Service Instruction SI-0025

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

Subject: K019 Rudder Trailing Edge Void Repair

ATA-Code: 27-20

Labor: Varies

Effectivity: K019

Affected Model(s): E1000, E1000 GX

Due: Before the Next Flight

Compliance: Recommended ☐ Mandatory ☒

Recurrence: No

1 BACKGROUND AND PURPOSE:

Inspection of the Rudder Trailing Edge Bondline on SN K0019 completed per SB-0031 found 2 unbonded regions, defined as Condition 1 and Condition 2 below.

Condition 1: Void region 8.5” long by 0.5” wide beginning 1.5” below the Rudder Trim Tab Cutout.

Condition 2: Void region 6.0” long by 0.5” wide beginning 14” below the Rudder Trim Tab Cutout.

See the following Figure 1 for the global location and detailed view of the conditions.

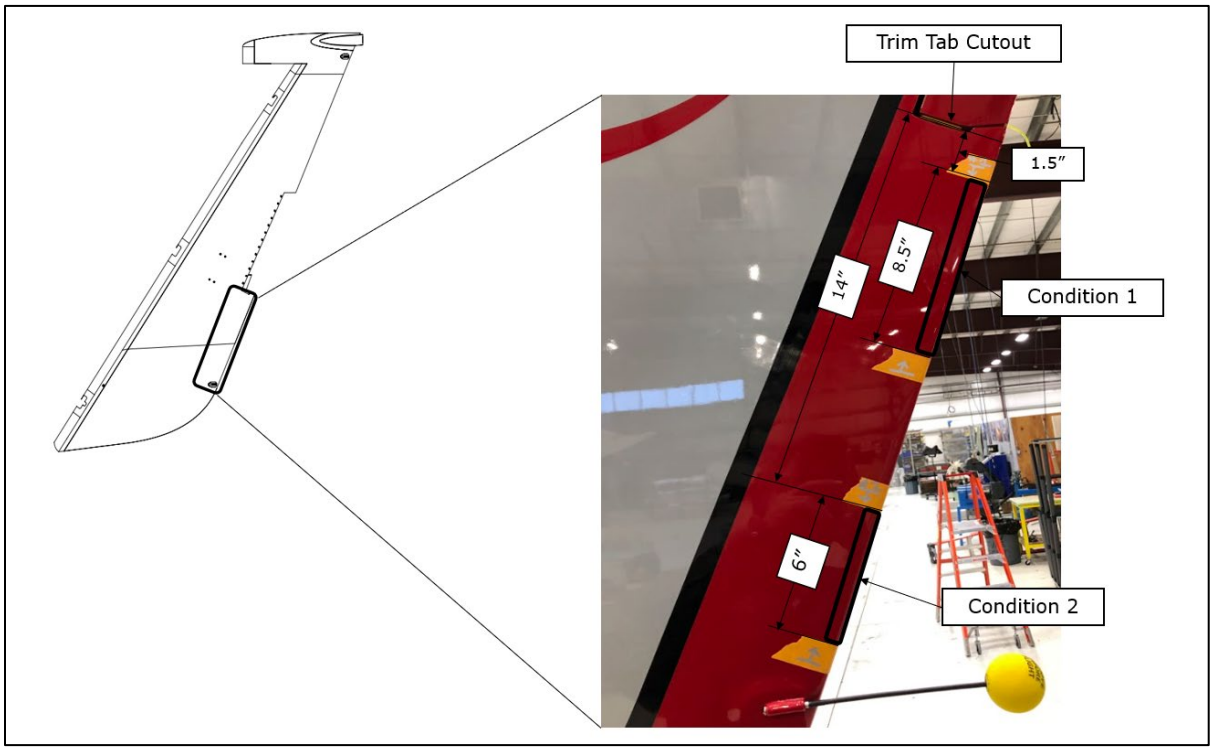

Figure 1: Conditions 1 and 2 View

This Service Instruction provides repair instructions for the conditions described above.

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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 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	☐	☒

6 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	☐	☒

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7 INSTRUCTIONS:

7.1 Repair Instructions

1. Set the BATT 1 and BATT 2 switches to OFF.
2. Remove 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 for both conditions 1 and 2. See Figure 2 for paint removal region.

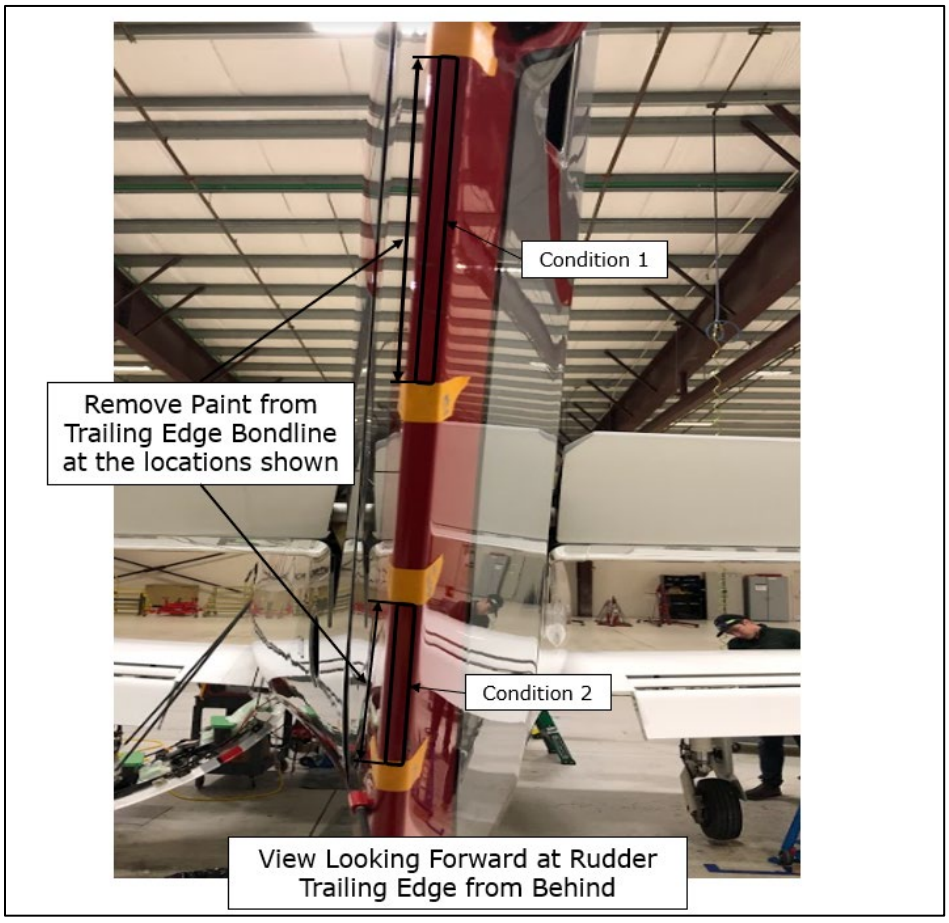

Figure 2: Paint Removal Region

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6. Working from the trailing edge, carefully remove the adhesive and damaged material in the voided region for both conditions 1 and 2. Adhesive removal is to extend 0.125" above and below the disbonded/void area until all disbonded/voided adhesive is removed. 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.

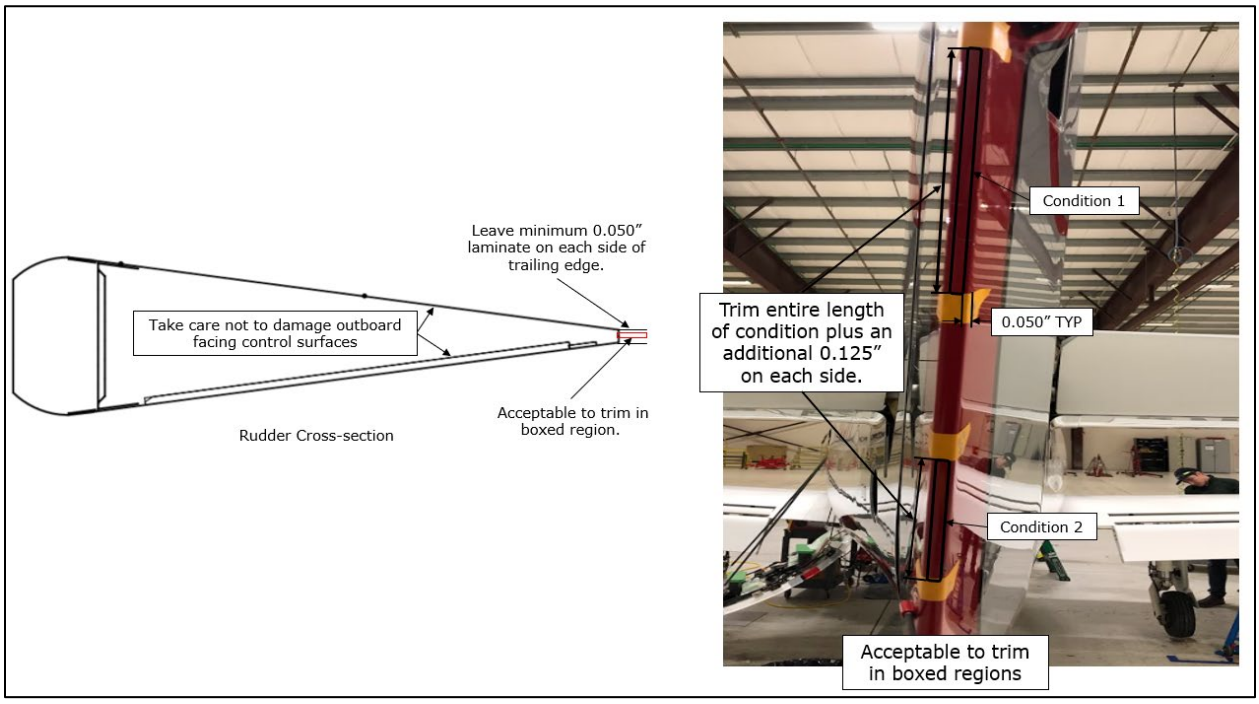

Figure 3: Material Removal Limits

7. Trim the trailing edge of the rudder in the void region as needed to provide access to the bond line at both conditions. 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. Clean and surface prep the remnant adhesive and exposed inner surface of the Rudder Skin along the length of the material removal region at both conditions 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.

9. 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.
10. 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 12. Enough paste should be set aside to apply a thin layer on the remnant adhesive and exposed laminate in the repair region.

11. 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 7.2 of this document to determine pot life and complete all bonding steps within the allowable timeframe.

12. Within the pot life of the bonding paste, wet out the surface of repair region for both conditions using neat EA 9360 Aero Bonding paste. Apply paste in a thin layer on the remnant adhesive and exposed laminate in the repair region.
13. Within the pot life of the bonding paste, completely fill the repair region for both conditions 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.

14. 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.

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15. Visually inspect the repair region for defects and complete an ultrasonic inspection to verify joint continuity at both conditions, refer to SB-0031 for the ultrasonic test procedure.
16. 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.
17. Return the sample cup fabricated in step 10 to Epic Aircraft to verify passing adhesive Tg requirements.
    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

18. Prep, prime and paint the repair (refer to Epic E1000 Aircraft Maintenance Manual, PN SK05000000, chapter 51-20).
19. 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).
20. Install the rudder (refer to Epic E1000 Aircraft Maintenance Manual, PN SK05000000, chapter 55-40).

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7.2 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.

RELATIVE HUMIDITY (%RH)	TEMPERATURE (°F)																													RELATIVE HUMIDITY (%RH)
	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	
65	50	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30	30	30	30	-	-	-	-	-	-	-	-	-	-	65
64	50	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30	30	30	30	-	-	-	-	-	-	-	-	-	-	64
63	50	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30	30	30	30	-	-	-	-	-	-	-	-	-	-	63
62	50	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30	30	30	30	-	-	-	-	-	-	-	-	-	-	62
61	50	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30	30	30	30	-	-	-	-	-	-	-	-	-	-	61
60	50	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30	30	30	30	30	-	-	-	-	-	-	-	-	-	60
59	50	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30	30	30	30	30	-	-	-	-	-	-	-	-	-	59
58	50	50	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30	30	30	30	30	-	-	-	-	-	-	-	-	58
57	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30	30	30	30	30	-	-	-	-	-	-	-	57
56	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30	30	30	30	30	-	-	-	-	-	-	56
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54	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30	30	30	30	30	30	-	-	-	-	-	54
53	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30	30	30	30	30	30	-	-	-	-	-	53
52	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30	30	30	30	30	30	30	-	-	-	-	52
51	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30	30	30	30	30	30	30	-	-	-	-	51
50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30	30	30	30	30	30	30	-	-	-	50
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12	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30	12
11	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30	11
10	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30	10
	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	
	TEMPERATURE (°F)																															

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

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8 WEIGHT AND BALANCE:

Negligible

9 PUBLICATIONS AFFECTED:

N/A

10 RECORD COMPLIANCE:

Make appropriate entry in airplane maintenance records.

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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: _____