMS lapshears with no induced gap, stored in air at the temperature indicated and tested at 23°C.

Storage Temperature	% Initial Strength retained after	
	500 hr	1000 hr
80°C	100	100
100°C	110	150
120°C	150	200

Chemical/Solvent Resistance

Cured for 5 days at 23°C on GBMS lapshears with no induced gap, immersed in the conditions indicated and tested at 23°C.

Solvent	Temp.	% Initial Strength retained at	
		500 hr	1000 hr
Motor Oil (10W-30)	87°C	73	104
Unleaded Petrol	22°C	87	72
Water/Glycol (50%/50%)	87°C	70	52
Salt/Fog ASTM B-117	22°C	7	0
98% Relative Humidity	40°C	7	5
Water	22°C	48	59
Acetone	22°C	13	0
Isopropyl Alcohol	22°C	58	35
Tensile Strength, (ASTM D2095/EN 26922) cured for 7 days at 23°C GBMS pin to soda glass			
	22°C	52	52
98% Relative Humidity	40°C	8	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 oxidising materials.

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

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.

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 3-5cm of bead dispensed. Using bulk containers, mix thoroughly by weight or volume in the proportions specified in Properties of Uncured Material section. For hand mixing, weigh or measure out the desired amount of resin and hardener and mix thoroughly. Mix approximately 15 seconds after uniform colour is obtained.

3. Do not mix quantities greater than 20g as excessive heat build-up can occur. Mixing smaller quantities will minimise 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. Working Life of the mixed adhesive is 3 minutes at 25°C. Higher temperature 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.

Storage

Product shall be ideally stored in a cool, dry location in unopened containers at a temperature between 8°C to 21°C (46°F to 70°F) unless otherwise labelled. 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 Centre.

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.

**Bulk Numbers: Part A - 210004
Part B - 210005**