Hysol® EA 9396

Epoxy Paste Adhesive

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Description

Hysol EA 9396 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). Hysol EA 9396 has a shelf life of one year when stored @ 77°F/25°C for separate components. Qualified to MMM-A-132, Rev A, Type 1, Class 3.

Features

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

Uncured Adhesive Properties

	Part A	Part B	Mixed
Color	Aqua-Blue	Light Amber Red - Purple (Gardner color 17+)	Green to Dark Purple
Viscosity @ 77°F	400 - 1,400 Poise	0.7 - 1.1 Poise	35 Poise
Brookfield, HBT	Spdl 4 @ 10 rpm	Spdl 1 @ 100 rpm	Spdl 1 @ 20 rpm
Viscosity @ 25°C	80 Pa·S	0.1 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)	1.19	1.00	1.14
Shelf life			
@ <40°F/4°C	1 year	1 year	
@ <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	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 (450 g mass) 75 - 90 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 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 - 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.

	Typical Results					
Test Temperature	**Cure**		**Cure**		**Cure**	
°F/°C	**5 days @ 77°F/25°C**		**1 hour @ 150°F/66°C**		**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

Specifications

The above values are typical results under ideal conditions. To establish certification values, please refer to the Henkel Aerospace Specification which defines quality control test values, methods and procedures. For a copy of the Henkel Aerospace Specification, contact Henkel's Literature Desk at (925) 458-8000.

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.

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 the Henkel Aerospace Specification (LAS) which provides detail test methods and values used to certify this adhesive.

Bulk Resin Properties

	psi	MPa
Tensile Strength @ 77°F/25°C	8,000	35.2
Tensile Modulus @ 77°F/25°C	400,000	2,750

	%
Elongation at Break @ 77°F/25°C	3.4

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.

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.

Hysol® is a registered trademark of Henkel Corporation.

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