



Water Contamination of Fuel because of **AWB** 28-008 **Issue :** 1
Failure of Fuel Filler Cap **Date :** 28 February 2008

1. Applicability

All aircraft, fitted with upward-facing or side-facing fuel filler opening(s) and fuel filler neck area.

2. Purpose

This AWB addresses the subject of water contamination of fuel in general.

3. Background

There has been a fatal accident in the UK, with a Piper PA-38-112 'Tomahawk' aircraft, due to engine stoppage during initial climb-out which was probably caused by water contamination of the fuel. As the aircraft had been parked outside during heavy rainfall, water was allowed to leak into the fuel tank because of a deteriorated fuel cap locking mechanism which rendered the sealing function of the fuel cap unserviceable.

Several "barriers", which are not specifically aircraft type related, failed before the PA-38 accident occurred. Each "barrier" by itself, if properly observed, could have given sufficient evidence that something was wrong and that corrective action was necessary. Furthermore, water contamination of fuel due to problems with the filler caps by design, production and maintenance have been subject to several occurrence reports.

Depending on aircraft design and aircraft manufacturer's instructions, inspection of the fuel filler cap and fuel filler neck area is usually described in the scheduled maintenance check list (fuel system section) of the aircraft maintenance manual (AMM). Similarly, relevant pre-flight inspection is usually described in detail in the Aircraft Flight Manual/Pilot's Operating Handbook (AFM/POH).

If requirements for such inspection are missing from the AMM/AFM/POH of your aircraft, this AWB provides recommendations for the maintenance and pre-flight inspections, addressing the issue identified above.

Note: This AWB is based on:

a) EASA Safety Information Notice No.: 2008-08 dated 07 February 2008.

b) UK Kingdom Aircraft Accident Investigation Board (AAIB) Bulletin EW/C2005/10/04.



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4. Recommendation

A: Maintenance

Periodically inspect for:

- i) proper condition of the fuel cap seals/ gaskets/ O-rings (check for deterioration or cracks, proper number, position and size);
- ii) proper condition of the fuel cap and fuel filler seal surfaces (nicks and marks within appropriate limits, surfaces are plain and smooth);
- iii) proper condition of the fuel cap locking mechanism (bayonets, locking tabs and lugs are in sufficient good condition and not unduly worn), including O-rings sealing through bolts and key lock seals;
- iv) proper adjustment of the fuel cap locking mechanism to make sure the fuel cap sits tight in closed/locked position and seals properly;
- v) drains of recessed fuel filler compartments are open, drain lines have a steady slope and allow water to drain by gravity;
- vi) proper condition of sealing in the area around the fuel filler neck;
- vii) Attaching screws of fuel filler assemblies are tight and properly sealed.

Any discrepancies which compromise the fuel filler/cap sealing and locking functions should be rectified before the aircraft is returned to service.

B: Pre-Flight Inspections:

During a pre-flight inspection, verify that:

- a) Gaskets, seals and O-rings of fuel filler caps are in place and not obviously damaged;
- b) fuel filler neck and fuel cap are not obviously damaged;
- c) fuel level in the tanks corresponds to the fuel gauge reading(s) in the cockpit;
- d) fuel cap sits tight and secure when closed/locked; any loose or rocking fuel cap should be considered suspicious;
- e) drain samples are taken from the fuel tanks before first flight of the day and either, after refuelling or after precipitation with the aircraft parked outside;



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- f) drain samples are visually inspected for correct colour of fuel grade and contamination (water, sand, dirt, other fluids, etc.). Be aware that no water droplets might be visible in the sample cup if large amounts of water are contained in the fuel tank drains. Colour and smell can also help to identify if the sample consists mainly of fuel or water.

If any doubts remain during pre-flight inspection regarding fuel cap/filler condition or fuel contamination, consult an appropriately qualified maintenance facility or LAME to have the discrepancy corrected before operating the aircraft.

5. Enquiries

Enquiries with regard to the content of this Airworthiness Bulletin should be made via the direct link e-mail address:

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Or in writing, to:

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