



## EASA Safety Information Bulletin

**SIB No.:** 2010-19  
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**Subject:** Exhaust Mufflers Inspection for piston engine Helicopters and Aeroplanes

**Ref. Publication:** FAA SAIB No CE-04-22 dated December 17, 2003

FAA SAIB No CE-10-19R1, dated March 17, 2010

**Description:** A review of accident/incident reports for piston engine helicopters and aeroplanes reveals that there have been numerous events as a result of exhaust system component failures (mufflers as well as heat exchangers). Some of these events have resulted in injuries to pilots and passengers.

The following probable causes for these accidents and incidents have been identified:

- Carbon Monoxide (CO) poisoning;
- Partial or complete loss of engine power;
- Fire or
- A combination of the above.

EASA has received a specific Safety Recommendation concerning a muffler internal failure of a helicopter. The cone blocked the exhaust gas outlet flow resulting in engine power loss on takeoff. This muffler configuration is common or similar to many other general aviation aeroplane mufflers, not being limited to Helicopter only.

During EASA's investigation EASA concluded that the Standard Maintenance Manuals or procedures may not always contain enough information concerning the inspection procedures pertaining to exhaust mufflers for piston engine Helicopter and Aeroplanes.

**Recommendations:** The purpose of this EASA Safety Airworthiness Bulletin (SIB) is to highlight the importance and need to properly inspect and maintain the exhaust mufflers of piston engine powered Aeroplane and Helicopter in accordance with the specifications for Inspection and Checks of the attached Appendix. The goal is to reduce the safety hazards resulting from an exhaust muffler failure.

**Applicability:** Piston Engine Helicopters and Aeroplanes

**Contact:** For further information contact the Airworthiness Directives, Safety Management & Research Section, Certification Directorate, EASA; E-mail: [ADs@easa.europa.eu](mailto:ADs@easa.europa.eu).

To find the reference SAIB, go to:

[FAA SAIB CE-04-22](#)

[FAA SAIB CE-10-19R1](#)

## APPENDIX

Any exhaust system component failure should be treated as a severe hazard. Many light airplane cabins are warmed by air that has been circulated around the engine exhaust pipes. Most of the common exhaust system component failures are muffler or exhaust gas to air heat exchanger related.

### ***Possible types of failures of mufflers or heat exchanger:***

- Muffler or heat exchanger leakage, which permits exhaust gas to escape and directly enter the cabin or enter through the cabin heat system.
- Heat transfer pins or knobs failure. These can be found under the shroud on heat exchangers or mufflers that function as both a heat exchanger and muffler. Pin or knob failure can lead to leakage of the exhaust gas directly into the cabin or through the cabin heat system.
- Loose or internal failure of baffles, cones or diffusers can (depending on the design) partially or completely block the exhaust gas outlet flow leading to partial or full engine power loss. This condition may occur intermittently if internal components are loose within the muffler and move around during subsequent flights. A power loss close to the ground is considered a severe hazard to a helicopter or a small aeroplane.

### ***Inspections and Checks:***

All inspections, checks, and processes should be in accordance with the manufacturer's recommendations. There are two types of inspections that need to be performed as daily and periodic inspections.

#### ***1) Daily inspections:***

All airplane owners and operators should acquaint themselves with the configuration, pieces and parts that make up the exhaust system on their airplane. This will assist in any pre-flight or inspection to identify areas that are abnormal (not normal or that may have changed since last inspection). Therefore EASA recommends daily inspections (visual inspections) of the Helicopter and Aeroplanes exhaust system components because failures can occur in a relatively short time.

#### ***2) Periodic Inspections:***

Besides the daily inspections the manufacturers normally have defined as part of their basic maintenance program inspections at 100 or 200 flight hour intervals (or possible at yearly intervals and when the engines are changed). These inspections should be performed with sufficient depth to find any damage before it becomes critical. The main goal of those inspections is to find the degradation of the exhaust system in time and to ensure that a failure will not materialise within the time to go to the next inspection.

***Typical areas to check for periodic inspections and potential problems:***

1. All external surfaces for signs of leakage.
2. All external joints, flex-joints, slip-joints, clamps, couplings for misalignment, warpage, broken, loose or missing fasteners, clamps, gaskets or seals and abnormal wear.
3. All interior areas for blockage, restrictions, dents or protrusions into the exhaust flow path (removing the tailpipe for interior inspection of the muffler every 100 FH interval).
4. Muffler, heat exchanger, bellows or shrouds, heat transfer pins or knobs, baffles, cones or diffusers or support rods.
5. Stack or riser to flange interface for cracks in welds or weld heat affected area, blown out or missing gaskets.
6. All welds and area adjacent to the weld for cracks or weld separation.
7. Tailpipes, for erosion, thinning, bulging or burn through.
8. Contoured, shaped or bend areas, turns and interfaces (wyes) for erosion, thinning, bulging or burn through.
9. Fluid or moisture traps, for scaling, corrosion, or cracks.
10. Bracing, supports and support attach lugs on other structures for security and self locking or safeties hardware and signs of overheat or burning.
11. Surrounding structures for discoloration, heat damage, or burning.
12. Usage of non-high temperature materials, or non-self-locking or unsafe tied hardware.

The exhaust system can also be pressure tested on the aircraft to detect leaks. If the particular aircraft service manual does not specify such a test as part of the maintenance program, it is recommended that this be accomplished. This test is also recommended anytime exhaust system components are removed or replaced.

EASA also recommends that exhaust systems be completely inspected when the engine is replaced. Airplanes that do not operate on a continual basis or those located in humid climates are also more likely to have a higher rate of exhaust system component deterioration. It is always recommended the use of new gaskets or seals when replacing or reinstalled the exhaust system components.