



1. Applicability

Aircraft fitted with toilet automatic built-in fire extinguishers utilising Halon 1301 fire extinguishing agent.

2. Purpose

This AWB provides information on automatic toilet (lavatory) built-in fire extinguishers that utilise Halon 1301 which may be prone to loss of fire extinguishing agent due to other factors not relating to any sort of fire event.

3. Background

Automatic built-in fire extinguishers that are installed in aircraft toilet waste receptacles are a requirement under paragraph 90.270 (3)(b) of CASR 1998 (see Figure 1). The likely fire threat in the toilet waste receptacle would involve Class A materials (paper and paper products), with the typical ignition source being burning material discarded into the receptacle, such as a lit cigarette. The waste receptacles are designed to contain the likely fire. No fire detection system is provided in the waste receptacle. Toilet waste receptacles are equipped with a built-in automatic fire extinguisher that discharges automatically into the receptacle upon the occurrence of a fire. In order to accomplish this, the extinguisher bottle incorporates a eutectic device at the end of a tube directed into the receptacle. In the event of a fire, the heat generated will melt the eutectic tip, releasing the agent directly into the receptacle.

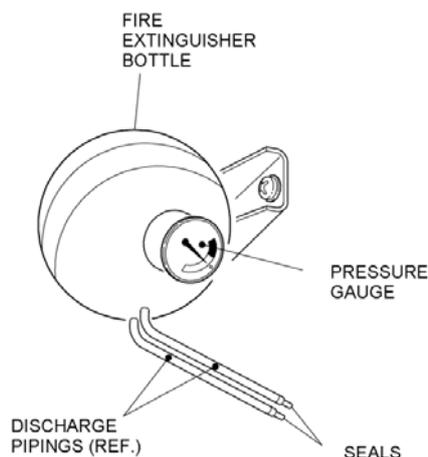


Figure 1 – Automatic lavatory fire extinguisher

Several SDRs have been reported to CASA by different operators, where toilet automatic built-in fire extinguishers using Bromotrifluoromethane (commercially known as Halon 1301) as the fire extinguishing agent, have lost their contents due to displacement of the eutectic solder seal over a period of time, see Figure 2.



Eutectic Seal Waste Receptacle Fire Extinguishers

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The fire extinguishers can be susceptible to premature failure when exposed to temperature/pressure stress cycling. A relatively small amount of agent (100 grams of Halon 1301) is effective in extinguishing a toilet waste receptacle fire.

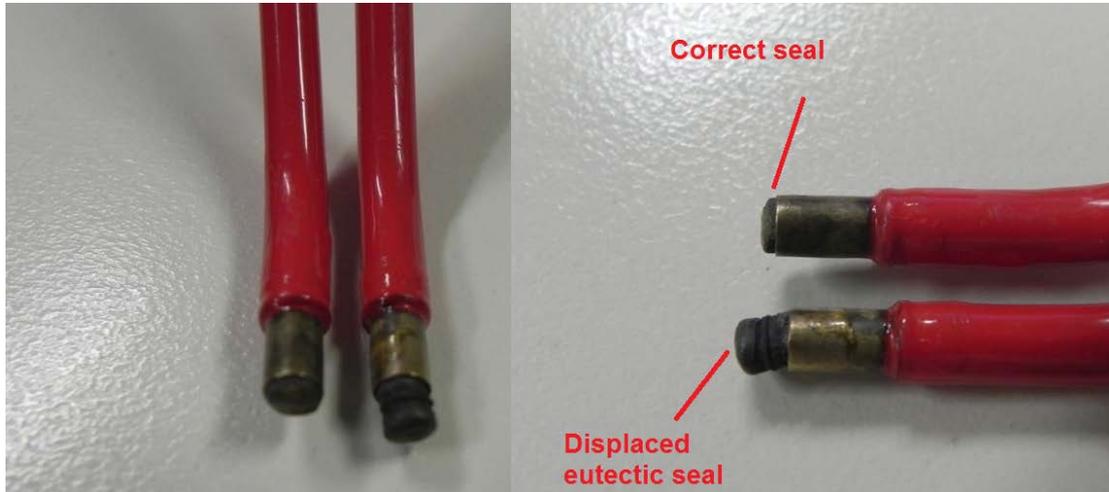


Figure 2 – Eutectic solder seal

In information provided by a manufacturer, Bromotrifluoromethane has a high expansion ratio, which when the ambient temperature rises, so the pressure inside the extinguisher increases significantly. When the ambient temperature approaches the 50°C mark, the pressure inside the extinguisher can reach in excess of 420PSI, which is almost double the nominal operating pressure of 200-220PSI at 25°C. See Figure 3.

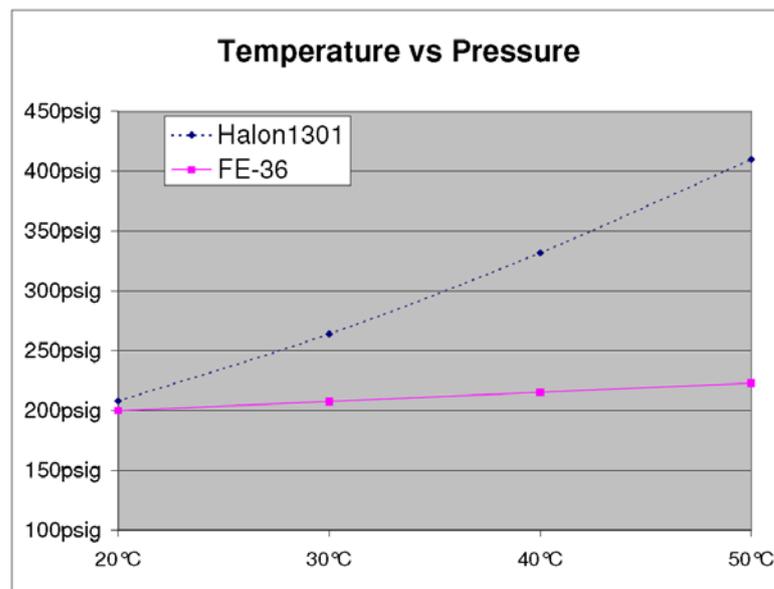


Figure 3 – Change in pressure due to temperature change with Halon 1301 and FE-36



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In 1999 a report published by United Nations Environmental Programme (UNEP) – *New Technology Halon Alternatives*, found Halon 1301 has the environmental potential for ozone depletion and global warming. One type of replacement for Halon 1301 is Hexafluoropropane (commercially known as FE-36) fire extinguishing agent.

Fire extinguishing agent technology is extremely dynamic and the International Halon Replacement Working Group (IHRWG) Task Group 7 and the FAA have established a Minimum Performance Standards for toilet waste receptacles.

For further information see:

- United Nations Environment Programme (UNEP) Halons Technical Options Committee [Technical Note No. 1](#), 1999 and
- FAA Report [DOT/FAA/AR-99-63](#) - *Options to the Use of Halons for Aircraft Fire Suppression Systems*.

4. Recommendations

Inspections of the toilet built-in fire extinguishers may not necessarily detail checks to the integrity of the eutectic solder plug. Check the integrity of the eutectic solder seal when carrying out an inspection of the automatic fire extinguishers.

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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