



## Hysol® EA 9657

### Epoxy Film Adhesive

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#### Description

Hysol EA 9657 is a 350°F/177°C service epoxy film adhesive designed for high honeycomb peel in a reticulated sound suppression structure. It is aluminum filled and available in both unsupported and fabric supported versions.

#### Features

High Service Temperature  
High Strength  
Available in Unsupported or Fabric Supported  
Reticulatable on Perforated Sheet or Honeycomb Core

#### 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 (77°F/25°C). 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** - This product requires refrigerated storage. Store @ 0°F/-18°C or below for maximum storage life. Warranty life @ 0°F/-18°C is greater than 6 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 /172 to 345 kPa is sufficient to assure proper part mating.

**Open Assembly Time** - This adhesive may be used within the following schedule after removing from cold storage:

- @ 77°F/25°C at least 15 days
- @ 90°F/32°C at least 10 days

**Curing** - This product may be cured for 90 minutes @ 350°F/177°C in an autoclave (30 - 100 psi/207 to 689 kPa). Heat up rate to the cure temperature is not critical, but should be between 1.5° and 9°F (0.8° and

5.1°C) per minute. Pressure should be applied before heating the parts to be bonded and maintained until cool down of the assembly.

The companion primer Hysol EA 9210B should be flashed by exposing the surfaces to ambient conditions for 30 minutes followed by a 60 minute cure after part reaches 270°F/132°C, in a forced air oven.

**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 denatured alcohol and many common industrial solvents. 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**

The following data was developed with Hysol EA 9657 and Hysol EA 9210B Primer:

**Tensile Lap Shear Strength**

Tensile lap shear strength tested per ASTM D1002 after curing for 1.5 hours @ 350°F/177°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>			
	<b>0.055 psf (268 g/m<sup>2</sup>)</b>		<b>0.08 psf (390 g/m<sup>2</sup>)</b>	
	<b>Unsupported</b>		<b>Supported</b>	
	<b>psi</b>	<b>MPa</b>	<b>psi</b>	<b>MPa</b>
-67/-55	5,000	34.5	4,800	33.1
77/25	5,300	36.5	5,000	34.5
350/177	2,400	16.5	2,300	15.8

**Wide Area Overlap Shear Strength**

Wide area overlap shear strength tested per ASTM D3165-73. Adherends are 2024-T3 bare aluminum treated with phosphoric acid anodizing per ASTM D3933.

<u>Test Temperature, °F/°C</u>	<b>Typical Results</b>			
	<b>0.055 psf (268 g/m<sup>2</sup>)</b>		<b>0.08 psf (390 g/m<sup>2</sup>)</b>	
	<b>Unsupported</b>		<b>Supported</b>	
	<b>psi</b>	<b>MPa</b>	<b>psi</b>	<b>MPa</b>
-67/-55	3,300	22.7	3,400	23.4
77/25	3,900	26.9	3,700	25.5
350/177	2,000	13.8	1,800	12.4
*77/25	3,600	24.8	3,600	24.8
*350/177	1,700	11.7	1,900	13.1

\*Post 1000 hours aging @ 350°F/177°C

**Metal to Metal Climbing Drum Peel Strength**

Metal to Metal Climbing Drum Peel strength tested per ASTM D1781. Adherends are 2024-T3 Alclad aluminum treated with phosphoric acid anodizing per ASTM D3933.

<u>Test Temperature, °F/°C</u>	<b>Typical Results</b>			
	<b>0.055 psf (268 g/m<sup>2</sup>)</b>		<b>0.08 psf (390 g/m<sup>2</sup>)</b>	
	<b>Unsupported</b>		<b>Supported</b>	
	<b>lb• in/in</b>	<b>M• n/m</b>	<b>bf• in/in</b>	<b>M• n/m</b>
77/25	23	102	25	111

**Honeycomb Sandwich Performance**

Adherends are 2024-T3 Alclad aluminum treated with phosphoric acid anodizing per ASTM D3933. The core used was 5052 nonperforated with .25 in/6.35 mm cells. The 0.055 psf/268 g/m<sup>2</sup> unsupported film was reticulated onto perforated skins with 20% open area.

*Honeycomb Climbing Drum Peel Strength tested per ASTM D1781.*

<u>Test Temperature, °F/°C</u>	<b>Typical Results</b>			
	<b>0.055 psf (268 g/m<sup>2</sup>)</b>		<b>0.08 psf (390 g/m<sup>2</sup>)</b>	
	<b>Unsupported</b>		<b>Supported</b>	
	<b><u>lb• in/3in</u></b>	<b><u>M• n/m</u></b>	<b><u>lb• in/3in</u></b>	<b><u>M• n/m</u></b>
77/25	25	37.1	40	59.3

*Flatwise Tensile Strength tested per ASTM C297*

<u>Test Temperature, °F/°C</u>	<b>Typical Results</b>			
	<b>0.055 psf (268 g/m<sup>2</sup>)</b>		<b>0.08 psf (390 g/m<sup>2</sup>)</b>	
	<b>Unsupported</b>		<b>Supported</b>	
	<b><u>psi</u></b>	<b><u>MPa</u></b>	<b><u>psi</u></b>	<b><u>MPa</u></b>
-67/-55	1,100	7.6	1,000	6.9
77/25	1,150	7.9	1,150	7.9
350/177	450	3.1	475	3.3
*350/177	450	3.1	475	3.3

\*Post 1000 hours aging @ 350°F/177°C

***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 400°F/204°C.

**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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