

# **MVS8001 - Fire Extinguishing Installations and Equipments on Premises**

Part 1: Guide for the selection of installed systems and other fire  
equipment

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## **Introduction**

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## 1.0 Fire Extinguishers

### General Considerations

Extinguishers complying with BS 5423 range from approximately 1 kg to 23 kg in gross mass, the latter being the maximum that it is considered a person can satisfactorily carry and use effectively. Those provided should be of a size that can conveniently be carried by the occupants of the building in which they are placed.

### Distribution of extinguishers according to classification and rating

The type of extinguisher should be selected having regard to the characteristics peculiar to each, the occupancy of the building and the nature of the particular combustible materials and circumstances.

The scheme of classification and rating given in BS 5423 makes it possible to specify the distribution of extinguishers in buildings according to extinguishing capability rather than by extinguisher type and size or content.

### Class A

Class A materials are generally present in all premises and occupancies. The basic scale of provision of extinguishers where these are the only primary first aid means of fire defence is that, on each storey, there should be at least two extinguishers sited in accordance with the provisions of [clause 6](#).

The total class A rating of all extinguishers on a storey should not be less than  $0.065 \times$  floor area of storey (in  $m^2$ ), and in no case less than 26A.

However, in the case of buildings in single occupancy with upper floor area not exceeding  $100 m^2$  the minimum aggregate rating required for these floors is 13A, and there need not be two extinguishers per floor on the upper floors.

### Class B

Table 1 gives recommended minimum ratings for the selection of extinguishers for class B fires.

To determine the minimum recommended provision of suitable extinguishers it is convenient to assess premises in the following manner.

- a) Each room or enclosure should be considered separately.
- b) Fire risks more than 20 m apart should be considered separately.
- c) Fire risks sited within 20 m of another fire risk should be assessed either as undivided groups (see 5.3.3.2) or as divided groups (see 5.3.3.3).

Table 1 — Maximum area of class B fire (deep liquid) for which extinguishers are suitable

Extinguisher rating	Maximum area for three extinguishers (foam extinguishers only) m <sup>2</sup>	Maximum area for two extinguishers m <sup>2</sup>	Maximum area for one extinguisher m <sup>2</sup>
13B	0.26	0.16	0.09
21B	0.42	0.26	0.14
34B	0.68	0.42	0.23
55B	1.10	0.69	0.37
70B	1.40	0.88	0.47
89B	1.78	1.11	0.59
113B	2.26	1.41	0.75
144B	2.88	1.80	0.96
183B	3.66	2.29	1.22
233B	4.66	2.91	1.55
296B	5.92	3.70	1.97
377B	7.54	4.71	2.51
479B	9.58	6.00	3.19
610B	12.20	7.62	4.07

### Sating of extinguishers

Normally, extinguishers should be located in conspicuous positions on brackets or stands where they will be readily seen by persons following an escape route.

Fire Extinguishers should be located in conspicuous positions on bracket or stands where they will be readily seen by person. The carrying handle of larger heavier extinguishers should be about 01m from the floor level. But smaller extinguishers should be mounted so as to position the handle 1.5m from the floor level. Extinguishers installing on the cabinet the height should be approved by MNDF Fire and Rescue Service.

### Cabinets for Fire Extinguishers.

Cabinets for fire extinguishers should be of stainless steel with or without glass-fronted doors. Color of the cabinet should be Red or to suit the requirements of architectural surroundings. Recessed Latch Type handle should be installed.

Fire Extinguisher Single Cabinets dimension should be no more than 190mm in width, 640mm in height, 180mm in depth (including door).

Fire Extinguisher Double Cabinets dimension should be no more than 440mm in width, 640mm in height, 180mm in depth (including door).

The Cabinets for Fire extinguishers should be approved by the MNDF fire and Rescue Service before Installation. Special permission should be taken if it is different from above.

## 2.0 Hose Reel System

### Conformity to standard

2.1 Hose reels should comply with the requirements of BS 5274.

### Limitation of hose in certain circumstances

2.2 Although BS 5274 permits up to 45m of hose on hose reels, frequently there are circumstances in which there is a likelihood of the hose having to be handled by persons of only moderate physical strength. In such cases, and also when the likely routes for the hose are tortuous, the length and size of hose on the reel should be limited, and the siting and provision of reels should be reviewed with these limitations in mind.

### Provision

2.3 One hose reel should be provided to cover every 800m<sup>2</sup> of floor space or part thereof.

### Siting

2.4 Hose reels should be sited in prominent and accessible positions at each floor level adjacent to exits in corridors on exit routes, in such a way that the nozzle of the hose can be taken into every room and within 6 m of each part of a room, having regard to any obstruction. Where heavy furniture or equipment may be introduced into a room, the hose and nozzle should be capable additionally of directing a jet into the back of any recess formed.

### Installation of hose reels

Preferably hose reels should be installed in recesses so that they do not form obstructions on a route of escape.

Any doors provided for hose reel recesses should be so hinged that they open approximately 180° so as not to offer any obstruction to the hose being run out in either direction. The doors should not normally be fitted with locks.

### Water supply for hose reels

The water flow rate at the most hydraulically remote hose reel should be not less than 24 L/min, and the pressure sufficient to meet the range requirements of BS 5274, when it is in use simultaneously with the nearest adjacent hose reel.

**Booster pumps**

Where the water pressure in hose reel mains needs to be boosted, the provision of an electrically driven pump is usually a convenient method. A duplicate standby pump should also be provided.

Both motors and pumps should be sited in fire protected positions and the electrical supply to them should be by an exclusive circuit with the cables following a route of negligible fire risk or be provided with adequate protection.

The booster pumps system should come into operation automatically on a drop in pressure or a flow of water. Both pumps should be automatically primed at all times.

All pumps should also be capable of being started or stopped manually. The standby pump should be so arranged that it will operate automatically on a failure for any reason of the duty pump.

An audible and visual alarm should be provided at an agreed position to indicate that the equipment and the pumping plant have operated.

**Connection for boosted supplies**

Some water undertakings do not permit a booster pump to be connected directly into a supply main. In such cases the installation should be fed from a suction tank or inter-connected tanks having a minimum capacity of 1125 liters. The tank or tanks should be automatically supplied from a towns main, controlled by a ball valve of minimum diameter 50 mm.

**Use of domestic water tanks**

Tanks supplying water for domestic purposes should not be used as suction tanks for hose reel installations unless arrangements have been made for these domestic supplies to be drawn off in such a manner that the requisite reserve of water for the hose reel installation is always preserved.

**Security**

The main stop valve controlling the water supply to the hose reels should be secured fully open by a suitable device such as a padlocked chain or strap. Appropriate notices should be provided reading "Fire hose reel main supply" (displayed at the stop valve controlling the water supply to the hose reels), and/or "Fire hose reel pump motor supply – not to be switched off in the event of fire" (displayed adjacent to all switches in the electrical power supply to any pumps).

The notices should be rectangular with white wording on a red background. The letter height should be not less than 25 mm and should be lower case except for the initial letter "F", which should be upper case, in accordance with BS 5499-1.

Notices should be resistant to weathering and to the effects of any industrial process in the vicinity.

### **Hose reel notices**

A notice reading "Fire hose reel" should be displayed adjacent to the hose reel (on the door if the hose reel is in a recess fitted with a door, glazed or otherwise). The notice should be rectangular with white wording on a red back-ground. The letter height should be not less than 50 mm and lower case except for the initial letter "F", which should be upper case, in accordance with BS 5499-1.

The notice should be resistant to weathering and the effects of any industrial process in the vicinity.

A notice giving full operational instructions should be displayed on or adjacent to the reel, whether this is manual or automatic. In the case of a manual hose reel in which an interlocking device is not incorporated the instructions should include the wording: "Open valve before running out hose".

The instructions should include specific instruction as to the correct method of closing the inlet valve to a manual fire hose reel, or of securing an automatic fire hose reel.

The notice should be in accordance with BS 5499-1 for fire equipment or supplementary signs. 19.3 If hose reels are located in recesses to which doors are fitted, the doors (whether glazed or otherwise) should bear the appropriate sign in accordance with the requirements of BS 5499-1 but with a minimum letter height of 50 mm.

## **3.0 Dry Riser System**

### **General**

3.1 Dry rising mains should be installed in buildings where any floor is higher than 18 m above ground level.

3.2 Each rising main should be provided with landing valves sited:

- a) Within a ventilated lobby of a lobby approach stairway, where this is provided, or
- b) In a stairway enclosure, or
- c) In such other position as may be agreed with the fire authority.

### Position of Inlets

3.3 In selecting positions for inlet connections for a dry rising main, regard should be paid to the positions of underground fire hydrants, the possibility of damage resulting from falling glass from windows and other possible occurrences during a fire.

3.4 The position of inlets should be clearly indicated using the appropriate sign in accordance with BS 5499-1 and using a letter height of 50 mm.

### Number of Rising Mains

3.5 The number and disposition of rising mains normally should be such that:

- a) One is provided for every 900 m<sup>2</sup>, or any part thereof, of the floor area at each level other than the ground floor;
- b) Rising mains are not more than 60 m apart in a horizontal direction;
- c) No part of a floor area is more than 60 m distant from a landing valve: the distance to be measured along a route suitable for hose lines, including any distance up or down a stairway.

## 4.0 Fire Alarm System

### Detection Zones

4.1 If manual call points are located on the landings of an enclosed stairway, the manual call point on each level should be incorporated within the zone that serves the adjacent accommodation on that level.

4.2 If the total floor area of the building is greater than 300 m<sup>2</sup>, each zone should be restricted to a single storey.

4.3 If the total floor area of the building is less than 300 m<sup>2</sup> a zone may cover more than a single storey.

4.4 The floor area of a single zone, that contains only manual call points, should not exceed 2000 m<sup>2</sup>. However, this may be increased, where the zone comprises mainly a single, open plan area (e.g. an unpartitioned warehouse) and in which case also should never exceed 10000 m<sup>2</sup> in area.

4.5 Detection zones that contain non-addressable automatic fire detectors should satisfy the following:

- a) The floor area of a single zone should not exceed 2000m<sup>2</sup>.

b) The search distance (the distance that has to be travelled by anyone responding to a fire alarm signal after entry to the zone in order for the location of the fire to be determined visually) should not exceed 60m.

c) Automatic fire detectors within any enclosed stairwell lift well or other enclosed flue-like structure should be considered as a separate zone.

4.6 Detection zones containing addressable automatic fire detectors should satisfy the following:

a) Zone indication should be given at the control and indicating equipment even if addressable text information is also available.

b) The recommendation of 4.3a does not apply if:

1) clear addressable text display of the location of, at least, the first detector to respond to a fire is available at the control and indicating equipment, without manual intervention; and

2) The display, if necessary in conjunction with other information on, or adjacent to, the control and indicating equipment, would enable fire-fighters, unfamiliar with the building, to proceed to the location of the fire.

### **Audible Alarm Signals**

4.7 The sound pressure level of alarm signals should be generally, throughout all accessible areas of the building not less than 65 dB(A). This may be reduced 60 dB(A) in the following cases.

- stairways;
- enclosures of no more than approximately 60 m<sup>2</sup> in area (e.g. cellular offices);
- specific points of limited extent;

4.8 Where the sound pressure level of background noise is greater than 60 dB(A), the sound pressure level of the fire alarm signal should be 5 dB above the sound pressure level of the background noise.

4.9 The sound pressure level of alarm signals should not be less than 75 dB(A) at the bed head within rooms in which the fire alarm system is intended to rouse people from sleep;

4.10 The sound pressure level of alarm signals should not be greater than 120 dB(A) at any normally accessible point.

4.11 The frequency(ies) produced by fire alarm sounders should lie in the range of 500 Hz to 1000 Hz, unless the frequency of background noise is such as to mask these frequencies.

### **Visual Alarm Signals**

4.12 Visual alarm signals should be provided in areas where ambient noise levels exceed 90dB(A) and in other areas where hearing protection is likely to be used under normal circumstances.

4.13 Visual alarm devices should be sufficient in number and distribution to be readily visible from all normally accessible locations, throughout the area in which they are provided, under normal ambient lighting levels.

4.14 The visual alarm signal should flash at a rate within the range of 30 to 130 flashes per minute.

4.15 The visual alarm signal should be clearly distinguishable from any other visual signal used in the premises. The color red is preferred.

4.16 The intensity of output of visual alarm devices should be sufficient to attract attention, but not so high as to cause difficulty with vision due to glare.

4.17 Visual alarms should be mounted at a minimum height of 2.1 m.

#### **Manual Call Points**

4.18 The method of operation of all manual call points in a system should be that of type A as specified in BS EN 54-11.

4.19 All call points should be identical unless there is a special reason for differentiation.

4.20 The delay between operation of a manual call point and the giving of an “Evacuate” signal in, at least, the alarm zone within which the call point is located should not exceed three seconds.

4.21 Manual call points should be located on escape routes and, in particular, at all storey exits and all exits to open air (whether or not the exits are specifically designated as fire exits). Those located at storey exits may be sited within the accommodation or on the landing of a stairway to which the storey exit gives access.

4.22 Distribution of manual call points should be such that no one need travel more than 45 m to reach the nearest manual call point, measured along the route that a person would actually follow taking into account the layout of walls, partitions and fittings. If, at the design stage, the final layout of the premises is unknown, the maximum straight line distance between any point in the building and the nearest manual call point should not exceed 30m.

4.23 The figures of 45 m and 30 m quoted 4.22 should be reduced to 25 m and 16 m respectively in the following circumstances:

- a) where a significant proportion of occupants have limited mobility and it can reasonably be anticipated that one of these occupants will be the appropriate person to first operate the fire alarm system in the event of fire; or

b) Where processes in the area result in the likelihood of rapid fire development (e.g. where there is use, or processing, of highly flammable liquids or flammable gases).

4.24 Where specific equipment or activities result in a high fire hazard level (e.g. kitchens or cellulose paint spraying), a manual call point should be sited in close proximity.

4.25 Manual call points should be fixed at a height of 1.4 m above finished floor level, at easily accessible, well-illuminated and conspicuous positions free from potential obstruction. They should be sited against a contrasting background to assist in easy recognition.

4.26 Manual call points may be flush mounted in locations where they will be seen readily but, where they will be viewed from the side (e.g. corridors), they should be surface mounted or only semi-recessed with the front face proud of the mounting surface by no less than 15 mm.

### **Types of fire detector and their selection**

4.27 The type(s) of fire detector used in a system should provide adequate protection of occupants, property or both, as appropriate to the Category of system, while minimizing the risk of false alarms as far as practicable.

4.28 Heat detectors may be used in any area, other than the following:

- 1) Areas of a Category P system in which a small fire (including any form of smoldering fire) has the potential to cause unacceptable damage;
- 2) Escape routes in Category L systems (but heat detectors may be used in other areas, including rooms that open onto escape routes);
- 3) Areas in which the production of smoke could present a threat to occupants' escape before it is likely to be detected by people or heat detection.
- 4) Areas in which heat detectors would have a high potential for false alarms

4.28 Smoke detectors may be used in any area, other than the following:

- 1) areas in which the principal fire hazard is the presence of flammable liquids or gases that produce little smoke when involved in a fire;
- 2) areas in which smoke detectors would have a high potential for false alarms, unless the risk from fire warrants the provision of automatic fire detection and the use of other forms of fire detection is precluded on the basis of their speed of response to fires of the type that might be anticipated;

### **Types of fire detector and their selection**

4.29 Under flat ceilings, the horizontal distance between any point in a protected area and the detector nearest to that point should not exceed:

- a) 7.5 m if the nearest detector is a smoke detector;
- b) 5.3 m if the nearest detector is a heat detector.

4.30 Heat and smoke detectors should not be mounted within 500 mm of any walls, partitions or obstructions to flow of smoke and hot gases, such as structural beams and ductwork, where the obstructions are greater than 250 mm in depth.

4.31 Where structural beams, ductwork, light fittings" or other isolated ceiling attachments, not greater than 250 mm in depth, create obstacles to the flow of smoke, detectors should not be mounted closer to the obstruction than twice the depth of the obstruction.

4.32 Where an area contains partitions or storage racks that reach within 300 mm of the ceiling, the partitions or storage racks should be treated as walls that extend to the ceiling (see Figure 9).

4.33 Ceiling obstructions, such as structural beams, deeper than 10 % of the overall ceiling height should be treated as walls.

### **Power supplies**

4.34 For reasons of electrical safety, the mains supply to all parts of the fire alarm system should be supplied, via an isolating protective device (such as a circuit-breaker), from the load ("dead") side of the main isolating device for the building.

4.35 The mains supply final circuit(s) to all parts of the fire alarm system should be dedicated solely to the fire alarm system, and should serve no other systems or equipment. The circuit(s) should be derived from a point in the building's electrical distribution system close to the main isolating device for the building.

### **Standby supplies**

4.36 The standby supply should comprise a secondary (rechargeable) battery with an automatic charger.

4.37 The battery should be of a type having a life of at least four years under the conditions of use likely to be experienced in the fire alarm system. Automotive batteries (of the type used for starting car engines) should not be used.

4.38 The capacity of all standby batteries that serve any part of the system that must operate correctly in order to satisfy the recommendations of BS 5839 should be sufficient to maintain the system in operation for at least 24 h, after which sufficient capacity should remain to provide an

“Evacuate” signal in all alarm zones for at least 30 min, unless the building is provided with an automatically started standby generator.

### **Cables, wiring and other interconnections**

4.39 Cable systems used for all parts of the critical signal paths, and for the low voltage mains supply to the system, should adequately resist the effects of fire. For most fire alarm systems, standard fire resisting cables should be considered to provide sufficient resistance to the effects of fire, with appropriate methods of support and jointing.

4.40 Cables used for all parts of the critical signal paths, for the extra low voltage supply from an external power supply unit" and for the final circuit providing low voltage mains supply to the system, should comprise one of the following:

- 1) Mineral insulated copper sheathed cables, with an overall polymeric covering, conforming to BS EN 60702-1, with terminations conforming to BS EN 60702-2;
- 2) Cables that conform to BS 7629;
- 3) Cables that conform to BS 7846;
- 4) Cables rated at 300/500 V (or greater) that provide the same degree of safety to that afforded by compliance with BS 7629.

## **5.0 Fire Hydrant System**

5.1 Where fire hydrants are to be installed, they should be included as part of a ring fire main system.

5.2 They should be positioned not more than 70 m from an entry to any building on the site.

5.3 The distance between any two hydrants should not exceed 150m.

5.4 In order for a fire hydrant to be usable during a fire, they should normally be not less than 6m from the building or from the risk.

5.6 Underground fire hydrants should be in accordance with BS 750 and be installed in pits.

5.7 Each fire hydrant should be clearly indicated by a plate in accordance with BS 3251 affixed nearby in a conspicuous position.

5.8 The preferred distance, when installed, between the hydrant outlet and the finished ground level is 300 mm.

5.9 Where pillar hydrants are installed care should be taken to protect them from mechanical damage.

### **Design Considerations**

The design and installation of hydrant systems should be closely correlated with all other services being provided in the building, and ducts may be shared. However, except as stated below, the water supply to hydrants and hose reels should be kept entirely independent from other water supplies including those for other fire fighting systems.

## **Design Approval**

Before any work starts, plans showing details of the arrangements proposed should be submitted to MNDF Fire & Rescue Service and their approval obtained thereto.

In completing the fire protection drawings the following symbols and abbreviations are encouraged to be used for consistence and familiarity.

## **System Installation**

Before any work starts, plans showing details of the arrangements proposed should be submitted to MNDF Fire & Rescue Service and their approval obtained thereto.

In completing the fire protection drawings the following symbols and abbreviations are encouraged to be used for consistence and familiarity.

## **System Commissioning**

Before any work starts, plans showing details of the arrangements proposed should be submitted to MNDF Fire & Rescue Service and their approval obtained thereto.

In completing the fire protection drawings the following symbols and abbreviations are encouraged to be used for consistence and familiarity.