SERVICE BULLETIN NO. 35 Aviat Aircraft Inc.

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DATE:18 FEB 2022 **<Mandatory Compliance>**

SUBJECT: ENGINE EXHAUST MUFFLER INSPECTION

REVISION: IR

AIRCRAFT MODELS AFFECTED: A-1, A-1A, A-1B, A-1C-180

ALL AIRCRAFT SERIAL NUMBERS FOR THE ABOVE MODELS ARE AFFECTED

(AIRCRAFT CERTIFIED IN ANY AIRWORTHINESS CATEGORY)

PURPOSE

In the interest of safety and to be proactive concerning possible exhaust system failures, Aviat Aircraft Inc. is issuing this Mandatory Service Bulletin.

WARNING: NON-COMPLIANCE WITH THIS SERVICE BULLETIN COULD RESULT IN CARBON MONOXIDE GAS ENTERING THE CABIN HEATING SYSTEM AND INTO THE CABIN. THIS MAY CAUSE OCCUPANTS IN THE CABIN TO HAVE DIMINISHED COMPREHENSION, BLURRED THINKING, POSSIBLE FEELINGS OF UNEASINESS, DIZZINESS, AND/OR, HEADACHE.

DESCRIPTION

Aviat Aircraft Inc. has received reports from the field of cracks being found in the muffler assembly during annual inspections. The exhaust muffler assembly part number is 35650-002.

Inspection and maintenance of the exhaust system is required and in many instances is not being adequately accomplished. An exhaust and heat exchange system can deteriorate due to age, inadequate inspection and inadequate maintenance which can cause carbon monoxide poisoning, in flight engine fire, engine malfunction, or engine failure in flight.

COMPLIANCE

For aircraft with 250 hours of operating time, within the next 40 hours of operation or at next annual inspection, whichever comes first, and at each 100 hours operating time thereafter: remove and inspect the exhaust muffler, muffler baffles, and the heat exchange system. This inspection should be performed in accordance with appropriate sections of the applicable “Instructions for Continued Airworthiness” for each aircraft model affected by this service bulletin. Additionally, we recommend the use of Advisory Circular (AC) 91-59-A, Inspection and Care of General Aviation Exhaust Systems, when performing this exhaust system inspection.

In the interest of safety, owners and operators should preform daily preflight inspections which include a thorough external, visual inspection of the exhaust system.

We highly recommend thorough preflight inspections of the exhaust system components because failures can occur over a short period of time. All aircraft owners and operators should acquaint themselves with the exhaust components including the heat exchange system.

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*NOTE:

- Only FAA certified mechanics or FAA certified repair station are to perform the instructions in this service bulletin.
- It is the responsibility of owner/operator to have only FAA certified mechanics or FAA certified repair stations perform this inspection.
- Complete and send the Aviat Aircraft, Inc. compliance letter to the address provided.

ACCOMPLISHMENT INSTRUCTIONS

Step 1. An FAA certified mechanic or a FAA certified repair station must perform this aircraft inspection to determine if the exhaust system is operating properly and if repairs are warranted.

Step 2. Locate the exhaust system under the cowling. The use of the illustrated parts catalog (IPC) engine section can be helpful with disassembly and reinstallation of the exhaust system and lower engine cowling.

Figure 1: lower cowling, mounting screws, and cowl doors

Step 3. Remove the lower cowl assembly shown in Figure 1. To remove the lower cowling, start by opening the cowl doors and securing them out of the way as shown in figure 1.
Next remove the 4, AN507, countersunk screws in the four corners of the cowling and replace them with four #10 sheet metal holding devices such as clecos to hold the cowling in place while all screws are being removed.
Next remove all the AN526 pan head screws around the front and rear of the lower cowling. The AN526 pan head screws securing the lower cowling on the front and rear are of two different lengths and should be separated to assure correct reassembly.

While holding the lower cowling in place, remove the sheet metal holding devices or clecos and the lower cowl can be removed by dropping it straight down.

Figure 2: cowling removed

Step 4. Remove the exhaust system. With the lower cowling removed the exhaust system can be seen in Figure 2. To remove the exhaust system, start by locating and removing the two scat hoses attached to the exhaust as shown in Figure 3.

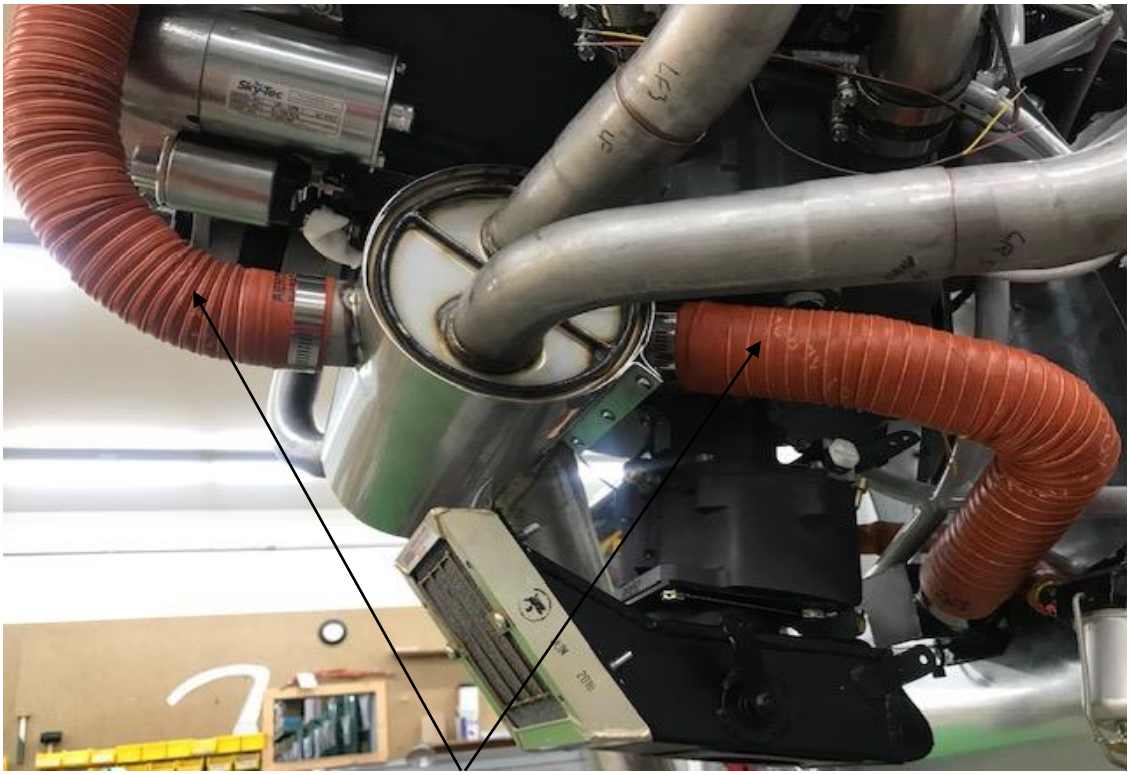

Figure 3, scat hoses

Step 5. Remove the EGT probe or probes from the exhaust manifold tube on number 3 cylinder, see Figure 4. Depending on aircraft options, all four exhaust manifold tubes can have EGT probes installed. Tie up the EGT probes and wiring out of the way, for ease in removal of the exhaust system.

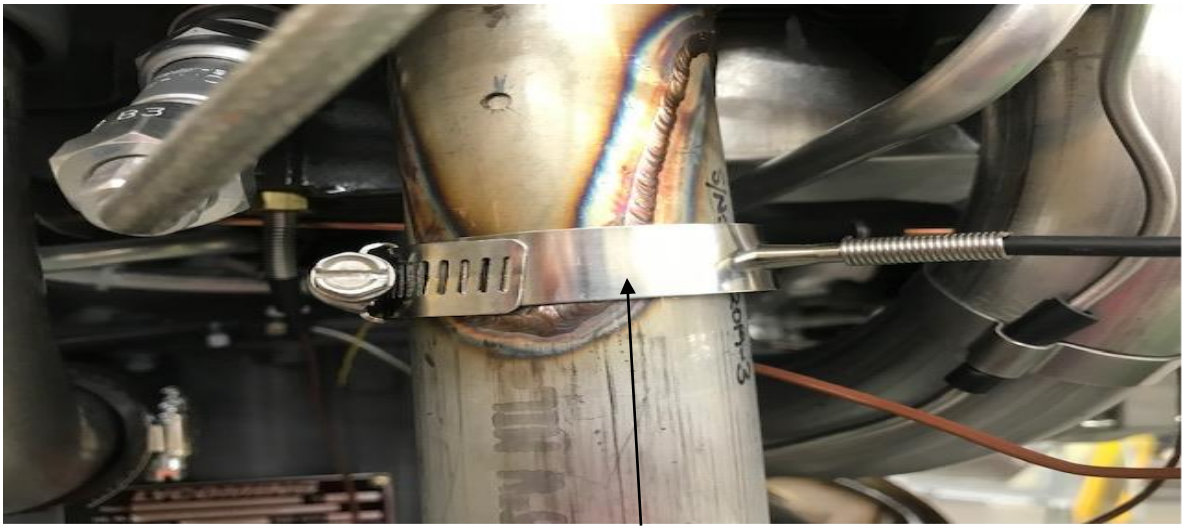

Figure 4, EGT probe

Step 6. Remove the lock nuts from the 8 engine studs. Next remove the mounting nuts, two each, from each exhaust manifold tube (see Figure 5). The exhaust system should be held in place while the mounting nuts are being removed. Once the EGT probes and the mounting hardware are removed, the exhaust system can be removed by dropping it straight down with the manifold tubes still inserted on the muffler assembly. When the exhaust system is removed, discard the used exhaust gaskets.

Figure 5, lock nuts, mounting nuts, washers, & exhaust gasket

Step 7. Remove the exhaust assembly from the aircraft and place it on a bench for inspection as shown in Figure 6. Next, remove manifold tubes & shroud to expose the exhaust can as shown in Figure 7.

Figure 6: removed exhaust assembly

Figure 7: muffler with shroud removed

Step 8. Using the “Instructions for Continued Airworthiness” applicable to each aircraft model, inspect the muffler assembly. In addition to the required inspections listed in the “Instructions for Continued Airworthiness”, inspect the muffler assembly for signs of cracks and / or leaks. We recommend the use of (AC) 91-59-A, Inspection and Care of General Aviation Exhaust Systems, for performing this inspection. Sections 6b and 6c should be referenced for specifics of inspection. Signs of an exhaust leak include a flat gray, gray-white, or light gray powder or a sooty appearance on surfaces. Inspect the scat tube on the back of the shroud for signs of exhaust leaking into the cabin heater. See Figure 3. If exhaust residue is found in the scat tube, an exhaust leak is present that must be found and corrected. Typical cracks reported from the field were found on the muffler assembly around the base of the tailpipe and on the ridges as shown in Figures 8, 9, and 10.

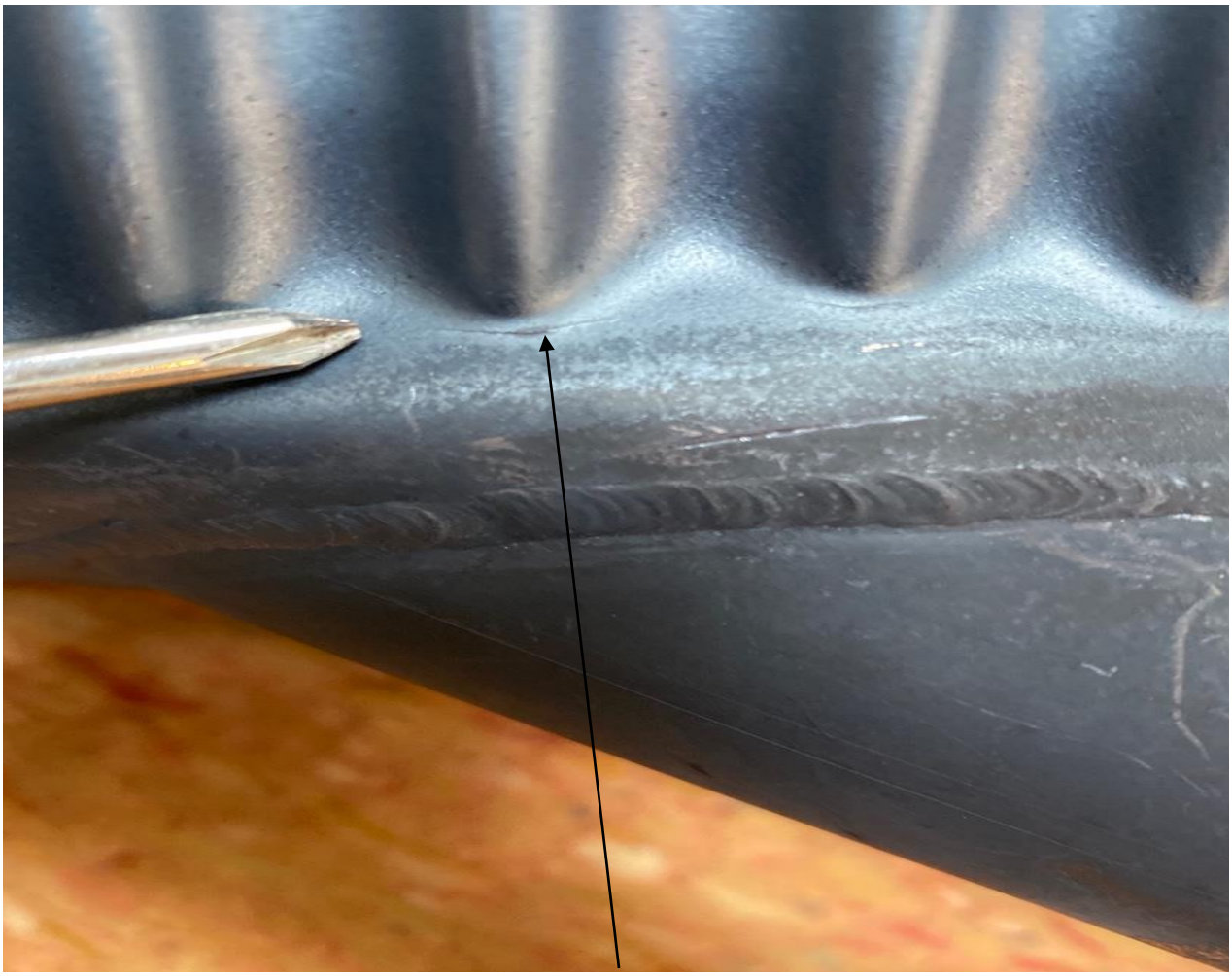

Figure 8, typical muffler cracks

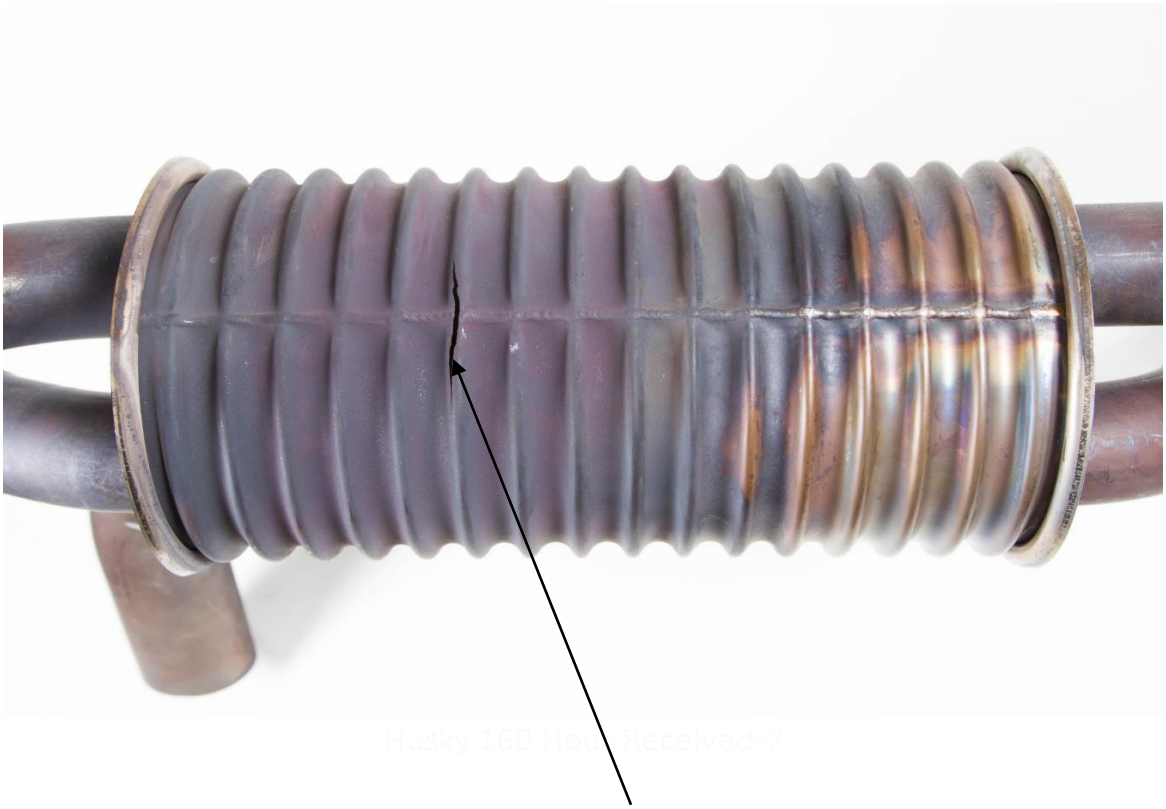

Figure 9, muffler crack

Figure 10, muffler crack

Step 9. After inspection of the exhaust system and if no signs of cracks or leaks are found in the muffler and no signs of exhaust residue is found in the aircraft heating system or the rear scat tube, the exhaust system can be considered compliant. On this case, move to step 12.

Step 10. If cracks are discovered during the inspection of the muffler, the cracks must be repaired, or the muffler must be replaced.

Step 11. The severity of the crack or cracks found during inspection will determine if a repair is applicable or if replacement is necessary. Cracks found at the base of the muffler tail pipe as shown in Figure 8 are repairable. **Cracks in the muffler can on top of the ridges or bottom of the valleys as shown in Figure 9 are not repairable and the muffler must be replaced. A crack as shown in Figure 10 is too severe to repair and the muffler must be replaced.** The FAA certified mechanic or FAA certified repair station performing this inspection must determine the severity of the cracks and determine if a replacement muffler is necessary.

Mufflers needing repairs, should be sent to an FAA certified repair station for repair and testing. Make welding repairs in accordance with AC 43.13-1 or an FAA-approved equivalent. The welding process is Tungsten Inert Gas (TIG). The muffler is made from 321 stainless steel and a 347-filler rod must be used for repairs. Pressure test the repaired muffler in accordance with AC 91-59A section 8c4.

Step 12. After a thorough inspection is performed, and the exhaust system is found compliant, repaired, or replaced, the muffler assembly may be reinstalled on the engine per the steps below.

Step 13. First install the exhaust shroud onto the muffler in reverse order as removed. Verify the shroud is centered on the muffler assembly and tighten the three previously removed screws.
Next install the manifold tube into the slip joints on the muffler using a high temperature anti-seize lubricant such as Loctite C5-A. The anti-seize lubricant should be applied to the first 2 inches of the manifold tube before installing into the muffler assembly.
With the shroud installed and the manifold tubes inserted into the muffler as seen in Figure 6, the exhaust can now be installed on the engine.
Verify new exhaust gaskets are in place and install the exhaust using the plain nuts that were removed from the manifold tubes. See Figure 5. The AN936A516 lock washers that were removed must be replaced by new ones and installed before the nuts.
The nuts holding the manifold tubes must be torqued to 160 inch-lbs. Next install the 5/16-18 pal nuts. Pal nuts are used as a locking device and must be torqued to 52 inch-lbs. after installation. See Figure 11. Install EGT probes in reverse order as removed.

Figure 11, plain nut, and pal nut

Step 14. After installing the exhaust, torquing the nuts, and installing the EGT probes, the lower engine cowling can be installed in the reverse order as removed. Verify all mounting hardware is tightened and close the cowl doors.

Step 15. Make an aircraft logbook entry, recording the results of this inspection and listing any repairs made.

Step 16. Complete the service bulletin compliance letter and return it to Aviat Aircraft, Inc. at the address provided.

COMPLIANCE LETTER

This is to certify that I have complied with Service Bulletin 35 on airplane:

Model: _____

Serial No: _____

Registration Number: _____

Aircraft Hours: _____

Answer questions with a (yes), (no) or specific times.

Is the muffler installed the original muffler? ____

If the muffler is not original, how many operating hours have accumulated on the new muffler? ____

If the muffler has been repaired, how many operating hours have accumulated since the repair? ____

Were cracks discovered in the muffler assembly during this Inspection? ____

Was the muffler assembly repaired by welding? ____

Was the muffler assembly replaced with a new muffler assembly? ____

FAA Certified Repairman: _____

License No.: _____

Signed: _____

Date: _____

Return completed compliance letter to:

Aviat Aircraft, Inc.
Engineering Department
P.O. Box 1240
Afton, WY 83110
Fax: 307-885-9674
Email: engineering@aviataircraft.com

(Attach any comments on a separate sheet)