



Technical Process Bulletin

LOCTITE EA 9628 AERO

Epoxy Film Adhesive

(KNOWN AS Hysol EA 9628)

INTRODUCTION

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

FEATURES

- 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 - LOCTITE EA 9628 AERO 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 LOCTITE 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 - LOCTITE EA 9628 AERO 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 - LOCTITE EA 9628 AERO 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.



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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/m²).

Typical Results

Test Temperature, °F/°C	Knit Support Cured 1 hr @ 250°F/121°C		Non-Woven Support Cured 1.5 hrs @ 235°F/113°C	
	psi	MPa	psi	MPa
-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

Test Temperature, 75°F/25°C	Knit Support Cured 1 hr @ 250°F/121°C		Non-Woven Support Cured 1.5 hrs @ 235°F/113°C	
	psi	MPa	psi	MPa
Specimen Exposure				
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 at 77°F/25°C	6,500	44.8	-	-
JP-4 Jet fuel - 7 days at 77°F/25°C	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



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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**Knit Support****Cured 1 hr @ 250°F/121°C**

Test Temperature, °F/°C	<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 D3933.

Typical Results**Knit Support****Cured 1 hr @ 250°F/121°C****Non-Woven Support****Cured 1.5 hrs @ 235°F/113°C**

Test Temperature, °F/°C	<u>in-lb/in</u>	<u>N-25mm</u>	<u>in-lb/in</u>	<u>N-25mm</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**Knit Support****Cured 1 hr @ 250°F/121°C****Non-Woven Support****Cured 1.5 hrs @ 235°F/113°C**

Test Mode	<u>lb/in</u>	<u>N/m</u>	<u>lb/in</u>	<u>N/m</u>
Glc	8	1401	14.3	2504
Gla	6	1051	10.4	1821
Glsc (5 weeks)	-	-	6.1	1068
Glsc (15 weeks)	-	-	4.0	700



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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**

Test Temperature, °F/°C	Knit Support Cured 1 hr @ 250°F/121°C		Non-Woven Support Cured 1.5 hrs @ 235°F/113°C	
	<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

Flatwise Tension Strength**Typical Results**

Test Temperature, °F/°C	Knit Support Cured 1 hr @ 250°F/121°C		Non-Woven Support Cured 1.5 hrs @ 235°F/113°C	
	<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	
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 (by DMTA)	90.5 ksi	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



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Handling Precautions

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

DISPOSAL INFORMATION

Dispose of spent remover and paint residue per local, state and regional regulations. Refer to HENKEL TECHNOLOGIES MATERIAL SAFETY DATA SHEET for additional disposal information.

PRECAUTIONARY INFORMATION

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.

Before using this product refer to container label and HENKEL TECHNOLOGIES MATERIAL SAFETY DATA SHEET for additional precautionary, handling and first aid information.

Note

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