

Hysol®

Hysol® 3450™

May 2006

PRODUCT DESCRIPTION

Hysol® 3450™ provides the following product characteristics:

| | |
|--|------------------------------------|
| Technology | Epoxy |
| Chemical Type (Resin) | Epoxy |
| Chemical Type (Hardener) | Epoxy |
| Appearance (Resin) | Black |
| Appearance (Hardener) | Creamy, white paste |
| Components | Two part - Resin & Hardener |
| Mix Ratio, by volume - Resin : Hardener | 1 : 1 |
| Cure | Room temperature cure after mixing |
| Application | Bonding |
| Maximum Gap | 3.0 mm |

Hysol® 3450™ is a two component epoxy adhesive which cures rapidly at room temperature after mixing. It is a metal bonding adhesive which develops high strength. The gap filling properties make this adhesive system suitable for rough and poorly fitting surfaces made from metal, ceramic, rigid plastics or wood. Applications include bonding aluminum window frames and GRP panels.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Resin Properties

| | |
|--|-----|
| Specific Gravity @ 25 °C | 1.9 |
| Viscosity, Brookfield, 25 °C, mPa·s (cP): Spindle 6, speed 10 rpm | 40 |
| Flash Point - See MSDS | |

Hardener Properties

| | |
|--|-----|
| Specific Gravity @ 25 °C | 1.8 |
| Viscosity, Brookfield, 25 °C, mPa·s (cP): Spindle 6, speed 10 rpm | 30 |
| Flash Point - See MSDS | |

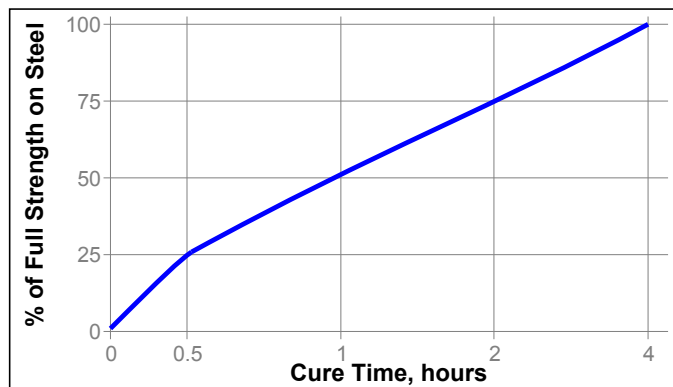
Mixed Properties

| | |
|---------------------------|--------|
| Pot Life @ 25 °C, minutes | 4 to 6 |
|---------------------------|--------|

TYPICAL CURING PERFORMANCE

Cure Speed vs. Time, Temperature

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



TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties:

| | |
|---|--|
| Coefficient of Thermal Conductivity, ISO 8302, W/(m·K) | 0.28 |
| Tensile Modulus, ISO 527-3 | N/mm ² 1,750 (psi) (255,000) |

Electrical Properties:

| | |
|---|----|
| Dielectric Breakdown Strength, IEC 60243-1, kV/mm | 25 |
|---|----|

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured for 16 hours @ 40 °C, tested at 22 °C

Lap Shear Strength, ISO 4587:

| | |
|------------------------------|---------------------------------------|
| Steel (grit blasted) | N/mm ² 25 (psi) (3,600) |
| Steel (degreased) | N/mm ² 19 (psi) (2,800) |
| Aluminum (grit blasted) | N/mm ² 15 (psi) (2,200) |
| Aluminum (degreased) | N/mm ² 6 (psi) (870) |
| Wood | N/mm ² 5 (psi) (730) |
| Polycarbonate | N/mm ² 2 (psi) (290) |
| PVC (polyester resin matrix) | N/mm ² 1 (psi) (150) |



Technologies

TYPICAL ENVIRONMENTAL RESISTANCE

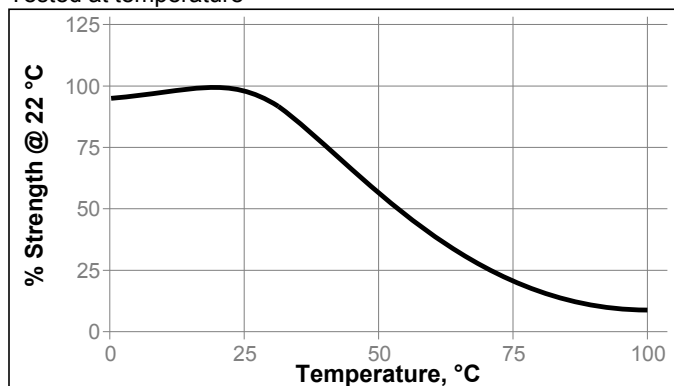
Cured for 24 hours @ 22 °C followed by 30 minutes @ 80 °C

Lap Shear Strength, ISO 4587:

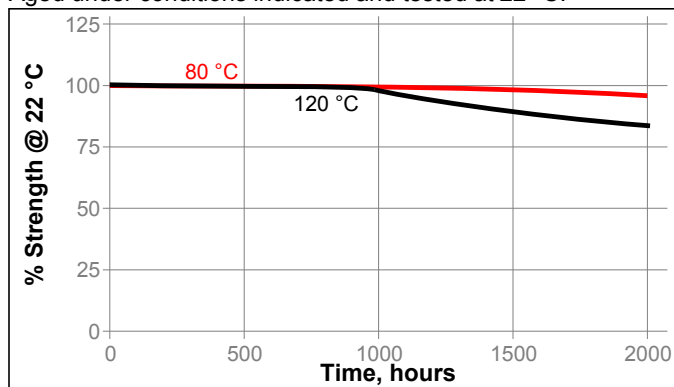
Aluminum (grit blasted)

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.

| Environment | °C | % of initial strength | | |
|-------------------------------|----|-----------------------|--------|--------|
| | | 750 h | 1500 h | 2000 h |
| Lubricating Oil | 22 | 80 | 80 | 80 |
| Acetic Acid, 10% | 22 | 0 | 0 | 0 |
| Ethyl Acetate | 22 | 80 | 80 | 80 |
| Gasoline | 22 | 80 | 80 | 80 |
| Industrial methylated spirits | 22 | 70 | 70 | 70 |
| Paraffin | 22 | 100 | 100 | 100 |
| Water | 22 | 70 | 40 | 5 |
| Water | 60 | 50 | 50 | 35 |
| Water | 90 | 40 | 30 | 10 |
| Humidity, 92% RH | 40 | 65 | 55 | 20 |

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).

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. In some cases these aqueous washes can affect the cure and performance of 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 the mixed adhesive is 4 to 6 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 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.

Not for product specifications

The technical data contained herein are intended as reference only. Please contact your local quality department for assistance and recommendations on specifications for this product.

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 1.0