Service Bulletin SB-0036

Epic Aircraft, LLC ◆ 22590 Nelson Road ◆ Bend OR 97701
Phone: 541-318-8849 ◆ Fax: 541-382-5125 ◆ Web: www.epicaircraft.com

Subject: Rudder Trailing Edge Void Repair

ATA-Code: 27-20

Labor: Varies

Effectivity: K003 – K029

Affected Model(s): E1000, E1000 GX

Due: On Condition*

Compliance: Recommended ☐ Mandatory ☒

Recurrence: No

*** Compliance with this service bulletin is dependent on the results of SB-0031. Contact Epic Aircraft with the results of SB-0031 before proceeding with this repair.**

https://epicaircraft.com/customer-support/
customersupport@epicaircraft.com

1 BACKGROUND AND PURPOSE:

In accordance with SB-0031, a tap test and ultrasonic inspection is to be completed on the rudder trailing edge bond line of Serial Numbers K003 – K029 among the E1000 Fleet. If the inspection from SB-0031 shows a void totaling less than 27" in length along the bonded joint, comply with this Service Bulletin to repair the void.

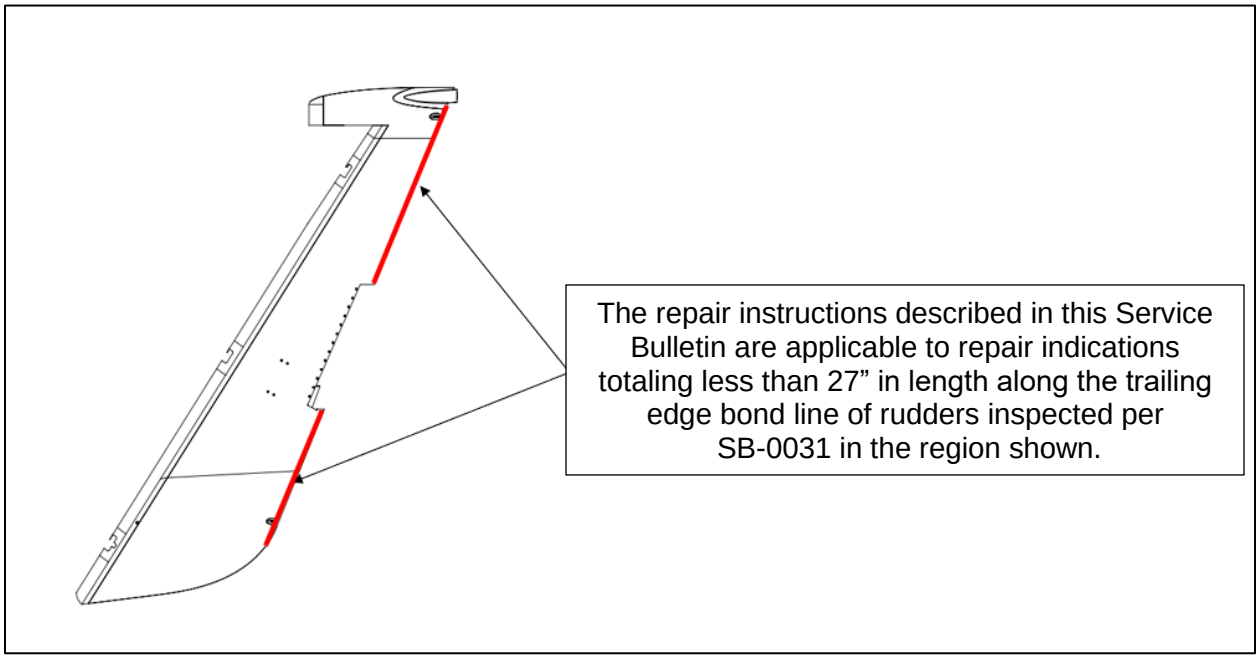

Figure 1: Applicable Region

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2 REFERENCES:

Epic E1000 Airframe Maintenance Manual, PN SK05000000

3 WARRANTY:

Aircraft warranty is not affected if work is performed IAW this Service Notification. The work outlined in this service notification is covered under warranty.

4 APPROVAL:

The engineering aspects of this service document have been shown to comply with the applicable Federal Aviation Regulations and are FAA approved.

5 REVISION:

A: If the original issue of this service bulletin was complied with, compliance with revision A is not required.

- Bond void length allowed to be 27” instead of less than 12”.
- Grammar/format changes.
- Note saying adhesive sample cup must pass prior to returning aircraft to service.
- Added a related note to “Record Compliance” section.
- Added Caution note before step 6.
- Added LSP mesh layup step, materials, and bagging section.

6 TOOLS:

No.	Description	Qty	Epic Aircraft Supplied	Customer Supplied
1.	Common Hand Tools	A/R	☒	☒
2.	Thermocouples J or K Type	1	☐	☒
3.	Portable bonding and repair controller and heaters capable of recording time and temperature data	1	☐	☒

7 PARTS/MATERIALS:

No.	Part Number	Description	Qty	Epic Aircraft Supplied	Customer Supplied
1.	-	Aluminum Oxide, 80-220 Grit Sandpaper	A/R	☐	☒
2.	7447	Scotch-Brite General Purpose Pad	A/R	☐	☒
3.	W200	White Cotton Flock	A/R	☐	☒
4.	Loctite EA 9360 Aero	Type 1 Bonding Paste	A/R	☐	☒
5.	Imron AF740	Clearcoat	A/R	☐	☒
6.	Imron AF700, color Epic White 4192016	Basecoat	A/R	☐	☒
7.	8989S	Accelerator	A/R	☐	☒
8.	13100S	Activator	A/R	☐	☒
9.	-	Isopropyl Alcohol, 99%	A/R	☐	☒
10.	Hermitex 300 or Kimtech P2 or DuPont Sontara AC9165A	Wiping Cloth	A/R	☐	☒
11.	-	Paper, Non-lined or Plastic Mixing Cups	A/R	☐	☒
12.	1220S	Primer	A/R	☐	☒
13.	-	Stir Sticks	A/R	☐	☒
14.	416	Metal Glaze	A/R	☐	☒
15.	McMaster-Carr # 7519A47	2” long, 0.187” Diameter Plastic Syringe	A/R	☐	☒
16.	Vacuum sealant tape	Pucky Tape	A/R	☐	☒
17.	Vacuum Bag	Polyolefin Film	A/R	☐	☒
18.	Expanded Copper Foil	3CU7-100FA, CU040CX36, or CU195F	A/R	☐	☒
19.	Bleeder Lease B	Nylon, .11 cm, 450°F maximum use temperature	A/R	☐	☒
20.	Breather Cloth	Polyester mat (non-woven), 4 to 10 oz/sq. yd, with a minimum use temperature of 350°F	A/R	☐	☒
21.	Rhino 1307-LV Resin	Repair Resin	A/R	☐	☒
22.	Rhino 3176 Medium Hardener	Repair Resin Hardener	A/R	☐	☒

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8 INSTRUCTIONS:

8.1 Repair Instructions

1. Set the BATT 1 and BATT 2 switches to OFF.
2. Remove all external electrical power from the airplane (refer to Epic E1000 Aircraft Maintenance Manual, PN SK05000000, chapter 24-40).
3. Remove the rudder (refer to Epic E1000 Aircraft Maintenance Manual, PN SK05000000, chapter 55-40).
4. Place the rudder on a suitable work surface.
5. Remove the paint from the indicated area at the rudder trailing edge, refer to Figure 2.

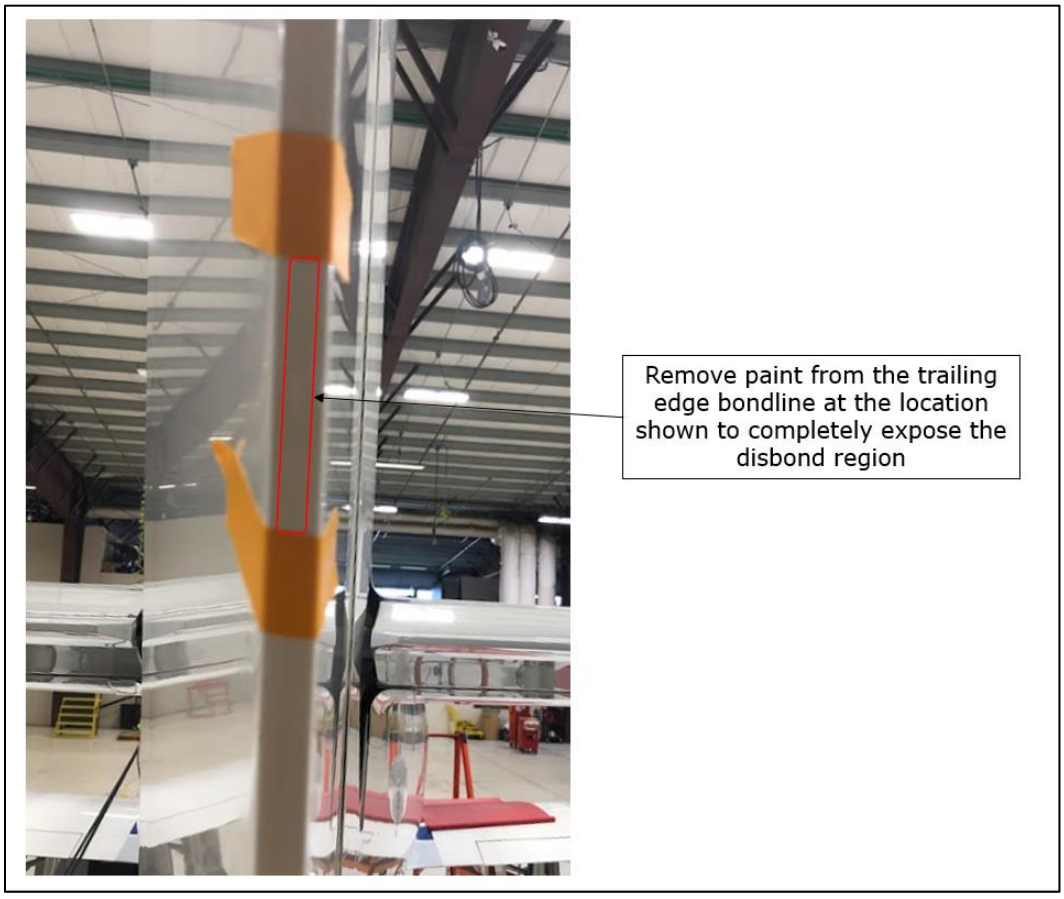

Figure 2: Paint Removal Region

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CAUTION: Take care not to damage internal trim tab structure if trimming the bondline directly above or below the bondline.

6. Working from the trailing edge, carefully remove the adhesive and damaged material in the voided region. Adhesive removal is to extend 0.125" above and below the disbonded/void area until all disbonded/voided adhesive is removed. The total length of trimmed regions should not exceed 27". If more than 27" of trimming is required, contact Epic. It is acceptable to trim carbon fiber laminate skin structure from the trailing edge to expose the discrepant area, but ensure the final dimension from the edge of the trimmed region to the outboard facing surfaces of the Rudder Skin are not reduced below 0.050" on either side. Refer to Figure 3 for material removal limits and region.

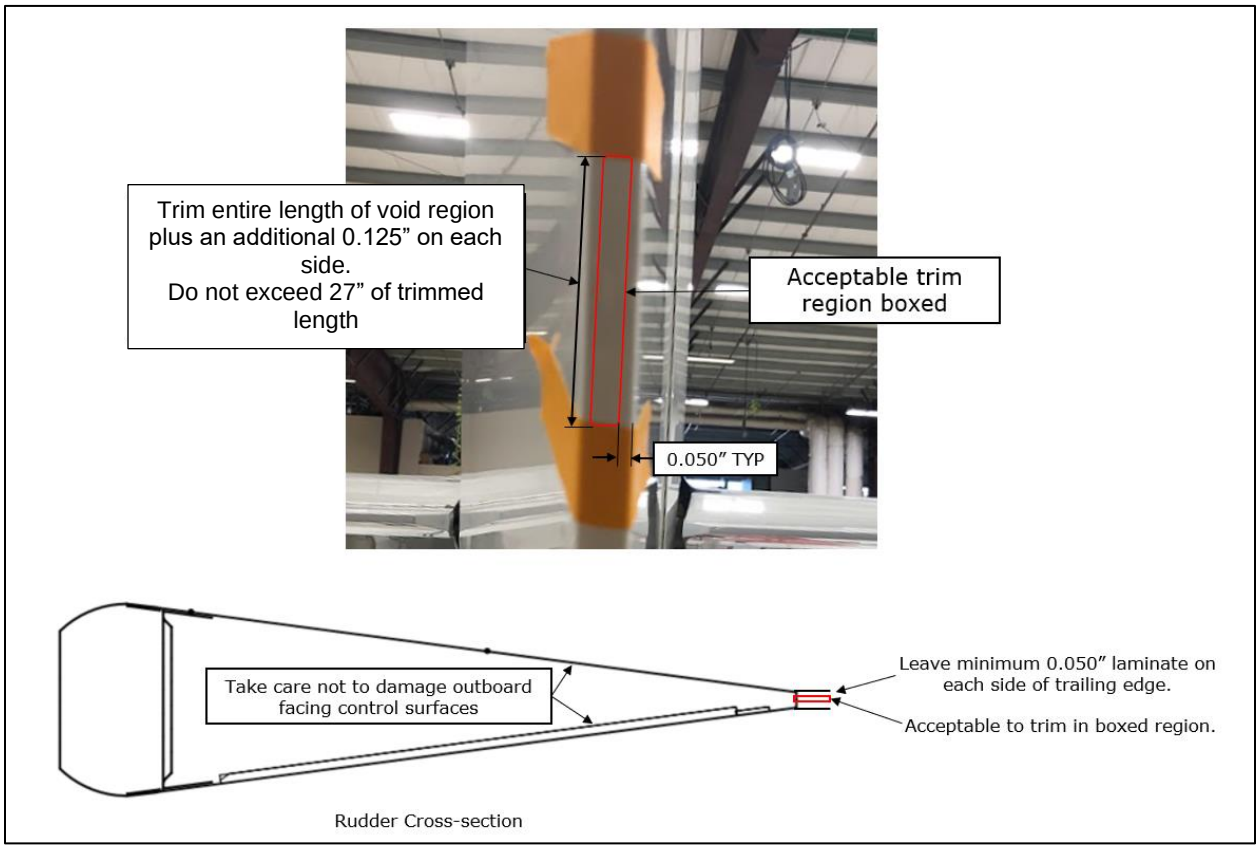

Figure 3: Material Removal Limits

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7. Trim the trailing edge of the rudder in the void region as needed to provide access to the bond line. It is acceptable to trim laminate from the trailing edge but do no reduce the distance between the edge of the trimmed region and the outward facing surface of the rudder skin below 0.050". See Figure 3 for material removal region.
8. Report the location and final dimensions of the material removal region to Epic via email to *customersupport@epicaircraft.com* for review. Include photos as required for clarity.
9. Clean and surface prep the remnant adhesive and exposed inner surface of the Rudder Skin along the length of the material removal region as follows:
    a. Wash the surface with isopropyl alcohol.
    b. Abrade the surface with 80 - 150 grit sandpaper.
    c. Remove abrading dust with a vacuum before dry-wiping the surface with a clean, dry, lint-free cloth.
    d. Final clean the surface by thoroughly wetting the surface with isopropyl alcohol then immediately wiping with a clean, dry, lint-free cloth in a single stroke. After each wipe, turn the drying cloth to a clean surface.

Note: It is acceptable to perform surface prep operations listed above using a stir stick with the appropriate cloth, sandpaper or alcohol wipe attached to the end.

10. Mix Loctite EA 9360 Aero Bonding paste at a ratio of 100:43 by weight (Part A: Part B). Mix for a minimum of two minutes until a uniform color is achieved. Take care to scrape the sides of the container and mix such that air bubbles are not introduced to the paste. Transfer the Mixed resin to a separate container (aka "double cup") prior to the addition of any fillers.
11. Fill a 2" long 0.187" diameter plastic syringe (item 15) with neat (not mixed with flock) EA 9360 Aero Bonding paste for use as a sample cup. The sample cup is to be cured with the repair in all subsequent curing steps.

Note: Set aside a small amount of neat (not mixed with flock) EA 9360 Aero Bonding paste for use in step 13. Enough paste should be set aside to apply a thin layer on the remnant adhesive and exposed laminate in the repair region.

12. Add cotton flock filler at a ratio of 8% by weight to Loctite EA9360 Aero Bonding paste mixed in step 10.

Note: The pot life of Loctite EA 9360 Aero bonding paste is determined by the environmental temperature and humidity. See Section 8.2 of this document to determine pot life and complete all bonding steps within the allowable timeframe.

13. Within the pot life of the bonding paste, wet out the surface of repair region using neat EA 9360 Aero Bonding paste. Apply paste in a thin layer on the remnant adhesive and exposed laminate in the repair region.
14. Within the pot life of the bonding paste, completely fill the repair region with the bonding paste-cotton flock mix.

Note: Take care to apply adhesive such that no air bubbles or discontinuities are introduced to the repair region. Orient the Rudder with the trailing edge facing up to ease with the repair process.

15. Cure as follows:
    a. Cure for 24 hours at room temperature, or
    b. Cure by applying an air temperature ramp from ambient to 95 deg F at a max rate of 3 deg per minute. Once 95 deg is reached maintain air temperature at 95 deg +/- 5 deg for 120 minutes before allowing to cool.
16. Visually inspect the repair region for defects and complete an ultrasonic inspection to verify joint continuity, refer to SB-0031 for the ultrasonic test procedure.
17. Final cure as follows
    a. Apply air temperature ramp from ambient (100°F or lower) to 160±10°F at a max rate of 5°F per minute.
    b. Maintain the air temperature at 160±10°F for a minimum of 90 minutes.
    c. Cool down the air temperature to 110°F or lower at a max rate of 5°F per minute before allowing to cool.
18. Return the sample cup fabricated in step 11 to Epic Aircraft to verify passing adhesive Tg requirements.

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a. Include a parts tag on sample with the airplane N number and serial number, date, person performing the work, shop performing the work, aircraft hours, and oven cure data.

b. Send to:

Epic Aircraft
22590 Nelson Road
Bend, OR 97701
Attn: Epic Engineering

Note: The adhesive MUST PASS the lab test prior to returning the aircraft to service.

19. Repair lightning strike mesh in the repair region. Mesh repair shall wrap the Rudder trailing edge and extend onto both the left and right Rudder Skins. (Refer to Epic E1000 Aircraft Maintenance Manual, PN SK05000000, chapter 51-20). If applying vacuum during the mesh repair refer to Section 7.3 of this document.
20. Prep, prime and paint the repair (refer to Epic E1000 Aircraft Maintenance Manual, PN SK05000000, chapter 51-20).
21. Check the weight and balance of the rudder and re-balance as needed. (Refer to Epic E1000 Aircraft Maintenance Manual, PN SK05000000, chapter 55-40).
22. Install the rudder (refer to Epic E1000 Aircraft Maintenance Manual, PN SK05000000, chapter 55-40).

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8.2 Facility Qualifications

Mix and apply Loctite EA 9360 Aero Bonding Paste within the pot life defined in the following Figure. The pot life is shown in minutes; 50 minutes for green, 30 minutes for yellow, and no bonding allowed for red.

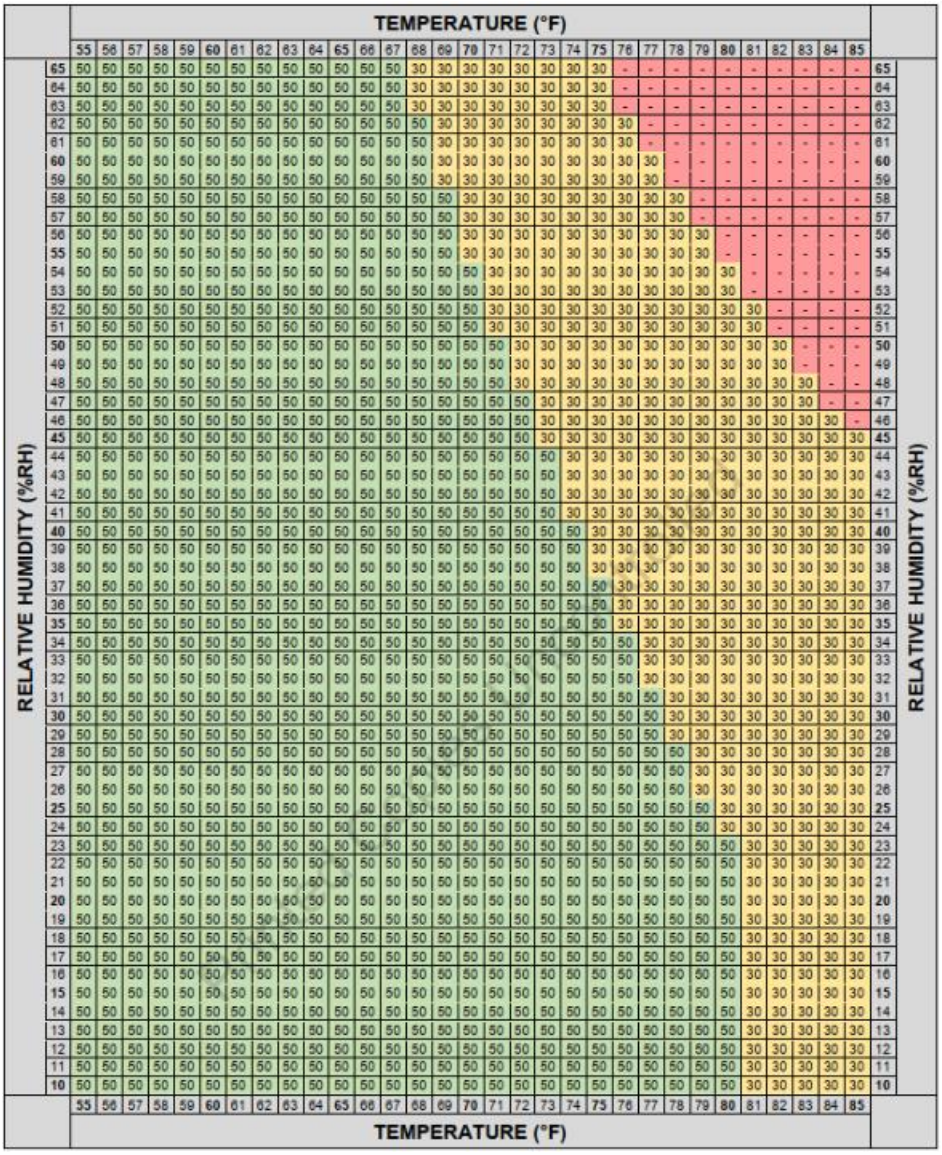

Figure 4: Loctite EA 9360 Aero Bonding Paste Pot Life Requirements

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8.3 Vacuum Bagging Instructions

1. Place one layer of perforated release film over the laminate. Extend the film beyond the repair region.
2. Released or Teflon taped caul plates may be directly applied to the surface of the part. Pressure intensifiers are to be placed on top of the release film.
3. Place synthetic breather over the entire part. Extend the breather material to just inside where the vacuum bag sealant tape will be located.
4. Prepare vacuum port pads for inclusion into the bagging material stack-up using the following guidelines:
    a. The vacuum port pads should be roughly four by four inches and two to four plies of synthetic breather.
    b. Place vacuum pad ports on top of the breather material.
    c. Place the bottom portion of the vacuum port on the port pads. Vacuum ports can float in a pleat as long as the port is far enough above the part to prevent suction down on the part.
5. Place vacuum bag sealant tape around the periphery of the lay-up.

Note: Do not remove the paper release layer from the sealant tape at this time.

6. Place a vacuum bag over the top of the entire lay-up. Extend the bag beyond the perimeter of the vacuum bag sealant tape.
7. Tack the bag to top of the vacuum bag sealant tape on one side of the lay-up.
8. Pleat the bag to allow the bag to fit in the contours and corners of the part.
9. Attach the upper portion of the vacuum port to the lower portion by cutting a hole through the bagging film directly over the bottom portion at both locations.
10. Attach a static vacuum gage at one of the ports and a vacuum line to the other vacuum port(s) and slowly evacuate the bagged lay-up, making sure to minimize wrinkles in the bagging film.
11. Once the vacuum stabilizes, perform a leak check.

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12. Perform the leak check as follows:
    a. Pull a vacuum.
    b. Isolate the system, wait two minutes and record the initial vacuum level.
    c. Wait five additional minutes and record the change (drop) in vacuum.
    d. Acceptable leakage rate is 3.0 inches of mercury or less in five minutes.
    e. If the leakage rate is greater than 3.0 inches of mercury in five minutes, locate the leak and repair as required.
    f. Repeat the leak check, until the acceptable leakage rate is achieved.

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9 WEIGHT AND BALANCE:

Negligible

10 PUBLICATIONS AFFECTED:

N/A

11 RECORD COMPLIANCE:

Make appropriate entry in airplane maintenance records. Do not return aircraft to service until you have verified the adhesive lab testing per step #18.

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Appendix A: Compliance Letter

Please complete and mail this form to Customersupport@epicaircraft.com

This is to certify that I have completed the work in accordance with the Epic Aircraft, LLC Service Instruction.

Aircraft Owner Information:
Date: _____ Aircraft Serial Number: _____ Aircraft Reg. Number: _____ Owner's Name: _____
Maintenance Entity Information
Name of Shop Performing the work: _____ Name of Person(s) Performing inspection and/or work: _____ Phone Number: _____ Email: _____