Technical Process Bulletin

LOCTITE EA 9396 AERO
Epoxy Paste Adhesive
(KNOWN AS Hysol EA 9396)

INTRODUCTION
LOCTITE EA 9396 AERO is a low viscosity, room temperature curing adhesive system with excellent strength properties at temperatures from -67°F to 350°F (-55°C to 177°C). LOCTITE EA 9396 AERO has a shelf life of one year when stored @ 77°F/25°C for separate components. Qualified to MMM-A-132, Rev B, Type 1, Class 3.

FEATURES
- Low Viscosity
- Room Temperature Cure
- Room Temperature Storage
- High Strength at Low and High Temperatures

Uncured Properties

	Part A	Part B	Mixed
Color	Aqua - Blue	Light Amber Red - Purple	Green to Dark Purple
Viscosity @ 77°F	700 Poise	0.9 Poise	35 Poise
Brookfield, HBT	Spdl 4 @ 10 rpm	Spdl 1 @ 100 rpm	Spdl 1 @ 20 rpm
Viscosity @ 25°C	70 Pa·S	0.09 Pa·S	3.5 Pa·S
Brookfield, HBT	Spdl 4 @ 2.1 rad/s	Spdl 1 @ 10.5 rad/s	Spdl 1 @ 2.1 rad/s
Density (g/ml)	1.17	0.98	1.14
Shelf life			
@ <40°F/4°C	1 year	1 year	
@ <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).

Mix Ratio	Part A	Part B
By Weight	100	30

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

Pot Life (100 gram mass) 120 minutes @77°F/25°C
Method - ASTM D2471 in water bath.

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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 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 - This adhesive may be cured for 3 to 5 days @ 77°F/25°C to achieve normal performance. Accelerated cures of 1 hour @ 150°F/66°C may be used.

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 Bare aluminum treated with phosphoric acid anodized per ASTM D3933.

Test Temperature °F/°C	Typical Results					
	Cure 5 days @ 77°F/25°C		Cure 1 hr @ 150°F/66°C		Cure 30 min @ 180°F/82°C	
	psi	MPa	psi	MPa	psi	MPa
-67/-55	3,300	22.8	3,300	22.8	3,500	24.1
77/25	3,500	24.1	4,000	27.6	4,000	27.6
180/82	3,200	22.0	3,300	22.8	3,300	22.8
300/149	1,800	12.4	1,800	12.4	1,900	13.1
350/177	1,250	8.6	1,200	8.3	1,200	8.3

Peel Strength

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

Test Temperature	Typical Results	
°F/°C	lb/in	N/25mm
77/25	25	111
180/82	20	89

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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 350°F/177°C.

Bulk Resin Properties
Electrical Properties - tested per ASTM D149, D150.

	0.1 KHz	1.0 KHz	10.0 KHz
Dielectric Constant	4.17	4.12	3.97
Dissipation Factor	0.006	0.017	0.031

Volume Resistivity	2.14×10^{15} (ohm-cm)
Surface Resistivity	3.17×10^{14} (ohm)
Thermal Conductivity	5.01×10^{-4} (cal/sec x cm x deg C)
Coefficient of Thermal Expansion (Alpha)	70.7 µm/m°C @ 40°C 108.0 µm/m°C @ 100°C
Shore D Hardness, @77°F/25°C	80

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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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.

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