



# Hysol® EA 9330

## Epoxy Paste Adhesive

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### Description

Hysol EA 9330 is a two-component paste adhesive, which is easily mixed and has high peel strength. This room temperature cure system has good environmental resistance and bonds to a variety of substrates.

### Features

Two Component System  
Tolerant of Bondline Thickness Variations  
Room Temperature Cure  
High Peel Strength  
Excellent Environmental Resistance

### Uncured Adhesive Properties

	<u>Part A</u>	<u>Part B</u>	<u>Mixed</u>
Color	Cream	Amber	Cream
Viscosity, 77°F	700-900 Poise	15 Poise	
Brookfield, HBT	Spdl 5 @ 10 rpm	Spdl 1 @ 20 rpm	
Viscosity, 25°C	70-90 Pa·S	1.5 Pa·S	
Brookfield, HBT	Spdl 5 @ 1.05 rad/sec	Spdl 1 @ 2.09 rad/sec	
Density (g/ml)	1.20	1.03	1.15
Shelf Life			
(from date of shipment)			
@ <40°F/4°C	1 year	1 year	
@ <77°F/25°C	1 year	1 year	
@ <90°F/33°C	1 year	1 year	

This material will normally be shipped at ambient conditions, which will not alter our standard warranty, provided that the material is placed into its intended storage upon receipt. Premium shipment is available upon request.

### Handling

*Mixing* - This product requires mixing two components together just prior to application to the parts to be bonded. Complete mixing is necessary. The temperature of the separate components prior to mixing is not critical, but should be close to room temperature (77°F/25°C).

Note: Volume measurement is not recommended for structural applications unless special precautions are taken to assure proper ratios.

<u>Mix Ratio</u>	<u>Part A</u>	<u>Part B</u>
By Weight	100	33

*Pot Life* (100 gm mass) 60 minutes  
 Method - ASTM D 2471 in water bath.

**Application**

*Mixing* - Combine Part A and Part B in the correct ratio and mix thoroughly. THIS IS IMPORTANT! Heat buildup during or after mixing is normal. Do not mix quantities greater than 450 grams as dangerous heat buildup can occur causing uncontrolled decomposition of the mixed adhesive. TOXIC FUMES CAN OCCUR, RESULTING IN PERSONAL INJURY. Mixing smaller quantities will minimize the heat buildup.

*Applying* - Bonding surfaces should be clean, dry and properly prepared. For optimum surface preparation consult the Hysol Surface Preparation Guide. The bonded parts should be held in contact until the adhesive is set. Handling strength for this adhesive will occur in 24 hours @ 77°F/25°C, after which the support tooling or pressure used during cure may be removed. Since full bond strength has not yet been attained, load application should be small at this time.

*Curing* - Hysol EA 9330 may be cured for 5 to 7 days @ 77°F/25°C to achieve normal performance. Accelerated cures up to 200°F/93°C (for small masses only) may be used as an alternative. For example, 1 hour @ 180°F/82°C will give complete cure.

*Cleanup* - It is important to remove excess adhesive from the work area and application equipment before it hardens. Denatured alcohol and many common industrial solvents are suitable for removing uncured adhesive. Consult 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 chromic acid etch.

<u>Test Temperature, °F/°C</u>	<u>Typical Results (psi/MPa)</u>		
	<u>Cured 7 days @</u> <u>77°F/25°C</u>	<u>Cured 2 hrs @</u> <u>180°F/82°C</u>	<u>Cured 1 hr @</u> <u>250°F/121°C</u>
-67/-55	5,000/34.5	6,000/41.3	6,000/41.3
77/ 25	5,000/34.5	6,000/41.3	6,300/43.4
180/82	1,000/ 6.9	1,100/ 7.6	1,200/ 8.3

*Effect of Surface Preparation* on Tensile Lap Shear @ 77°F/25°C. Substrates are 2024-T3 Alclad aluminum:

<u>Surface Preparation</u>	<u>Cured 7 days @</u> <u>77°F/25°C</u>	<u>Cured 2 hrs @</u> <u>180°F/82°C</u>	<u>Cured 1 hr @</u> <u>250°F/121°C</u>
MEK Wiped	3,900/26.9	4,300/29.6	5,600/38.6
Sand Blasted	4,400/30.3	5,100/35.1	5,200/35.8
Wire Brushed	4,100/28.2	4,500/31.0	5,300/36.5

<u>After Exposure to the following conditions*:</u>	<u>Cured 7 days @</u> <u>77°F/25°C</u>	<u>Cured 2 hrs @</u> <u>180°F/82°C</u>	<u>Cured 1 hr @</u> <u>250°F/121°C</u>
Control, 77°F/25°C	5,500/37.9	6,300/43.4	6,500/44.8
77°F/25°C Water - 30 days	3,700/25.5	4,400/30.3	4,400/30.3
120°F/49°C-100% RH - 30 days	4,300/29.6	4,100/28.2	3,900/26.9
Anti-icing FI - 7 days	5,500/37.9	6,200/42.7	6,000/41.3
Hydraulic Oil - 7 days	5,600/38.6	6,400/44.1	6,600/45.5
JP-4 Fuel - 7 days	5,800/40.0	6,100/42.0	6,300/43.4
Salt Spray - 105°F/41°C - 30 days	3,500/24.1	3,500/24.1	3,700/25.5

Skydrol 500 - 7 days	5,700/39.3	6,100/42.0	6,300/43.4
TT-S-735 - 7 days	5,300/36.5	5,900/40.7	5,800/40.0

\*Test temperature on all exposure tests is 77°F/25°C

*Effect of Primer on Tensile Lap Shear properties:*

<u>Test Temperature, °F/°C</u>	<u>Primer</u>		
	<u>None</u>	<u>EA 9202(A)</u>	<u>EA 9202(B)</u>
-67/-55	5,300/36.5	5,600/38.6	5,400/37.2
77/ 25	5,500/37.9	5,100/35.1	5,600/38.6
180/82	1,000/ 6.9	1,500/10.3	1,900/13.1

Primer Thickness:	0.3 mils/.008 mm
Primer Flash:	1 hr @ 77°F/25°C
Primer Bake:	(A) 1 hr @250°F/121°C
	(B) 1 hr @ 325°C/163°C
Adhesive Cure:	7 days @ 77°F/25°C

*Effect of Bondline Thickness on Tensile Lap Shear @ 77°F/25°C (Cure: 7 days @ 77°F/25°C):*

<u>Bondline Thickness (mils/mm)</u>	<u>Typical Results (psi/MPa)</u>
4/0.10	5,200/35.8
10/0.25	5,000/34.5
20/0.51	4,500/31.0
30/0.76	4,500/31.0
40/1.02	4,400/30.3
50/1.27	4,100/28.2

*Peel Strength*

T-Peel strength tested per ASTM D1876 after curing as shown below. Adherends are 2024-T3 Alclad aluminum treated with chromic acid etch.

<u>Test Temperature, °F/°C</u>	<u>Typical Results (lb/in-N/25 mm)</u>		
	<u>Cured 7 days @ 77°F/25°C</u>	<u>Cured 2 hrs @ 180°F/82°C</u>	<u>Cured 1 hr @ 250°F/121°C</u>
77/ 25	35/156	46/205	46/205

*Bell Peel Strength*

<u>Test Temperature, °F/°C</u>	<u>Typical Results (lb/in-N/25 mm)</u>		
	<u>Cured 7 days @ 77°F/25°C</u>	<u>Cured 2 hrs @ 180°F/82°C</u>	<u>Cured 1 hr @ 250°F/121°C</u>
77/ 25	92/409	97/431	106/471

*Metal to Metal Climbing Drum Peel*

<u>Test Temperature, °F/°C</u>	<u>Typical Results (in•lb/in - M•n/m)</u>		
	<u>Cured 7 days @ 77°F/25°C</u>	<u>Cured 2 hrs @ 180°F/82°C</u>	<u>Cured 1 hr @ 250°F/121°C</u>
77/ 25	58/258	99/440	92/409

*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 180°F/82°C.

### Henkel QC Acceptance Testing

This data sheet provides users with typical properties obtained from this adhesive. These values are not meant to be used to develop aerospace QC acceptance testing. Users interested in establishing values and tests for routine QC acceptance should request our internal specification (DAS), which provides detail test methods and values used to certify this adhesive.

### Bulk Resin Properties

*Tensile Properties* - tested using 0.125 inch/3.18 mm castings per ASTM D 638. Specimens were cured 7 days @ 77°F/25°C.

	<u>Typical Results</u>
Tensile Strength, psi / MPa @77°F/25°C	5,600 / 38.6
Tensile Modulus, ksi / MPa @77°F/25°C	384 / 2,646
Elongation at Break, % @77°F/25°C	2.4
Barcol Hardness @ 77°F/25°C,#935 Impressor	65
T <sub>g</sub>	135°F / 57°C
Shear Modulus ksi / MPa	140 / 965
Poisson's Ratio	0.41

*Compressive Properties* - tested using 0.5 inch/12.7 mm castings per ASTM D 695.

Compressive Strength, psi @ 77°F/MPa @ 25°C	7,700/53.1
Compressive Modulus, ksi @ 77°F/MPa @ 25°C	253/1743

*Electrical Properties* - tested per ASTM D149, D150

	<u>100 Hz</u>	<u>1 KHz</u>	<u>10 KHz</u>	<u>100 KHz</u>
Dielectric Constant	4.50	4.38	4.23	3.96
Dissipation Factor	0.025	0.020	0.032	0.056
Volume Resistivity @ 77°F/25°C, 500 Volts, 1.0 minute electrification	1.59x10 <sup>14</sup> Ohms-CM			
Surface Resistivity @ 77°F/25°C, 500 Volts, 1.0 minute electrification	1.59x10 <sup>14</sup> Ohms			

### 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.

**PART A**

**WARNING!** The uncured adhesive causes eye irritation and may cause skin irritation or allergic dermatitis. Contains epoxy resins.

**PART B**

**DANGER!** Causes severe skin and eye burns. Vapors may be irritating to the respiratory tract.

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Rev. 4/11

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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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