FIRE EXTINGUISHER

Part VI - General Operating and Flight Rules

Subpart 2 - Operating and Flight Rules

602.60 Requirements for Power-driven Aircraft

(1) No person shall conduct a take-off in a power-driven aircraft, other than an ultra-light aeroplane, unless the following operational and emergency equipment is carried on board:

(e) a hand-held fire extinguisher in the cockpit that

(i) is of a type suitable for extinguishing fires that are likely to occur,
(ii) is designed to minimize the hazard of toxic gas concentrations, and
(iii) is readily available to each flight crew member;

1.4 Aircraft Hand Fire Extinguishers

1.4.1 General

When selecting a hand fire extinguisher for use in aircraft, consider the most appropriate extinguishing agent for the type and location of fires likely to be encountered. Take account of the agent's toxicity, extinguishing ability, corrosive properties, freezing point, etc.

The toxicity ratings listed by the Underwriters' Laboratories for some of the commonly known fire extinguisher chemicals are as follows:

Bromotrifluoromethane (Halon 1301)	– Group 6
Bromochlorodifluoromethane (Halon 1211)	– Group 5a
Carbon dioxide	– Group 5a
Common Dry Chemicals	– Group 5a
Dibromidifluoromethane (Halon 1202)	– Group 4*****
Bromochlormethane (Halon 1011)	– Group 4*****
Carbon Tetrachloride (Halon 104)	– Group 3*****
Methyl bromide (Halon 1001)	– Group 2*****

****Should not be installed in an aircraft***

It is generally realized that virtually any fire extinguishing agent is a compromise between the hazards of fire, smoke, fumes and a possible increase in hazard due to the toxicity of the extinguishing agent used. Hand fire extinguishers using agents having a rating in toxicity Groups 2 to 4 inclusive should not be installed in aircraft. Extinguishers in some of the older types of aircraft do not meet this standard and for such aircraft it is recommended that hand fire extinguishers employing agents in toxicity Group 5 or above be installed when renewing or replacing units and that they be of a type and group approved by the Underwriters' Laboratories. It is further recommended that instruction in the proper use, care and cautions to be followed be obtained from the manufacturer and the local fire protection agency.

1.4.2 Classification of Fires

Class A fires:	Fires in ordinary combustible materials. On these, water or solutions containing large percentages of water are most effective.
Class B fires:	Fires in flammable liquids, greases, etc. On these a blanketing effect is essential.
Class C fires:	Fires in electrical equipment. On these the use of a nonconducting extinguishing agent is of first importance.

1.4.3 Types of Extinguishers

1. *Carbon Dioxide Extinguishers*: Carbon dioxide extinguishers are acceptable when the principal hazard is a Class B or Class C fire. Carbon dioxide portable installations should not exceed five pounds of agent per unit to ensure extinguisher portability and to minimize crew compartment CO2 concentrations.

2. *Water Extinguishers*: Water extinguishers are acceptable when the principal hazard is a Class A fire and where a fire might smolder if attacked solely by such agents as carbon dioxide or dry chemical. If water extinguishers will be subject to temperatures below freezing, the water extinguisher must be winterized by addition of a suitable anti-freeze.

3. *Vaporizing Liquid Extinguishers*: Vaporizing liquid type fire extinguishers are acceptable when the principal hazard is a Class B or Class C fire.

4. *Dry Chemical Extinguishers*: Dry chemical extinguishers using a bi-carbonate of sodium extinguishing agent or potassium bi-carbonate powder are acceptable where the principal hazard is a Class B or Class C fire. Dry chemical extinguishers using a so-called All Purpose Monoammonium Phosphate are acceptable where the hazard includes a Class A fire as well as Class B and Class C.

5. The size of the dry chemical extinguisher should not be less than two lbs. Only an extinguisher with a nozzle that can be operated either intermittently or totally by the operator should be installed. Some abrasion or corrosion of the insulation on electrical instruments, contacts or wiring may take place as a result of using this extinguisher. Cleaning and inspection of components should be carried out as soon as possible. Care should be taken when using this extinguisher in crew compartments because the chemical can interfere with visibility while it is being used and because the nonconductive powders may be deposited on electrical contacts not involved in the fire. This can cause equipment failure.

6. *Halon Extinguishers*: Halon 1211 is a colourless liquefied gas which evaporates rapidly, does not freeze or cause cold burn, does not stain fabrics nor cause corrosive damage. It is equally effective on an A, B or C class fire and has proven to be the most effective extinguishant on gasoline based upholstery fires. The size of a Halon 1211 extinguisher for a given cubic space should not result in a concentration of more than 5%. Halon 1211 is at least twice as effective as CO2 and is heavier than air (so it “sinks”). Decomposed Halon 1211 “stinks” so it is not likely to be breathed unknowingly.

7. Halon 1301 is less toxic than Halon 1211 but it is also less effective and is excellent for B or C class fires. A short-coming appears to be the lack of a visible “stream” on discharge; Halon 1301 turns into an invisible gas as it discharges.

551.400 ***Hand-Held Fire Extinguisher***

(c) Installation

The installation of hand-held fire extinguishers must be such that when properly secured in its mounting: (1) the extinguisher will remain secure when subjected to the ultimate inertia loads established by the aircraft certification basis of the aircraft, but not less than the following ultimate load factors:

Load Factors	**Aeroplanes**
forward	9.0
sideward	1.5
upward	2.0
downward	4.5

(2) the extinguisher will have a "quick release" function to enable easy removal from its mount.

523.561 ***General, Emergency Landing Condition***

(a) The aeroplane, although it may be damaged in emergency landing conditions, must be designed as prescribed in this section to protect each occupant under those conditions.

(b) The structure must be designed to give each occupant every reasonable chance of escaping serious injury when:

(3) The items of mass within the cabin, that could injure an occupant, experience the static inertia loads corresponding to the following ultimate load factors.

(i) Upward, 3.0g;

(ii) Forward, 18.0 g; and

(iii) Sideward, 4.5g.