



Technical Process Bulletin

LOCTITE EA 9309NA AERO Epoxy Paste Adhesive (KNOWN AS Hysol EA 9309NA)

INTRODUCTION

LOCTITE EA 9309NA AERO is a toughened adhesive ideal for bonding metal, wood, plastics and glass. Bonds are flexible and resist water, salt spray and most common fluids. Its outstanding feature is excellent peel strength to aluminum.

FEATURES

- High Peel Strength
- Bonds Many Surfaces
- Room Temperature Cure
- Two Component

Uncured Properties

	<u>Part A</u> Beige	<u>Part B</u> Red	<u>Mixed</u> Red
Color			
Viscosity @ 77°F Brookfield, HBT	1,500 - 6,000 Poise Spdl 7 @ 20 rpm	0.2-0.5 Poise Spdl 1 @ 100 rpm	120 Poise Spdl 4 @ 20 rpm
Viscosity @ 25°C Brookfield, HBT	150 - 600 Pa·s Spdl 7 @ 2.1 rad/s	0.02-0.05 Pa·s Spdl 1 @ 10.5 rad/s	12 Pa·s Spdl 4 @ 2.1 rad/s
Density (g/ml)	1.15	1.00	1.1
Shelf life @ <77°F/25°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).

Mix Ratio	<u>Part A</u>	<u>Part B</u>
By Weight	100	23

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

Pot Life (450 gram mass) 40 minutes @ 77°F/25°C
Method - ASTM D2471 in water bath.





LOCTITE EA 9309NA AERO Epoxy Paste Adhesive (KNOWN AS Hysol EA 9309NA)

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 1 pound/ 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 BONDERITE Surface Preparation Guide. The bonded parts should be held in contact until the adhesive is set. Handling strength for this adhesive will occur in 12 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 - This adhesive may be cured for 3 - 5 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 with your supplier's information pertaining to the safe and proper use of solvents.

Bond Strength Performance

Tensile Lap Shear Strength - tested per ASTM D1002. Adherends are aluminum as referenced and treated with Phosphoric Acid Anodizing (PAA) per ASTM D3933.

Typical Results

Test Temperature, °F/°C	7075-T3 Alclad / PAA 3 days @ 77°F/25°C		2024-T3 Alclad / PAA 1 hour @ 180°F/82°C	
	psi	MPa	psi	MPa
-67/-55	4,000	27.6	6700	46.2
77/25	5,000	34.5	6100	42.1
180/82	600	4.1	1300	9.0
77/25 (Hot/Wet)	-	-	5700	39.3
750 hours @ 160°F/71°C & 85% RH	-	-	-	-

Floating Roller (Bell) Peel Strength - tested per ASTM D3167. Adherends are aluminum as referenced and treated with Phosphoric Acid Anodizing (PAA) per ASTM D3933. Bondline line thickness 10 mils.

Typical Results

Test Temperature, °F/°C	2024-T3 Alclad / PAA 24 hours @ 77°F/25°C under 28 in-Hg		2024-T3 Bare / PAA 1 hour @ 180°F/82°C under 10 psi	
	lbf/in	N/25mm	lbf/in	N/25mm
77/25	89	396	85	378





Technical Process Bulletin

LOCTITE EA 9309NA AERO Epoxy Paste Adhesive (KNOWN AS Hysol EA 9309NA)

T-Peel Strength - tested per ASTM D1876 after curing for 24 hours @ 77°F/25°C under 28 in-Hg. Adherends are 2024-T3 Alclad aluminum treated with phosphoric acid anodizing per ASTM D3933. Bondline line thickness 10 mils.

<u>Test Temperature, °F/°C</u>	<u>Typical Results</u>	
	<u>lbf/in</u>	<u>N/25mm</u>
77/25	46	205

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 160°F/71°C.

Bulk Resin Properties

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

Shore D Hardness - Durometer Model D ASTM D2240.

Tensile Properties: Cure 72 hours @ 77°F/25°C & Tested @ 77°F/25°C

▪ Tensile Strength	4,500 psi	31.0 MPa
▪ Tensile Modulus	338 ksi	2,331 MPa
▪ Shear Modulus	122 ksi	841 MPa
▪ Poisson's Ratio	0.38	
▪ Elongation at Break	10%	
▪ Shore D Hardness	80	

Thermal Property

Glass Transition Temperature (T_g) - Rheometric Scientific DMTA IV - Single Cantilever,

Heat-up rate: 5°C/min., Frequency: 1 Hz, Strain: 0.1%

Specimen Dimensions: 1 inch/25.4 mm x 0.49 inch/12.4 mm x 0.063 inch/1.6 mm

Cure: 72 hours @ 77°F/25°C

▪ T _g dry (DMTA)	127°F	53°C
▪ T _g wet (DMTA)	147°F	64°C

Cure: 1 hour @ 180°F/82°C

▪ T _g dry (DMTA)	162°F	72°C
▪ T _g wet (DMTA)	145°F	63°C

*Wet: 160°F/71°C & 85% RH until saturation. Moisture uptake was 2.5%.





Technical Process Bulletin

LOCTITE EA 9309NA AERO

Epoxy Paste Adhesive

(KNOWN AS Hysol EA 9309NA)

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

Compressive Strength @ 77°F/25°C	7,000 psi	48.2 MPa
Compressive Modulus @ 77°F/25°C	249 ksi	1,716 MPa

Electrical Properties - tested per ASTM D149, D150.

Dielectric Constant, 1 KHz, 77°F/25°C	4.29
Dissipation Factor, 1 KHz, 77°F/25°C	0.016

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.



Technical Process Bulletin

LOCTITE EA 9309NA AERO

Epoxy Paste Adhesive

(KNOWN AS Hysol EA 9309NA)

Note

The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, **Henkel Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Henkel Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.

Rev. 7/2013



Authorized Distributor

1-800-375-0605

www.rudolphbros.com

Henkel Corporation Aerospace | 2850 Willow Pass Road | Bay Point, CA 94565
PHONE: +1.925.458.8000 | FAX: +1.925.458.8030 | www.henkel.com/aerospace

Trademark usage

Except as otherwise noted, all trademarks in this document are trademarks of Henkel Corporation in the U.S. and elsewhere. ® denotes a trademark registered in the U.S. Patent and Trademark Office.

The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, **Henkel Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Henkel Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.

