



Airworthiness Bulletin

AWB 14-003 Issue 2 - 12 February 2021

Standard Practices - Hazard - Chloride Based Materials and Stainless Steel or Titanium Based Components

An Airworthiness Bulletin is an advisory document that alerts, educates and makes recommendations about airworthiness matters. Recommendations in this bulletin are not mandatory.

1. Effectivity

All turbine and piston aircraft engines and aircraft components, including flight control terminals made from stainless steel.

2. Purpose

To alert operators and maintainers to the hazard of component failure due to stress corrosion cracking induced by contact with materials containing chlorides.

3. Reference

US FAA publication General Aviation Alerts, AC43-16, Alert Number 130 of May 1989.

SAAB 340 Service Newsletter SN 340-9507, 29-04 HYDRAULIC POWER – USE OF CHLORIDE BASED DETERGENTS, 19 May 1995.

4. Background

The referenced AC provides a description of an American turbine engine manufacturer service letter alerting operators to the fact that wrapping stainless steel tube assemblies with a chloride-based material, such as neoprene tubing and fibreglass tape to prevent chafing, may result in premature tube failure.

A chloride-based material in the tape breaks down from the presence of high engine temperatures and attracts moisture, resulting in the formation of salts which are highly corrosive to stainless steel tubes. After a period of time, stress cracking develops resulting in failure of the tubes.

Additional investigation along the same lines by a foreign engine manufacturer revealed that titanium is also affected by the chemical reaction between chloride-based materials when operating in temperatures in excess of 150 degrees C.

A related problem is the use of chloride-based packaging material, such as PVC sheeting (plasticized polyvinyl chloride) as a packaging material. This can result in chloride-based residue being left on the component, possibly leading to tube failure.

While the FAA reference document identifies only turbine engines, the same hazard has been found to exist with stainless steel tubes in piston engines, and contact with chlorides is a key factor in stainless steel flight control terminal failures.



Additionally, SAAB 340 Service Newsletter SN 340-9507 describes that use of chloride-based detergents can stress corrosion cracking to filter bowls on the aircraft's hydraulic filter manifold.

The service letter says;

'A cracked filter bowl has been returned to Saab and the Vendor for investigation. A metallurgical investigation of the cracked filter bowl showed that the cracks were of stress corrosion nature, and the initiator most likely was presence of high concentration of chloride.'

The presence of chloride can be an indication that a chloride-based detergent has been used (e.g. for cleaning purpose prior to maintenance action).

Damage on the components can occur long time after presence of Chloride.

To prevent this type of failure, operators are advised to not use chloride-based detergents (trichlorethylene, 111 trichlorethan etc.) on the filter manifold.'

SAAB also notes;

'that other components on the aircraft can be damaged if chloride-based detergents are used.'

5. Recommendations

CASA strongly recommends that operators and maintainers follow the engine and aircraft manufacturer's publications when installing stainless steel engine air, oil and fuel tubes and do not allow chloride-based materials including packaging materials and cleaning detergents and solvents to contact any stainless steel or titanium components, including flight control terminals.

6. Enquiries

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

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