Technical Process Bulletin

LOCTITE EA 9380.05 AERO Epoxy Paste Adhesive

(KNOWN AS Hysol EA 9380.05)

INTRODUCTION

LOCTITE EA 9380.05 AERO is a low temp curing two-part adhesive that can be applied to large parts via a controlled meter mix operation or via dual cartridge static mixer kits. LOCTITE EA 9380.05 AERO offers the strength, toughness and high temperature resistance of heat curing film adhesives with greater flexibility and ease of use. Fully cures after 2 hours at 180°F/82°C.

FEATURES

- Low temp curing two-part adhesive
- Meter mixable
- High strength, toughness and high temp resistance
- Prebond humidity resistant

Benefits

- Long assembly times
- Facilitates automated application
- Film type properties in paste form
- No surface carbonation

Uncured Adhesive Properties

	Part A	Part B	Mixed
Color	Black	White	Grey
Mix Ratio			
by volume	100	50	
by weight	100	45	
Density, g/cc	1.12	1.00	1.06
Viscosity @ 86°F/30°C[1]	300-1500 poise	700-2500 poise	
	30-150 Pa·s	70-250 Pa·s	
Working Life @ 75°F/25°C[2]	-	-	3 hours
Surface Carbonation	-	-	None
Vertical Slump @ 75°F/25°C	-	-	2.0 inches
▪ 0.5 inch/12.7 mm thick			51 mm
Shelf life @ 0°F/-18°C	1 year	1 year	
@ <40°F/4°C	1 year	1 year	
@ 77°F/25°C	4 months	1 year	

Footnotes:

1. Measured using parallel plate Rheometry. Measurements made at 10 rad/sec.
2. Time available for part assembly with retention of complete adhesive properties, measured in 0.016/0.4 mm thick layer

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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	45
By Volume	100	50

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

Application

Mixing - Combine Part A and Part B in the correct ratio and mix thoroughly. Heat build-up during or after cure is normal. Maximum temperature recorded in a 1 lb / 450 g mass was 100°F/38°C.

Applying - Bonding surfaces should be clean, dry and properly prepared. For optimum surface preparation consult the LOCTITE Surface Preparation Guide. Material may pre-heated to 86°F/30°C to improve flow when dispensing from dual cartridge containers.

Curing - This adhesive may be cured at temperatures at or above 180°F/82°C. The recommended range is 180°F/82°C to 220°F/80°C for 120 minutes.

Cleanup - It is important to remove excess adhesive from the work area and application equipment before it hardens. Acetone 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 Shear Strength

Tensile lap shear strength tested per ASTM D1002 after curing 2 hours @ 200°F/93°C. Adherends are 2024-T3 Bare aluminum, phosphoric acid anodized per ASTM D3933.

	Typical Results	
Test Temperature, °F/°C	psi	MPa
-67/-55	4,000	27.5
77/25	5,100	35.0
180/82	4,000	27.5
250/121	1,750	12.0

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Floating Roller Peel

Floating roller peel tested per ASTM D3167 after curing 2 hours @ 200°F/93°C. Adherends are 2024-T3 Bare aluminum, phosphoric acid anodized per ASTM D3933.

Typical Results

Test Temperature, °F/°C	lb/in	N/25mm
77/25	50	220

Bond Strength Performance

Composite Bonding - Single Slotted Lap Shear

- Prepreg BMS 8-276 CFRP Unitape
- LOCTITE EA 9895 AERO Wet Peel Ply as the Surface Prepartion

	Test Temperature		Test Results	
Specimen Exposure	°F	°C	psi	MPa
Initial Dry	-67	-55	5127	35.4
	75	25	5860	40.4
	180	82	4015	27.7
30 days @ 160°F/70°C & 85% R.H.	75	25	6186	42.7
	180	82	3272	22.6

Service Temperature

Service temperature is defined as being the onset of the glass transition using a 2 hour @ 200°F/93°C cure. The service temperature is 250°F/121°C.

Bulk Resin Properties

Adhesive Cure: 2 hrs. @ 200°F/93°C

Shore D Hardness @ 77°F/25°C	85	
Density, g/cm^3	1.04	
Tg Dry	223°F	106°C
Tg Wet (2000 hrs. @ 71°C/ 85% R.H.)	192°F	89°C

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Film Comparisons

	LOCTITE EA 9380.05 AERO	LOCTITE EA 9628 AERO	LOCTITE EA 9696 AERO
Form	Paste	Supported Film	Supported Film
Film Weight, psf (g/m^2)	-	0.060 (293)	0.060 (293)
Support Fabric	None	Non-woven	Non-woven
Adhesive Cure	2 hrs. @ 200°F/93°C	1.5 hrs. @ 235°F/113°C	1 hr. @ 250°F/120°C
Adherends	2024-T3 AlClad, PAA, BR127	2024-T3 Bare, PAA, BR127	2024-T3 Bare, PAA, BR127
Tensile Lap Shear, psi (MPa)			
-67°F/-55°C	4,000 (27.5)	5,500 (37.9)	6,700 (46.2)
77°F/25°C	5,100 (35.0)	5,800 (40.0)	6,300 (43.5)
180°F/82°C	4,000 (27.5)	5,100 (35.2)	4,550 (31.8)
250°F/120°C	1,750 (12.0)	2,100 (14.5)	2,200 (15.2)
Tensile Lap Shear Hot/Wet, psi (MPa) ▪ 2000 hrs. @ 160°F/70°C & 85% R.H. ▪ Tested @ 180°F/82°C	2,100 (14.5)	2,650 (18.3)	2,750 (19.0)
Bell Peel Tested @ 75°F/25°C, lb/in (N/25mm)	50 (220)	55 (240)	80 (350)
Glass Transition Temperature (Tg), °F (°C) ▪ As Cured ▪ Water Saturated, 160°F/70°C @ 85% RH	 223 (106) 192 (89)	 230 (110) 180 (82)	 225 (107) 200 (93)

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.

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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.

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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