



## Hysol® EA 9628

### Epoxy Film Adhesive

#### Description

Hysol EA 9628 is a modified epoxy film adhesive designed for structural bonds requiring toughness. Hysol EA 9628 is available with two carrier fabrics: a knitted nylon (Hysol EA 9628K) or a non-woven nylon mat (Hysol EA 9628NW). Hysol EA 9628 has excellent resistance to most environments.

#### Features

Film Adhesive  
Good Toughness  
235 - 250°F/113 - 121°C Cure  
Bonds Many Materials  
Excellent Durability

#### Handling

This product is in film form and is ready to use as received. The adhesive should be removed from cold storage and allowed to warm to room temperature. All moisture should be removed from the protective packaging before opening. The adhesive film has a protective liner(s) on it that must be removed prior to parts assembly (see "Applying" below). The liner(s) will always be a contrasting color from the adhesive to allow the user easy confirmation of removal.

#### Application

**Storage Life** - Hysol EA 9628 requires refrigerated storage. Store @ 0°F/-18°C or below for maximum storage life. Warranty life @ 0°F/-18°C is 12 months from date of shipment. Store only in sealed containers to prevent moisture contamination. Allow all moisture to evaporate from container before opening for use.

**Applying** - Bonding surfaces should be clean, dry and properly prepared. For optimum surface preparation consult the Hysol Surface Preparation Guide. The adhesive film, with one liner left on it, may be tacked to the detail part for cutting to shape and size. The liner should remain with the adhesive until just before assembly of the detail to the other faying surface. This will minimize contamination of the adhesive bond. The bonded parts should be held in contact until the adhesive has cured. Usually 25 to 50 psi /170 to 340 kPa is sufficient to assure proper mating.

**Open Assembly Time** - Hysol EA 9628 may be used within the following schedule after removing from cold storage:

- @ 77°F/25°C at least 20 days
- @ 90°F/32°C at least 10 days

**Curing** - Hysol EA 9628 may be cured for 1 hour @ 250°F/121°C or 90 minutes @ 235°F/113°C. Heat up rate to the cure temperature is not critical, but should be between 4° and 7°F (2.2° and 4°C) per minute.

Pressure should be applied before heating the parts to be bonded and maintained until cool down of the assembly.

**Cleanup** - It is important to remove excess adhesive from the part and bonding tools before it hardens. Once the adhesive is cured, it is difficult to remove except by mechanical abrasion. Uncured adhesive may be removed with a ketone solvent in a well-ventilated area. Saturate a clean cloth or industrial wiper with solvent and apply just enough to do the job. Be careful to prevent any solvent from entering the uncured bondline, as solvent will degrade the final bond performance. Consult with 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 as shown below. Adherends are 2024-T3 Alclad aluminum treated with phosphoric acid anodizing per ASTM D3933. Performance is comparable when a state of the art corrosion inhibiting primer is used. Film weight is 0.060 PSF (293 g/m<sup>2</sup>).

#### Typical Results

| <u>Test Temperature, °F/°C</u> | <u>Knit Support</u>             |            | <u>Non-Woven Support</u>           |            |
|--------------------------------|---------------------------------|------------|------------------------------------|------------|
|                                | <u>Cured 1 hr @ 250°F/121°C</u> |            | <u>Cured 1.5 hrs @ 235°F/113°C</u> |            |
|                                | <u>psi</u>                      | <u>MPa</u> | <u>psi</u>                         | <u>MPa</u> |
| -67/-55                        | 5,500                           | 37.9       | 5,500                              | 37.9       |
| 77/25                          | 6,000                           | 41.3       | 5,800                              | 40.0       |
| 180/82                         | 4,000                           | 27.6       |                                    |            |
| 250/121                        | 1,900                           | 13.1       | 2,100                              | 14.5       |

#### Typical Results

#### After Exposure to the Following Conditions\*:

|                                   | <u>Knit Support</u>             |            | <u>Non-Woven Support</u>           |            |
|-----------------------------------|---------------------------------|------------|------------------------------------|------------|
|                                   | <u>Cured 1 hr @ 250°F/121°C</u> |            | <u>Cured 1.5 hrs @ 235°F/113°C</u> |            |
|                                   | <u>psi</u>                      | <u>MPa</u> | <u>psi</u>                         | <u>MPa</u> |
| Control, 77°F/25°C                | 6,300                           | 43.4       | 6,300                              | 43.4       |
| 77°F/25°C Water - 30 days         | 6,300                           | 43.4       | 6,300                              | 43.4       |
| 120°F/49°C - 100% RH - 30 days    | 5,900                           | 40.7       | 5,900                              | 40.7       |
| Hydraulic Oil - 7 days            | 6,500                           | 44.8       |                                    |            |
| JP-4 Jet fuel - 7 days            | 6,100                           | 42.0       | 6,100                              | 42.0       |
| Salt Spray - 105°F/41°C - 30 days | 6,100                           | 42.0       | 6,100                              | 42.0       |
| 77°F/25°C Anti-icing FL - 7 days  | 6,300                           | 43.4       | 6,300                              | 43.4       |

\*All exposures tested at 77°F/25°C.

#### **Peel Strength**

T Peel strength tested per ASTM D1876 after curing as shown below. Adherends are 2024-T3 Alclad aluminum phosphoric acid anodized per ASTM D3933.

#### Typical Results

| <u>Test Temperature, °F/°C</u> | <u>Knit Support</u>             |               |
|--------------------------------|---------------------------------|---------------|
|                                | <u>Cured 1 hr @ 250°F/121°C</u> |               |
|                                | <u>Lb/in</u>                    | <u>N•25mm</u> |
| -67/-55                        | 28                              | 125           |
| 77/25                          | 37                              | 165           |
| 180/82                         | 34                              | 151           |

Metal to Metal Climbing Drum Peel per ASTM D1781 strength tested after curing as shown below. Adherends are 2024-T3 Alclad aluminum phosphoric acid anodized per ASTM D393.

**Typical Results**

| <u>Test Temperature, °F/°C</u> | <u>Knit Support</u>             |                 | <u>Non-Woven Support</u>           |                 |
|--------------------------------|---------------------------------|-----------------|------------------------------------|-----------------|
|                                | <u>Cured 1 hr @ 250°F/121°C</u> |                 | <u>Cured 1.5 hrs @ 235°F/113°C</u> |                 |
|                                | <u>in• lb/in</u>                | <u>N• 25 mm</u> | <u>in• lb/in</u>                   | <u>N• 25 mm</u> |
| -67/-55                        | 50                              | 222             | 45                                 | 200             |
| 77/25                          | 70                              | 311             | 65                                 | 289             |
| 180/82                         | 60                              | 267             | 55                                 | 245             |

**Crack Extension** tested per ASTM D3433.

**Typical Results**

| <u>Test Mode</u>             | <u>Knit Support</u>             |            | <u>Non-Woven Support</u>           |            |
|------------------------------|---------------------------------|------------|------------------------------------|------------|
|                              | <u>Cured 1 hr @ 250°F/121°C</u> |            | <u>Cured 1.5 hrs @ 235°F/113°C</u> |            |
|                              | <u>lb/in</u>                    | <u>N/M</u> | <u>lb/in</u>                       | <u>N/M</u> |
| G <sub>IC</sub>              | 8                               | 1401       | 14.3                               | 2504       |
| G <sub>Ia</sub>              | 6                               | 1051       | 10.4                               | 1821       |
| G <sub>IscC</sub> (5 weeks)  |                                 |            | 6.1                                | 1068       |
| G <sub>IscC</sub> (15 weeks) |                                 |            | 4.0                                | 700        |

**Honeycomb Sandwich Performance**

Honeycomb sandwich strength tested after curing as shown above. Adherends are 2024-T3 clad aluminum with 0.25 inch/6.35mm cell 5052 non-perforated aluminum core.

*Honeycomb Climbing Drum Peel Strength*

**Typical Results**

| <u>Test Temperature, °F/°C</u> | <u>Knit Support</u>             |               | <u>Non-Woven Support</u>           |               |
|--------------------------------|---------------------------------|---------------|------------------------------------|---------------|
|                                | <u>Cured 1 hr @ 250°F/121°C</u> |               | <u>Cured 1.5 hrs @ 235°F/113°C</u> |               |
|                                | <u>in• lb/3in</u>               | <u>M• n/m</u> | <u>in• lb/3in</u>                  | <u>M• n/m</u> |
| -67/-55                        | 54                              | 80            | 45                                 | 67            |
| 77/25                          | 60                              | 89            | 63                                 | 93            |
| 180/82                         | 48                              | 71            | 45                                 | 67            |

**Typical Results**

| <u>Test Temperature, °F/°C</u> | <u>Knit Support</u>             |            | <u>Non-Woven Support</u>           |            |
|--------------------------------|---------------------------------|------------|------------------------------------|------------|
|                                | <u>Cured 1 hr @ 250°F/121°C</u> |            | <u>Cured 1.5 hrs @ 235°F/113°C</u> |            |
|                                | <u>psi</u>                      | <u>MPa</u> | <u>psi</u>                         | <u>MPa</u> |
| 77/25                          | 1,400                           | 9.6        | 1,300                              | 8.9        |

**Service Temperature**

Service temperature is defined as that temperature at which this adhesive still retains 1000 psi/6.9 MPa using test method ASTM D1002 and is approximately 250°F/121°C.

**Bulk Resin Properties**

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

|                                    |           |           |
|------------------------------------|-----------|-----------|
| Tensile Strength @ 77°F/25°C       | 7,500 psi | 51.7 MPa  |
| Tensile Modulus @ 77°F/25°C        | 345 ksi   | 2,377 MPa |
| Elongation at Break, % @ 77°F/25°C | 7.5       |           |

|  |         |         |
|--|---------|---------|
| Shore D Hardness @ 77°F/25°C                 | 83.0    |         |
| Tg dry (Tan delta by DMTA)                   | 248°F   | 120°C   |
| Tg wet (Tan delta by DMTA)                   | 210°F   | 99°C    |
| Shear Modulus dry @ 77°F/25°C, Ksi (by DMTA) | 90.5ksi | 624 MPa |

**Compressive Properties** - tested using 0.125 inch/3.18mm castings per ASTM D695.

|                                  |            |           |
|----------------------------------|------------|-----------|
| Compressive Strength @ 77°F/25°C | 11,500 psi | 79.3 MPa  |
| Compressive Modulus @ 77°F/25°C  | 310 ksi    | 2,136 MPa |

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

|                     |                 |
|---------------------|-----------------|
| Dielectric Constant | 3.56 @ 1 KHz    |
| Dissipation Factor  | 0.087 @ 1 KHz   |
| Dielectric Strength | > 258 volts/mil |

**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.

ONE PART

**CAUTION!** This material may cause eye and skin irritation or allergic dermatitis. It contains epoxy resins.

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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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