Airworthiness Bulletin

AWB 26-002 Issue 4 – 10 September 2025

Selection and Installation of Handheld Portable Fire Extinguishers

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 aircraft.

2. Purpose

To provide advisory material regarding handheld portable fire extinguishers in aircraft.

3. Background

This bulletin aims to provide advice regarding the installation of handheld portable fire extinguishers required by:

- AD/BAL/13 Amdt 1 for ballons
- CAO 95.4.1 for gliders
- Civil Aviation Safety Regulations 1998 (CASR) Part 91 General Operating and Flight Rules Manual of Standards (MOS)
- CASR Part 121 Australian Air Transport Operations-Larger Aeroplanes MOS
- CASR Part 133 Australian Air transport Operations-Rotorcraft MOS
- CASR Part 135 Australian Air Transport Operations-Smaller Aeroplanes MOS
- Acceptable Means of Compliance (AMC) within the CASR Part 91, 121, 133 and 135 MOS Acceptable Means of Compliance/Guidance Material (AMC/GM) documents as appropriate.
- or the aircraft's type design.

It also provides advice for owner/operators who are not required but voluntarily choose to install a Fire Extinguisher.

The bulletin aims to clarify interpretation of various aspects of CASA Part 91/121/133 and 135 MOS requirements for all aeroplanes for handheld fire extinguishers, and how the prohibition of certain fire extinguisher agents is controlled by CASA Part 90 MOS requirements for all aeroplanes

This bulletin provides information on fire extinguisher requirements and new technologies.

Installation requirements are becoming more varied with different extinguisher types required in certain areas of the aircraft and various structural load considerations. Less

environmentally toxic Halocarbon extinguishers (also referred to as 'Halon-replacement' extinguishers) are becoming available.

Considering halon supplies are dwindling and the environmental community is becoming more concerned with the lack of substantive progress in aviation, the International Civil Aviation Organisation (ICAO) has urged a faster rate of implementing halon alternatives in engines and auxiliary power units (APUs), handheld extinguishers and lavatories. ICAO had requested that by 2019, new production aircraft have halon-replacement handheld portable fire extinguishers. CASA has issued complementary regulations to ICAO SARPs.

This issue updates information on halon replacement agents, references, and hyperlinks; and discusses CASR (1998) regulation 90.150.

4. Information

a. Halon Fire Extinguishers

The use of halon (halogenated hydrocarbon) fire extinguishers is covered by Commonwealth Regulations.

The Department of Climate Change, Energy, the Environment and Water administers regulations covering the possession of halon. See Regulation 304 of the Ozone Protection and Synthetic Greenhouse Gas Management Regulations (1995).

Essentially, it is an offence to be in possession of halon unless it is contained in fire protection equipment installed in, or carried in, an aircraft.

Halon special permits are available via Regulation 341 of the Ozone Protection and Synthetic Greenhouse Gas Management Regulations (1995), such as:

- For the storage of halon fire protection equipment, or as spares, provided the halon equipment must not be surplus to the minimum requirements for operation of aircraft in line with CASR 1988.
- Import equipment licence for replacement purposes for either equivalent equipment exported for servicing or halon equipment discharged in service.

Applications should be made to The Department of Climate Change, Energy, the Environment and Water.

Note: CASA does not issue halon special permits.

b. Civil Aviation Safety Regulations (1998)

MOS Part 91 General Operating and Flight Rules, MOS 121 Australian Air Transport Operations—Larger Aeroplanes, MOS 133 Australian Air Transport Operations—Rotorcraft) and MOS 135 Australian Air Transport Operations—Smaller Aeroplanes specify the requirements for selecting the type of fire extinguisher agent based on the type of fire likely to occur in the compartment where the extinguisher is intended to be used/ to minimize the hazard of toxic gas concentration in compartments occupied by persons and

to specify the minimum quantity of hand held fire extinguishers required to be carried on Australian aeroplanes and rotorcraft operating in the general or transport categories

In aircraft manufactured prior to 31 December 2018, the continued use of halon 1211 (BCF) extinguishing agents for all firefighting applications (because of the fire extinguisher agent's superior performance) is allowed by the requirements contained in CASR 90.150 and Manual of Standards 90.5F.

However, operators must be aware that due to the dwindling stock of halon 1211 (BCF) extinguishing agents used in handheld firefighting applications, they may be forced to source approved equivalents that can be fitted in accordance with the type certificate holder approved data or using a CASR Part 21 design approval holder authorisation.

For all aircraft manufactured on or after 31 December 2018, because of MOS Part 91 General Operating and Flight Rules, MOS 121 Australian Air Transport Operations—Larger Aeroplanes, MOS 133 Australian Air Transport Operations—Rotorcraft) and MOS 135 Australian Air Transport Operations—Smaller Aeroplanes or the aircraft certification basis) that extinguisher must not contain halon but may be any other agent appropriate for the location in which it will be used.

c. Halocarbon Fire Extinguishers

Some halocarbon agents are considered to be replacements for halon, however it must be noted that the replacement extinguisher should have the same performance rating that it replaces.

Like halon, halocarbon fire extinguishing agents are electrically non-conductive and are 'clean agents' because they leave no residue upon evaporation.

The following halocarbon fire extinguishing agents are approved equivalents to halon in handheld portable fire extinguishers:

Chemical Name	Trade Name
HCFC Blend B	Halotron 1
HFC-227ea	FM-200 or FE-227
HFC-236fa	FE-36
2-BTP	Halotron BrX

Table 1 – Halocarbon extinguishing agents

If replacing an existing fire extinguisher with a halocarbon extinguisher, the replacement extinguisher should have the same performance rating.

Note: To achieve the same performance rating as a halon extinguisher 50% to 150% more halocarbon agent by weight is required to extinguish a given fire as compared to halon 1211.

A 5B:E (or US 5B:C – see the next section) rating should be considered as the minimum extinguishing rating unless the cabin volume is less than 5.6m^3 (200ft^3).

d. Fire Classifications

Note that the Australian and US classification systems for fire class are different.

Fuel/Heat source	Fire Class	
	Australian Asian European	North American
Ordinary combustibles	A	A
Flammable liquids	B	B
Flammable gases	C	
Combustible metals	D	D
Electrical equipment	E	C
Cooking oils and fats	F	K

Table 2 - Fire Classifications

Therefore, for example, whereas an Australian Fire Extinguisher may be rated as a 5B:E, the equivalent Extinguisher from the USA will be rated as 5B:C.

5. Recommendations

Regardless of whether the regulations or aircraft type design require a fire extinguisher or not, CASA recommends at least one fire extinguisher be fitted to an aircraft and that fire extinguisher be accessible to a pilot.

a. Precautions

Human exposure to high levels of halon vapour may result in dizziness, impaired coordination, and reduce mental sharpness. Exposure to undecomposed halogenated agents may produce varied central nervous system effects. Halogenated agents will also decompose into more toxic products when burnt. The decomposition products of halon have a characteristically sharp, acrid odour, and an eye irritating effect, even in concentrations of only a few parts per million.

However, decomposition products from the fire and burning aircraft materials themselves, especially carbon monoxide, smoke, heat and oxygen depletion, create a much greater hazard than halon or thermally decomposed products of halon.

Carbon dioxide fire extinguishers extinguish fire by reducing the concentration of oxygen and/or the gaseous phase of the fuel in the air to the point where combustion stops.

Assuming a perfect mix, carbon dioxide will not support life when used in sufficient concentrations to extinguish a fire and therefore should not be used aircraft.

Dry chemical / powder extinguishing agents when discharged may cause serious impairment to visibility and should not be located or used in any enclosed compartment common to the flight crew of an aeroplane or helicopter. Additionally, there are corrosion and clean up issues with dry powder. However, for the highly ventilated, open-cockpit environment of a hot air balloon basket, ABE dry chemical / powder extinguishing agents are recommended over halon.

b. Extinguisher rating

Unless otherwise stipulated, the minimum rating for a portable handheld fire extinguisher in an aeroplane or helicopter shall be 5B:E (or 5B:C for a US fire extinguisher).

Where only one fire extinguisher is required, a 2B:E (or 2B:C for a US fire extinguisher) is acceptable if the total cabin volume is less than 5.6m3 (200ft3) – typically a 2 or 4 seat aircraft.

For a manned hot air balloon the minimum recommended rating is 1A:10B:E dry powder.

c. Structural Requirements

It has been generally regarded that ‘9g’ static strength covers structural requirements. However, new non-transport category aeroplanes and new rotorcraft designs appearing from the 1990s onwards have been designed for higher emergency loading conditions because of increased type design requirements. Always ensure the fire extinguisher structural installation (that is the fire extinguisher, its mounting bracket and the structure it’s attached to) meet the type design strength requirements of the aircraft it is being installed in.

If replacing a fire extinguisher with one of a different extinguishing agent, review the adequacy of the structural installation.

Ensure any changes regarding structural aspects are adequately approved.

d. Locations

Locate fire extinguishers according to the following priorities:

1. In the cockpit, within reach of at least one seated flight crew member.
2. Adjacent to hazardous areas, i.e. galleys, accessible baggage compartments, electrical racks etc.
3. Near cabin crew members.
4. Evenly distribute the remaining fire extinguishers uniformly throughout the cabin.
5. Fire extinguishers should be mounted so as to be readily visible and available. If they are not visible, a placard should identify their location with a minimum 10mm (⅜ in) high lettering, or alternatively an internationally recognisable symbol.

e. Design Features

A flexible outlet nozzle, also known as a discharge hose or 'wand', can be a useful feature. Although it increases the complexity of the use of the extinguisher, and may not be appropriate for small aircraft due to the need to use two hands, they do allow the following advantages:

1. They allow the fire extinguisher to remain upright thus ensuring the maximum amount of extinguishant can be used. Fire extinguishers use a siphon tube to pull the contents from the bottom of a bottle. To maximise the amount of extinguishant expelled, the bottle must remain upright. The use of a wand helps achieve this.
2. The wand outlet can be poked into a hole in a container, into a slightly ajar door, or behind gaps in a panel more easily than an extinguisher with a fixed nozzle, and again this can be achieved in most cases with the bottle remaining upright.

f. Design Standards

A handheld portable fire extinguisher for use in aircraft should meet the following recommendations:

1. The extinguisher should be capable of controlled flow.
2. If the gross weight is less than 5 kg, the extinguisher should be capable of single person operation, even if they contain a flexible hose or wand on the discharge nozzle.
3. The following information at least, should be clearly marked on each extinguisher:
    a. type of extinguishant; and
    b. termination date of current service life; and
    c. charged weight, or empty weight and weight of charge; and
    d. operating instructions; and
    e. any special precautions for use.
4. Acceptable specifications and standards for Fire Extinguishers are:
    - Civil Aviation Safety Authority Australia, Australian Technical Standard Order (ATSO).
      Australian Department of Defence Specifications (DEF (Aust)).
    - Standards Association of Australia Australian Standards (AS).
    - United States of America Federal Aviation Administration Technical Standard Order (TSO).
    - American Society of Automotive Engineers, Aerospace Material Specifications (AMS).
    - Aerospace Industries Association of America, National Aerospace Standards (NAS).
    - Underwriters Laboratories (UL).
    - International Organisation for Standardisation (ISO).
    - British Standards Institution Specifications (BSI).

Some foreign manufactured fire extinguishers are a light-weight pressure pack type cylinder design with a snap-on head. These designs are not allowed under the AS / NZS 1841.1:2007 standard. If an extinguisher of this type is listed above in the acceptable specification and standards, it is allowed to be used in aircraft. However, due to their construction, they should be better protected from sources of damage within the cabin (i.e. baggage, trolleys and carts, feet, etc.). Additionally, difficultly may be found in getting foreign fire extinguishers serviced. See AWB 26-003 ‘Maintenance of Fire Extinguishing Systems’ for more information.

6. Further Guidance

Further information on selecting the correct fire extinguisher type and size for your aircraft, and guidance on the use of halon, halocarbon and water fire extinguishers can be found in FAA AC 20-42D *‘Hand Fire Extinguishers for use in Aircraft’*. Additionally, FAA AC 120-80B on ‘*Firefighting of General and High-Energy In-Flight Fires*’ may be informative. Copies of these documents can be found on the internet at the FAA's *Dynamic Regulatory System* website.

7. Enquiries

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

AirworthinessBulletin@casa.gov.au

or in writing, to:

Airworthiness and Engineering Branch
National Operations and Standards
Civil Aviation Safety Authority
GPO Box 2005, Canberra, ACT, 2601