



## Research, Development & Engineering

Tallaght Business Park,  
Dublin, Ireland

# Technical Data Sheet Hysol® 9509

July 2003

### PRODUCT DESCRIPTION

Loctite Hysol 9509 is a single component, heat curing epoxy adhesive. It has excellent chemical and solvent resistance and can be used in high operating temperature environments. Its viscosity characteristics ensure it is self levelling and can be applied by roller.

### TYPICAL APPLICATIONS

Ideal for bonding metal parts subjected to high service temperatures for example automotive assemblies in "under the hood" applications.

### PROPERTIES OF UNCURED MATERIAL

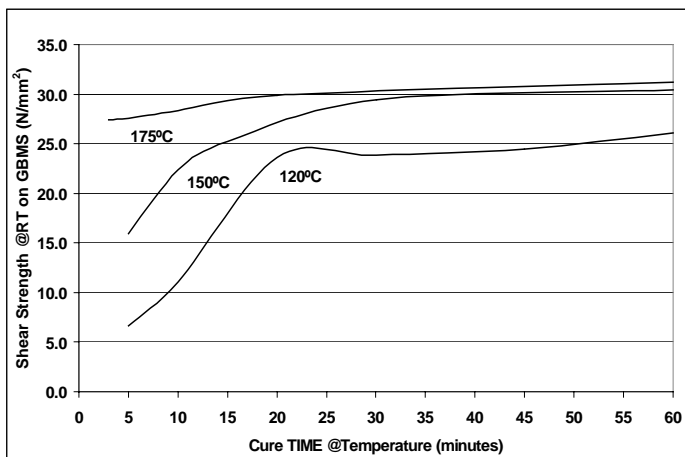
	Typical Value
Chemical Type	Epoxy
Appearance	Off-white Self Levelling
Specific Gravity @25°C	1.37
Brookfield RVT viscosity @25°C Spindle 7 @ 1rpm, mPas	30,000 to 80,000
Maximum gap filling in horizontal position bond-line (mm)	0.1

### TYPICAL CURING PERFORMANCE

Product 9509 cures when exposed to appropriate levels of heat. Recommended conditions for curing are exposure of the bond line to temperatures at or above 120°C, (typically 60 minutes @120°C). Rate of cure and final strength will depend on the residence time at the cure temperature so cure schedule should be confirmed with actual production parts and equipment.

### Cure Speed vs. Temperature

The following graph shows the shear strength developed with time at different temperatures. In practice, total oven time will be longer to allow for heat up period. Shear strength is measured on grit blasted mild steel (GBMS) lapshears with 25.4mm overlap and 0.05mm bond gap tested at 22°C, according to ASTM D1002/EN 1465.



### TYPICAL PROPERTIES OF CURED MATERIAL

(1.2mm thick samples cured for 30 min @150°C)

Physical Properties	Typical Value
Bulk Modulus, ASTM D-882, N/mm²	1,280
Elongation, ASTM D-882, %	2
Tensile Strength, ASTM D-882, N/mm²	23
Glass Transition Temperature, Tg., °C ASTM E1640-99	147
Coefficient of Thermal Conductivity ASTM C177-63, W/m/°C	0.37
Coefficient of Thermal Expansion, ASTM E831-93 (19° - 99°), µm/m/°C (142° - 200°), µm/m/°C	19 224
Compressive Strength, ASTM D695, N/mm²	82

### PERFORMANCE OF CURED MATERIAL

(30 minutes cure @ 150°C, tested @ 22°C)

Shear Strength, ASTM D1002/EN 1465 (0.05mm bond gap unless otherwise stated)	Typical Value (N/mm²)
Steel, Grit Blasted Mild Steel (GBMS)	30
Stainless Steel	25
Zinc Dichromate Steel	20
Aluminium, Abraded (Silicon Carbide Paper, A166 grit, P400A grade)	19
Aluminium, Etched in Acidic Ferric Sulphate	19
Brass	20
GRP (Polyester Resin Matrix) (60 min @120°C)	2.7
Epoxy (Glass Fibre Reinforced Epoxy) (60 min @120°C)	9
Hot Dipped Galvanised Steel	12

IZOD Impact Resistance ISO 9653/ASTM D950-98, GBMS, J/m²	4
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180° Rigid Peel Strength, ASTM D1876 Steel, GBMS, N/mm	<1
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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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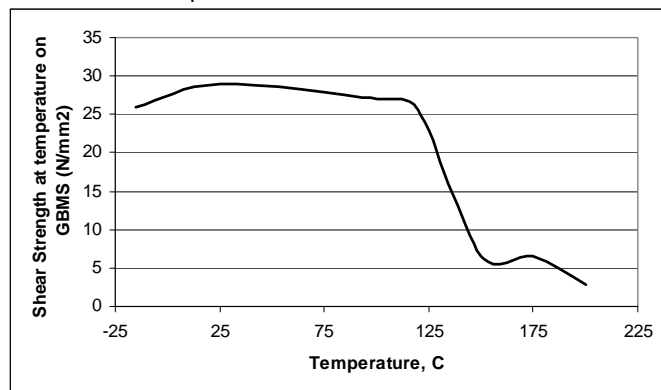
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**TYPICAL ENVIRONMENTAL RESISTANCE**

Test Procedure :	ASTM D1002/EN 1465
Substrate:	Grit Blasted Mild Steel (0.05mm bond gap)
Cure procedure:	30 minutes @150°C

**Strength at Temperature**

Tested at the temperature indicated.

**Heat Ageing**

Stored at temperature indicated and tested @ 22°C.

Temperature	% Initial Strength retained after			
	100 hr	500 hr	1000 hr	3000 hr
100°C	86	88	97	90
125°C	88	82	92	84
150°C	93	79	102	80
180°C	84	72	76	56
200°C	77	54	47	27

**Chemical/Solvent Resistance**

Immersed in conditions indicated and tested @ 22°C.

Solvent	Temp.	% Initial Strength retained after			
		100 hr	500 hr	1000 hr	3000 hr
Motor Oil	22°C	88	87	79	78
Unleaded Petrol	22°C	94	87	86	82
50% Water Glycol	87°C	84	68	64	48
4% NaOH/water	22°C	97	84	83	78
98% Relative Humidity	40°C	85	103	88	79
Water	60°C	86	73	62	57
Water	90°C	91	82	72	71
10% Acetic Acid	22°C	100	85	74	52
7.5% Salt water solution	22°C	92	86	86	75

**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).**

**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. Product can be applied directly from the cartridge by dispensing through the nozzle supplied..
3. At cure of quantities larger than 10g in mass, excessive heat build up can occur.
4. For maximum bond strength apply adhesive evenly to the surface to be bonded. Parts should be assembled immediately after adhesive has been applied.
5. Excess uncured adhesive can be wiped away with organic solvent (e.g. acetone). Once cured it is difficult to remove excess adhesive.
6. Cure adhesive by heating as recommended on page 1. Some additional fillet may form due to lowering of product viscosity with temperature.
7. Keep the assembled parts from moving during cure. The joint should be allowed to develop full strength before subjecting to any service loads.
8. After use and before adhesive hardens mixing and dispensing 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 2°C to 8°C (36°F to 46°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.

**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 Number: 210063**