



# Hysol® EA 9330.3

## Epoxy Paste Adhesive

Henkel Corporation  
Aerospace Group  
2850 Willow Pass Road  
P.O. Box 312  
Bay Point, CA 94565 USA  
**925.458.8000**  
Fax: 925.458.8030  
www.aerospace.henkel.com

### Description

Hysol EA 9330.3 is a two-component thixotropic paste adhesive with low slump and high peel strength. This easy mix system maintains high tensile shear strength to 160°F/71°C. Hysol EA 9330.3 is the thixotropic version of Hysol EA 9330.

### Features

Two Component System  
Low Slump  
Room Temperature Cure  
Easy Mix  
High Peel Strength

### Uncured Adhesive Properties

|                 | <u>Part A</u>      | <u>Part B</u>      | <u>Mixed</u> |
|-----------------|--------------------|--------------------|--------------|
| Color           | Gray               | Clear              | Gray         |
| Viscosity, 77°F | 4,000 Poise        | 300 Poise          |              |
| Brookfield, HBT | Spdl 7 @ 20 rpm    | Spdl 5 @ 20 rpm    |              |
| Viscosity, 25°C | 400 Pa·S           | 30 Pa·S            |              |
| Brookfield, HBT | Spdl 7 @ 2.1 rad/s | Spdl 5 @ 2.1 rad/s |              |
| Density         | 1.17 gm/ml         | 1.06 gm/ml         | 1.14 gm/ml   |
| Warranty Life   |                    |                    |              |
| @ <40°F/4°C     | 1 year             | 1 year             |              |
| @ <77°F/25°C    | 1 year             | 1 year             |              |
| @ <90°F/32°C    | 1 year             | 1 year             |              |

### Handling

**Mixing** - This product requires mixing two components together just prior to application to the parts to be bonded. Complete mixing is necessary. The temperature of the separate components prior to mixing is not critical, but should be close to room temperature (77°F/25°C).

| <u>Mix Ratio</u> | <u>Part A</u> | <u>Part B</u> |
|------------------|---------------|---------------|
| By Weight        | 100           | 33            |

Note: Volume measurement is not recommended for structural applications unless special precautions are taken to assure proper ratios.

**Pot Life** (100 gm mass) 60 minutes  
Method - ASTM D 2471 in water bath.

## Application

**Mixing** - Combine Part A and Part B in the correct ratio and mix thoroughly. **THIS IS IMPORTANT!** Heat buildup during or after mixing is normal. Do not mix quantities greater than 250 grams as dangerous heat buildup can occur causing uncontrolled decomposition of the mixed adhesive. **TOXIC FUMES CAN OCCUR, RESULTING IN PERSONAL INJURY.** Mixing smaller quantities will minimize the heat buildup.

**Applying** - Bonding surfaces should be clean, dry and properly prepared. For optimum surface preparation consult the Hysol Surface Preparation Guide. The bonded parts should be held in contact until the adhesive is set. Handling strength for this adhesive will occur in 24 hours (>77°F/25°C), after which the support tooling or pressure used during cure may be removed. Since full bond strength has not yet been attained, load application should be small at this time.

**Curing** - Hysol EA 9330.3 may be cured for 5 to 7 days @ >77°F/25°C to achieve normal performance. Accelerated cures up to 200°F/93°C (for small masses only) may be used as an alternative. For example, 1 hour @ 180°F/82°C will give complete cure.

**Cleanup** - It is important to remove excess adhesive from the work area and application equipment before it hardens. Denatured alcohol and many common industrial solvents are suitable for removing uncured adhesive. Consult your supplier's information pertaining to the safe and proper use of solvents.

## Bond Strength Performance

### Tensile Lap Shear Strength

Tensile lap shear strength tested per ASTM D1002 after curing for 5 days @ 77°F/25°C. Adherends are 2024-T3 alclad aluminum treated with phosphoric acid anodizing per ASTM D3933.

| <u>Test Temperature, °F/°C</u> | <b>Typical Results</b> |            |
|--------------------------------|------------------------|------------|
|                                | <u>psi</u>             | <u>MPa</u> |
| -67/-55                        | 5,700                  | 39.3       |
| 77/ 25                         | 4,900                  | 33.8       |
| 160/71                         | 1,700                  | 11.7       |
| 180/82                         | 1,100                  | 7.6        |

### Tensile Lap Shear Strength with Variable Bondline Thicknesses

| <u>Bondline Thickness (mm):</u> | <b>Typical Results</b> |            |            |            |            |            |            |            |            |            |
|---------------------------------|------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|                                 | 3 mils                 | 0.08mm     | 5 mils     | 0.13mm     | 10 mils    | 50 mils    | 1.27mm     | 75 mils    | 1.91mm     |            |
| <u>Test Temperature</u>         | <u>psi</u>             | <u>MPa</u> | <u>psi</u> | <u>MPa</u> | <u>psi</u> | <u>MPa</u> | <u>psi</u> | <u>MPa</u> | <u>psi</u> | <u>MPa</u> |
| 77°F/25°C                       | 5,200                  | 35.8       | 5,000      | 34.5       | 4,800      | 33.1       | 4,200      | 28.9       | 3,800      | 26.2       |

**Tensile Lap Shear Strength with Variable Cure Conditions** - all specimens cured 5 days @ 77°F/25°C plus a post cure as noted:

| <u>Post Cure @</u>      | <b>Typical Results</b> |            |            |            |            |            |            |            |            |            |
|-------------------------|------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|                         | 3 days                 |            | 7 days     |            | 15 days    |            | 30 days    |            | 60 days    |            |
| <u>Test Temperature</u> | <u>psi</u>             | <u>MPa</u> | <u>psi</u> | <u>MPa</u> | <u>psi</u> | <u>MPa</u> | <u>psi</u> | <u>MPa</u> | <u>psi</u> | <u>MPa</u> |
| 77°F/25°C               | 5,400                  | 37.2       | 6,000      | 41.3       | 6,100      | 42.0       | 6,200      | 42.7       | 6,000      | 41.3       |
| 160°F/71°C              | 2,300                  | 15.8       | 2,100      | 14.5       | 2,200      | 15.2       | 2,400      | 16.5       | 2,100      | 14.5       |

**T-Peel Strength with Variable Bondline Thicknesses**

T-Peel strength tested per ASTM D1876 after curing for 5 days @ 77°F/25°C.

Adherends are 2024-T3 alclad aluminum treated with phosphoric acid anodizing per ASTM D3933.

| <u>Bondline Thickness:</u> | <b>Typical Results</b> |             |            |             |            |             |            |             |            |             |
|----------------------------|------------------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|
|                            | 3 mils                 |             | 5 mils     |             | 10 mils    |             | 20 mils    |             | 30 mils    |             |
|                            | 0.08mm                 |             | 0.13mm     |             | 0.25mm     |             | 0.50mm     |             | 0.76mm     |             |
| <u>Test Temperature</u>    | <u>Lb/</u>             | <u>N/25</u> | <u>Lb/</u> | <u>N/25</u> | <u>Lb/</u> | <u>N/25</u> | <u>Lb/</u> | <u>N/25</u> | <u>Lb/</u> | <u>N/25</u> |
|                            | <u>in</u>              | <u>mm</u>   | <u>in</u>  | <u>mm</u>   | <u>in</u>  | <u>mm</u>   | <u>in</u>  | <u>mm</u>   | <u>in</u>  | <u>mm</u>   |
| 77°F/25°C                  | 50                     | 8.8         | 50         | 8.8         | 55         | 9.6         | 60         | 10.5        | 58         | 10.2        |

**T-Peel Strength with Variable Peel Rate**

T-Peel tested per ASTM D1876 except for peel rate. Cure and adherends as noted above.

| <u>Peel Rate (In./Min.):</u> | <b>Typical Results</b> |             |            |             |            |             |            |             |            |             |
|------------------------------|------------------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|
|                              | 2                      |             | 5          |             | 10         |             | 12         |             | 30         |             |
|                              | <u>Lb/</u>             | <u>N/25</u> | <u>Lb/</u> | <u>N/25</u> | <u>Lb/</u> | <u>N/25</u> | <u>Lb/</u> | <u>N/25</u> | <u>Lb/</u> | <u>N/25</u> |
|                              | <u>in</u>              | <u>mm</u>   | <u>in</u>  | <u>mm</u>   | <u>in</u>  | <u>mm</u>   | <u>in</u>  | <u>mm</u>   | <u>in</u>  | <u>mm</u>   |
| 77°F/25°C                    | 45                     | 8.0         | 45         | 7.7         | 45         | 7.9         | 45         | 7.9         | 45         | 8.2         |

**Bell Peel Strength**

Bell Peel tested after curing 5 days @ 77°F/25°C.

| <u>Test Temperature, °F/°C</u> | <b>Typical Results</b> |             |
|--------------------------------|------------------------|-------------|
|                                | <u>pli</u>             | <u>N/mm</u> |
| -67/-55                        | 29                     | 5.0         |
| 77/25                          | 93                     | 16.3        |
| 160/70                         | 12                     | 2.1         |

**Service Temperature**

Service temperature is defined as that temperature at which this adhesive still retains 1000 psi (6.9 MPa) using test method ASTM D 1002 and is 180°F/82°C.

**Henkel QC Acceptance Testing**

This data sheet provides users with typical properties obtained from this adhesive. These values are not meant to be used to develop aerospace QC acceptance testing. Users interested in establishing values and tests for routine QC acceptance should request our internal specification (DAS), which provides detail test methods and values used to certify this adhesive.

**Bulk Resin Properties**

**Density** - tested per ASTM D1622, gm/cc

**Typical Results**

1.11

**Tensile Properties** – tested using 0.125 inch/3.18 mm castings per ASTM D638.

|                                   |           |          |
|-----------------------------------|-----------|----------|
| Tensile Strength, @ 77°F/25°C     | 6,100 psi | 42.0 MPa |
| Tensile Modulus, @ 77°F/25°C      | 390 ksi   | 2687 MPa |
| Elongation at Break, % @77°F/25°C | 9         |          |
| Shore D Hardness @ 77°F/25°C      | 81        |          |
| T <sub>g</sub> (by DMTA)          | 129°F     | 54°C     |

**Electrical Properties** - tested per ASTM D149, D150.

|  |       |
|--|-------|
| Dielectric Constant, 1 KHz, 77°F/ 25°C | 4.46  |
| Dissipation Factor, 1 KHz, 77°F/25°C   | 0.013 |

### Handling Precautions

Do not handle or use until the Material Safety Data Sheet has been read and understood.

For industrial use only.

#### General:

As with most epoxy based systems, use this product with adequate ventilation. Do not get in eyes or on skin. Avoid breathing the vapors. Wash thoroughly with soap and water after handling. Empty containers retain product residue and vapors, so obey all precautions when handling empty containers.

#### PART A

**WARNING!** As with most epoxy based systems, the uncured adhesive may cause eye and skin irritation or allergic dermatitis. Contains epoxy resins.

#### PART B

**DANGER!** Causes severe skin and eye burns. Vapors may be irritating to the respiratory tract.

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Users should review the Materials Safety Data Sheet (MSDS) and product label for the material to determine possible health hazards, appropriate engineering controls and precautions to be observed in using the material. Copies of the MSDS and label are available upon request.

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