



Hysol[®] 9480

July 2009

PRODUCT DESCRIPTION

Hysol[®] 9480 provides the following product characteristics:

Technology	Epoxy
Chemical Type	Epoxy
Appearance (Resin)	White-cream flowable paste ^{LMS}
Appearance (Hardener)	White-cream flowable paste ^{LMS}
Appearance (Mixed)	White-cream flowable paste
Viscosity	Flowable paste
Components	Two part - Resin & Hardener
Mix Ratio, by volume - Resin : Hardener	2 : 1
Mix Ratio, by weight - Resin : Hardener	100 : 46.5
Cure	Room temperature cure after mixing
Application	Bonding
Key Substrates	Metals, Ceramics, Wood, Glass and Rigid plastics
Specific Application	Food Appliances

Hysol[®] 9480 is a two component room temperature curing epoxy adhesive developed for use in food contact applications. It has a medium cure speed and when cured, has good chemical resistance. Typically Hysol[®] 9480 shall be used to assemble pieces of metal and / or plastics in food processing and packaging machines as well as household applications such as mixers, pasta machines or microwave ovens. For these applications the adhesive is generally located between the adherent materials, therefore direct food contact of the adhesive is not intended, but may occur incidentally via the bond line of the applied adhesive.

Incidental Food Contact: Hysol[®] 9480 was tested according to EU Plastics Directive 2002/72/EC, and has been certified by an independent test institute to fulfill the requirements of Article 3 (1a) of the EU Framework Regulation No. 1935/2004 of the incidental food contact. **Note:** For more details and clarification, please contact your local Technical Service Center or Customer Service Representative.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Resin Properties

Specific Gravity @ 25 °C	1.3 to 1.48 ^{LMS}
Viscosity @ 25 °C, mPa·s (cP), :	
Shear Gradient: 20 s ⁻¹	7,000 to 14,000 ^{LMS}
Flash Point - See MSDS	

Hardener Properties

Specific Gravity @ 25 °C	1.15 to 1.42 ^{LMS}
Viscosity @ 25 °C, mPa·s (cP), :	
Shear Gradient: 20 s ⁻¹	3,000 to 7,500 ^{LMS}
Flash Point - See MSDS	

Mixed Properties

Pot Life (10 g mix) @ 25 °C, minutes	110 to 190 ^{LMS}
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TYPICAL CURING PERFORMANCE

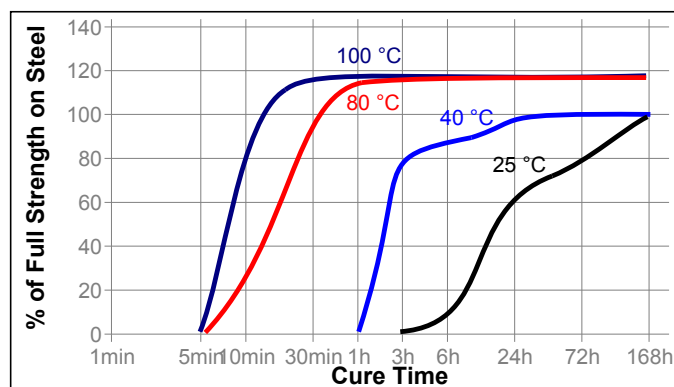
Fixture Time

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

Fixture Time, mixed, @ 23 °C, minutes	270
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Cure Speed

The following graph shows the shear strength developed over time on grit-blasted mild steel lapshears with a 0.05 mm bondline gap and tested according to ISO 4587.



TYPICAL PROPERTIES OF CURED MATERIAL

Cured for 7 days @ 22 °C

Physical Properties:

Coefficient of Thermal Expansion ISO 11359-2, K ⁻¹ :	
Temperature Range: 6 °C to 56 °C	85×10 ⁻⁶
Temperature Range: 66 °C to 199 °C	200×10 ⁻⁶
Coefficient of Thermal Conductivity, ISO 8302, W/(m·K)	0.5
Shore Hardness, ISO 868, Durometer D	80
Linear Shrinkage, ASTM D792, %	1.5
Elongation, at break, ISO 527-3, %	1.8
Glass Transition Temperature, °C:	
(Tg) by DMTA, ASTM E 1640	73
Tensile Strength, ISO 527-3	N/mm ² 47
	(psi) (6,820)
Tensile Modulus, ISO 527-3	N/mm ² 4,400
	(psi) (638,000)

Electrical Properties:

Surface Resistivity, IEC 60093, Ω	190×10 ¹⁵
Volume Resistivity, IEC 60093, Ω·cm	2.9×10 ¹⁵



TYPICAL PERFORMANCE OF CURED MATERIAL

Cured for 16 hours @ 22 °C followed by 1 hour @ 80 °C

Lap Shear Strength , ISO 4587:

Aluminum (abraded)	N/mm ²	>12 ^{LMS}
	(psi)	(1,740)
Steel (grit blasted)	N/mm ²	>15 ^{LMS}
	(psi)	(2,175)

Cured for 1 week @ 22 °C

Lap Shear Strength , ISO 4587:

Mild steel (grit blasted)	N/mm ²	21.0 to 27.5
	(psi)	(3,045 to 3,980)
Stainless steel (grit blasted)	N/mm ²	12.0 to 25.0
	(psi)	(1,740 to 3,620)
Aluminum (abraded)	N/mm ²	11.5 to 15.5
	(psi)	(1,670 to 2,250)
Aluminum (etched)	N/mm ²	10.5 to 18.5
	(psi)	(1,520 to 2,690)
Zinc dichromate	N/mm ²	6.5 to 12.0
	(psi)	(940 to 1,740)
Brass	N/mm ²	3.5 to 6.5
	(psi)	(500 to 940)
Epoxy	N/mm ²	6.5 to 13.0
	(psi)	(940 to 1,880)
Glass-reinforced plastic (GRP)	N/mm ²	2.5 to 5.0
	(psi)	(360 to 725)
Phenolic	N/mm ²	8.0 to 10.0
	(psi)	(1,160 to 1,450)
Hardwood (Mahogany)	N/mm ²	7.5 to 13.5
	(psi)	(1,090 to 1,950)
Softwood (Red Deal)	N/mm ²	4.0 to 12.5
	(psi)	(580 to 1,810)
Polycarbonate	N/mm ²	3.5 to 6.2
	(psi)	(500 to 870)
Nylon	N/mm ²	2.0 to 2.5
	(psi)	(290 to 360)

Tensile Strength , ISO 6922:

Steel pin (grit blasted) to Glass	N/mm ²	3.0 to 7.0
	(psi)	(430 to 1,020)

"T" Peel Strength, ISO 11339:

Mild steel (grit blasted)	N/mm	0.35 to 0.43
	(lb/in)	(2 to 2.5)

TYPICAL ENVIRONMENTAL RESISTANCE

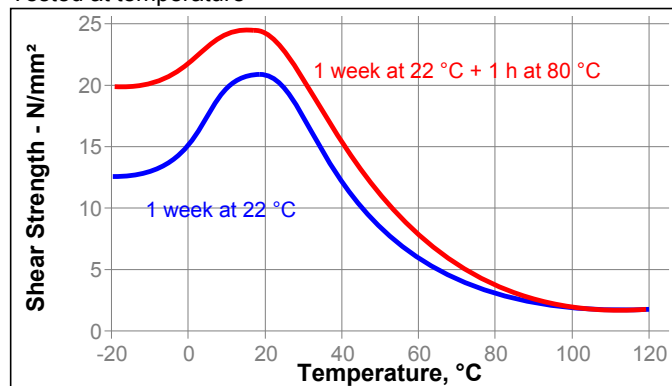
Cured for 1 week @ 22 °C

Lap Shear Strength , ISO 4587:

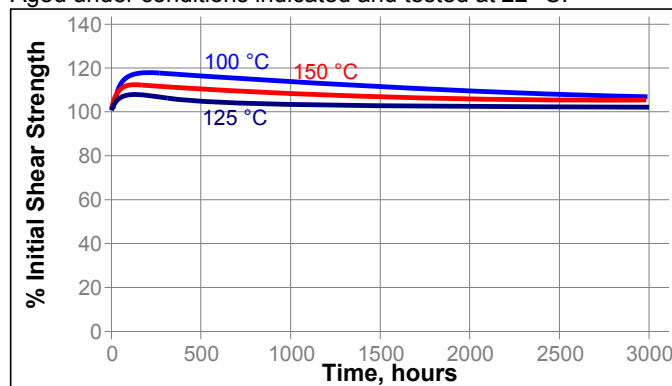
Mild Steel (grit blasted)

Hot Strength

Tested at temperature

**Heat Aging**

Aged under conditions indicated and tested at 22 °C.

**Chemical/Solvent Resistance**

Immersed in conditions indicated and tested at 22 °C.

Environment	°C	% of initial strength		
		100 h	500 h	1000 h
98% RH	40	95	75	70
Motor oil	22	100	105	95
Water	70	75	80	75
Sodium Chloride, 7.5%	22	85	75	60
Sodium hydroxide, 4%	22	85	80	70
Glucose Syrup	22	100	75	70
Sulfuric Acid, 6.5%	40	45	25	5
Water (reflux)	100	105	90	85
Acetic Acid 3%	70	55	45	20
Ethanol 10%	70	80	90	90
Rectified Olive Oil	70	115	100	105

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).

Due to the Food Contact Approval, raw material restrictions apply following Directive 2002/72/EC. This peculiarity may lead in the worst case to Resin Crystallization. In that case a 60 minute heating cycle at 50 to 70 °C should be applied followed by cooling at room temperature, before mixing the product.

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 to 5 cm of bead dispensed. 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 10g mixed adhesive is 100 minutes @ 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, before complete cure has occurred can be wiped away from surfaces, clothes, hands by simply washing with warm soapy water.
8. After use and before adhesive hardens, mixing and application equipment should be cleaned with hot soapy water.

Loctite Material Specification^{LMS}

LMS dated February 20, 2009 (Resin) and LMS dated February 20, 2009 (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

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

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

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

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

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

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

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

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

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

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

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

Note

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Reference 0.0