Hysol® 9497™

February 2008

PRODUCT DESCRIPTION

Hysol® 9497™ provides the following product characteristics:

Technology	Epoxy
Chemical Type	Epoxy
Appearance (Resin)	White liquid[LMS]
Appearance (Hardener)	Gray liquid[LMS]
Components	Two component - requires mixing
Mix Ratio, by volume - Resin : Hardener	2 : 1
Mix Ratio, by weight - Resin : Hardener	100 : 50
Cure	Room temperature cure
Application	Bonding

Hysol® 9497™ is a medium viscosity, two component, room temperature curing epoxy adhisive that bonds a wide variety of materials making it suitable as a general purpose adhesive. Hysol® 9497™ is ideal for heat dissipation applications such as bonding metal sheets for high heat transfer and potting electrical components. It is good for high compression strength applications, as well as high Tg applications with demanding hot strength requirements.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Resin Properties

Specific Gravity @ 25 °C	2.05 to 2.13[LMS]
Casson Viscosity, Cone & Plate Rheometer, Pa·s:	
Temperature: 25 °C, Shear Rate: 0 to 40 s^{-1}	5 to 16[LMS]
Flash Point - See MSDS	

Hardener Properties

Specific Gravity @ 25 °C	2.02 to 2.1[LMS]
Casson Viscosity, Cone & Plate Rheometer, Pa·s:	
Temperature: 25 °C, Shear Rate: 0 to 40 s^{-1}	8 to 24[LMS]
Flash Point - See MSDS	

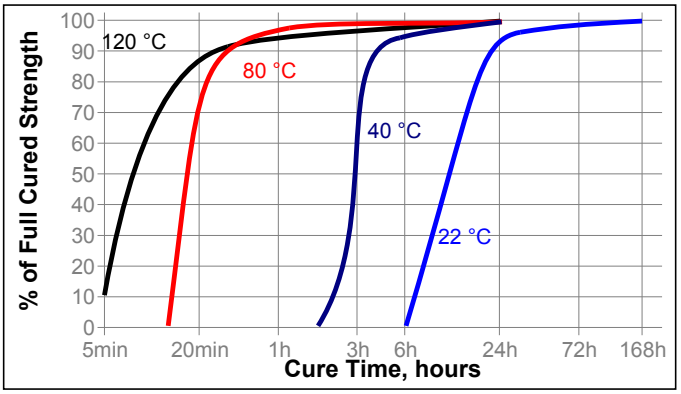
Mixed Properties

Pot Life @ 25 °C, minutes:	
267 g resin / 133 g hardener	165 to 255[LMS]

TYPICAL CURING PERFORMANCE

Cure Speed vs. Time/Temperature

The rate of cure will depend on the ambient temperature. The graph below shows the shear strength developed with time on grit blasted steel lap shears at different temperatures and tested according to ISO 4587.



Fixture Time

Fixture time is defined as the time to develop a shear strength of 0.1 N/mm² .

Fixture Time, ISO 4587, @ 22 °C, hours	8

TYPICAL PROPERTIES OF CURED MATERIAL

Cured for 7 days @ 22 °C

Physical Properties:

Coefficient of Thermal Conductivity, ISO 8302, W/(m·K)		1.4
Coefficient of Thermal Expansion ISO 11359-2, K^{-1}:		
Below Tg		50×10^{-6}
Above Tg		104×10^{-6}
Linear Shrinkage, ISO 1675, %		0.73
Tensile Strength, ISO 37	N/mm² (psi)	52.6 (7,640)
Tensile Modulus , ISO 37	N/mm² (psi)	2,420 (351,000)
Compressive Strength	N/mm² (psi)	112.5 (16,300)
Elongation , ISO 37,%		2.9
Shore Hardness, ISO 868, Durometer D		83
Glass Transition Temperature, ISO 11359-2, °C		67

Electrical Properties:

Dielectric Constant / Dissipation Factor, IEC 60250:	
1 kHz	5.5 / 0.038
1 MHz	5.0 / 0.001
10 MHz	2.5 / 0.983
Volume Resistivity, IEC 60093, Ω·cm	41×10^{15}
Surface Resistivity, IEC 60093, Ω	75×10^{15}

Cured for 24 hours @ 22 °C followed by 30 minutes @ 80 °C.

Physical Properties:

Glass Transition Temperature ISO 11359-2, °C	97

Cured for 24 hours @ 22 °C followed by 15 minutes @ 120 °C.

Physical Properties:

Glass Transition Temperature ISO 11359-2, °C	116

TYPICAL PERFORMANCE OF CURED MATERIAL

Cured for 7 days @ 22 °C

Lap Shear Strength , ISO 4587:

Mild Steel (grit blasted)	N/mm² (psi)	20 (2,900)
Stainless Steel	N/mm² (psi)	9 (1,300)
Aluminum	N/mm² (psi)	7 (1,000)
Aluminum (abraded)	N/mm² (psi)	15 (2,170)
Brass	N/mm² (psi)	5 (750)
Copper	N/mm² (psi)	5 (750)
Zinc dichromate	N/mm² (psi)	5 (750)
ABS	N/mm² (psi)	6 (900)
Polycarbonate	N/mm² (psi)	4 (700)
Polymethylmethacrylate	N/mm² (psi)	1 (150)
Glass Fiber Reinforced Epoxy	N/mm² (psi)	8 (1,200)
Hardwood (Teak)	N/mm² (psi)	12 (1,700)
Softwood (Deal)	N/mm² (psi)	8 (1,200)

TYPICAL ENVIRONMENTAL RESISTANCE

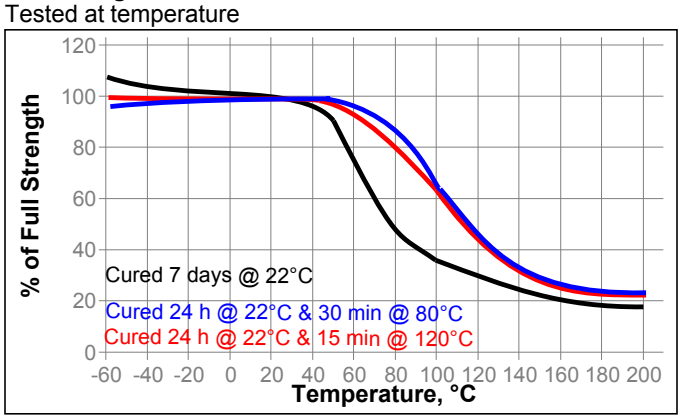
Cured for 7 days @ 22 °C

Lap Shear Strength , ISO 4587:

Mild Steel (grit blasted)

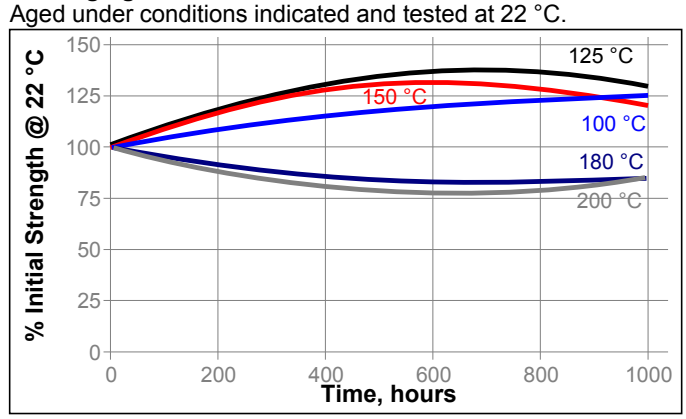
Hot Strength

Tested at temperature



Heat Aging

Aged under conditions indicated and tested at 22 °C.



Chemical/Solvent Resistance

Aged under conditions indicated and tested at 22 °C

		% of initial strength	
Environment	**°C**	**500 h**	**1000 h**
Water	60	100	110
Water	90	135	135
Motor oil	40	105	105
Acetone	22	115	110
98% RH	40	125	120
Unleaded gasoline	22	90	95
Sodium Chloride, 7.5%	22	105	100
Water/glycol 50/50	87	110	120
Acetic Acid, 10%	22	85	100
Sodium hydroxide, 4%	22	105	80

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. To use, resin and hardener must be blended. Using bulk containers, mix thoroughly by weight or volume in the proportions specified in the Product Description Matrix. For hand mixing, weigh or measure out the desired amount of resin and hardener and mix thoroughly. Mix approximately 15 seconds after uniform color is obtained.
3. **Do not mix quantities greater than 4 kg in mass as excessive heat build-up can occur. Mixing smaller quantities will minimize 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 to 4 hours @ 22 °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.

Loctite Material Specification[LMS]
LMS dated November 22, 2007 (Resin) and LMS dated December 07, 2007 (Hardener). 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 Loctite Quality.

Storage
Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling.
Optimal Storage: 8 °C to 21 °C. Storage below 8 °C or greater than 28 °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

Note
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Reference 0.1