



## Hysol® EA 9686

### Epoxy Film Adhesive

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#### Description

Hysol EA 9686 is a modified epoxy film adhesive designed for applications requiring both toughness and service temperatures between -67°F to 300°F (-55°C to 149°C). It features the ability to cure at various temperatures (250°F to 350°F/121°C to 177°C), balanced flow, excellent environmental resistance, and long shop out-time, which makes it suitable for a variety of metal, composite, and honeycomb bonding applications.

#### Features

- Balanced high peel strength and high shear strength in the -67°F/-55°C to 300°F/149°C service temperature range.
- Balanced flow, enabling use of one adhesive for honeycomb and metal to metal applications.
- Allows from 230°F/110°C to 350°F/177°C cure, which broadens material application and widens shop floor processing.
- Excellent environmental resistance.
- Optimized reticulation properties.
- Long out-time facilitates shop floor usage and repair applications.
- Wide cure and process tolerance. Oven curable (under vacuum or pressure).

#### Product Detail

Product Name	Hysol EA 9686.03 UNS	Hysol EA 9686.03 N.W.	Hysol EA 9686.060 K	Hysol EA 9686.085 K
Color	Maroon	Maroon	Maroon	Maroon
Carrier	Unsupported	Polyester Non Woven	Polyester Knit	Polyester Knit
Tack	Moderate	Moderate	Moderate	Moderate
Weight	0.03 psf/146 g/m <sup>2</sup>	0.03 psf/146 g/m <sup>2</sup>	0.060 psf/293 g/m <sup>2</sup>	0.085 psf/415 g/m <sup>2</sup>

#### 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 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** – This product 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 facing 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 90 days  
 @ 90°F/32°C at least 45 days

**Curing** – This product may be cured for 60-90 minutes at 250°F/121°C or for 60-90 minutes at 350°F/177°C. Heat up rate to the cure temperature is not critical, but should be between 1°F to 10°F (0.6°C to 5.6°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 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.

**250°F/121°C Cure - Bond Strength Performance**

Film weight:	0.060 Knit (293 g/m <sup>2</sup> )	0.030 Non Woven (146 g/m <sup>2</sup> )
Carrier:	Polyester Knit	Non Woven
Cure:	275°F, 90 min, 45 psi (135°C, 90min, 310kpa)	275°F, 90 min, 45 psi (135°C, 90min, 310kpa)
Substrate:	2024 T3 Bare PAA	2024 T3 Bare PAA
Primer:	None	None

**Tensile Lap Shear**

Tensile lap shear strength tested per ASTM D1002 after curing as shown below. Adherends are 2024-T3 bare aluminum treated with phosphoric acid anodizing per ASTM D3933.

<u>Test Temperature °F/°C</u>	<u>Typical Results psi/Mpa</u>	
	<u>0.060 psf Knit</u> (293 g/m <sup>2</sup> )	<u>0.030 psf NW</u> (146 g/m <sup>2</sup> )
77/25	5175/36	4700/32
212/100	3770/26	3770/26
212/100 Wet	2230/15	-----
250/121	2600/18	2580/18

**90° Floating Roller Peel**

Tested per ASTM D3167. Adherends are 2024-T3 Alclad aluminum treated with phosphoric acid anodizing per ASTM D3933

**Test Temperature °F / °C**

**Typical Results lb/in - N/25mm**

.060 psf Knit (293 g/m<sup>2</sup>)

77/25  
212/100

55/245  
55/245

**KGR 1 Stress/Strain**

Test Temperature °F/°C

Ultimate Stress psi/MPa

Strain to Failure in/in

Shear Modulus ksi

77/25

6500/45

0.77

94.0/647

180/82

4600/32

0.94

78.3/539

**Bulk Resin Properties**

Tg @ Knee dry – Cured 1 hour @ 250°F/121°C

271°F/133°C

Tg Tan Delta dry – Cured 1 hour @ 250°F/121°C

298°F/148°C

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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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