



Code of practice for

Fire extinguishing installations and equipment on premises

Part 2. Sprinkler systems

(Formerly CP 402.201)

Code de bonne pratique des installations et du matériel d'extinction
d'incendie dans les locaux

Partie 2. Installations d'extincteurs automatiques à eau

Richtlinien für Feuerlöschanlagen und -geräte in Gebäuden
Teil 2. Sprinkler-Anlagen

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This code of practice deals mainly with sprinkler systems which are installed primarily to reduce loss of property in fire. However, some sprinkler systems are installed which additionally may serve for the protection of life and in particular circumstances may form an integral part of measures approved by the fire authority for the protection of life, for example in covered and enclosed shopping centres, where automatic sprinkler systems serve to prevent the spread of fire and its products to adjacent exit routes. Appendix B gives additional recommendations to ensure that the reliability of such a sprinkler system is consistent with its function as an essential life safety measure, in such particular circumstances or where sprinkler systems may be called for in BS 5588 : Part 10*.

Automatic sprinkler systems may provide life safety protection to occupants of the areas of buildings in which the sprinklers are installed and it is intended to cover this subject, which may include recommendations for sprinkler sensitivity for life safety purposes, in a future revision of this code

Foreword

It is important that the fire protection of a building should be considered as a whole. Sprinkler systems may form only part, although an important part of such facilities, and it should not be assumed that the provision of such a system entirely obviates the need for portable fire extinguishers, other appliances or other fixed fire suppression systems. Advice on such matters can always be obtained from the Fire Authority, the Health and Safety Executive and the fire insurance companies. In addition, reference should be made as necessary to other parts of this code of practice. This code of practice supersedes CP 402.201: 1952. It is expressed in metric terms. For information on SI units reference should be made to BS 3763 'The International Systems of units (SI)'.

CP 402 is being revised. In line with the policy to bring codes of practice into the numbering series for British Standards, the Part of the code is being published under the number BS 5306 : Part 2. Other Parts of the code are being published as follows.

- Part 1 Hydrant systems, hose reels and foam inlets
- Part 3 Portable fire extinguishers*
- Part 4 Carbon dioxide fire extinguishing systems*
- Part 5 Halogenated hydrocarbon fire extinguishing systems*
- Part 6 Foam fire extinguishing systems*
- Part 7 Extinguishing powder fire extinguishing systems*

In this Part 2, the opportunity has been taken further to coordinate the information in it with that given in 'Rules for automatic sprinkler installations' (29th edition) issued by the Fire Offices' Committee (FOC), and the code should be read in conjunction with that publication which is obtainable from:

The Fire Offices' Committee,
Aldermay House,
Queen Street,
London EC4.

A reference copy is also held by the BSI Library at 2 Park Street, London W1.

The practices followed by sprinkler engineers, insurance companies, fire authorities and users of sprinkler systems have been progressively established since the late nineteenth century; they have been successful in reducing loss of life and property through fire and, as much accumulated experience is represented in FOC rules, it is essential that they be referred to.

- References to the relevant section of the FOC rules are indicated, and all are to be construed as referring to the 29th edition (issued November 1973) with all amendments issued between that date of publication and 4 April 1981, i.e. incorporating amendments of 1 February 1974, 14 November 1974, 28 February 1975, 9 October 1975, 23 January 1976, 1 April 1977, 16 January 1978, 8 February 1978, 17 July 1979, 18 August 1979, 12 December 1979, 18 August 1980.

The principles in this edition do not essentially differ from those in this code. The overall emphasis continues to be placed on the need, in the earliest possible stage of planning, to seek and heed the advice of acknowledged experts in this

specialized field; and also on the need to avoid false economies in the specification of the installation, and to ensure that the installation is maintained in a state of readiness for instant, automatic and efficient operation. When sprinklers are required for action, there may well be lives at risk and heavy financial loss at stake.

Following the introduction into the FOC rules of a classification of buildings by the extent of the fire hazard their occupancy involves, the factors affecting the design and maintenance of sprinkler systems protecting those buildings have been related to that classification in this revision. There are components that have been tested, approved and listed by the Fire Offices' Committee for use with sprinkler systems, and the reliability of an installation can be dependent upon the use of such components.

Attention is drawn to the 'Extra light fire hazard' classification, the provisions for which have now been proven in fire tests and by experience.

The use of low rates of water flow enables town mains and pressure tanks to form adequate yet inexpensive water supplies, and the wider spacing of sprinklers and the smaller pipe sizes result in further economies. 'Extra light hazard' sprinkler systems are a most effective method of protecting life against the dangers of fire, and they should always be considered for hospitals, hotels, offices, schools and similar buildings.

The terminology and definitions adopted have, as far as possible, been aligned with those given in BS 4422 which are in themselves being agreed on an international basis.

To conform to present day general usage, the terms 'system' or 'systems' are used when referring to the general principles and overall requirements of fire protection by sprinklers (e.g. in the title) or when referring to differing design principles (e.g. in clause 8). However, when an assembly of the tangible components of a specific design system are referred to, these are called 'sprinkler installations'. Primarily a 'sprinkler installation' is regarded in this code as a cognate set of sprinkler heads, pipework and ancillary items controlled by a set of installation control valves (see 3.24), and installed for the protection of a defined section of the buildings concerned. However, the term 'sprinkler installation' is also used by fire engineers to refer to all the equipment installed by the sprinkler installer for the protection of the whole complex but, in this code, the use of the term in this sense has been avoided.

In order to focus the attention on the need to keep under review the relationship of installation design to the changing usage of the premises which it protects, the recommendations on this subject have been brought forward into section six 'Inspection, testing and review of risk', which has been retitled.

New sections have been added dealing with action to be taken following a fire and action to be taken when an installation is to be rendered inoperative. Appendix A dealing with pipe supports has also been added.

*In course of preparation

British Standard Code of practice for

Fire extinguishing installations and equipment on premises.

Part 2. Sprinkler systems

0. Introduction

Sprinkler systems are designed to provide an automatic means of detecting and extinguishing or controlling a fire by water in its early stages by an installation of overhead pipes on to which sprinkler heads are fitted at intervals.

Each sprinkler head is in effect a heat operated valve designed to open at a predetermined temperature and to discharge water under pressure from the installation. The water emerging from the head is directed into a specific pattern by a deflector incorporated in the head, and the flow of water from the installation also causes an alarm to sound.

Sprinkler heads may be defined by any of the following characteristics:

- (a) nominal size of opening for water flow;
- (b) type of heat-operated element;
- (c) operating temperature;
- (d) type of deflector.

The pipework incorporating the sprinkler heads may be arranged in a number of different sprinkler installations according to the requirements of the building being protected. Each installation is separately controlled and may be designed according to different systems. The choice of system mainly depends on the nature of the hazard to be covered, and on the extent to which any water standing in the installation might be subject to freezing or to the effect of high temperature.

Whichever system is chosen, and provided the equipment is properly designed, installed and maintained, a sprinkler installation ensures that a well directed and ample amount of water is automatically applied to the fire whilst it is still comparatively small. As only the sprinkler head or heads in the immediate vicinity of the fire open, water damage during the extinguishing of the fire is reduced to the minimum whilst the remainder of the building remains fully protected. Moreover, the installation operates automatically, it is not impaired by smoke or fumes, and it is not hindered by blockage of access routes.

Section one. General

1. Scope

This code deals with the provision of automatic sprinkler systems and installations in buildings. It also covers their essential supplies and their maintenance. It is not intended to cover other systems having affinity to sprinkler systems such as drenchers, deluge sprinklers, projectors, sprayers, multiple-jet systems or emulsifiers, although some of these applications are mentioned incidentally in a number of places.

Recommendations to cover automatic sprinkler systems which are integral to measures for the protection of life in particular circumstances are given in appendix B.

2. References

The titles of the standards publications referred to in this standard are listed on the inside back cover.

References to FOC rules in this standard shall be taken to refer to the edition and amendments as listed in the foreword.

3. Definitions

For the purposes of this code the following definitions apply.

In the main these are in line with the definitions given in BS 4422 : Part 4, but in some cases it has been necessary to vary the glossary definitions. The full terms given in BS 4422 have, in some cases, been shortened for this code: in these instances the BS 4422 term is shown as an alternative and it has been put in parentheses.

3.1 accelerator (sprinkler water accelerator). A device fitted to a dry-pipe system (3.15) or to an alternate system (3.6) for accelerating the flow of water into the installation by causing the installation control valve to operate earlier than would otherwise be the case.

3.2 air valve. A valve so constructed that the air pressure in a dry-pipe system or in an alternate system, when charged with air, will hold back a much higher pressure of water on the supply side of the valve.

3.3 alarm gong (sprinkler alarm gong). A water-operated warning gong associated with a sprinkler installation.

3.4 alarm test valve. A valve in a sprinkler installation (3.29) used for testing the operation of the alarm gong (3.3).

3.5 alarm valve. A valve in a sprinkler installation that permits the passage of water to the alarm gong when the system operates.

3.6 alternate system (automatic sprinkler system (alternate)). An automatic sprinkler installation (3.29) in which the pipes may optionally be charged with air or water.

3.7 check valve (non-return valve) (back pressure valve). A valve that automatically prevents the return flow of water in a pipe.

3.8 concealed spaces. Spaces in buildings that are not readily accessible such as spaces above false ceilings, in roofs, or between floors, or spaces at the sides of buildings.

3.9 deflector. That part of the sprinkler head (3.28) on which water impinges and which is designed to distribute the water in a specified fashion.

3.10 drain and test pipe. A pipe of not less than 50 mm nominal internal diameter normally taken from a point just above the alarm valve (3.4) and used for draining the sprinkler installation (3.29) and for testing the hydraulic characteristics of the water supply. (See drain and test valve (3.11).)

3.11 drain and test valve. A valve fitted to a drain and test pipe (3.10) and used for draining the sprinkler installation when required. It is also used for ascertaining the hydraulic characteristics of the water supplies.

3.12 drain valve. A valve in a sprinkler installation used for draining the installation of water.

3.13 drencher head (sealed) (sealed drencher head).

A device sealing an aperture in a pipe of a drencher system which operates at a predetermined temperature to discharge water on to a surface to be protected against fire exposure.

3.14 drencher head (open) (open drencher head). A device fitted to a pipe of a manual or dry drencher system designed to discharge water on to a surface to be protected against fire exposure.

3.15 dry-pipe system (automatic sprinkler system (dry-pipe)). An automatic sprinkler installation in which the pipes are normally charged with air.

3.16 exhaustor. A device fitted to a dry-pipe or an alternate system (3.6) for accelerating the flow of water into the installation by causing the air pressure in the system to drop rapidly.

3.17 heat sensitive element. A frangible glass bulb or fusible soldered linkage or strut designed to operate at a specified temperature.

3.18 gravity tank (elevated gravity tank). A tank for supplying water by gravity to a sprinkler installation.

3.19 main stop valve (sprinkler stop valve). The principal control of a sprinkler installation which, when closed, will shut off all supply of water to it.

3.20 pre-action system. A system in which pipes from a set of installation control valves (3.24) to the sprinkler heads which is normally charged with air under pressure and in which separate detection equipment is linked to the control valves so that, when a fire operates the detection equipment, the control valves release water into the pipe to the sprinkler heads. It is necessary for the sprinkler heads (3.28) to operate in the normal manner for water to be discharged. There are two types of pre-action system:

Type 1 : in which water will only be released into the sprinkler pipe when the separate detection equipment operates;

Type 2 : in which water is released into the sprinkler pipework either when the separate detection equipment operates or when the sprinkler heads operate.

3.21 pressure tank. A tank partly filled with water and partly with air under sufficiently high pressure to ensure that all the water can be discharged from the tank through any part of the sprinkler installation.

3.22 projector (high velocity). A special type of open discharge head used for the protection of plant utilizing certain types of flammable liquids.

3.23 range pipes. Pipes on which sprinklers are attached, either directly or through short arm pipes.

3.24 set of installation control valves. An assembly of valves and components as detailed in 10.4 that enables the following functions to be undertaken at a centralized point in order:

- (a) to isolate the installation from its water supply to enable modifications or maintenance to be carried out or the sprinklers to be replaced following a fire case of alternate systems, to permit change-over from the wet to the dry system;

- (b) to control the flow of water to the installation at an acceptable rate when recharging;

- (c) to drain the installation;

- (d) to enable the hydraulic characteristics of the water supply to be verified;

- (e) to enable the alarm gong to be periodically tested.

3.25 smoke detector ionization chamber (ionization chamber smoke fire detector) (fire detector, smoke ionization chamber). A smoke detector that responds when smoke, having entered the detector, causes a change in ionization currents within the detector.

3.26 smoke detector (optical) (fire detector, smoke, optical) (optical smoke fire detector). A fire detector having a photoelectric cell that responds when light is absorbed or scattered by smoke particles.

3.27 sprayer (medium velocity). A special type of open discharge head used for the protection of plant containing certain types of flammable liquids (normally of the lighter type) by means of cooling and by controlling the burning.

3.28 sprinkler head. A device sealing an aperture in a pipe of a sprinkler installation that discharges water automatically in a predetermined pattern over a specified area when it operates at a predetermined temperature.

3.29 sprinkler installation. An assembly of pipework, graded in size, erected throughout a building and in which sprinkler heads are installed at prescribed intervals. The pipework is connected to a set of installation control valves incorporating a hydraulic alarm, and is fed by an approved water supply.

3.30 standing pressure. The water pressure indicated by the gauge of a sprinkler installation connected immediately below the installation control valves when no water is being discharged.

3.31 suction tank. A tank from which a pump can draw water.

3.32 tail-end air valve. A subsidiary air valve that enables part of a wet pipe system (3.34) to be charged with air.

3.33 town mains isolating valve. A valve that shuts off all supplies from the town mains.

3.34 wet pipe system (automatic sprinkler system wet-pipe). An automatic sprinkler installation in which the pipes are permanently charged with water.

4. Classification of fire hazards

The Fire Offices' Committee has defined various classes of fire hazard according to the occupancy of the building to be protected. The essential basis of this classification is given in table 1. For further detail, reference should be made to the FOC rules 1000 and 1200.

5. Grading of sprinkler systems

For purposes of defining the effectiveness of a sprinkler system according to the number and type of water supplies, the FOC has the following grades (see FOC rule 2200).

Grade I having either a 'duplicate' or a 'superior' water supply subject to certain limitations on the number of sprinkler heads served.

Grade II having a 'superior' water supply without limit on the number of sprinkler heads.

Table 1. Classification of fire hazards (see clause 4)

Class	Brief definition	Subdivision		Some examples	Remarks
Extra light	Non-industrial occupancies where the combustibility of the contents is low	NIL		Hospitals Hotels Office buildings Schools	See FOC rule 1210
Ordinary	Commercial and industrial occupancies involving processing and storage of mainly ordinary combustible materials	Group I (Light ordinary)		Restaurants Cement works	See FOC rule 1221
		Group II (Medium ordinary)		Bakeries Engineering works Motor garages	See FOC rule 1222
		Group III (High ordinary)		Aircraft factories Clothing factories Saw mills	See FOC rule 1223
		Group IV (Special)		Film studios Match factories	See FOC rule 1224
Extra high	Commercial and industrial occupancies having normal fire load but subject to special risk factors	(a) Process risks		Aircraft hangars Foam plastics manufacturers Paint manufacturers	See FOC rule 1231
		(b) High piled storage risks	Category I	Carpets Groceries	Goods piled above 4 m high see FOC rule 1232
			II	Linoleum Patterns Wood furniture	Height of pile over 3 m
			III	Celluloid Rubber goods	Height of pile over 2.1 m
			IV	Foamed plastics off-cuts	Height of pile over 1.2 m

Grade III having a single water supply from town mains, an automatic pumped supply, an elevated private reservoir or a gravity tank.

'Superior' supplies are:

- (a) town mains;
- (b) automatic pumped supply;
- (c) elevated private reservoir;
- (d) gravity tank; or
- (e) pressure tank;

which are provided with special (and defined) pipework and valve systems which, in the case of (b), (c), (d) and (e), should include a fire brigade inlet in each case where permitted by the local water authority.

Section two. Planning and design considerations

6. Planning

6.1 When automatic sprinkler systems are being considered for new or existing buildings it is important that the following be consulted at an early stage to ensure compliance

with all statutory or other requirements, the hazard classification (see clause 4 and table 1) and local by-laws:

- (a) the Fire Service;
- (b) the local water authority;
- (c) insurers;
- (d) the appropriate public authorities;
- (e) engineers specialising in the design, manufacture and installation of sprinkler systems;
- (f) the local Electricity Board, where applicable.

6.2 The functions of the authorities mentioned in 6.1 should be co-ordinated in a general manner in the early stages.

6.3 When planning a sprinkler scheme it is essential to good fire engineering practice that all communication buildings and rooms be protected. Consideration should also be given to the protection of all detached premises that are at risk one to another.

6.4 The sprinkler engineers should be fully informed of the areas to be protected.

6.5 In the early stages of the preparation of an automatic sprinkler scheme, the adequacy of town mains or of existing water supplies should be checked to ensure that at all times they comply with the requirements of the relevant hazard classification given in FOC rules (FOC 2300). Such water supplies will be satisfactory only if the sprinkler installation has been hydraulically designed in accordance with the FOC rules. The water supply for a sprinkler installation should not be used for any other purpose unless circumstances are exceptional, in which case the agreement of those authorities listed in 6.1 should be obtained.

7. Presentation of information

7.1 Information required to obtain initial approval. The sprinkler engineers are required to provide the information called for in 7.1.1, 7.1.2 and 7.1.3 where installations are to be approved by either the insurance authority or the fire authority or both.

7.1.1 At the preliminary or estimating stage a general specification of the proposed protection including particulars of the water supplies should be provided. This specification should include a block plan of the premises showing:

- (a) the class or classes of installation according to the hazard class in the various buildings (see note);
- (b) the extent of the protection;
- (c) the construction and occupancy of each building;
- (d) a cross-section of the full height of the building or buildings indicating the height of the highest sprinkler head with respect to a stated datum level.

NOTE. It is the responsibility of the insured or the applicant to confirm with the fire insurers or fire authority the respective hazard class or classes to which the protection is to be designed.

7.1.2 After the contract has been placed but before commencing erection, complete working drawings should be provided of the sprinkler protection planned on each floor or part thereof, in accordance with FOC rules (FOC rule 1412). Symbols used should comply with the requirements of BS 1635 where applicable, but in any case a key to the symbols used should be included.

7.1.3 When complying with 7.1.2 there should also be provided a drawing detailing the water supplies and pipework therefrom up to the installation control valves, indicating the position of stop valves, back pressure valves, any pressure reducing valves, water meters, water locks and any orifice plates together with any connection taken off other than for sprinklers. Where the water supplies include a town main, the following details of it should be given:

- (a) the nominal diameter;
- (b) the relevant pressure/flow characteristics;
- (c) whether the main is dead-end or circulating. If dead-end, the location of the nearest connected circulating main should be given.

Where a pump driven by a compression-ignition engine is installed it should be confirmed that the engine is capable of operating continuously on full load at its correct site elevation for a period of 6 h and that the conditions governing the heating and ventilation of the engine-room comply with FOC rules (FOC rule 2549.21).

7.2 Information for final approval. The final approval of a sprinkler installation will vary according to the circumstances but the authorities listed in 6.1 (a) and (b) should in all cases be consulted.

7.3 Information on completion. When the installation has been completed the purchaser should be provided with a complete set of operating and maintenance instructions and 'as installed' drawings.

8. Choice of system

8.1 Wet-pipe system (see 3.34). An automatic sprinkler installation on the 'wet' system can only satisfactorily be used in premises that are not subject to freezing at any time throughout the year or in premises in which the ambient temperature does not exceed 70 °C because of the possibility of deposits forming within the sprinklers from a combination of high temperature and water having solids in solution (temporary hardness). In this connection consideration should be given to conditions which may occur at night-time, weekends, holidays and other shutdown periods, particularly during winter months.

8.2 Dry-pipe systems (see 3.15). Dry-pipe systems are appropriate only in areas where the installations are subject to temperatures continuously below freezing point or above 70 °C. Examples of such areas are cold stores and ovens.

8.3 Alternate systems (see 3.6) Alternate systems should be installed in premises where there is danger of freezing occurring only during cold weather.

8.4 Pre-action systems (see 3.20). Pre-action systems introduce complications into a sprinkler installation and should be used only where other systems are unsuitable. Intending purchasers should preferably consult reliable advisers in this field on this point. Considerable reservation should be exercised when considering the use of a Type 1 pre-action system because of its sole dependence upon an alarm system to trigger the valve. If a pre-action system is to be used to protect an 'extra high' hazard risk, a Type 2 system should preferably be used (FOC rule 1122.32.5).

8.5 Colour coding for pipes and valves. For all systems the colour code is as specified for fire extinguishing water in BS 1710.

9. Types of sprinkler head

9.1 Nominal sizes. Sprinklers having the nominal sizes given in table 2 should be used only for the hazard class stated.

Table 2. Sprinkler head sizes for different hazard classes

Nominal size of sprinkler head	Hazard class	K factor (see note)
mm		
10	Extra light	57 ± 5 %
15	Either ordinary or extra high	80 ± 5 %
20	Extra high	115 ± 5 %

NOTE. The K factor is the constant in the formula $Q = K \sqrt{P}$, where Q is the flow in dm³/min and P is the pressure in bar.

9.2 Temperature rating. The temperature rating of sprinkler heads should be as close as possible to, but not less than, 30 °C above the highest temperature conditions in the area concerned. The colour coding that indicates the temperature rating of sprinkler heads is given in table 3.

Table 3. Colour coding of sprinkler heads according to their temperature rating

Soldered type	Colour of yoke arms
°C	
68 to 74	Uncoloured
93 to 100	White
141	Blue
182	Yellow
227	Red
Bulb type	Colour of bulb liquid
°C	
57	Orange
68	Red
79	Yellow
93	Green
141	Blue
182	Mauve
204 to 260	Black

9.3 Sprinkler patterns

9.3.1 Conventional pattern. Conventional pattern sprinklers are designed to produce a spherical type of discharge with a proportion of the water being thrown upwards to the ceiling. They are usually designed with a universal type deflector which enables the sprinkler to be erected in either the upright or the pendent position. Some conventional pattern sprinklers are, however, made in two distinct types: one suitable for erection in the upright position, and the other in the pendent position.

9.3.2 Spray pattern. Spray pattern sprinklers are designed to produce a hemispherical discharge below the plane of the deflector with little or no water being discharged upwards to wet the ceiling. They are made in two types: one suitable for erection in the upright position, and the other in the pendent position.

9.3.3 Ceiling (flush) pattern. Ceiling (flush) pattern sprinklers are designed for use where the ceiling is a flat one and the pipework is above it. The sprinklers are installed pendent with plate or base flush with the ceiling with the heat-sensitive element below the ceiling line. Ceiling (flush) sprinklers are intended for use where it is desired, for reasons of appearance, to make sprinklers inconspicuous. They are normally used in hotel lobbies, dining rooms, offices, boardrooms and parts of retail stores etc. There are two types:

- (a) those having fixed deflectors;
- (b) those having retracted deflectors that drop to the normal position on actuation.

Ceiling pattern sprinklers of type (b) should not be fitted under stairs or under sloping roofs where the angle of the stairs or roof exceeds 45° from the horizontal. Nor are they suitable for use in atmospheres that are corrosive or subject to a high dust content.

9.3.4 Sidewall pattern. Sidewall pattern sprinklers are designed for installation along the walls of a room close to the ceiling. The design of the sprinkler is usually similar

to the conventional pattern sprinkler (see 9.3.1) except for a special deflector that causes most of the water to be discharged to one side in a pattern somewhat resembling one quarter of a sphere with a small proportion discharging on the wall behind the sprinkler. Sidewall pattern sprinklers are not considered to be a substitute for standard sprinklers generally and their use is, in the main, limited to offices, entrance halls, lobbies, corridors, etc. They can, however, be used with advantage in drying tunnels and hoods over paper-making machines where condensation dripping from sprinklers and pipework at the ceiling might be troublesome. Sidewall pattern sprinklers can also be used in certain other locations such as saleshop windows and under platforms, etc. having low headroom, where standard sprinklers would be subject to damage.

9.3.5 Dry pendent pattern. Dry pendent pattern sprinklers are designed for use in portions of premises protected by a dry pipe or an alternate system where it is not practicable to install standard sprinklers in the upright position, or on a wet pipe system where some sprinklers may be subject to frost. Apart from the valve arrangement, the sprinklers are of standard design having either conventional or pendent spray type deflectors. They are manufactured integrally with drop pipes of varying lengths, the valve being so placed that there is no pocket or depression within which water can be trapped.

9.3.6 Dry upright pattern. Dry upright pattern sprinklers are essentially the same as the dry pendent types except that, if of the spray pattern, an upright type deflector is incorporated. They are used for the protection of unheated concealed roof spaces in installations on the wet pipe system.

10. Basic principles of layout and design

10.1 Wet pipe systems should be so designed that the number of sprinklers controlled by one set of installation control valves (including tail end extensions) does not exceed:

- 500 in the case of extra light hazard systems;
- 1000 in the case of ordinary and extra high hazard systems (inclusive of any sprinklers on extra light hazard systems).

NOTE. In calculating the total number of sprinklers on wet pipe systems, the number of sprinklers in concealed spaces or in machines, etc., may be ignored.

10.2 'Alternate' and 'dry-pipe' systems should be so designed that the number of sprinklers controlled by one set of installation control valves (including tail end extensions) does not exceed those given in table 4.

Table 4. Maximum number of sprinkler heads controlled by one set of installation control valves in alternate and dry-pipe systems

1	2	3
Hazard class	Extra light (see note below)	Ordinary and/or extra high
With an accelerator or exhauster	250	500
Without an accelerator or exhauster	125	250

NOTE. In the case of installations comprising both extra light hazard and ordinary and/or extra high hazard sections, the maximum number of sprinklers on any one such composite installation should not exceed that stated in column 3, but in determining the maximum number, the actual number of sprinklers in the extra light hazard section should be doubled. For example, in an installation comprising 400 sprinklers (300 in ordinary hazard and 100 in extra light hazard sections), the number of sprinklers for the purpose of this requirement is to be taken as 500 i.e. $300 + (100 \times 2)$.