



Scheduled Extinguishing Agents in the Aviation Industry

Fire is a major safety hazard for civil, commercial, and military aircraft. In Australia the potential fire zones of modern multi-engine aircraft are protected by fixed fire protection systems. A fire zone is an area, or region, of an aircraft designed by the manufacturer to require fire detection and/or fire extinguishing equipment and a high degree of inherent fire resistance.

Fire protection equipment containing ozone depleting substances (ODS) and synthetic greenhouse gases (SGG) (scheduled extinguishing agents) used in the aviation industry are regulated under the *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989 (the Act)* and the *Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995 (Regulations)*.

Halon in aviation

The industry relies heavily on halons because of the restrictions of space on-board aircraft with the size and weight of fire suppression systems. However, halon is an ozone depleting and global warming chemical, and its production has been banned by international agreement. Although halon usage has been banned in Australia, halon in some aviation applications has been granted an exemption because of its unique operational and fire safety requirements. Aviation applications of halon are among the most demanding uses of the agents, and require their beneficial characteristics, especially dispersion and suppression effectiveness, acceptable toxicity and highly efficient weight and space requirements. This is due to their unique ability to fight fires at the flame chemistry level. There are two types of halons employed in the aviation industry:

- Halon 1301, a total flooding agent
- Halon 1211, a streaming agent

Where are scheduled extinguishing agents found?

Typical areas on aircraft that have a fixed fire detection and/or fire extinguisher are:

- Engines and auxiliary power unit (APU)
- Cargo and baggage compartments
- Lavatories on transport aircraft
- Electronic bays
- Wheel wells
- Bleed air ducts

The aviation industry relies heavily on halons to extinguish and suppress fires. Gaseous fire suppression systems use Halon 1211 and Halon 1301 and are used for both commercial and small private aircrafts.

However, hydrofluorocarbons (HFCs) agents have the most potential as halon replacements. The most widely employed clean agents in aviation applications, due to their high volumetric efficiency and low weight and volume requirements, are the HFC-based clean agents:

- FM – 200[®] / FE-227[™] / HFC-227ea
- FE -36 / HFC-236fa





Halon and the Montreal Protocol

The Montreal Protocol sets binding progressive phase out obligations for developed and developing countries for all the major ozone depleting substances, including chlorofluorocarbons (CFCs), halons and less damaging transitional chemicals such as hydrochlorofluorocarbons (HCFCs).

Although CFCs, halons and HCFCs are very effective and versatile chemicals, they are also very stable which allows them to migrate to the upper atmosphere where ultraviolet light triggers a chemical reaction that may cause depletion of the stratospheric ozone layer.

The aviation industry was granted an exemption for continued halon use because none of the currently available alternative fire-extinguishing and suppression agents could meet the stringent performance requirements to ensure safety of flight. Since the Montreal Protocol, the aviation industry has continued

Recommendations

The Board recommends the following actions to ensure that technicians working in the aviation industry are compliant with the Act and Regulations while contributing to Australia's effort in reducing emissions of ODS & SGG scheduled extinguishing agents into the atmosphere:

- Operators of aviation sites with gaseous fire suppression systems containing scheduled extinguishing agents must ensure that the installation and maintenance of these systems is done by licensed technicians.
- Licensed Aircraft Maintenance Engineers (LAMEs) and Aircraft Maintenance Engineers (AMEs) handling scheduled extinguishing agents complete the unit CPPFES2043A - *Prevent ozone depleting substance and synthetic greenhouse gas emissions* or an equivalent assessment to achieve competency.
- All technicians working with scheduled extinguishing agents must hold the appropriate licence, authorisation, or permit.
- Regular service and maintenance of gaseous fire suppression systems to ensure full functionality in the event of a fire.

The Board has produced a [Good Practice Guide](#) and numerous [factsheets](#) that are aimed at educating field practitioners in appropriate work practices and the precautions to be observed in avoiding unwanted emissions of scheduled extinguishing agents.

All technicians should be thoroughly familiar with these handling precautions and with relevant Australian Standards impacting on such activity.

Do you require a licence?

Licences, authorisations, and permits are issued by the Fire Protection Industry (ODS & SGG) Board and are required when handling scheduled extinguishing agents in the aviation industry.

- Technicians installing, servicing, maintaining or decommissioning systems containing scheduled extinguishing agents must hold an Extinguishing Agent Handling Licence (EAHL).
- Technicians or companies who buy, store and/or sell scheduled extinguishing agents must hold an Extinguishing Agent Trading Authorisation (EATA).
- Companies possessing halon are required to hold a Halon Special Permit (HSP).

