



Hysol® EA 9690

Modified Epoxy Film Adhesive



Authorized Distributor

1-800-375-0605

www.rudolphbros.com

Description

Hysol EA 9690 is a modified epoxy film adhesive designed for high peel capability in structural bonds requiring toughness

Features

- Film Adhesive
- Bonds Many Materials
- Low Flow
- Cures Below 250°F/120°C
- Exceptional Peel Strength
- Available with Knit or Non-Woven Mat
- Excellent Performance with Low Pressure Cures

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, which 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 9690 requires refrigerated storage. Store @ 0°F/-20°C or below for maximum storage life. Warranty life @ 0°F/-20°C is 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 mating.

Open Assembly Time - Hysol EA 9690 may be used within the following schedule after removing from cold storage:

- @ 77°F/25°C at least 14 days
- @ 90°F/30°C at least 10 days

Curing - Hysol EA 9690 may be cured for 1 hour @ 250°F/120°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

All data presented is based on a 0.06 psf woven supported film

Tensile Lap Shear Strength

Tensile lap shear strength tested per ASTM D1002 after curing as shown below. Adherends are 2024-T3 bare aluminum treated with phosphoric acid anodized per ASTM C3933. Primed with Hysol EA 9210H and cured 60 minutes at 300°F/150°C to a thickness of 0.0002 to 0.0004 inches (0.005-0.010mm)

<u>Test Temperature, °F / °C</u>	Typical Results	
	<u>PSI</u>	<u>MPa</u>
-67/-55	6,350	43.8
77/ 25	6,100	42.0
180/ 80	3,900	26.9
225/105	3,300	22.8
250/120	2,100	14.5

<u>Environmental Exposure</u>	<u>Test Temperature, °F / °C</u>	Typical Results	
		<u>PSI</u>	<u>MPa</u>
140°F/60°C – 100% RH – 30 days	77/ 25	3,500	24.2
Hydraulic Oil – 7 days	77/ 25	5,990	41.3
JP-4 Fuel – 7 days	77/ 25	5,750	39.7

Peel Strength

T Peel strength tested per ASTM D1876 after curing as shown below. Adherends are 2024-T3 bare aluminum treated with phosphoric acid anodized per ASTM D3933. Primed with Hysol EA 9310H cured 60 minutes at 300°F/150°C to a thickness of 0.0002 to 0.0004 inches (0.005-0.010mm)

<u>Test Temperature, °F / °C</u>	Typical Results	
	<u>PLI</u>	<u>N/mm</u>
-67/-55	30	5.25
77/ 25	45	7.88
180/ 80	41	7.18

Metal-to-metal climbing drum peel strength tested after curing as shown below. Adherends are 2024-T3 bare aluminum treated with phosphoric acid anodized per ASTM D3933. Primed with Hysol EA 9310H cured 60 minutes at 300°F/150°C to a thickness of 0.0002 to 0.0004 inches (0.005-0.010mm).

Typical Results		
Cured 1 hr @ 250°F/120°C, 40 PSI (0.27 MPa)		
<u>Test Temperature, °F / °C</u>	<u>In.Lb./In.</u>	<u>N•m/m</u>
77/ 25	90	400
180/ 80	80	350

Honeycomb Sandwich Performance

Honeycomb sandwich strength tested after curing as shown below. Adherends are 2024-T3 clad aluminum with 0.25" (6.4mm) cell 5052 non-perforated aluminum core. Face sheets primed with Hysol EA 9210H and cured 60 minutes at 300°F/150°C to a thickness of 0.0002 to 0.0004 inches (0.005-0.010mm).

Honeycomb Climbing Drum Peel Strength

Typical Results		
Cured 1 hr @ 250°F/120°C, 40 PSI (0.27 MPa)		
<u>Test Temperature, °F / °C</u>	<u>In.Lb./In.</u>	<u>N•m/m</u>
-67/-55	13	58
77/ 25	18	80
180/ 80	11	50

Flatwise Tensile Strength

Typical Results		
Cured 1 hr @ 250°F/120°C, 40 PSI (0.27 MPa)		
<u>Test Temperature, °F / °C</u>	<u>PSI</u>	<u>MPa</u>
-67/-55	1,225	8.45
77/ 25	925	6.38
180/ 80	600	4.14

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 250°F/120°C.

Bulk Resin Properties

		<u>°F/°C</u>
T_g dry	Tan delta by DMTA	240/115
T_g wet	Tan delta by DMTA	200/ 95

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.
