

**BRITISH STANDARD**

# **Code of practice for fire extinguishing installations and equipment on premises –**

## **Part 1: Hose reels and foam inlets**

ICS 13.220.10

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## **Summary of pages**

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 13 and a back cover.



# Foreword

## Publishing information

This part of BS 5306 was published by BSI and came into effect on 31 May 2006. It was prepared by Technical Committee FSH/14, *Fire precautions in buildings*. A list of organizations represented on this committee can be obtained on request to its secretary.

## Supersession

This part of BS 5306 supersedes BS 5306-1:1976, which is withdrawn.

## Relationship with other publications

BS 5306 is published as a series of parts:

- Part 0: *Guide for the selection of installed systems and other fire equipment*;
- Part 1: *Hose reels and foam inlets*;
- Part 2: *Specification for sprinkler systems*;
- Part 3: *Code of practice for the inspection and maintenance of portable fire extinguishers*;
- Part 4: *Specification for carbon dioxide systems*;
- Part 5: *Halon systems*:
  - Section 5.1: *Specification for halon 1301 total flooding systems*;
  - Section 5.2: *Halon 1211 total flooding systems*;
- Part 6: *Foam systems*:
  - Section 6.1: *Specification for low expansion foam systems*;
  - Section 6.2: *Specification for medium and high expansion foam systems*;
- Part 7: *Specification for powder systems*;  
*NOTE BS 5306-7 has been superseded by BS EN 12416-2 but remains current.*
- Part 8: *Selection and installation of portable fire extinguishers – Code of practice.*

## Information about this document

This is a full revision of the standard. The principal change from the previous edition is that recommendations for non-automatic fire-fighting systems in buildings (wet and dry fire mains) have been removed and are now given in BS 9990. This part of BS 5306 now contains only the residual material which deals with hose reels and foam inlets and this has been updated.

## Use of this document

As a code of practice, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Any user claiming compliance with this British Standard is expected to be able to justify any course of action that deviates from its recommendations.

### **Presentational conventions**

The provisions in this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is “should”.

*Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.*

### **Contractual and legal considerations**

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

**Compliance with a British Standard cannot confer immunity from legal obligations.**

# 1 Scope

This part of BS 5306 gives recommendations for hose reels and foam inlets. It covers good practice in matters affecting the design, installation, testing and maintenance of such systems. It does not give requirements for the hose reels themselves, which are specified in BS EN 671.

This part of BS 5306 does not cover wet and dry fire mains, automatic foam systems and portable fire-fighting equipment. These systems are covered in BS 9990, BS 5306-3, BS 5306-8 and BS EN 3-7.

# 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 336, *Fire hose couplings and ancillary equipment*

BS 1387, *Specification for screwed and socketed steel tubes and tubulars and for plain end steel tubes suitable for welding or for screwing to BS 21 pipe threads*

BS 1710, *Specification for identification of pipelines and services*

BS 5041-5, *Fire hydrant systems equipment – Part 5: Specification for boxes for foam inlets and dry riser inlets*

BS 5499-1, *Graphical symbols and signs – Safety signs, including fire safety signs – Part 1: Specification for geometric shapes, colours and layout*

BS 5499-5, *Graphical symbols and signs – Safety signs, including fire safety signs – Part 5: Signs with specific safety meanings*

BS 5588-5, *Fire precautions in the design, construction and use of buildings – Part 5: Access and facilities for fire-fighting*

BS 5588-12, *Fire precautions in the design, construction and use of buildings – Part 12: Managing fire safety*

BS 7430, *Code of practice for earthing*

BS 7671, *Requirements for electrical installations – IEE Wiring Regulations – Sixteenth edition*

BS EN 671 (all parts), *Fixed fire fighting systems – Hose systems*

BS EN 1057, *Copper and copper alloys – Seamless, round copper tubes for water and gas in sanitary and heating applications*

BS EN 1254-1, *Copper and copper alloys – Plumbing fittings – Part 1: Fittings with ends for capillary soldering or capillary brazing to copper tubes*

BS EN 1254-2, *Copper and copper alloys – Plumbing fittings – Part 2: Fittings with compression ends for use with copper tubes*

## 3 Terms and definitions

For the purposes of this part of BS 5306 the following definitions apply.

### 3.1 foam inlet

fixed equipment consisting of an inlet connection, fixed piping and a discharge assembly, enabling fire-fighters to introduce foam into a compartment

### 3.2 hose reel

fire-fighting equipment, consisting of a length of tubing fitted with a shut-off nozzle and attached to a reel, with a permanent connection to a pressurized water supply

### 3.3 shut-off nozzle

device that is coupled to the outlet end of hose reel tubing and by means of which the jet of water or spray is controlled

## 4 Hose reels

### 4.1 General design considerations

**4.1.1** Hose reels should conform to BS EN 671.

**4.1.2** Pipework for hydraulic hose reels should not normally be less than 50 mm nominal bore and feeds to individual hose reels should be not less than 20 mm nominal bore.

**4.1.3** Pipes should be made of one of the following:

- a) steel in accordance with BS 1387;
- b) copper in accordance with BS EN 1057, with fittings in accordance with BS EN 1254-1 or BS EN 1254-2;
- c) plastics which are satisfactory to the water supply undertaking for this application, provided the pipework is protected from damage, by fire or otherwise, by location in a low risk area such as underground or in a service duct of brick, concrete or equivalent construction.

**4.1.4** The water supply to hose reels should normally be kept entirely independent from other water supplies within the building including those for other fire-fighting systems. In certain special circumstances the supply to hose reels may be taken from the supply provided for a sprinkler system (see BS EN 12845, BS 5306-2 and the Fire Protection Association publication *LPC rules for automatic sprinkler installations incorporating BS EN 12845* [1]).

**4.1.5** 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. Consideration should also be given to the physical attributes of the individuals who are expected to use the equipment.

**4.1.6** It is essential that pressures and flows should at all times be adequate to serve the designed number of hose reels likely to be used. This is irrespective of the source of water supply.



## **4.2 Provision and siting**

### **4.2.1 Provision**

Hose reels, where installed, should be provided to cover all risk areas.

### **4.2.2 Siting**

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 might be introduced into a room, the hose and nozzle should be capable additionally of directing a jet into the back of any recess formed.

In exceptional circumstances it might be desirable to site hose reels in such a way that if a fire prevents access to one hose reel site, the fire can be attacked from another hose reel in the vicinity.

It is essential that the hose reels remain unobstructed and that they are available for use at all times.

In buildings that have large open floor areas such as warehouses, the stacking arrangements should provide for unobstructed access to the hose reel. It might also be considered necessary to provide guard rails around the hose reel position to prevent stacking taking place immediately adjacent, care being taken that the guard rails do not obstruct the operation of the hose.

Where stacking is taking place, notices indicating the hose reel positions should be sited at high level.

These notices could be situated over the main avenues, subject to directional arrows being provided.

### **4.2.3 Frost protection**

Hose reels and their water supply systems should be afforded all possible protection against frost.

### **4.2.4 Electrical earthing**

Electrical earthing should be in accordance with BS 7671 and BS 7430.

### **4.2.5 Installation of hose reels**

#### **4.2.5.1 Hose reels in recesses**

Preferably hose reels should be installed in recesses so that they do not form obstructions on a route of escape. The details of installation will vary considerably owing to the wide variation of types of hose reel and their size.

#### **4.2.5.2 Recess doors**

Any doors provided for hose reel recesses should be in accordance with BS EN 671.

#### **4.2.6 Hose reels in open areas**

When installed on open floor areas it might be necessary to position hose reels above head height but in these cases the nozzle retainer, the hose guide and the inlet valve should be fitted at about 900 mm above floor level.

*NOTE It might also be desirable to provide an anti-over-run device to prevent the hose from becoming entangled when run out.*

#### **4.2.7 Importance of firm fixing**

Hose reel brackets should be firmly fixed to the wall so that casual knocks received during normal use of the building and the stresses incurred during use for fire-fighting will not prevent the unimpeded use of the hose reel.

### **4.3 Water supply for hose reels**

#### **4.3.1 General**

The water flow rate at the most hydraulically remote hose reel should be not less than the relevant values specified in BS EN 671-1:2001, Table 4 and BS EN 671-2:2001, Table 4, and the pressure should be sufficient to meet the range requirements of BS EN 671-1 when it is in use simultaneously with the nearest adjacent hose reel.

*NOTE The method given in BS EN 671-1 gives a test running pressure, at the reel inlet, of 4 bar<sup>1)</sup> or 5 bar, for the maximum lengths of 25 m and 19 m hose respectively, with a requirement that the range of a jet be not less than 6 m. The range of a spray on a jet/spray nozzle may be less than this value.*

#### **4.3.2 Booster pumps**

**4.3.2.1** 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.

**4.3.2.2** 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.

**4.3.2.3** 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.

**4.3.2.4** 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.

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

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<sup>1)</sup> 1 bar = 10<sup>5</sup> N/m<sup>2</sup> = 100 kPa.

### **4.3.3 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 capable of supporting operation of the hose reel for 45 min at the minimum flow rate specified in BS EN 671-1:2001, Table 4.

The tank or tanks should be automatically supplied from a town's main, controlled by a ball valve of minimum diameter 50 mm.

### **4.3.4 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.

### **4.3.5 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. Hose reels should also be protected against interference and attack by thieves and vandals as far as it is possible to do so without adversely affecting operational capability. This should be done in accordance with Annex A.

## **5 Foam inlets**

### **5.1 General**

Oil risks situated at or below ground level, e.g. oil-fired boiler rooms, oil storage tank chambers or transformer chambers, where they might not be directly accessible for fire-fighting and search and rescue operations, might require foam inlets so that foam can be applied to a fire from outside a building by means of a system of fixed piping and suitable outlets. The fire authority should be consulted on this matter.

A foam inlet delivery pipe in a transformer chamber should be electrically earthed in accordance with BS 7671 and BS 7430. Those joints which do not provide electrical continuity should be bonded.

### **5.2 Capability of inlets and lines**

Not more than three outlets, having an aggregate cross-sectional area of not more than 3 200 mm<sup>2</sup>, should be supplied by one inlet and one line of delivery pipe. Where there are more than three outlets, or the aggregate cross-sectional area of the outlets appreciably exceeds 3 200 mm<sup>2</sup>, additional inlet(s) and delivery pipe(s) should be installed.

### **5.3 External connections**

**5.3.1** The external connection should normally be housed in a box conforming to BS 5041-5 built into an external wall of a building, or into a boundary wall so that the bottom of the box is at a level between 400 mm and 600 mm above the ground. There should be at least 2.50 m of clear working space in front of the box, and it should be clear of openings from the space protected by the foam system, so that the inlet can be used without undue exposure of personnel to heat and smoke. Access to these connections should also conform to the recommendations given in BS 5588-5.

**5.3.2** Depending upon local requirements, the external connection fitted in the inlet box (see **5.3.1**) should be either:

- a) an instantaneous male coupling conforming to BS 336; or
- b) a foam inlet adaptor conforming to BS 336.

### **5.4 Delivery pipe**

The delivery pipe from each foam inlet to the space protected should not exceed 18 m in total length and should be 65 mm or 80 mm nominal bore pipe, threaded and socketed, and of suitable heavy quality steel to meet the pressure, robustness and durability requirements of the system in question. The run of pipe should be as direct as possible with a fall away from the inlet provided on all sections of it, and any changes of direction should be made with standard bends, springs or long turn fittings; elbows should not be used. The pipe from one inlet should serve only one space.

### **5.5 Termination of delivery pipe**

Normally the delivery pipe from the inlet coupling should terminate in the following ways:

- a) in an oil-fired boiler room: about 1 m above the level of the oil burners, with a separate outlet above each burner;
- b) in an oil storage tank chamber: about 150 mm above the estimated level of the oil should the total contents of the tank(s), when full, be discharged into the chamber;
- c) in a transformer chamber: at ceiling level. (For earthing see **5.1**.)

### **5.6 Foam inlet acceptance inspection**

**5.6.1** The layout of all foam inlets should be checked to ascertain that they conform to the approved layout plan.

**5.6.2** Any inlet coupling should also be checked to ensure correct functioning, and to verify that earthing procedures (see **5.1**) have been carried out.

## **6 Installation, commissioning and maintenance**

### **6.1 Work on site**

**6.1.1** Adequate provision should be made by the responsible contractor to protect materials and components on site from deterioration or damage.

**6.1.2** Unloading, stacking and storage should be carried out with care to prevent damage to pipes and pipe threads, fittings, couplings and other components used in the system.

**6.1.3** Pipes should be securely anchored before any pressure or flow tests are carried out.

### **6.2 Initial inspections and acceptance tests for hose reels**

#### **6.2.1 Flushing out**

Before any water is introduced into the hose reel, the supply to it should be thoroughly flushed out to ensure that no harmful matter is passed into the reel. This is particularly important for automatic hose reels. After flushing out, the tubing should be run out and the water turned on to establish that the assembly is fully operational.

#### **6.2.2 Procedure (direct mains supply)**

The two most highly situated and remote reels should be discharged simultaneously, one being led to waste and the other directed into a suitable receptacle to ascertain that the flow rate recommended in **4.3.1** is achieved. For the purpose of this test it will be necessary to provide a receptacle of a suitable capacity.

#### **6.2.3 Procedure (boosted supplies)**

The two most highly situated and remote reels should be discharged simultaneously, until the duty pump cuts in automatically. Thereafter, with both reels still in operation, the discharge rate of one of them should be measured as in **6.2.2**.

The test should be repeated. This time a simulated mechanical or electrical failure of the duty pump should be arranged, and the ability of the standby pump to come into service automatically and to maintain the required outputs should be tested.

## **6.2.4 Putting into operational readiness**

**6.2.4.1** When the tests in **6.2.2** and **6.2.3** have been satisfactorily completed, the system should be restored to its normal operating state. Reels should never be left under pressure and, where practicable, hose should be drained prior to being returned to the drum.

**6.2.4.2** Hose should be rewound on the drums, particular attention being paid to automatic hose reels to ensure that the automatic valve is fully closed when the hose has been rewound. Where an isolation valve has been incorporated this should be closed on completion of stowage, and the nozzle interlock, where fitted, should be completed.

**6.2.4.3** Where it is the practice of water undertakings to seal the inlet valve to the reel, the undertaking concerned should be notified of the test.

## **6.3 Initial inspections and acceptance tests for foam inlets**

**6.3.1** The layout of all foam inlets should be checked to ascertain that they conform to the approved layout plan.

**6.3.2** Any inlet coupling should also be checked to ensure correct functioning, and to verify that earthing (see **5.1**) has been carried out satisfactorily or certified by the electrical contractor.

## **6.4 Indemnities**

Before testing any system a signed indemnity should be sought from the person at that time responsible for the work site or premises.

*NOTE This might be required by the appropriate authority in respect of liability for damage caused to persons or property arising out of, or in connection with, any test.*

## **6.5 Test records**

A permanent record of all inspections and tests should be maintained as part of the fire safety manual in accordance with BS 5588-12.

This should record:

- a) date and time for inspection or test;
- b) person carrying out the test;
- c) test results noted;
- d) any external factors significantly affecting the results (e.g. weather conditions);
- e) follow-up action required;
- f) work carried out as a result of (e) with date and result of retest.

## 6.6 Maintenance and testing of hose reels

**6.6.1** The maintenance and testing of hose reels should be in accordance with BS EN 671-3.

**6.6.2** If booster pumps have been installed (see 4.3.2), these and their associated mechanical and electrical equipment should also be checked.

## 6.7 Rectification of defects

**6.7.1** It is essential that all defects are rectified in the shortest possible time, to ensure that the fixed fire-fighting equipment is restored to a satisfactory condition in as short a time as possible.

**6.7.2** Where, due to unforeseen difficulties, it is necessary to leave an installation not available for use, the fire and rescue service should be informed immediately in order that alternative arrangements can be made to cover this deficiency should the need arise. In addition a suitable notice to indicate that the installation is not available for use should be placed in a prominent position. In the case of foam inlets the notice should be in the inlet box.

**6.7.3** When the installation is reinstated, the fire and rescue service should again be informed so that any alternative arrangements can be cancelled and, if considered necessary, an inspection and test of the repaired installation can be carried out.

# 7 Signage

## 7.1 General

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

## 7.2 Identification of equipment

**7.2.1** The pipework supplying water to hose reels should be identified in accordance with BS 1710 and should meet the recommendations given in 7.2.2.

**7.2.2** The following notices should be rectangular with white wording on a red background. 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 and in accordance with BS 5499-1 and BS 5499-5.

- a) A notice reading "Fire hose reel main supply" should be displayed at the stop valve controlling the water supply to the hose reels.
- b) A notice reading "Fire hose reel pump motor supply – not to be switched off in the event of fire" should be displayed adjacent to all switches in the electrical power supply to any pumps.

**7.2.3** A sign in accordance with BS 5499-1 and BS 5499-5 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).

### **7.3 Operational instructions**

A notice giving full operational instructions should be displayed on or adjacent to the hose 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".

*NOTE The interlocking device, where provided, ensures that the nozzle cannot be withdrawn until the water supply has been turned on.*

The instructions should include specific instructions 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 and BS 5499-5 for fire equipment or supplementary signs.

### **7.4 Temporary notices**

Where reliance is being placed on the operation of fire-fighting systems or appliances during the construction period, temporary notices (to the satisfaction of the fire and rescue service) giving essential information for their protection from damage and for their efficient operation should be set up and remain until the installation becomes fully operative.



## Annex A (normative) **Protecting installed equipment from theft and vandalism**

### **A.1 General**

Equipment stolen or damaged can be expensive to replace, but it is even more important to recognize that the effect of the lack of even a small part of any fire-fighting installation can seriously delay the attack on a fire and in consequence cause unnecessary loss of life and damage to property. In any situation where installed equipment is at risk from thieves and vandals, special measures to protect all parts of the installation are essential, provided that these measures do not inhibit the primary purpose for which the equipment is installed. Precautions of any kind in these circumstances are however of little use unless the installation is kept under adequate surveillance.

Measures designed to discourage persons from removing or damaging equipment are given in **A.2** to **A.4**.

### **A.2 Reduced attractiveness**

Materials which have a high scrap value can be attractive targets for thieves. Components from materials of lower value can be considered when their use is permitted by a British Standard, but in those cases in which there is no standard the local fire and rescue service should be consulted.

Until the outcome of field trials for plastics hydrant outlets are known and sufficient experience has been gained from their use, plastics for these components should not be specified.

### **A.3 Making theft more difficult**

**A.3.1** If practicable all exposed screw threads or heads of nuts should be spot welded.

**A.3.2** Where it is permitted to choose between providing a panel in the door of a box and providing a panel of breakable material, the latter design, being somewhat less obviously vulnerable, may be adopted.

*NOTE Some fire and rescue services permit the use of solid fronted boxes secured by hasp, staple and padlock. These can make it more difficult to tamper with the contents of the box but they have not been accepted as conforming to the requirements of British Standards.*

### **A.4 Action on discovering theft or damage**

As soon as loss or damage is noticed the fire and rescue service, the owners and the police should be informed and the advice in **6.7** followed.

# Bibliography

## Standards publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 5306-0, *Fire extinguishing installations and equipment on premises – Part 0: Guide for the selection of installed systems and other fire equipment*

BS 5306-2, *Fire extinguishing installations and equipment on premises – Part 2: Specification for sprinkler systems*

BS 5306-3, *Fire extinguishing installations and equipment on premises – Part 3: Code of practice for the inspection and maintenance of portable fire extinguishers*

BS 5306-4, *Fire extinguishing installations and equipment on premises – Part 4: Specification for carbon dioxide systems*

BS 5306-5.1, *Code of practice for fire extinguishing installations and equipment on premises – Part 5: Halon systems – Section 5.1: Specification for halon 1301 total flooding systems*

BS 5306-5.2, *Code of practice for fire extinguishing installations and equipment on premises – Part 5: Halon systems – Section 5.2: Halon 1211 total flooding systems*

BS 5306-6.1, *Fire extinguishing installations and equipment on premises – Part 6: Foam systems – Section 6.1: Specification for low expansion foam systems*

BS 5306-6.2, *Fire extinguishing installations and equipment on premises – Part 6: Foam systems – Section 6.1: Specification for medium and high expansion foam systems*

BS 5306-7, *Fire extinguishing installations and equipment on premises – Part 7: Specification for powder systems*<sup>2)</sup>

BS 5306-8, *Fire extinguishing installations and equipment on premises – Part 8: Selection and installation of portable fire extinguishers – Code of practice*

BS 9990, *Code of practice for non-automatic fire-fighting systems in buildings*

BS EN 3-7, *Portable fire extinguishers – Part 7: Characteristics, performance requirements and test methods*

BS EN 12416-2, *Fixed firefighting systems – Powder systems – Part 2: Design, construction and maintenance*

BS EN 12845, *Fixed firefighting systems – Automatic sprinkler systems – Design, installation and maintenance*

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<sup>2)</sup> BS 5306-7 has been superseded by BS EN 12416-2 but remains current.

**Other publications**

- [1] FIRE PROTECTION ASSOCIATION. *LPC rules for automatic sprinkler installations incorporating BS EN 12845*. Moreton-in-Marsh: Fire Protection Association, 2003.

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