



# SERVICE DIRECTIVE BULLETIN

SERVICE DIRECTIVE BULLETIN NO. T-061  
Revision 1  
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DATE:            October 29, 2019

1.    SUBJECT:    Lower Air Plenum Assembly Wedge Vane
2.    MODEL:       480 and 480B
3.    EFFECTIVITY: All
4.    BACKGROUND:

Enstrom has received reports of failure of the adhesive bond between the lower air plenum wedge vane and the plenum wall, causing the wedge vane to become loose or dislodged entirely during flight. Enstrom has established a preventive measure that includes applying fiberglass patches around the base of the wedge vane to ensure components and material used in the assembly of the lower plenum do not loosen and enter into the engine system. (The lower plenum wedge vane is depicted in Figure 1.)



*Figure 1. Lower Plenum Wedge Vane*

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This Service Directive Bulletin (SDB) requires inspecting the bond between the wedge vane and the plenum wall and repairing the bond as necessary as defined in Paragraph 6.

5. COMPLIANCE:

At the next 100 hr/annual inspection, check for bond failure between the wedge vane and the lower plenum wall. If the bond is sound or there are only minor voids, no further action is required. Check for voids of significance using a 0.010 inch (.25 mm) feeler gauge by attempting to insert it between the flange of the plenum wedge vane and the plenum interior wall. If there are significant voids in the adhesive, repair the wedge vane bond in accordance with Paragraph 6.4. If the bond has severely degraded, fully remove the wedge vane and re-install in accordance with Paragraph 6.3.

6. PROCEDURE:

**NOTE: Perform all maintenance in accordance with the TH-28/480 Series Maintenance Manual (MM).**

**NOTE: The following steps address the plenum fiberglass procedure based on the Preferred Products List (see Table 1). Alternate materials and products may be used based on field availability. See Table 2 for guidance in choosing alternate materials and products.**

**In the event that alternate materials and products are used for the procedure, follow the manufacturer's recommended instructions for application. If alternate materials and products are used, the Enstrom Helicopter Warranty Policy is null and void. Enstrom Helicopter Corporation will not assume liability for the fiberglass procedure in the event that alternate materials and products are used.**

6.1 Obtain access to the Lower Plenum

6.1.1 Remove baggage box door and left side cowl skin. (Figure 2)

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Figure 2. Left Cowl Skin and Baggage Box Door

6.1.2 Remove baggage box bulkhead and upper shelf assemblies. (Figure 3)



Figure 3. Baggage Box Bulkhead and Upper Shelf Assemblies

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- 6.1.3 Remove oil cooler inlet duct and left hand cowl frame. Removal of the cowl frame will require detaching the left side of the lower cowl assembly and removal of the baggage box closeout. This is not required for an inspection, only if a repair is to be made. (Figure 3 & 4)

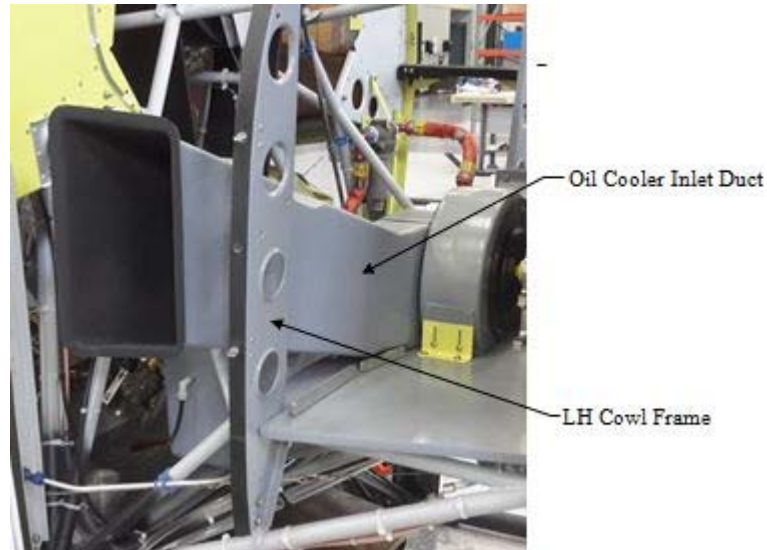


Figure 4. Oil Cooler Inlet Duct

- 6.1.4 Loosen the top and bottom clamps retaining the upper and lower boots of the left and right duct to the upper and lower plenums and slide the clamps out of the way. Roll the boots onto the ducts and remove them from the aircraft. (Figure 5 – shows left duct only)

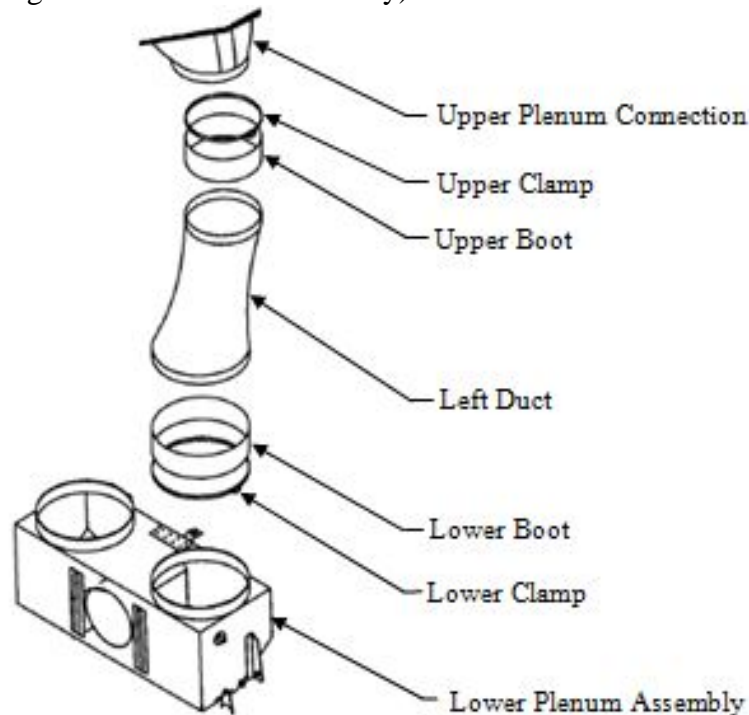


Figure 5. Upper and Lower Plenum Duct Connections

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- 6.1.5 The lower plenum is now accessible from the right and left duct openings as shown in Figure 6.

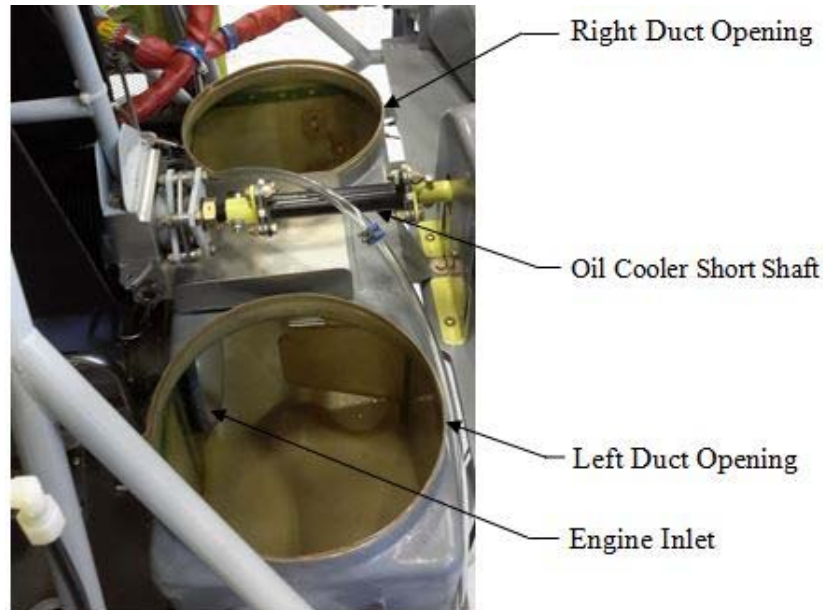


Figure 6. Lower Plenum Duct Openings

### CAUTION

Protect or cover the engine inlet so that foreign object debris (FOD) does not enter the inlet.

**NOTE:** Minimal amount of component removal is described herein. However, additional cowl panels may be removed to aid access to the repair area. To remove the lower plenum, remove the oil cooler short shaft and oil cooler blower shelf. If the oil cooler short shaft is removed it will require re-alignment. For blower shaft alignment refer to TH-28/480 Series Maintenance Manual, paragraph 11-17, D.

- 6.2 Inspect the bond area for voids and dis-bonded areas.
- 6.2.1 Check for voids using a 0.010 inch (.25 mm) feeler gauge by attempting to insert it between the flange of the plenum wedge vane and the plenum interior wall.
- 6.2.2 If 50% or more of the area is dis-bonded or has voids, remove and re-bond the wedge vane by completing steps defined paragraphs 6.3 and 6.4.
- 6.2.3 If 10% or more but less than 50% of the area is dis-bonded or has voids, reinforce the joint in accordance with steps 6.4.
- 6.2.4. If less than 10% of the area is dis-bonded or has voids, no further action is required.

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- 6.3 If 50% or more of the bond between the wedge vane and the plenum wall is degraded per criteria defined in step 6.2, refer to steps 6.3.1 thru 6.3.7 for instructions to remove and re-bond the wedge vane.
- 6.3.1 Cut or grind the boded area at the exit end of the wash tube free of the wedge vane. Using a sharp putty knife, slice the remaining bonded surface of the wedge vane from the lower plenum wall and remove it. Inspect the flanges of the wedge vane and the mating surface of the lower plenum for any damage. If the wedge vane or lower plenum is damaged beyond repair, replace either or both of them as needed. Remove all loose material from the bonding surfaces.
- 6.3.2 Using 60-80 grit abrasive paper/cloth, scuff the surface of the lower plenum where the original adhesive (green) was applied (Figure 7). Also, scuff the flange of the wedge where it attaches to the lower plenum. Continue scuffing until most of the green adhesive residue is removed while minimizing removal of the base fiberglass.



*Figure 7. Original Adhesive*

- 6.3.3 Locate the wedge vane in its original position against the lower plenum wall and carefully match drill seven  $\text{\O}0.096$  inch (2.5 mm) holes thru the wedge vane and plenum wall. Position the holes approximately  $\frac{5}{16}$  inch (8 mm) from the outer edge of the wedge vane flange and spaced as shown in Figure 8.

**CAUTION:** Do not drill into or through any structure or systems behind the plenum.

- 6.3.4 Thoroughly clean the scuffed and drilled mating surfaces of the lower plenum, wedge vane, and the wash tube with isopropyl alcohol or equivalent.

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- 6.3.5 Prepare the Loctite 9359.3 adhesive in accordance with the manufacturer's instructions and apply the mixture to the plenum surface.

**NOTE: Lubricate the ends of the clecos with grease to prevent bonding to the assembly.**

- 6.3.6 Position the wedge vane securely against the plenum wall. Ensure the entire flange surface is in contact with the adhesive and no gaps occur between the wedge vane flange and the plenum wall. Cleco the wedge vane to the plenum wall using holes drilled in step 6.3.3. Apply adhesive around the wash tube where it exits the wedge vane to seal any air gap. Clean up any excess adhesive prior to adhesive cure.

- 6.3.7 Allow the adhesive to cure for 24 hours before removing clecos and proceeding to step 6.4.

6.4 Reinforce the bond between the wedge vane and the plenum wall as follows:

- 6.4.1 Using 60-80 grit abrasive paper/cloth, scuff the outside surface of the wedge vane flanges and approximately 1 inch (25 mm) from the edge of the flanges onto the adjacent lower plenum wall.

**NOTE: It is not necessary to scuff along the bottom edge of the wedge vane.**

- 6.4.2 Thoroughly clean the scuffed areas with isopropyl alcohol or equivalent.

**NOTE: For the following procedures, refer to Paragraph 7, Table 1 and Table 2 for the preferred and alternate materials for fiberglass and resin.**

- 6.4.3 Prepare four strips of fiberglass cloth approximately 1.75 inch (44 mm) wide and long enough to cover the side and top flanges of the wedge vane.

- 6.4.4 Prepare the resin in accordance with the manufacturer's instructions and bond the fiberglass strips to the wedge vane flanges and plenum wall using the prepared resin.

- 6.4.5 Ensure the fiberglass strips are saturated with resin and clean up any excess resin prior to the resin curing.

- 6.4.6 Allow the resin to cure for a minimum of 12 hours. Full cure is achieved in 48 hours.



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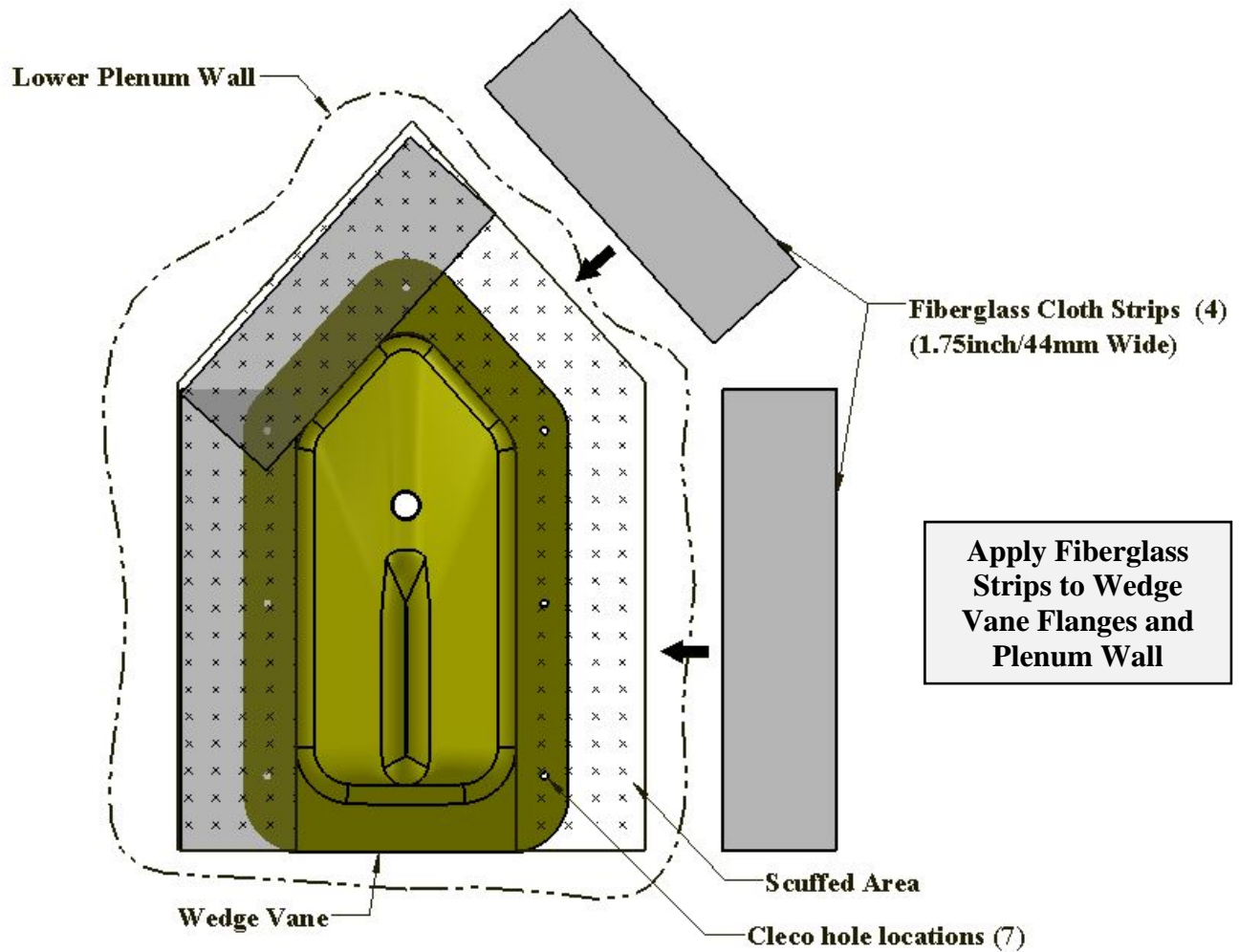


Figure 8. Fiberglass repair

- 6.5 Thoroughly vacuum the lower plenum cavity and use a tack cloth to wipe the interior surface so no loose materials remain. Remove the covering protecting the engine inlet.
- 6.6 Re-assemble items removed in step 6.1 ensuring cleanliness of all air intake surfaces.
- 6.7 Return the aircraft to service.



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## 7. PARTS:

**Table 1: Preferred Products List\***

<i>Consumable Materials</i>	<i>Description</i>	<i>Quantity</i>
Epoxy Paste Adhesive	Loctite 9359.3 AERO	A/R
Fiberglass	5.8 oz. plain weave Hexcel 3733	A/R
Polyester Resin	Reichhold DION® FR 7704-00	A/R

\*Products utilized by Enstrom Helicopter Corporation during the manufacturing process, and ensured to meet the environmental requirements and service conditions of the aircraft.

**Table 2: Acceptable Alternate Materials and Product Guidance\*\***

<i>Consumable Materials</i>	<i>Acceptable Alternate</i>
Adhesive	3M EC-2615 B/A LW
Fiberglass	5-10 oz. fiberglass cloth
Polyester Resin	As recommended by the Fiberglass manufacturer and compatible with the Fillet Putty, suitable for the minimum conditions**

\*\*Alternate materials may be utilized by the operator based on product availability in the field. Alternate products should be chosen based on their resistance to degradation due to environmental changes and service conditions (vibration, etc.); and their compatibility with each other. Refer to Paragraph 1-15 in the 480B Rotorcraft Flight Manual for environmental limits. The operator is advised to follow the chosen manufacturer's recommendations in regards to additional agents needed for the application.

8. SPECIAL TOOLS: N/A

9. MAN-HOURS: (1 hour/ no repairs) (4 hours/ with repairs)

10. WARRANTY: Per Enstrom Helicopter Warranty Policy

11. WEIGHT CHANGE: None

12. LOG BOOK ENTRY: Enter compliance with this SDB, including level of repair, in the aircraft maintenance records.

13. REPETITIVE ACTION: N/A