

LOCTITE EA 9313 AERO

Epoxy Paste Adhesive

(KNOWN AS Hysol EA 9313)

INTRODUCTION

LOCTITE EA 9313 AERO is a low viscosity, two component paste adhesive designed for bonds requiring flexibility. The low viscosity of the mixed system allows it to be injected into pre-assembled parts. The flexibility of the cured adhesive makes it useful for bonding dissimilar substrates. LOCTITE EA 9313 AERO can also be used as a laminating resin and for potting small assemblies.

FEATURES

- High Peel Strength
- Room Temperature Cure
- Pourable Low Viscosity
- Flexible Bondlines
- Excellent Low Temperature Properties

Uncured Properties

	<u>Part A</u>	<u>Part B</u>	<u>Mixed</u>
Color	Off-White	Red	Pink
Viscosity @ 77°F Brookfield, HBT	130-240 Poise Spdl 3 @ 20 rpm	0.25-0.45 Poise Spdl 1 @ 100 rpm	6-15 Poise LVF, Spdl 1 @ 60 rpm
Viscosity @ 25°C Brookfield, HBT	13-24 Pa·S Spdl 3 @ 2.09 rad/s	0.025-0.045 Pa·S Spdl 1 @ 10.5 rad/s	0.6-1.5 Pa·S LVF, Spdl 3 @ 6.28 rad/s
Density, g/ml	1.11	1.01	1.09
lbs/gallon	9.3	8.4	9.1
Shelf Life @ <77°F/25°C	1 year	1 year	

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: One of the components in the EA 9313 is temperature sensitive which results in the crystallization of the Part A when stored at 40°F/4°C or below. The material can be warmed and will melt back into solution. Heat the Part A at 120°F/49°C for 1-2 hours, allow the material to cool to ambient and then hand mix with a spatula. Henkel has validated through testing that the Part A can be heated at 120°F/49°C for 1-2 hours and then re-mixed without impacting the product performance.

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Mix Ratio	<u>Part A</u>	<u>Part B</u>
By Weight	100	25
By Volume	3.5	1.0

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

Pot Life (200 gram mass) 60 minutes @ 77°F/25°C
Method - ASTM D 2471 in water bath.

Peak Exotherm (250 gram mass) 370°F/188°C @ 70 minutes
Method - ASTM D2471 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 LOCTITE Surface Preparation Guide. The bonded parts should be held in contact until the adhesive is set. Handling strength for this adhesive will occur in 8 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.

Handling Strength (lap shear >500 psi):

<u>Cure Time</u>	<u>Test Temperature, °F/°C</u>
8 hours	77/25
75 minutes	100/38
30 minutes	140/60
5 minutes	200/93

Curing - LOCTITE EA 9313 AERO may be cured for 5 days @ > 77°F/25°C to achieve normal performance. Accelerated cures up to 180°F/82°C (for small masses only) be used as an alternative. For example, 1 hour at 180°F/82°C will give complete cure.

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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 for 5 days @ 77°F/25°C. Adherends are 2024-T3 AlClad aluminum treated with phosphoric acid anodized per ASTM D3933.

<u>Test Temperature, °F/°C</u>	<u>Typical Results</u>	
	<u>psi</u>	<u>MPa</u>
-67/-55	4,200	28.9
77/25	4,500	31.0
140/60	900	6.2
160/71	600	4.1

Peel Strength

Floating Roller Bell Peel strength tested per ASTM D3167 after curing for 5 days @ 77°F/25°C. Adherends are 2024-T3 AlClad aluminum treated with phosphoric acid anodized per ASTM D3933.

<u>Test Temperature, °F/°C</u>	<u>Typical Results</u>	
	<u>ln/lb</u>	<u>N/25 mm</u>
77/ 25	60	267

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 120°F/49°C.

Bulk Resin Properties

Tensile Properties - tested using 0.125 inch/3.18 mm castings per ASTM D638.

Tensile Strength, @77°F/25°C	6,300 psi	45 MPa
Tensile Modulus, @77°F/25°C	330 ksi	2274 MPa
Elongation at Break, % @77°F/25°C	8.0	
Shore D Hardness @ 77°F/25°C	80	
T _g	120°F	49°C
Shear Modulus, DRY @ 77°F/25°C	129 ksi	889 MPa
Poisson's Ratio	0.36	



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Compressive Properties - tested using 0.5 inch/12.7 mm castings per ASTM D695.

Compressive Strength, @77°F/25°C	9,040 psi	62.3 MPa
Compressive Modulus, @77°F/25°C	263 ksi	1812 MPa

Electrical Properties - tested per ASTM D149, D150

Dielectric Constant, 1 KHz, 77°F/25°C	3.86
Dissipation Factor, 1 KHz, 77°F/25°C	0.012

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. Empty containers retain product residue and vapors so obey all precautions when handling empty containers.

PART A

CAUTION! This material may cause eye and skin irritation or allergic dermatitis. It contains epoxy resins.

PART B

WARNING! This material causes eye and skin irritation or allergic dermatitis. It contains amines.

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





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