

Metropolitan Fire & Emergency Services Board Community Safety Directorate		<i>Guideline No: GL-16</i>
GUIDELINE		<i>Prepared By:</i> MFESB Community Safety Policy Group
SELECTION, INSTALLATION & MAINTENANCE OF PORTABLE FIRE EXTINGUISHERS		<i>Authorised By:</i> ACFO Greg Bawden
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1. PURPOSE

This guideline has been developed to ensure that consistent advice is provided when specifying the selection, location, and level of maintenance of portable fire extinguishers.

2. SELECTION & INSTALLATION CRITERIA

Portable fire extinguishers must be installed within every building, except Class 1 residential dwelling, sole occupancy units of a Class 2 or 3 buildings or a Class 4 part of a building, as necessary to allow effective initial attack on a fire by occupants. However, it is recommended that that for all classes of building portable fire extinguishers are installed, including sole occupancy units and domestic buildings.

The selection of suitable extinguishers depends on a number of factors, including the following:

- a) Expected types of fires including size and propagation.
- b) Construction and occupancy of the property.
- c) Special risk to be protected.
- d) Extremes of temperature expected.
- e) Reliability and availability of other manual or automatic firefighting equipment.
- f) Knowledge and capability of the likely user.

Portable fire extinguishers satisfy the above if-

1. They are provided and installed in accordance with AS 2444-2001 "Portable fire extinguishers and fire blankets – Selection and location", except water type extinguishers need not be installed in a building or part of a building served by a hose reel; and
2. Extinguishers provided for other than Class A fires are suitably located adjacent to the relevant risk; and
3. Where water type extinguishers are provided, they are located, wherever practicable, adjacent to required exits.

The distribution of portable fire extinguishers shall be in accordance with the hazard classification of the area or risk to be protected. Extinguishers shall be located in a conspicuous and readily accessible position, adjacent to the risk, in the path of exit travel or near exits and mounted at the appropriate height.

Appendix A of this guideline outlines the type and location of portable fire extinguishers for identified risks. For additional information, reference should be made to Section 4 (Distribution of Portable Fire Extinguishers) of AS 2444-2001 and where flammable or combustible liquids are stored reference must be made to AS1940-1993, "The Storage and Handling of Flammable and Combustible Liquids".



3. DEFINITION OF RATING AND CLASSIFICATION

Fire extinguishers complying with Australian Standards are marked with a classification and rating, determined in accordance with AS 1850.

Extinguishers are rated by their performance and suitability for a particular class of fire, i.e. 2A:40B:E. The classes of fire are:

Class A: Fires in ordinary combustible materials, such as wood, cloth, paper, rubber and many plastics.

Class B: Fires in flammable and combustible liquids, greases, and oils.

Class C: Fires in combustible gases.

Class D: Fires in combustible metals.

Class E: Fires which involve energised electrical equipment (where the electrical non-conductivity of the extinguisher is of importance).

Class F: Fires for cooking oils and fats.

The number before the letter is a measure of the relative performance within that class range, between 0 and 10 for Class A, 20 and 80 for Class B and 1 and 4 for Class F. A greater rating reflects an increased effectiveness of the extinguisher for the nominated class of fire. When a fire extinguisher is rated for more than one class of fire, it is expressed in alphabetical order, e.g. 2A:40B:E.

There is no one type of fire extinguisher that will universally cover all fires. For this reason, careful consideration needs to be given to all the factors involved in selecting the most suitable fire extinguisher, or combination of fire extinguishers.

The Rating and Classes listed in the attached appendix are minimum recommendations only. Individual companies may not manufacture exact Ratings as listed, therefore, the next highest rating should be utilised.

i.e. in the instance of a 1A:5B: E Dry Powder not being available then 1A:10B: E Dry Powder would be considered appropriate.

Note: If the attached Guideline table (Appendix A) is followed, the intent of Section 2 has been satisfied.

4. MAINTENANCE

The relevant maintenance standard for portable fire extinguishers is AS 1851.1-1995 "Maintenance of fire protection equipment - Portable fire extinguishers and fire blankets". The current maintenance schedule adopted by this standard is summarised below.

Classification	Inspection Frequency
Level 1	Six-monthly intervals
Level 2	Yearly intervals
Level 3	Three-yearly intervals
Level 4	Six-yearly intervals
Level 5	After use

Immediately following each inspection, the maintenance tags are required to be indented and a written inspection report submitted to the building owner or occupier. The owner or occupier is

then responsible for keeping a copy of that maintenance report on site at all times and where an essential services logbook is required by Part 11 – Division 1 of the Building Regulations 1994, preferably within that logbook.

5. ADDITIONAL FACTORS TO CONSIDER WHEN SELECTING AN EXTINGUISHER

For further information on the additional factors to consider when selecting a portable fire extinguisher refer to Appendix A of AS2444-2001.

5.1 Physical Factors

Physical factors which affect selection include the following:

- a) Choice of an appropriate extinguishant for the type of fire most likely to occur.
- b) Size and mass of the fire extinguisher and the ability of the user to carry and operate it.
- c) Effects of environmental conditions of the fire extinguisher and its support fixture.
- d) Possibility of adverse reactions, contamination, or other effects of an extinguishant on manufacturing processes or equipment.
- e) Possibility of winds or draughts affecting the distribution of the extinguishant.
- f) Possibility of installation of the fire extinguisher in a location where vibration may affect the components of the extinguisher or its contents, e.g. powder.

5.2 Health and Safety Factors

Most fires produce toxic products of combustion and some materials may produce highly toxic gases. Fires consume available oxygen and may involve dangerously high exposure to convected or radiated heat. Any space in which there is smoke, fumes or pungent odours, or in which extinguishers have been discharged, should be immediately vacated by all persons not involved in fire control. The space should only be re-entered with caution.

Note: *Inappropriate use of extinguishers may result in electrocution, oxygen deficiency, or respiratory irritation.*

Health and safety factors which affect the selection of extinguishers and need consideration include the following:

- a) Water-based extinguishants (water, wet chemical, hydro spray, and foam) are electrically conductive and therefore must not be used on fires involving electrically energised equipment.
- b) Carbon dioxide, used in sufficient concentration to extinguish a fire, will displace air. In a confined space, oxygen deficiency is life-threatening.
- c) Powder extinguishers discharged in a confined space can temporarily reduce visibility and may cause respiratory irritation, thus should not be used in patient care areas and areas that contain aged or very young persons
- d) A:B:E powders based on ammonium phosphate should not be used for the protection of appliances using cooking oils or fats.

The following factors should be taken into consideration when replacing an extinguishers:

- a) Assess the area (risk) that the extinguisher is to be provided for, i.e. kitchen, open fire, garage, etc.
- b) Always recommend replacement with an extinguisher of equivalent rating. i.e. B.C.F.1A:10B: E - replace with a Dry Powder 1A:10B: E Rating or higher.
- c) Aerosol type extinguishers are not recommended for commercial premises.

- d) It is recommended that only an 'F' type or B:E (other than ammonium based) extinguisher be used to protect a deep fat fryer.

6. REFERENCES

1. Performance Requirement EP1.2 of the Building Code of Australia 1996
(inter-alia deemed-to-satisfy clauses E1.6 and E1.10)
2. AS 2444 – 2001 *Portable fire extinguishers and fire blankets – Selection and location*
3. AS 1851.1 – 1995 *Maintenance of fire protection equipment - Portable fire extinguishers and fire blankets*
4. AS 1850 – 1997 *Portable fire extinguishers – Classification, rating and performance testing*
5. AS 1940 – 1993 *The Storage and Handling of Flammable and Combustible Liquids*
6. Part 11, Division 1 of the Building Regulations 1994

7. APPENDIX A - Extinguisher placement and size guide

Risk	Extinguisher Rating & Type	Preferred Location
Building where hose reels are NOT provided		
	2A. Water type (1 per 200 m ² or part thereof)	Adjacent to exit.
Dwellings		
Kitchen	1A:5B:E	Adjacent to kitchen door ¹ .
Open heating, etc	1A:5B:E	Near exit
Flats, Motels and Hotels		
Kitchen	1A:5B:E	Adjacent to kitchen door.
Takeaway Food shops or Kitchens	40B:E Dry Chem. Not A:B:E <u>Or</u> 2A:4F Wet Chem.	
- with deep fryer	2A:40B:E Dry Chem.	B/w 2 m and 4 m max.
Electrical switchboards	2A:20B:E Dry Chem.	B/w 2 m and 20 m from electrical switchboard.
Electrical switchrooms	2A:40B:E Dry Chem.	Adjacent to and external to entry door.
Plant rooms-		
- Oil fired air cond. (Hose reels installed)	80B:E Dry Chem.	Adjacent to and external to entry door b/w 2 m and 5 m max.
- (No hose reels)	4A:80B:E	
- Gas fired air cond.	2A:40B:E Dry Chem.	
- Lift motor	2A:40B:E Dry Chem. <u>Or</u> 10B:E Carbon Dioxide	Adjacent to exit door, 4 m max.
Commercial and Office Buildings		
Takeaway Food shops or Kitchens	40B:E Dry Chem. Not A:B:E <u>Or</u> 2A:4F Wet Chem.	Adjacent to exit door and accessible from cooking area, b/w 2 m and 20 m max.
- without deep fryer	2A:20B:E Dry Chem.	
Electrical switchboards	2A:20B:E Dry Chem.	B/w 2 m and 20 m from electrical switchboard.
Electrical switchrooms	2A:40B:E Dry Chem.	Adjacent to and external to entry door b/w 2 m and 5 m max.
Plant rooms-		
- Oil fired air cond. (Hose reels installed)	80B:E Dry Chem.	Adjacent to and external to entry door b/w 2 m and 5 m max.
- (No hose reels)	4A:80B:E	
- Gas fired air cond.	2A:40B:E Dry Chem.	
- Lift motor	2A:40B:E Dry Chem. <u>Or</u> 10B:E Carbon Dioxide	Adjacent to exit door, 4 m max.

¹ Where cooking appliances (using cooking oils and fats) are installed, a fire blanket is recommended, additional to the above.

Risk	Extinguisher Rating & Type	Preferred Location
Industrial Buildings		
Electrical switchboards	2A:40B:E Dry Chem. Or 10B:E Carbon Dioxide	
- Factory area less than 600 m ²	2A:20B:E Dry Chem.	Between 2 m and 20 m from electrical switchboard.
Electrical switchrooms	2A:40B:E Dry Chem.	Adjacent to and external to entry door, b/w 2 m and 5 m max.
Vehicle Entry Points, Loading Bays	4A:80B:E Dry Chem.	
- Hose reels	4A:80B:E	b/w 2 m and 10 m max
- No hose reels	4A:80B:E	Adjacent to exit door b/w 2 m and 20 m
Workshops and Garages		
- (hose reels installed)	2A:60B:E 80B:E Dry Chem.	Adjacent to exit door.
- (no hose reels)	2A:40B:E Dry Chem. 2A:40B Foam 4A:80B:E	
Automotive Practices	2A:40B:E Dry Chem. 2A:20B Foam	Between 2 m and 20 m from practices.
Flammable Liquid Store	Refer Table 10.3 of AS 1940	
Flammable Liquid Cabinets ¹	2A:60B:E Dry Chem. For each cabinet	Adjacent to exit door, b/w 2 m and 20 m max. Between 3 m and 10m from cabinet.
Spray Booth	2A:40B:E Dry Chem.	Between 2 m and 5 m from booth.
Automotive Practices	2A:40B:E Dry Chem. 2A:20B Foam	Between 2 m and 20 m from practices.
Computer Room	1A:20B:E VL or 2A:20B:E Dry Chem.	Adjacent to exit door.
Electrical Practices	2A:20B:E (Powder)	Between 2 m and 20 m from practices.
Hospitals, Health Care and Nursing Homes		
Patient Care Areas	5B:E Carbon. Dioxide	Adjacent to nurse's station, b/w 2 m and 20 m max.
Operating Theatre	5B:E Carbon dioxide	Adjacent to exit door.
Surgery	5B:E Carbon dioxide	Adjacent to exit door, b/w 2 m and 20 m max.
Kitchens	40B:E Dry Chem. Not A:B:E	Adjacent to exit door and accessible to cooking areas, b/w 2 m and 20 m max.
Laboratories	5B:E Carbon dioxide	Adjacent to exit door, b/w 2 m and 20 m max.
Switchboards	5B:E Carbon dioxide	Adjacent to and between 2 m and 20 m from electrical switchboard.
Switchrooms	5B:E Carbon dioxide	Adjacent to and external to entry door, b/w 2 m and 5 m max.

¹ Where flammable or combustible liquids are stored, the selection and installation of portable fire extinguishers must be in accordance with AS1940-1993 "The storage and handling of flammable and combustible liquids".

Risk	Extinguisher Rating & Type	Preferred Location
Plant rooms		
- (Hose reels installed)	80B:E Dry Chem. for gas fired.	Adjacent to and external to entry door.
- (No hose reels)	4A:80B:E Dry Chem.	Adjacent to exit door 4 m max.
- Lift motor	2A:40B:E Dry Chem. Or 10B:E Carbon Dioxide	
Schools		
Administration area	1A 20B:E Dry Chem.	Adjacent to exit door and accessible for use on electrical office equipment.
Portable classrooms	2A Water type	Adjacent to exit, b/w 2 m and 20 m.
- stand alone	or 2A:40B:E Dry Chem.	
Portable classroom with switchboard	20B:E: Dry Chem.	Between 2 m and 20 m from electrical switchboard.
Electrical switchrooms	2A:40B:E Dry Chem..	Adjacent to and external to entry door, b/w 2 m and 5 m max.
Electrical switchboard	1A:20B:E Dry Chem.	Adjacent to and between 2 m and 20 m from electrical switchboard.
Canteen or kitchen	40B:E Dry Chem. Not A:B:E Or 2A:4F Wet Chem.	Adjacent to exit doors and accessible to cooking areas.
Audio/Visual	20B:E Dry Chem.	Adjacent to exit doors.
Science room or laboratories	2A:40B:E Dry Chem.	Adjacent to exit door, between 2 m and 2m max.
Home Economics	40B:E Dry Chem. Not A:B:E	Adjacent to exit door.
Boiler rooms	2A:40B:E Dry Chem.	External to and adjacent to entry doors.
Woodwork room	2A:40B:E Dry Chem.	Adjacent to exit door.
Woodwork machine room	1A:20B:E Dry Chem.	Adjacent to exit door.
Art room		
- 3D (spray booth)	2A:40B:E Dry Chem.	Accessible to spray booth.
- Kiln room	1A:20B:E Dry Chem.	Accessible to kiln.
Metal work	2A:40B:E Dry Chem.	Adjacent to exit door.
Automotive practices	2A:40B:E Dry Chem.	Adjacent to exit door.
Computer room	1A:20B:E Dry Chem.	Adjacent to exit doors.
Electrical practices	1A:20B:E Dry Chem.	Adjacent to exit door.
Staff resources area	1A:20B:E Dry Chem.	Adjacent to exit door.
Bio Box	2A:40B:E Dry Chem. Or 10B:E Carbon Dioxide	Adjacent to exit door. Within 4 m max.

Risk	Extinguisher Rating & Type	Preferred Location				
Temporary Structures						
General	2A Water Type (1 per 200m ² or part thereof)	Adjacent to exit.				
Electrical Generator	4A:80B:E	Between 1 m and 4 m from generator.				
Electrical Switchboard	4A:80B:E	Between 2 m and 4 m from electrical switchboard.				
Flammable Liquid or Gas Containers	4A:80B:E	Between 2 m and 4 m from flammable liquid or gas containers.				
Cooking Areas						
- Single cooking facility	2A:40B:E	Between 2 m and 4 m from cooking area.				
- Multiple cooking facilities	40B:E Dry Chem. Not A:B:E Or 2A:4F Wet Chem.	Between 2 m and 4 m from cooking area.				
Note 1: Dry Powder extinguisher may be substituted for the use of a water type extinguisher where they have a Class A rating.						
Note 2: Where cooking appliances (using cooking oils and fats) are installed, a fire blanket is recommended, additional to the above						
Note 3: Water type extinguishers not to be located near other specific risks (e.g. electrical).						
Amusement Rides and Devices						
Registered capacity of amusement device (number of patrons)		Number of fire extinguishers				
Over	Up to and including	Category of amusement devices (see Legend)				
		A	B	C	D	E
0	5	1	1	1	1	1
5	20	2	2	1	1	1
20	50	3	2	2	2	1
50	-	3	3	3	2	1
LEGEND:						
Category A	made of and housed in a structure of primarily combustible or low melting temperature materials, such as timber, aluminium, plastics.					
Category B	made of primarily combustible or low melting temperature materials and sited in open air.					
Category C	made of and housed in a structure where no significant quantities of combustible or low melting temperature materials are used or contained.					
Category D	containing no significant quantities of combustible or low melting temperature materials.					
Category E	made in a manner that presents minimal fire danger or hazard.					
Fire extinguishers shall be provided in accordance with the following requirements:						
a)	The number of extinguishers shall not be less than as specified in the table above.					
b)	The capacity of any fire extinguisher shall not be less than 2A:40B:E powder type.					
c)	At least one of the specified extinguishers shall be located at either the operator's position or the electrical control.					
d)	Extinguishers shall be supported by a substantial bracket.					
e)	Extinguishers shall be maintained in accordance with AS 1851.					
Pyrotechnics						
The operator of the outdoor display shall provide at least a 2A water type fire extinguisher, 2A:40B:E Dry Chemical fire extinguisher, 20 L container of water and a bucket of sand at each point of launch.						
Note 1: WorkSafe Victoria, local council and the fire brigade are required to be informed of the time, location and type of display to be undertaken.						
Note 2: The pyrotechnician must be licensed and the license must be available on request.						

Risk	Extinguisher Rating & Type	Preferred Location
Vehicles		
Sedan, station wagon, panel van or utility	1A:5B:E	Adjacent to driver's seat
Caravan/Campervan		
- Single compartment	1A:5B:E	Adjacent to exit door ¹
- Multi compartment	1A:5B:E	Adjacent to exit in each compartment ³
- Relocatable dwelling	1A:5B:E	Adjacent to kitchen and near exit.
Outboard/Inboard Powered Boat		
- Small fuel tank <25 L	5B:E	Adjacent to drivers seat ³
- Large fuel tank >25 L	20B:E	Adjacent to drivers seat ³
- Houseboat and motor cruising yacht	2A:10B:E	Min of 2 fire extinguishers located adjacent to driver's seat.
Passenger carrying vehicle		
- Not fitted with integral luggage compartment	2A:20B:E (fitted with hose)	Adjacent to driver's seat
- Fitted with integral luggage compartment	2A:20B:E (fitted with hose)	Adjacent to driver's seat plus one mounted near underfloor area or engine
- Cargo carrying vehicle	1A:10B:E (fitted with hose)	Adjacent to driver's seat ²

8.

¹ In caravans and boats where cooking appliance (using cooking oils and fats) are installed, a fire blanket is recommended, additional to the above.

² Additional extinguishers appropriate to the cargo carried and in accordance with the relevant regulations.