Hysol 9514

November 2012

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

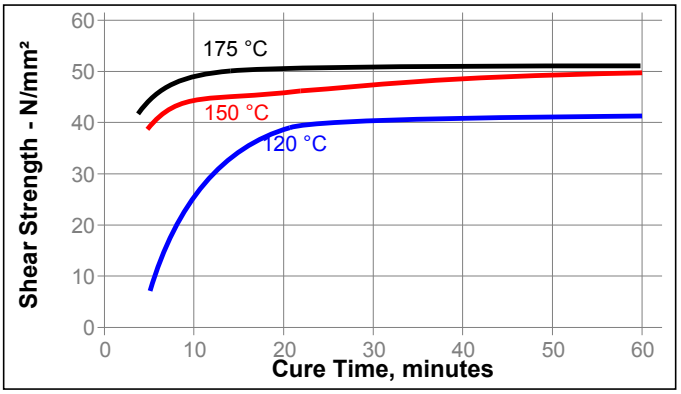
Specific Gravity @ 25 °C	1.42 to 1.48[LMS]
Yield Point @ 25 °C, Pa·s:	
Haake PK 100, M10/PK 1 2° Cone	272
Casson Viscosity @ 25 °C, mPa·s (cP)	
Cone & Plate Rheometer	30,000 to 60,000[LMS]
Casson Base Viscosity , mPa·s (cP):	
Haake PK 100, M10/PK 1 2° Cone	42,000
Flash Point - See MSDS	

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/mm²	44
	(psi)	(6,380)
Tensile Modulus , ISO 527-3	N/mm²	1,460
	(psi)	(211,700)
Compressive Strength, ISO 604	N/mm²	62
	(psi)	(900)
Elongation , ISO 527-3,%		5.8
Glass Transition Temperature, ASTM E 1640, °C		133
Coefficient of Thermal Conductivity, ISO 8302, W/(m-K)		0.3

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/mm²	45
	(psi)	(6,530)
Stainless Steel	N/mm²	32
	(psi)	(4,640)
Zinc dichromate	N/mm²	28
	(psi)	(4,060)
Aluminum (abraded) (Silicon Carbide Paper, A166 grit, P400A grade)	N/mm²	40
	(psi)	(5,800)
Aluminum (etched in acidic ferric sulphate)	N/mm²	40
	(psi)	(5,800)
Brass	N/mm²	25
	(psi)	(3,630)
Galvanized Steel (Hot Dipped)	N/mm²	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

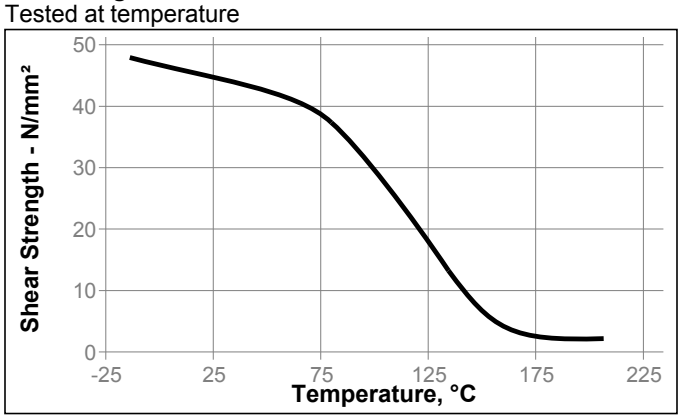
Cured for 30 minutes @ 150 °C (0.05 mm bond gap).

Lap Shear Strength , ISO 4587:

Mild steel (grit blasted)

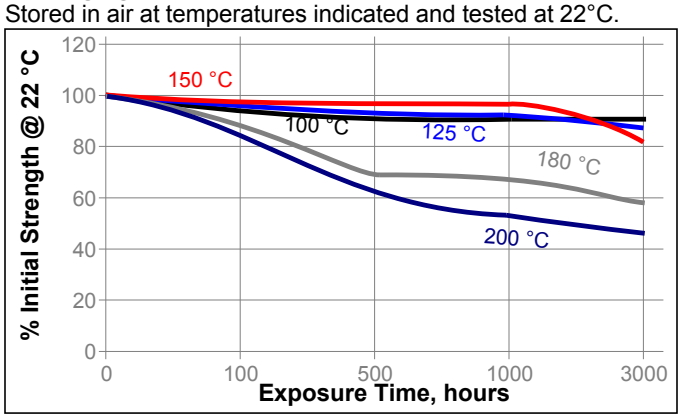
Hot Strength

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.

		% of initial strength			
Environment	**°C**	**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. It is recommended that this product is not cured in large quantities as excessive heat build-up and uncontrolled exothermal runaway can occur. Curing 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

(°C x 1.8) + 32 = °F
kV/mm x 25.4 = V/mil
mm / 25.4 = inches
N x 0.225 = lb
N/mm x 5.71 = lb/in
N/mm² x 145 = psi
MPa x 145 = psi
N·m x 8.851 = lb·in
N·m x 0.738 = lb·ft
N·mm x 0.142 = oz·in
mPa·s = cP

Disclaimer

Note:

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.

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Reference 0.1