Hysol® EA 9313

Epoxy Paste Adhesive

Description
Hysol EA 9313 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. Hysol EA 9313 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 Adhesive Properties

	Part A	Part B	Mixed
Color	Off-White	Red	Pink
Viscosity @ 77°F	230 Poise	0.04 Poise	12 Poise
Brookfield, HBT	Spdl 3 @ 20 rpm	Spdl 1 @ 100 rpm	Spdl 1 @ 20 rpm
Viscosity @ 25°C	23 Pa·S	0.4 Pa·S	1.2 Pa·S
Brookfield, HBT	Spdl 3 @ 2.09 rad/s	Spdl 1 @ 10.5 rad/s	Spdl 1 @ 2.09 rad/s
Density g/ml	1.13	1.01	1.10
Pounds/Gallon g/l	9.4/1130	8.4/1010	9.2/1100
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.

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

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	25
By Volume	3.5	1.0

Pot Life (450 gm mass): 60 minutes
Method - ASTM D 2471 in water bath.

Peak Exotherm (250 gm 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 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 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):
8 hrs @ 77°F/25°C, or
75 min @ 100°F/38°C, or
30 min @ 140°F/60°C, or
5 min @ 200°F/93°C

Curing - Hysol EA 9313 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**.**

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.

	Typical Results	
Test Temperature, °F/°C	**psi**	**MPa**
-67/-55	4,200	28.9
77/ 25	4,000	27.6
140/60	900	6.2
160/71	600	4.1

Peel Strength

T-Peel strength per ASTM D1876 after curing for 5 days @ 77°F/25°C. Adherends are 2024-T3 clad aluminum treated with phosphoric acid anodized per ASTM D3933.

	Typical Results	
Test Temperature, °F/°C	**In/lb**	**N/25 mm**
77/ 25	59	262

Service Temperature
Service temperature is defined as that temperature at which this adhesive still retains 1000 psi (6.9 MPa) using test method ASTM D 1002 and is 120°F/49°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 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	76	
T_g	120°F	49°C
Shear Modulus, DRY @ 77°F/25°C	129 ksi	889 MPa
Poisson's Ratio	0.36	

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.

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! As with most epoxy based systems, 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. Prolonged or repeated exposure may cause allergic skin reactions. Vapors may be irritating to the respiratory tract.

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