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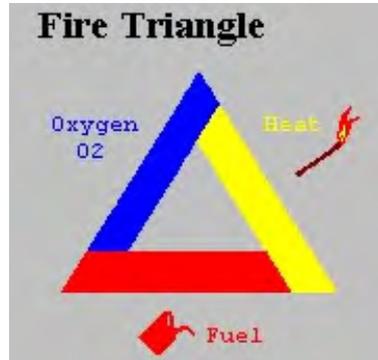
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Disclaimer: *The document provides a general overview on the topic of portable extinguishers. It may not apply to everyone, consequently to find out if this guide applies to you and to get more information on this subject you should seek advice from an expert.*

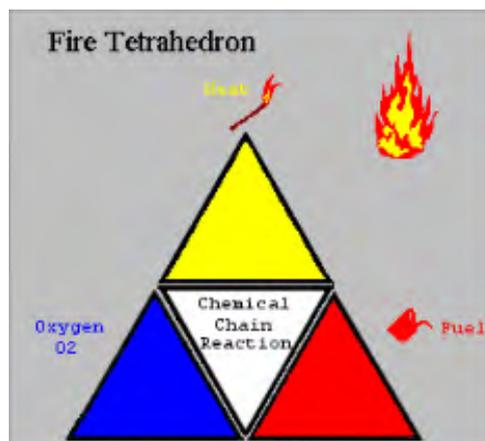
1. The Fire Tetrahedron

In order to understand how fire extinguishers work, you first need to know a little about combustion. For many years the concept of fire was symbolized by the Triangle of Combustion which represented fuel, heat and oxygen.

Further fire research determined that a fourth element, a chemical chain reaction, was a necessary component of fire.



The fire triangle was changed to a fire tetrahedron to reflect this fourth element. A tetrahedron can be described as a pyramid with four faces. Essentially all four elements must be present for a fire to occur: fuel, heat, oxygen and a chemical chain reaction. Removal of any one of these essential elements will result in the fire being extinguished.



The four elements are oxygen to sustain combustion, sufficient heat to raise the material to its ignition temperature, fuel or combustible material and subsequently an exothermic chemical chain reaction in the material. Fire extinguishers put out fire by taking away one or more elements of the fire tetrahedron.

Fire can be extinguished by either:

- a. Creating a barrier using foam for instance and prevent oxygen getting to the fire
- b. Applying water to lower the temperature below the ignition temperature
- c. Removing or diverting the fuel
- d. Interfering with the chemical chain reaction by absorbing the free radicals in the chemical reaction using for example dry powders or mists

What should you do if you discover a fire? You must get everyone out as quickly as possible and call the Fire Service. If you discover a fire in its very early stages and are trained in the use of extinguishers you can often deal with it yourself. However, be mindful that fire can spread very quickly. Even a small, contained fires can produce smoke and fumes which can overcome you in seconds. If you are in any doubt do not tackle the fire, no matter how small. You can put yourself at risk by fighting the fire. If in doubt get out, call the Fire Service out and stay out.

2. Classes of Fire

Fires have been classified into five groups:

- **Class A fires** – fires involving organic solids like paper, wood, etc.
- **Class B fires** – fires involving flammable Liquids
- **Class C fires** – fires involving flammable Gasses
- **Class D fires** – fires involving Metals such as lithium or aluminium swarf
- **Class F fires** – fires involving cooking fats and oils, such as deep fat fryers



Electrical fires are treated separately, as fires caused by electricity can fall into any of the above classifications. After all, electricity does not burn but the materials in contact with electricity might do so.

If you use a water-based extinguisher on electrical equipment make sure the extinguisher has the lightning symbol displayed.



Water-based extinguishers (foam, water, mists, etc.) that have passed an electrical safety test display this symbol and can be used on live electrical equipment of up to 1,000 Volt as long as a safety distance of 1 m is adhered to. The test involves spraying the extinguishers onto charged metal plates with 35,000 Volt. The test is called di-electric test and is specified in BS EN 3.

3. Types of Extinguisher

The type of fire extinguisher is determined by:

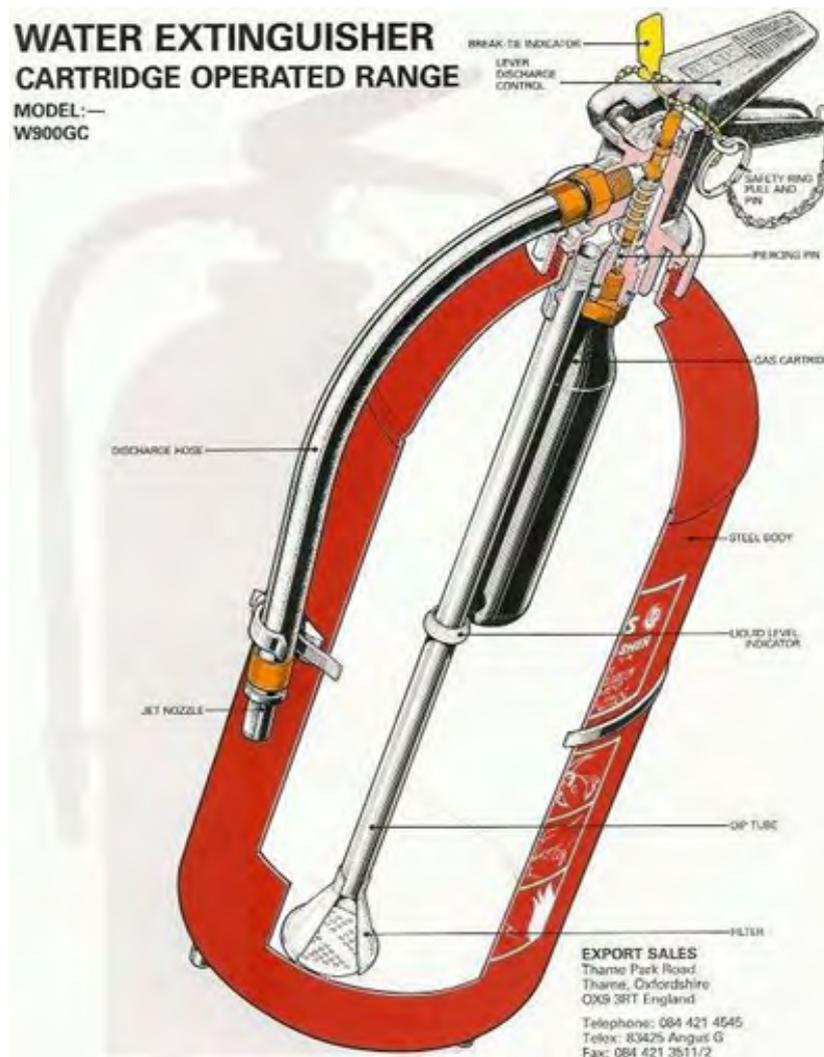
- a. The method of expelling the contents
- b. The extinguishing media contained within

3.1 Methods of expelling the contents

Two methods exist:

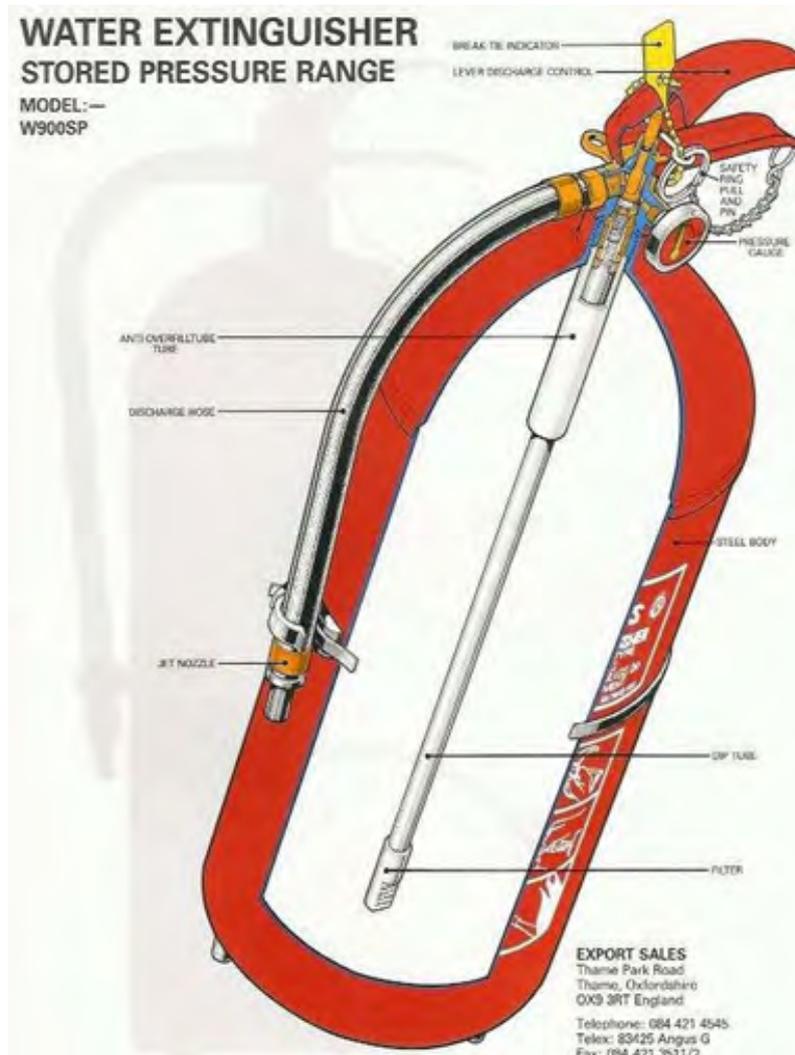
- **Gas cartridge pressure**

In these extinguishers a small cylinder of compressed gas (usually CO₂) is screwed into the head cap inside the main extinguisher body. Upon operation the cartridge seal is pierced allowing the CO₂ inside to pressurise the main body and expel the contents.



- **Stored pressure**

In these extinguishers the body of the extinguisher is permanently pressurised with a propellant gas (usually nitrogen). Upon operation a valve is opened allowing the pressurised contents to escape. These types often have a pressure gauge to allow the user to easily check the serviceability of the extinguisher. CO₂ extinguishers operate on the stored pressure method with the CO₂ stored as a liquid under its own vapour pressure.



3.2 Extinguishing Media

Water

Plain water is an effective cooling agent, absorbing the latent heat from a fire. It is especially effective on Class A fires.

Ordinary water extinguishers with continuous jet discharge are not safe for use on other classes of fire, they will spread a Class B fire, conduct electricity from energised equipment, release explosive hydrogen from Class D fires and will explosively boil over on Class F fires

Water additives

To increase the effectiveness of water, detergent-based surfactants can be added to improve the penetration of the water into the burning material. This allows greater firefighting capacity and a 3 litre water additive extinguisher can extinguish the same area of fire as a 9 litre plain water extinguisher.

As with water its use is limited to Class A fires.

De-ionised Water Mist

A relatively recent development are [de-ionised water extinguishers](#). They discharge de-ionised water in microscopic droplets. De-ionised water is non-conductive, therefore these extinguishers

can be used on live electrical equipment up to 1,000 Volt at a 1m safety distance. Another benefit is that de-ionised water does not allow bacteria growth within the extinguisher. Water mist can also be applied successfully on Class C and B fires.

De-ionised water also evaporates residue-free, reducing the clean-up after a fire. It is also safe to be used on people and animals.

Foams

Detergent or protein based compounds are added to water to produce a film or froth that can float over the surface of Class B fires forming a vapour-proof seal that smothers a fire.

Effective on Class A fires as well as Class B fires. Foam allows partial extinction of a liquid fire and prevents re-ignition.

If the foam extinguishers have the lightning symbol on the front they have been successfully de-electrically tested and can be used on live electrical equipment of up to 1,000 Volt at a 1m safety distance.

Foams cannot be used on Class D fires. Neither can they be used on Class F fires as the tremendous heat of the burning fat destroys the foam blanket rendering it ineffective. Certain flammable liquids (polar solvents) also destroy normal foam solutions making them ineffective.

Dry Powders

Dry powders prevent the chemical reaction between heat, fuel and oxygen, thus extinguishing the fire. Three types of powder extinguishers are common:

- BC Powder – A Sodium or Potassium Bicarbonate compound designed for Class B & C fires. Does not conduct electricity. High performance blends (Monnex, Purple K) are used in the petrochemical industry
- ABC Powder – Mono-ammonium Phosphate compound that melts and flows to seal and smother Class A fires in addition to its chemical inhibition properties used on Class B & C fires. Does not conduct electricity.
- D Powder – Sodium Chloride, Graphite or Copper compounds that are designed to melt and form a crust around burning metals, smothering the fire and allowing the metal to cool

Powders are almost multipurpose and knock down most fires in seconds but have some drawbacks – they do not cool, reducing their effectiveness on Class A fires, the discharge is very messy and obscures vision and on Class B fires the flames will flashback if the whole fire is not extinguished in one go or if an ignition source remains (unlike foam which is not affected either way). Enclosed electrical equipment is difficult to tackle and the powder (especially if ABC) will damage electronic components

ABC Powder is ineffective on Class F fires as the heat of the oil causes flashback once the extinguisher is empty, although BC Powder can have a limited effect.

Carbon Dioxide (CO₂)

Carbon dioxide is a non-conductive gaseous agent that displaces oxygen to smother a fire.

CO₂ can be used on live electrical equipment as it penetrates & floods enclosures and leaves no residue. However, once the CO₂ gas dissipates the fire can re-ignite, especially if the equipment

remains live. It is also effective on small indoor Class B fires, however, re-ignition of the hot liquid is possible.

It is ineffective against Class A, D or F fires.

CO2 extinguishers cannot be used in small rooms, as the risk of CO2 poisoning is significant. 4% CO2 concentration is enough to cause symptoms of CO2 poisoning. 8% is enough to kill a person.

Wet Chemical

An alkaline water-based solution of potassium acetate that reacts with the burning fat of a Class F fire to saponify it and turn the surface into a soapy crust, sealing it from the air and allowing it to cool.

It is the definitive extinguishing agent for all Class F fires in fryers over 3 litre capacity/300mm diameter (the limits for using a fire blanket) and due to its water content is also effective on Class A fires. All wet chemical extinguishers have to be di-electrically tested and are therefore safe on live electrical equipment up to 1,000 Volt at 1m safety distance.

Vaporising Liquids

Complex chemical compounds that extinguish by separating the four parts of the fire tetrahedron. They prevent the chemical reaction between heat, fuel and oxygen, thus extinguishing the fire

The most common used to be BCF (Halon 1211) effective against Class A & B fires, energised electrical equipment and particularly popular for vehicle and computer protection.

Halon extinguishers are now illegal to possess, service or fill except for a very narrow list of exempted uses (e.g. on aircraft) and although environmentally friendly replacements are available they are rarely found in portable extinguishers.

4. Design of Portable Extinguishers

Definition of portable extinguisher

An extinguisher which is designed to be carried and operated by hand and which, in working order, has a mass of not more than 20KG.

Markings

The following information should be on the same label:

- The word 'extinguisher'
- Extinguishing medium and nominal charge
- Types of fires
- Instructions for use (pictograms and text)
- Restrictions or dangers of use
- Suitability for use on electrical equipment (water-based extinguishers) where applicable
- Manufacturer/suppliers name and address

Instructions include pictograms to enable non-English speaking people to quickly and easily identify the method of operation.

This does not detract from the need for staff at any premises to be trained in the correct use of the fire equipment provided.

The following information may be found on a separate label:

- Instructions to refill after use
- Instructions to check periodically
- Instructions to use conforming spare parts
- Identification of extinguishing medium
- Identification of percentages of additives for water-based extinguishers
- Propelling gas
- Number of references of the approval
- Manufacturer's model number
- Temperature limits
- Warning against freezing (if applicable)
- Reference to EN3

Colour

The colour of the body shall be red. A zone of colour up to 5% of the body maybe used to identify the extinguishing agent.

Pressure test

The test pressure shall not be less than 1.3 times the working pressure or at least 20 bars. The body shall not leak or show any visible signs of permanent deformation.

Burst test

The burst pressure shall not be less than 2.7 times the working pressure or at least 55 bars. The burst test shall not cause the body to fragment.

Safety devices

The operating mechanism shall be provided with a safety device to prevent accidental operation. It shall be possible to determine whether the extinguisher has been operated by means of a safety element (used indicator) e.g. used/empty indicator, gauge reading zero, nonreturnable pin.

Water-based extinguishers

The discharge tube shall be made from materials resistant to the extinguishing agent.

A strainer shall be provided with the following design features:

- Each orifice shall have an area smaller than the smallest cross section of the discharge passage
- The total area of the holes on the strainer shall be, at least, equal to eight times the smallest cross section of the discharge passage.

Dielectric test

This test is to establish the suitability of water-based extinguishers for use on live electrical equipment. Other types of extinguisher are not subject to this test.

Operating position

Extinguishers shall operate without being inverted. The operating devices shall be located on the upper part of the extinguisher or partly on the upper part and partly on the lower part and partly at the end of the hose or nozzle.

Hose assembly

Extinguishers with a mass of extinguishing medium or volume greater than 3kg or 3 litres shall be provided with a discharge hose. The flexible section of the hose shall be 400mm or greater.

5. Colour Coding of Extinguishers

Fire extinguishers may be colour-coded to indicate their type. Previously, the entire body of the extinguisher had been colour-coded, but British Standard EN3: Part 7: requires that all new fire extinguisher bodies should be red. A zone of colour of up to 5% of the external area, may be used to identify the type of extinguisher.

Fire extinguishers, if properly maintained and serviced, may be in service for at least 20 years. So there may be situations where a building will have a mixture of new and old fire extinguishers with the same type of extinguishing medium but with different colour-coded markings.

In these cases and to avoid any confusion, it is advisable to ensure that extinguishers of the same type but with different colour-coded markings are not mixed, either at the same location in single-storey buildings or on the same floor level in multi-storey buildings.

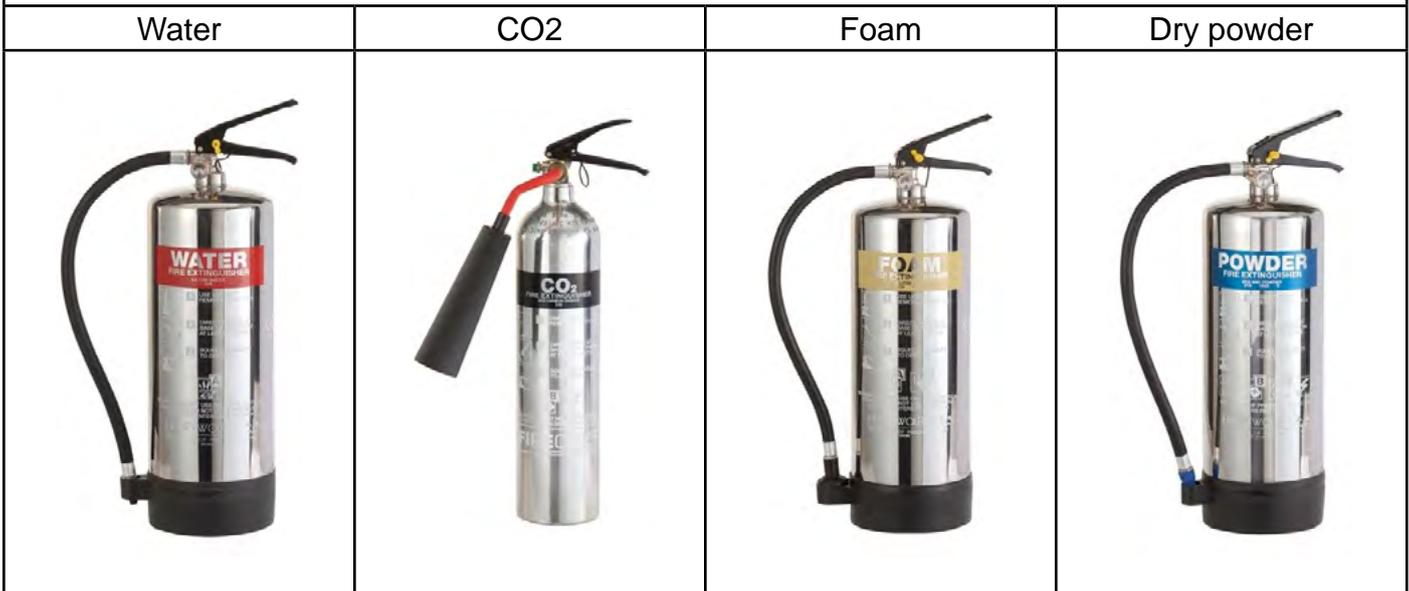
You may find extinguishers colour coded green, they were vaporising liquids (BCF), and have been phased out as the result of the Montreal.

Old extinguisher coding				
Water	Foam	Powder	CO2	Halon
				

New extinguisher coding in line with BS EN3					
Water	De-ionised Water Mist	Foam	Powder	CO2	Wet Chemical
					

Stainless steel or polished aluminium extinguishers

Where aesthetics are important, you may find extinguishers that are not red but of polished aluminium or stainless steel. It is important you familiarise yourself with their contents before there is a fire.



6. Fire Ratings

Extinguishers display a fire rating which indicates the type of fire the extinguisher can be used on and the size of test fire they can extinguish. The type (Class) of fire is identified by a letter A B C D F and the size of fire is identified by a number. The larger the number, the larger the test fire it can extinguish i.e. 13A/113B. This rating indicates the extinguisher is capable of extinguishing a Class A fire to the size 13A and a Class B fire to the size 113B under test conditions and when operated by a trained person.

6.1 Test Fires for Class A

A test fire is created made from a crib of wooden sticks 500mm wide and 546mm wide. The length of the crib that can be extinguished with a specific extinguishers determines the A rating.

Ratings	Length of Crib (m)	No of 0.5m Sticks in each Transverse Section
5A	0.5	5
8A	0.8	8
13A	1.3	13
21A	2.1	21
27A	2.7	27
34A	3.4	34
43A	4.3	43
55A	5.5	55

6.2 Test Fires for Class B

These tests are carried out using welded steel, cylindrical trays. Industrial heptane is used.

The trays are filled with a third water and two-thirds fuel, which floats on top of the water. The fuel is ignited and allowed to burn for 1 minute. The fire is then attacked.

All flames to be extinguished and there is a minimum of 5mm depth of fuel left in the tray. There is a minimum duration of discharge for extinguishers.

DIAGRAM OF TRAY USED FOR B TEST FIRES

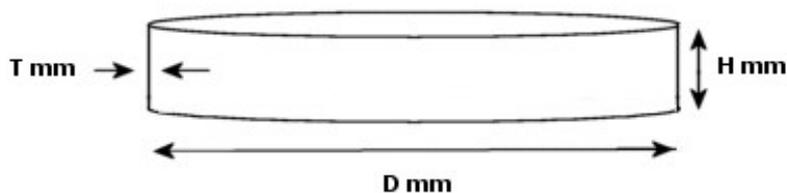


Table of permitted B ratings and tray sizes for test fires

Rating	Vol of liquid	Vol of fuel (approx)	Vol of water	Area of fire (approx)	Tray diameter	Tray depth	Tray wall thickness
21B	21	14	7	0.66	920+/-10	150	2.0
34B	34	23	11	1.07	1170+/-10	150	2.5
55B	55	37	18	1.73	1480+/-15	150	2.5
70B	70	47	23	2.20	1670+/-15	150	2.5
89B	89	60	29	2.80	1890+/-20	200	2.5
113B	113	76	37	3.55	2130+/-20	200	2.5
144B	144	96	48	4.52	2400+/-25	200	2.5
183B	183	122	61	5.75	2710+/-25	200	2.5
233B	233	156	77	7.32	3000+/-30	200	2.5

6.3 Test Fires for Class F

All extinguishers capable of extinguishing class F fires have a rating based on 4 benchmark tests using 5, 15, 25 and 75 litres of sunflower oil. The oil is heated to autoignition and allowed to pre burn for 2 minutes. Fire is extinguished and no re-ignition shall occur within 10 minutes of extinguishing the fire. This section will be updated in the near future.

7. Provision

7.1 Class A Risks

Multi-storey

- On each storey there should be at least two extinguishers sited
- The total Class A rating of all extinguishers on that storey should be not less than $0.065 \times$ floor area (m²) and in no case less than 26A
- A 13A rated extinguisher covers 200m²

Single occupancy

- The above applies but on upper floors in single occupancy buildings if the floor area does not exceed 100m² the minimum aggregate rating is 13A.

Multiple-occupancy

- As each storey could be occupied by separate companies the minimum provision of 26A applies.

The above provision is based on minimal risk in a building. Provision of fire equipment should be increased depending on fire load of the building.

Example:

$40\text{m} \times 40\text{m} = 1600\text{m}^2$ (floor area) $\times 0.065 = 104$ Class A rating

In the above example, the following options are available:

- 8 x 13A rated extinguishers = 104A
- 2 x 27A and 7 x 8A rated extinguishers = 110A
- 4 x 27A rated extinguishers = 108A
- 3 x 43A rated extinguishers = 129A
- 1 x 43A and 5 x 13A rated extinguishers = 108A.

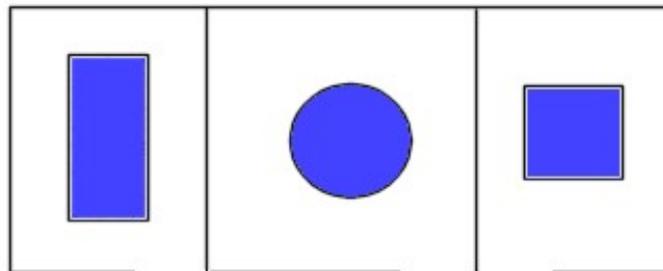
Additional Reference: BS 5306 Part 8

7.2 Class B Risks

The following factors should be taken into account when providing extinguishers for Class B risks in a building:

- Each room or enclosure to be considered separately
- Fire risks more than 20m apart consider separately
- Fire risks sited within 20m of another fire risk should be assessed either as individual groups or as divided groups

Each room or enclosure to be considered separately

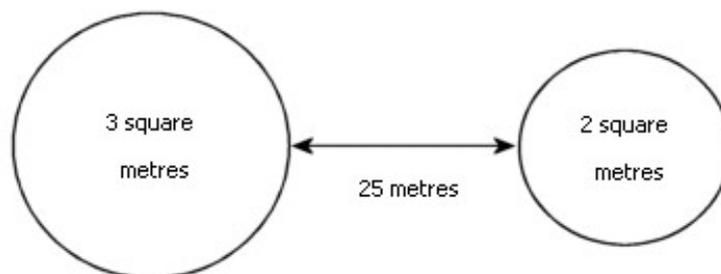


7.2.1 Contained Class B Risks

To determine the fire protection requirement for a contained Class B risk, we need to consider the surface area of the container and the separation distance from other contained Class B risks.

Separate Risks

Risks more than 20m apart need to consider separately e.g.



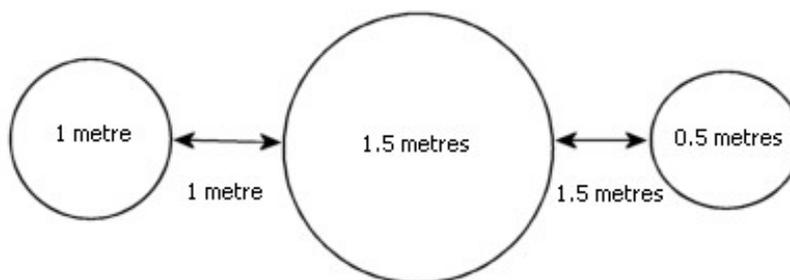
Provide one set of fire protection to deal with a 3 square metre container and

Provide one set of fire protection to deal with a 2 square metre container.

Grouped Risks

Undivided Group - Less than 2 metres apart

Treat as a single risk equivalent to the combined surface areas of the individual risks



E.g. Combined risk equivalent to = $1 + 1.5 + 0.5 = 3$ square metres

Need to provide fire protection to deal with the equivalent combined risk of 3 square metres

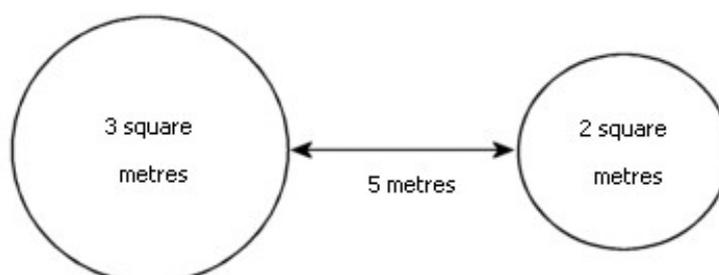
NOTE: The distance of 2m is an approximation of the maximum likely distance across which a typical flaming liquid might be able to ignite an adjacent container. This distance may be increased if factors such as the type of liquid, vapours properties, airflow, and ambient temperatures are considered liable to increase the risk of spreading.

Divided Group - Less than 20 metres but more than 2 metres apart

Treat as a single risk using the higher of the following two values:

- Method B1 - The largest surface area of the individual risks
- Method B2 - The combined surface area of the individual risks, divided by three

Example 1

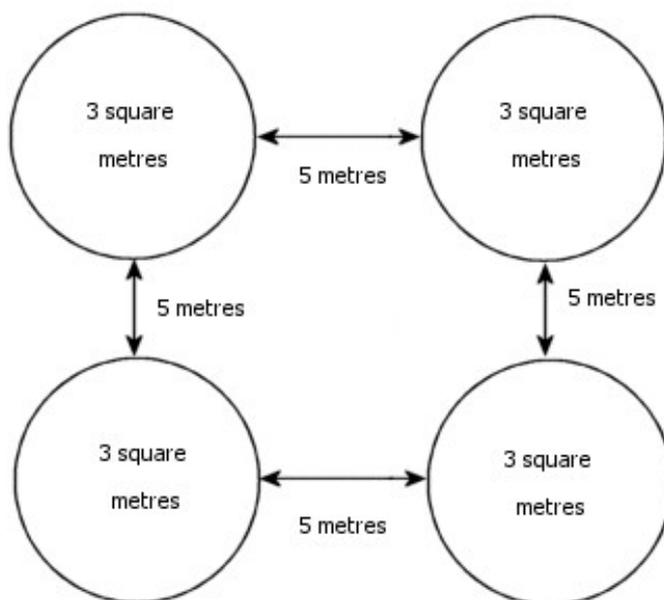


Method B1 gives a combined risk equivalent to the surface area of the largest container = 3 square metres

Method B2 gives a combined risk equivalent of one third of the combined surface areas of the individual risks = $(3+2)/3 = 5/3 = 1.67$ square metres

Since Method B1 gives the higher value the equivalent risk is 3 square metres and fire protection needs to be selected to deal with this size of Class B risk

Example 2



E.g. Method B1 gives a combined risk equivalent to the surface area of the largest container = 3 Square metres

Method B2 gives a combined risk equivalent to one third of the combined surface areas of the individual risks = $1/3 \times (3+3+3+3) = 12/3 = 4$ square metres

Since Method B2 gives the bigger value the combined risk is equivalent to 4 square metres and fire protection needs to be selected to deal with this size of risk.

Selecting Fire Protection Equipment for Contained B Risk

Look in "Table 1 Provision of foam extinguishers for single open top containers"

Look down the first column until a value no less than the surface area in question is reached

Read across to find the minimum number of extinguishers needed and the minimum fire rating of each extinguishers needed to deal with a risk of that surface area

E.g. If the contained B risk is 1.5 square metres this can be dealt with by:

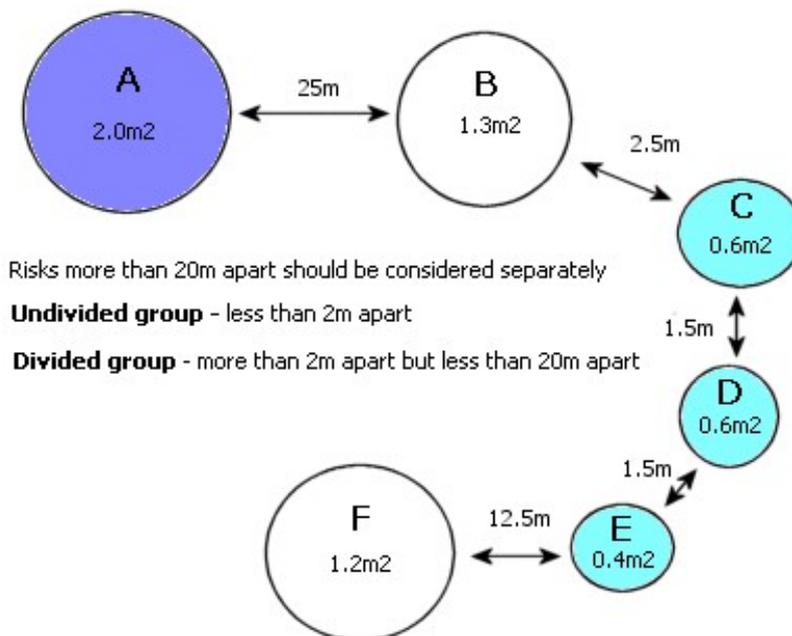
- 2 x 144B foam extinguishers or
- 3 x 144B foam extinguishers or
- 1 x 144B plus 1 x 183B extinguisher

But not:

- 3 x 89B foam extinguishers – Enough extinguishers but rated too low
- 1 x 233B foam extinguisher – Sufficient area and rating but too few extinguishers

Table 1: Provision of foam extinguishers for open top containers	
Maximum area of exposed Class B m ²	Minimum quantity and minimum rating for each extinguisher
0.14	1 x 21B
0.23	1 x 34B
0.37	1 x 55B
0.47	1 x 70B
0.59	1 x 89B
0.75	1 x 113B
0.96	1 x 144B
1.22	1 x 183B
1.41	2 x 113B
1.80	2 x 144B
2.29	2 x 183B
2.88	3 x 144B
3.66	3 x 183B
4.66	3 x 233B

GROUP OF CLASS B RISKS



Tank A is considered separately. Tanks C, D and E are an undivided group. Tanks B, (C, D, E) and F are a divided group.

7.2.2 Uncontained Class B Risks

The minimum rating should be calculated from the anticipated volume of spillage – recommended minimum rating 10 x volume (in litres) of spillage.

Where some of the spillage is contained within a restricted area such as a bund or gully, this should be treated as a Contained Risk.

8. Purchasing

The purchase and installation of independently tested and certified extinguishers is part of a Responsible Person's measures for protecting their staff and others from fire in line with the Regulatory Reform (Fire Safety) Order 2005.

It is essential that portable extinguishers conform to the BS EN3 standard.

The Responsible Person is legally required to provide a maintenance routine for extinguishers. This can take two forms:

- a. Have the extinguishers annually serviced by a competent person, usually an external provider
- b. Select service-free extinguishers such as the [Britannia P50](#). These do not require any physical maintenance for ten years but must be annually inspected staff to ensure that they have not been damaged or discharged.

Traditionally, offices require a water-based extinguisher plus a CO2 extinguisher. However, over the last few years, this pattern has been replaced, as it can be confusing for staff having to decide which extinguisher to apply on a fire. Instead, de-ionised water mist extinguishers offer the benefits of both types of extinguishers in one unit. They also reduce the number of extinguishers required.

		W	WM	F	ABC	D	CO2	WC
	Fires involving freely burning materials. For example wood, paper, textiles and other carbonaceous materials	✓	✓	✓	✓			OK
	Fires involving flammable liquids. For example petrol and spirits. Not alcohol or cooking oil		✓	✓	✓			
	Fires involving flammable gasses. For example propane and butane		✓		✓			
	Fires involving flammable metals. For example magnesium and lithium					✓		
	Fires involving electrical equipment. For example photocopiers, fax machines and computers		✓	✓			✓	
	Fires involving cooking oil and fat. For example olive oil, maize oil, lard and butter.							✓

W	WATER TYPE fire extinguisher. It includes water, water & an additive or water spray.
WM	De-ionised water mist extinguishers. Suitable for use on live-electrics.
F	FOAM TYPE fire extinguisher. Includes multi-purpose and Aqueous film-forming foam.
ABC	DRY POWDER TYPE - MULTIPURPOSE
D	SPECIAL POWDER TYPE fire extinguisher. It is a specialist powder designed to tackle fires involving combustible metals such as lithium, magnesium, sodium or aluminium when in the form of swarf or powder.
CO2	CARBON DIOXIDE TYPE fire extinguishers
WC	WET CHEMICAL TYPE fire
OK	Safe for this type of fire, but of limited capability – select a more appropriate type

9. Siting of Extinguishers

Extinguishers should be located in conspicuous positions, available at all times for immediate use in locations where they will be readily seen by persons following an escape route. Fire extinguishers should ideally be hung on wall brackets. Where this is impractical extinguishers should be located on suitable stands (not on the floor). If wall mounted the carrying handle of larger, heavier extinguishers should be 1 metre from the floor but smaller extinguishers should be mounted so the carrying handle is 1.5 metres from the floor.

Extinguishers should be sited in such a way that it is not necessary to travel more than 30 metres from the site of a fire to reach an extinguisher. To avoid confusion, all extinguishers installed in any one building or single occupancy should have the same method of operation and if intended for the same function should be similar in shape, appearance and colour. Wherever possible, portable extinguishers should be grouped to form a fire point.

Extinguishers should normally be sited:

- On brackets or stands
- On escape routes and in similar locations on all floors
- Near room exits, corridors, stairways, landings and lobbies

The following factors should be considered when siting fire extinguishers:

- Extinguishers should be on an escape route
- Elevated to a height so that the carrying handle is 1m from the floor for heavier units and 1.5m for smaller units
- Adjacent to the risk but not too close to prevent use in the event of fire occurring
- Near a door, inside or outside according to occupancy
- In multi-storey buildings at the same position on each storey
- In groups forming 'fire points'
- In shallow recesses where possible
- Away from extremes of temperature within extinguisher temperature ranges
- Maximum 30m travelling distance from a fire to an extinguisher

The following factors should also be considered when siting fire extinguishers as additions to existing fire protection equipment in a building:

Method of Operation

All extinguishers, where possible, operate by the same method

Ease of Handling

The occupiers should be capable of handling the types and sizes recommended. Can everybody

lift the weight?

Labelling

Where different types of extinguishers for different risk types are sited together they must be properly labelled to prevent confusion. It is preferable to use true multi-purpose extinguishers such as de-ionised water mists to avoid confusion.

Suitability for Risk

Extinguishers with suitable jet, spray or mist nozzles or flexible hoses to suit the risk involved

Maintenance Arrangements

Extinguishers to be serviced to the latest standard or in the case of the P50 service-free extinguishers to be inspected in line with manufacturer's instructions.

Rating

The fire rating must be covered.

10. Maintenance

Extinguishers should be routinely inspected by the user at not less than quarterly and preferably at monthly intervals to make sure that appliances are in their proper position and have not been discharged or lost pressure. The user should replace extinguishers not available for use, by serviceable extinguishers. In the case of traditional steel extinguishers annual service and 5-yearly test discharge should be carried out by a competent person in line with BS 5306 Part 3. Service-free extinguishers such as the Britannia P50s must be visually inspected by the owner in line with manufacturer's instructions.

To service traditional extinguishers in line with BS 5306 part 3 a competent person should be able to prove that they have completed maintenance courses and attended a refresher course within the last three years.

The servicing procedures for traditional steel extinguishers include three levels of maintenance:

- **Basic** – Annual inspection and servicing by competent person.
- **Extended** – Every 5 years a basic service plus test by discharge and internal examination of stored pressure extinguishers.
- **Overhaul** – Every 10 years for carbon dioxide extinguishers only- detailed inspection and hydraulic pressure test to meet Pressure Systems Safety Regulations 2000.

Service-free p50 extinguisher are only refilled and refurbished after ten years.