



Hysol[®] 9514[™]

January 2009

PRODUCT DESCRIPTION

Hysol[®] 9514[™] provides the following product characteristics:

Technology	Epoxy
Chemical Type	Epoxy
Cure	Heat cure
Appearance	Gray opaque paste ^{LMS}
Components	One component
Application	Bonding
Maximum Gap	3.0 mm

Hysol[®] 9514[™] is a toughened, single component heat curing epoxy adhesive. It has high shear and peel strength and excellent impact resistance. Hysol[®] 9514[™] provides high reliability in high operating temperature environments. Its viscosity characteristics ensure large gap filling and sag resistance properties as well as being suitable for a wide variety of substrates. The product can be cured by induction heating or conventional means.

TYPICAL PROPERTIES OF UNCURED MATERIAL

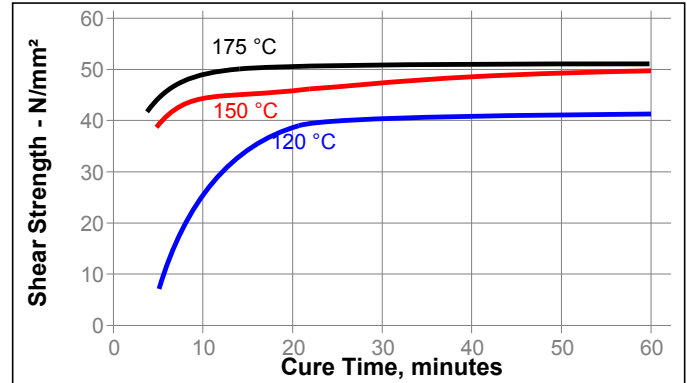
Specific Gravity @ 25 °C	1.42 to 1.48 ^{LMS}
Yield Point @ 25 °C, Pa-s:	
Haake PK 100, M10/PK 1 2° Cone	272
Casson Viscosity @ 25 °C, mPa-s (cP)	
Cone & Plate Rheometer	30,000 to 60,000 ^{LMS}
Casson Base Viscosity, mPa-s (cP):	
Haake PK 100, M10/PK 1 2° Cone	42,000
Flash Point - See MSDS	

TYPICAL CURING PERFORMANCE

Hysol[®] 9514[™] 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 cure 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 25.4 mm overlap and 0.05 mm bond gap tested at @ 22 °C according to ISO 4587.



Differential Scanning Calorimetry

Delta H, J/g ≤300^{LMS}

TYPICAL PROPERTIES OF CURED MATERIAL

1.2 mm thick samples cured for 30 minutes @ 150 °C

Physical Properties:

Tensile Strength, ISO 527-3	N/mm ²	44
	(psi)	(6,380)
Tensile Modulus, ISO 527-3	N/mm ²	1,460
	(psi)	(211,700)
Compressive Strength, ISO 604	N/mm ²	62
	(psi)	(900)
Elongation, ISO 527-3,%		5.8
Glass Transition Temperature, ASTM E 1640, °C		133
Coefficient of Thermal Conductivity, ISO 8302,		0.3
W/(m-K)		

TYPICAL PERFORMANCE OF CURED MATERIAL

Cured for 30 minutes @ 150 °C, tested at 22 °C. (0.05 mm bond gap).

Lap Shear Strength, ISO 4587:

Mild Steel (grit blasted)	N/mm ²	45
	(psi)	(6,530)
Stainless Steel	N/mm ²	32
	(psi)	(4,640)
Zinc dichromate	N/mm ²	28
	(psi)	(4,060)
Aluminum (abraded)	N/mm ²	40
(Silicon Carbide Paper, A166 grit, P400A grade)	(psi)	(5,800)
Aluminum (etched in acidic ferric sulphate)	N/mm ²	40
	(psi)	(5,800)
Brass	N/mm ²	25
	(psi)	(3,630)
Galvanized Steel (Hot Dipped)	N/mm ²	20
	(psi)	(2,900)

IZOD Impact Resistance, ISO 9653, J/m² :

Mild steel (grit blasted) 10

180° Rigid Peel Strength ISO 11339:

Mild steel (grit blasted) N/mm 9.5
(lb/in) (54)



Cured for 60 minutes @ 120 °C

Lap Shear Strength ISO 4587:

GRP (Polyester resin matrix)

N/mm² 6
(psi) (870)

Glass Fiber Reinforced Epoxy

N/mm² 24
(psi) (3,480)

TYPICAL ENVIRONMENTAL RESISTANCE

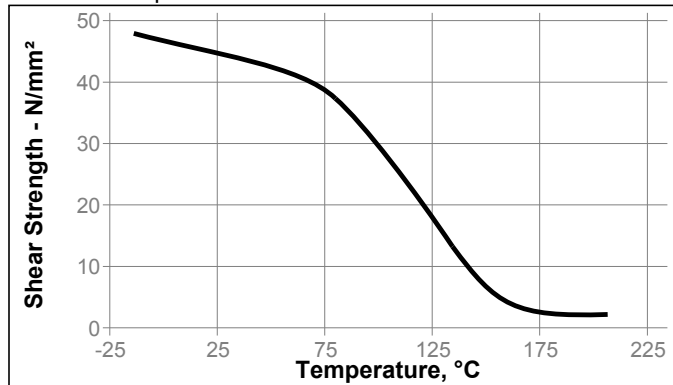
Cured for 30 minutes @ 150 °C (0.05 mm bond gap).

Lap Shear Strength , ISO 4587:

Mild steel (grit blasted)

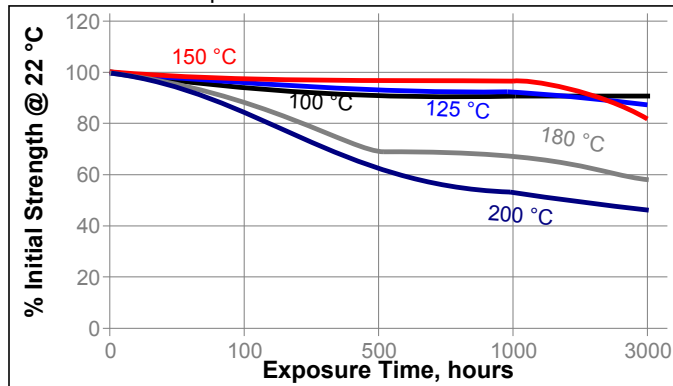
Hot Strength

Tested at temperature



Heat Aging

Stored in air at temperatures indicated and tested at 22°C.



Chemical/Solvent Resistance

Immersed in conditions indicated and tested at 22 °C.

Environment	°C	% of initial strength			
		100 h	500 h	1000 h	3000 h
Motor oil	22	100	95	95	91
Unleaded gasoline	22	98	97	90	85
50 % Water Glycol	87	64	63	49	30
4% Sodium Hydroxide / Water	22	90	88	76	65
98% RH	40	90	71	63	45
Water	60	72	56	44	44
Water	90	67	63	51	60
Acetone	22	89	86	86	76
Acetic Acid, 10%	22	81	85	71	51
Salt water solution, 7.5%	22	93	76	84	73

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 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. Do not mix quantities greater than 10 g in mass as excessive heat build-up can occur. Mixing smaller quantities will minimize the heat build-up.
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).
6. Cure adhesive as recommended in section 'Typical Cure Performance'. 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 application equipment should be cleaned with hot soapy water.

Loctite Material Specification^{LMS}

LMS dated December 04, 2008. 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 Quality.

Storage

Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling.

Optimal Storage: 2 °C to 8 °C. Storage below 2 °C or greater than 8 °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

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$

$\text{kV/mm} \times 25.4 = \text{V/mil}$

$\text{mm} / 25.4 = \text{inches}$

$\text{N} \times 0.225 = \text{lb}$

$\text{N/mm} \times 5.71 = \text{lb/in}$

$\text{N/mm}^2 \times 145 = \text{psi}$

$\text{MPa} \times 145 = \text{psi}$

$\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$

$\text{N}\cdot\text{m} \times 0.738 = \text{lb}\cdot\text{ft}$

$\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$

$\text{mPa}\cdot\text{s} = \text{cP}$

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, **Henkel Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel 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 Henkel 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.

Reference 0.0