

## Selection, Installation and Maintenance of Portable Fire Extinguishers

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### Purpose

This guideline has been developed to ensure that consistent advice is provided regarding installation, selection and maintenance aspects pertaining to portable fire extinguishers.

### Scope

This guideline outlines statutory and MFB recommendations regarding the selection, installation, rating, classification, maintenance requirements, use, and replacement of, portable fire extinguishers in all classes of buildings.

### Selection and Installation Criteria

Portable Fire Extinguishers are required by law to be installed within every new building except:

- Class 1 residential dwellings
- Sole occupancy units of Class 2 or 3 buildings
- A Class 4 part of a building.

Portable fire extinguishers are an excellent means of providing effective, initial attack on a fire by occupants. The MFB recommends that consideration should also be given to the installation of portable fire extinguishers in all classes of buildings.

The selection of suitable extinguishers depends on a number of factors, including, but not limited to, the following:

- expected types of fires including size and propagation (growth);
- construction and occupancy of the property;
- special risk to be protected;
- extremes of temperature expected;
- size and degree of hazards which would affect their use;
- reliability and availability of other manual or automatic firefighting equipment; and
- knowledge and capability of the likely user.

# Selection, Installation and Maintenance of Portable Fire Extinguishers

Portable fire extinguishers satisfy the above if:

- they are provided and installed in accordance with AS 2444-2001 “Portable fire extinguishers and fire blankets – selection and location”, except water type extinguishers which are not required in a building or part of a building served by a hose reel;
- extinguishers provided for fires other than Class A (see below) fires, are located at the required proximity to the relevant risk; and
- 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 in buildings) of AS 2444-2001. Where flammable or combustible liquids are stored, reference should be made to AS 1940-2004, “The Storage and Handling of Flammable and Combustible Liquids”. Where gases are stored within a building, reference should be made to AS 1596-2008 “Storage and Handling of LP Gas”.

## Rating and Classification

Fire extinguishers complying with Australian Standards are marked with a classification and rating, determined in accordance with AS 1850 – 2009 “Portable fire extinguishers – classification rating and performance testing.”

Extinguishers are rated by their performance and suitability for a particular class of fire, i.e. A water extinguisher will be marked 2A and a dry chemical extinguisher will be marked 2A:40B:E. The classes of fire are:

<b>Class A:</b>	Fires in ordinary combustible materials, such as wood, cloth, paper and rubber.
<b>Class B:</b>	Fires in flammable and combustible liquids, greases, and oils.
<b>Class C:</b>	Fires in combustible gases.
<b>Class D:</b>	Fires in combustible metals.
<b>Class E:</b>	Fires which involve energised electrical equipment.
<b>Class F:</b>	Fires for cooking oils and fats.

The number before the letter is a measure of the relative performance within that class range, namely:

- between 0 and 10 for Class A;
- 2 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, i.e. 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 the selection of 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. For example, 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 of the AS 2444-2001 has been satisfied.

Section 2 of the AS 2444-2001 has been satisfied on compliance with Appendix A of this Guideline.

## Additional Factors to Consider When Selecting an Extinguisher

Physical factors to consider are:

- choice of an appropriate extinguishant for the type of fire most likely to occur;
- size and mass of the fire extinguisher and the ability of the user to carry and operate it;
- effects of environmental impact on the condition of fire extinguisher and its support fixture;
- possibility of adverse reactions, contamination, or other effects of an extinguishant on manufacturing processes or equipment;
- possibility of winds or draughts affecting the distribution and thus effectiveness of the extinguishant; and
- 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.

## Health and Safety Factors to Consider are:

- 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;
- carbon dioxide, used in sufficient concentration to extinguish a fire, will displace air. In a confined space, the possible resultant oxygen deficiency may be life-threatening;
- 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 or areas that contain aged or very young persons; and
- A:B:E powders based on ammonium phosphate should not be used for the protection of appliances using cooking oils or fats.

For further information on the additional factors to consider when selecting a portable fire extinguisher refer to Appendix A of AS 2444-2001.

## Considerations after Use of Extinguishers

### Health and Safety:

Most fires produce toxic products of combustion and may produce highly toxic gases. 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. Fires consume available oxygen and may present dangerously high exposure to convectional or radiated heat.

## Considerations Regarding Replacement of Extinguishers

- direct access to the area (risk) that the extinguisher is to be provided for, i.e. kitchen, open fire, garage, etc;
- always recommend replacement with an extinguisher of equivalent or higher rating. i.e. 1a:10b:e - replace with a dry powder 1a:10b:e rating or higher;
- aerosol type extinguishers are not recommended for commercial premises; and
- it is recommended that only an 'f' type or b:e (other than ammonium phosphate based) extinguisher be used to protect a deep fat fryer.

## References

- a) Performance Requirement EP1.2 of the Building Code of Australia (inter-alia deemed-to-satisfy clauses E1.6 and E1.10);
- b) AS 2444 – 2001 *Portable fire extinguishers and fire blankets – Selection and location*;
- c) AS 1851 – 2005 *Maintenance of fire protection systems and equipment*;
- d) AS 1850 – 2009 *Portable fire extinguishers – Classification, rating and performance testing*;
- e) AS 1940 – 2004 *The Storage and Handling of Flammable and Combustible Liquids*;
- f) AS 1596 – Storage and Handling of L.P. Gas;
- g) Building Regulations 2006, Part 12 - *Maintenance of Buildings and Places of Public Entertainment*;
- h) The Dangerous Goods (Explosives) Regulations 2011;
- i) The Australian Code for the Transport of Dangerous Goods by Road and Rail Edition 7.

## Appendix A - Extinguisher Placement and Size Guide

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

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

# Selection, Installation and Maintenance of Portable Fire Extinguishers

Risk	Extinguisher Rating & Type	Preferred Location
<b>Industrial Buildings</b>		
Electrical switchboards	2A:40B:E Dry Chem. <u>Or</u> 10B:E Carbon Dioxide 2A:20B:E Dry Chem.	Between 2 m and 20 m from electrical switchboard and fitted with a hose.
- Factory area less than 600 m <sup>2</sup>		
Electrical switch rooms	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 Dry Chem.	b/w 2 m and 10 m max
- No hose reels	4A:80B:E Dry Chem.	Adjacent to exit door b/w 2 m and 20 m
Workshops and Garages		
- hose reels installed	2A:60B:E Dry Chem. 80B:E Dry Chem.	Adjacent to exit door.
- no hose reels	2A:40B:E Dry Chem. 2A:40B Foam	
Automotive Practices	2A:40B:E Dry Chem. 2A:20B Foam	Between 2 m and 20 m from practices.
Flammable Liquid Store	Refer Table 11.3 of AS 1940	
Flammable Liquid Cabinets <sup>2</sup> 250 Litre 850 Litres	2A:60B:E Dry Chem.  For <b>each</b> cabinet Additional 2A:20B Foam Ext or foam fire hose reel	Between 3 m and 10m from cabinet.
Spray Booth	2A:60B:E Dry Chem.	Between 2 m and 5 m from booth.
Computer Room	1A:20B:E Dry Chem <u>or</u> 2A:20B:E Dry Chem.	Adjacent to exit door.
Electrical Practices	2A:20B:E Dry Chem.	Between 2 m and 20 m from practices.
<b>Hospitals, Health Care and Nursing Homes</b>		
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. <b>Not A:B:E</b>	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.
Fume cupboard	5B:E Carbon dioxide	Adjacent to cupboard.
Switchboards	5B:E Carbon dioxide	Adjacent to and between 2 m and 20 m from electrical switchboard.

<sup>1</sup> Where flammable or combustible liquids are stored, the selection and installation of portable fire extinguishers must be in accordance with AS1940-2004 "The storage and handling of flammable and combustible liquids".

## Selection, Installation and Maintenance of Portable Fire Extinguishers

Risk	Extinguisher Rating & Type	Preferred Location
Switch rooms	5B:E Carbon dioxide	Adjacent to and external to entry door, b/w 2 m and 5 m max.
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. <u>Or</u> 10B:E Carbon Dioxide	
<b>Schools</b>		
Administration area	20B:E Dry Chem.	Adjacent to exit door and accessible for use on electrical office equipment.
Portable classrooms - stand alone	2A Water type <u>or</u> 2A:40B:E Dry Chem.	Adjacent to exit, b/w 2 m and 20 m.
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. <b>Not A:B:E</b> <u>Or</u> 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 fume cupboard	2A:40B:E Dry Chem. 5B:E Carbon Dioxide	Adjacent to exit door, between 2 m and 20m max.
Home Economics	40B:E Dry Chem. <b>Not A:B:E</b>	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. <u>Or</u> 10B:E Carbon Dioxide	Adjacent to exit door. Within 4 m max.

# Selection, Installation and Maintenance of Portable Fire Extinguishers

Risk	Extinguisher Rating & Type	Preferred Location
<b>Temporary Structures</b>		
General	2A Water Type (1 per 200m <sup>2</sup> 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 Cylinders	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. <b>Not A:B:E</b> 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).

<b>Amusement Rides and Devices</b>						
Registered capacity of amusement device (number of patrons)		Number of fire extinguishers				
		Category of amusement devices (see Legend)				
Over	Up to and including	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:40:BE 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.



# Selection, Installation and Maintenance of Portable Fire Extinguishers

## Pyrotechnics

Regulation 820 of the Dangerous Goods (Explosive) Regulations 2000 require a licensed operator to ensure:

a) that adequate fire prevention and a suitable means of fire fighting is available at the display site.

**Note 1:** WorkSafe Victoria, local council and the fire brigade are required to be notified 7 days prior to the event of the time, location and type of display to be undertaken.

## Vehicles

Sedan, station wagon, panel van or utility	1A:5B	Adjacent to driver's seat
Caravan/Campervan		
- Single compartment	1A:5B	Adjacent to exit door <sup>3</sup>
- Multi compartment	1A:5B	Adjacent to exit in each compartment <sup>3</sup>
- 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 <sup>3</sup>
- Large fuel tank >25 L	20B:E	Adjacent to drivers seat <sup>3</sup>
- 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	Non Dangerous Goods 1A:10B:E (fitted with hose) Dangerous Goods – dependent on the load: The Australian Code for the Transport of Dangerous Goods by Road and Rail 7 <sup>th</sup> Edition.	Adjacent to driver's seat <sup>4</sup>

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

<sup>2</sup>Additional extinguishers appropriate to the cargo carried and in accordance with the relevant regulations.