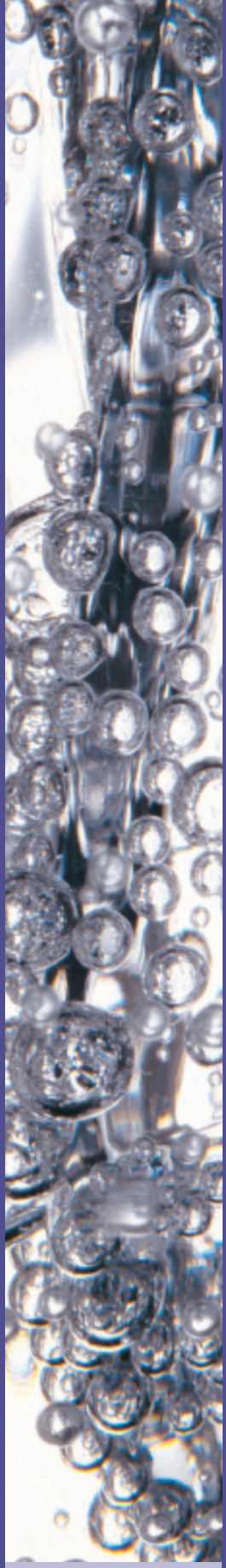
GUIDELINES FOR THE SUPPLY OF WATER TO FIRE SPRINKLER SYSTEMS



FSA
Fire Sprinkler Association

British Automatic Sprinkler Association Limited
basa

WATER UK

Foreword

Working Together

It gives me great pleasure to be asked to write the Foreword to what is an extremely significant and important safety document and one which I believe will, in the longer term, serve to improve the safety of the people of the UK from fire by encouraging the greater use of domestic and residential sprinkler systems. The document also clearly demonstrates that given goodwill and understanding on both sides it is possible for the national associations of two industries having a common but diverse interest in a safety product to develop national guidelines which will enable their member companies to work together in harmony at a local level.

I know that the guidelines have only been produced as the result of some very hard work and the demonstration of a high degree of pragmatism by all sides. I believe therefore that we all have reasonable cause to be grateful to the representatives of the British Automatic Sprinkler Association, the Fire Sprinkler Association and Water UK who have taken part in the discussions of the Working Group since its first meeting on the 28th November 2001.

It is completely within the ethos of the current government to provide opportunities for such joint stakeholder developments to take place so I am glad that I have been able to play a part in the enabling process which has led to the development of this document. I must also at this moment pay tribute to the efforts of the National Fire Sprinkler Network in providing the Chairman of the Working Group plus the administrative backup to create the document and finally also to the Fire Protection Association for agreeing to publish it.

I believe that the 'Guidelines for the Supply of Water to Fire Sprinkler Systems' is an extremely important document and I commend it to you.

Jim Knight MP
Chairman
The Fire Protection Association Council

Published by the Fire Protection Association

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Web: www.thefpa.co.uk

Printed in Great Britain 1.5/05.04

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Further information can be obtained from:

www,basa.org.uk

www.firesprinklers.org.uk

www.water.org.uk

INTRODUCTION

These guidelines and the associated Technical Guidance document have been prepared by the participants identified below:

The British Automatic Sprinkler Association
The Fire Sprinkler Association
Water UK

with the assistance and co-operation of:

The National Fire Sprinkler Network
The Chief Fire Officers' Association
Her Majesty's Fire Service Inspectorate
The Fire Protection Association
The Fire Brigades Union

The document is intended to outline how water supplied by the Water Industry may be used for the suppression of fires by automatic fire sprinkler systems and establish guidelines for how these systems may be supplied. It is understood that water suppliers may produce their own policy and procedures based upon these guidelines so that everyone can understand what is expected of them and that the sprinkler systems may be enabled to perform correctly in the event of a fire. Further practical guidance is given in the associated Technical Guidance document.

In many thousands of buildings throughout the UK, permanently installed automatic fire sprinkler systems are used as a preventative measure to control fires, for both life safety and property protection. Some systems are fed directly from the water mains; others via a storage cistern and pump or pressure vessel arrangement.

For operational reasons including the minimising of leakage, the reduction of disruption from burst mains and the reduction of power usage, water suppliers actively manage water pressures in the mains network. In doing so it is the water suppliers' aim to manage water pressure to a level commensurate with providing an adequate supply to domestic customers whilst meeting regulatory standards. Water pressures may also be affected by a growth in demand and diurnal variation.

The participants acknowledge that there is no guarantee that any particular pressure over and above the regulatory obligation will be achieved and that pressure levels that may have been available in the past may not be available in the future. Subject to this water suppliers will provide information to the best of their ability on the prevailing mains pressure and any significant seasonal variations that they are aware of to enable automatic fire sprinkler system design to be optimised.

It should also be understood that the fire service might have based its emergency rescue and fire control tactics on an assumption of effective fire sprinkler actuation and the availability of adequate water supplies for conventional firefighting. A failure of either or both of these components at a critical time could seriously jeopardise the proper operation of a fire sprinkler system thus endangering the lives of the occupants and firefighters.

Similarly, fire safety requirements made under the Building Regulations in England, Wales and Northern Ireland and the Building Standards in Scotland relating to fire safety measures to be incorporated into the design and construction of buildings may have been relaxed in favour of the fitting of an automatic fire sprinkler system. A failure of such a system at a critical time could also seriously endanger life and property.

Because of the importance of automatic fire sprinkler systems as an efficient means of detecting and controlling or extinguishing fires before they become a significant threat to life, property and the environment, coupled with economic usage of water, it is important that all the parties concerned co-ordinate their efforts in dealing with water supply issues, both for maintaining the effectiveness of existing systems and for ensuring that new systems are installed and maintained correctly.

NB: As there are currently no consolidated information systems indicating the presence or operational status of automatic fire sprinkler systems in customer premises it would be desirable for water companies, installers and regulators to develop such systems. This would permit customers to be advised of any planned significant permanent changes which may affect the operation of fire sprinkler systems.

SCOPE

This document reflects the desire of the participants to maintain and develop the goodwill that currently exists. The document is intended to provide guidance for all to enable them to work together in a spirit of co-operation and so ensure good working relationships between their member companies. The participants recognise that by so doing they will reduce fire casualties and fire losses by improving the safety of the general public, through the provision of properly designed and installed automatic fire sprinkler systems, and the provision of water supplies to support those systems.

The document provides guidance on best practice for the participants involved, i.e.

- the water supplier;
- the automatic fire sprinkler system designer and installer;
- the automatic fire sprinkler system user (i.e. the water user);
- the automatic fire sprinkler system maintainer.

This guidance document refers to all types of automatic fire sprinkler systems supplied directly or indirectly by mains water in accordance with statutory obligations placed upon the water companies.

AGREED PRINCIPLES

Subject to any legal requirements placed upon their member companies regarding the proper supply and use of public water, the participants agree that they will encourage their members, insofar as they are able, to:

- co-operate with each other at every level within their organisations in facilitating the provision of properly designed, installed and maintained automatic fire sprinkler systems and the provision of water supplies to support those systems; and
- provide clear and transparent methods of working with each other at both national and local level in support of a spirit of mutual co-operation and goodwill; and
- provide water supplies and install automatic fire sprinkler systems in accordance with the relevant legislation, British or European Standards and other recognised guidelines; and
- with regard to a specific automatic fire sprinkler installation, where a deviation from such Standards or guidelines affects the interests of the water supplier, then that deviation shall be agreed in writing locally with the parties concerned with the installation; and
- in the event of a dispute concerning the interpretation or application of these guidelines every attempt should be made to resolve the matter locally and at the appropriate level as swiftly as possible; and
- take all reasonable precautions to prevent the misappropriation of water or the commission of a related offence.

Any amendments to this document shall only be made with the consent in writing of the participants, or their successors following a joint review.

WATER POLICY GUIDELINES

1. The Benefits of Sprinklers

1.1 Automatic fire sprinkler systems have been in use for over 130 years. Sprinklers have, since the publication of BS 5306 Pt. 2 in 1990, been recognised as providing a vital life safety function in controlling the size of a fire to allow more time for escape of occupants. In the UK the majority of existing sprinkler systems have been designed and installed to the requirements of British Standard BS 5306 Part 2 and the *LPC Rules for Automatic Sprinkler Installations.* More recently systems have been introduced that are intended for the protection of life in domestic and residential property, and which are designed to BS DD 251. 2000.

1.2 An automatic fire sprinkler system is designed to:

- detect a fire within a protected building, and
- release water in the fire-affected area via the sprinkler heads, which contain heat sensitive elements designed to operate automatically at a pre-determined temperature [NB. Only those sprinklers in the vicinity of the fire operate], and
- initiate a water flow-activated, audible, local alarm when a sprinkler head operates, and
- transmit a signal to an approved alarm-receiving centre when required.

1.3 Records show that by this means of providing detection, alarm and localised water application, automatic fire sprinkler systems are very effective in preventing the development of major fires. In the UK no lives have been lost in fires in fully fire sprinkler protected buildings since the end of the Second World War.

1.4 In industrial and commercial automatic fire sprinkler systems about 60% of fires are controlled by four sprinkler heads or fewer. In domestic and residential sprinkler systems over 90% of fires are controlled by the activation of just one sprinkler head.

1.5 The volume of water used by a properly designed, installed and maintained automatic fire sprinkler system to control a fire will be significantly less than that used by the fire service to control and extinguish the same fire. In many cases this will be less than one tenth that which would have been used by the fire service.

1.6 In environmental terms automatic fire sprinkler systems make a valuable contribution by:

- reducing the size and severity of fires, and
- using water in the most effective and economical way to control fire, and
- minimising the problems of contaminated firefighting water run-off.

2. Sprinkler installations and their water supply needs

2.1 Automatic fire sprinkler systems are designed to apply water at various rates depending on the risk being protected. To obtain the design flow of water from the sprinkler heads, water supply requirements are calculated for the pressure and flow to the system in accordance with the relevant standards or guidelines being employed.

2.2 Reliable water supplies are essential, the most common forms being:

- direct connection to a water supplier's main, or
- a stored and pumped water supply, or
- large storage cisterns, with sufficient capacity to supply design flow for the specified time, or
- small cisterns, with reduced capacity and dependent on the inflow from a water service pipe to make up the design capacity, or
- a gravity supply from a storage cistern, or

- a pressurised vessel, or
- acceptable recycled water, e.g. rainwater recovery systems.

2.3 The water supply capacities, pressures and flow requirements vary, according to the classification of the fire hazard. Typical water requirements for a variety of automatic fire sprinkler systems are given in Annex A.

2.4 Domestic and residential occupancies include dwellings, residential care facilities, houses in multiple occupancy (HMOs), hostels and the like, and may be protected by automatic fire sprinkler systems directly supplied with mains water and designed in accordance with the relevant standards and guidelines.

2.5 Other occupancies such as shops, schools, offices and manufacturing facilities may also be protected by automatic fire sprinkler systems directly connected to the main(s) subject to the caveat expressed in paragraph 2.10.

2.6 To determine whether the required water pressure and the flow continue to be available, regular maintenance is needed to ensure that performance tests are carried out in accordance with the appropriate standard.

2.7 For automatic fire sprinkler systems designed for life safety protection in accordance with BS 5306 Pt. 2/ BS EN 12845: 2003 continuity and reliability of water supplies is essential. However, it should be noted that mains water supplies may be interrupted or modified for maintenance work, because of a failure in the supply system or other events beyond the water supplier's control. Designers should bear such possibilities in mind when specifying automatic fire sprinkler systems.

2.8 It is essential that automatic fire sprinkler systems are properly maintained to ensure correct operation when required. If this necessitates shutting off the system for any length of time, alternative precautions need to be instituted as required by the relevant standards or guidelines.

2.9 All participants recognise the importance of proper maintenance and testing of fire sprinkler systems in accordance with the relevant standards or guidelines and this should be brought to the attention of the system owner or user.

2.10 Any future deficiency of the automatic fire sprinkler system due to changes in the water supply characteristics shall be the responsibility of the property owner to remedy at their own expense.

3. Water Supply and Associated Legislation

3.1 The principal legislation through which water is supplied and controlled in England and Wales is:

(a) The Water Industry Act 1991 (as amended by the Water Act 2003); and

(b) The Water Supply (Water Fittings) Regulations 1999.

3.2 The principal legislation through which water is supplied and controlled in Scotland is:

(a) The Water Industry (Scotland) Act 2002, which prescribes requirements for the supply of water for non-domestic purposes in Scotland; and

(b) The Water Supply (Water Fittings) Regulations 1999 and the Byelaws (2000) in Scotland, which replaced the Water Byelaws 1986.

3.3 The principal legislation through which water is supplied and controlled in Northern Ireland is:

(a) The Water and Sewerage Services (Northern Ireland) Order 1973; and

(b) The Water Regulations (Northern Ireland) 1991.

3.4 Approved Document B Fire Safety - 2000 to the Building Regulations 2000 in England and Wales refers in a number of places to requirements for the provision of automatic fire sprinkler systems.

4. Conditions of Supply

4.1 The principal requirements which water suppliers place upon customers are to ensure that installations are designed and installed to avoid waste, undue consumption, misuse, contamination of water and erroneous measurement and to ensure compliance with the regulations throughout their useful life.

In particular:

- all materials and fittings used in systems that are directly connected to the water supplier's mains must comply with the requirements of the Water Supply (Water Fittings) Regulations 1999, and
- all below and above ground water pipes on private ground used solely for an automatic fire sprinkler system shall be identified by marking tape or some other suitable means.

4.2 Automatic fire sprinkler systems may be supplied independently of domestic or industrial supplies. They need not be metered dependent upon adequate safeguards against fraud being provided. In accordance with section 147 of the Water Industry Act 1991, no charge may be made for water used for firefighting, testing firefighting equipment or training people for fire fighting. This applies to automatic fire sprinkler systems.

4.3 The service pipe for the automatic fire sprinkler supply must be fitted with an isolating valve.

4.4 The service pipe must be fitted with an appropriate backflow prevention device to protect against backflow from the automatic fire sprinkler system. Maintenance of this device is the sprinkler user's responsibility.

4.5 Dual connections to mains in different pressure zones are not permitted; except where there is no practical alternative and there is no possibility of flow taking place between the two zones.

4.6 Dual connections to different mains in the same pressure zone may be acceptable by agreement with the water company, provided the pressures at the points of connection are similar. Backflow prevention would be particularly important in such situations.

4.7 Dual connections of treated water supplies and any other sources are not permitted other than via a cistern or tank fitted with an appropriate air gap.

4.8 Where the automatic fire sprinkler system is supplied by pumping from a storage cistern the inlet pipe to the storage cistern from the water suppliers' mains must have an automatic level control and an appropriate air gap or an arrangement of fittings as prescribed in the Water Regulations. The storage cistern should also be fitted with a warning pipe or level device to indicate if the cistern is overfilled.

4.9 Existing regulations may prohibit the direct connection of booster pumps to the water supplier's mains. On the basis that the activation of a fire sprinkler system is a rare but vital event, an exception should be made for automatic fire sprinkler systems, subject to agreeing details with the water supplier.

4.10 The provision of water storage for automatic fire sprinkler systems will not normally be required as a condition of supply (subject to paragraphs 2.6, 2.7 and 2.10 above).

CONCLUSIONS

The participants to the document recognise that automatic fire sprinkler systems have a valuable role to play in the protection of both life and property from fire and in the reduction of environmental damage such fires can cause. The participants also recognise that the water used by automatic fire sprinkler systems:

1 is a legitimate use of water, and

2 is free of charge, and

3 is a potential risk for fraud against which adequate safeguards must be provided, and

4 must pass through an appropriate and approved backflow prevention device, and

5 should be separately distributed from domestic or commercial use of water within the property: and

6 may be supplied to the sprinkler system by a variety of methods.

ACKNOWLEDGEMENTS

Acknowledgement is gratefully given to the Fire Protection Association whose 1998 document *LPC Guidelines for the Supply of Water to Automatic Sprinkler Systems for Fire Protection* formed the basis for this document and the other bodies listed below who assisted in, or co-operated with, the production of this document.

Fire Protection Association

National Fire Sprinkler Network

Her Majesty's Fire Service Inspectorate

The Chief Fire Officers' Association

The Fire Brigades Union

ANNEX A

Typical flow rates for different types of sprinkler systems

Type of property/ hazard	Min operating pressure at head bar	Typical design flow L/min	Design max no. of heads operating	Max design flow L/min
Domestic dwelling	0.5	60	2	84
Residential (ie HMO)	0.5	60	4	168
Light Hazard	0.7	94	4	190
Ordinary Hazard I	1.0	375	6	540
Ordinary Hazard II	1.4	725	12	1,000
Ordinary Hazard III	1.7	1,100	18	1,350
Ordinary Hazard IIIS	2.0	1,800	30	2,100

Domestic and Residential installations are defined in BS DD251:2000. Ordinary Hazard I etc is defined by BS 5306 Part 2 and LPC Rules for Automatic Sprinkler Installations.

ANNEX B

Glossary of terms

Backflow preventer
Check valve that will seat at zero flow.

Backflow prevention
Arrangement of pipe and fittings designed to prevent reverse flow and back siphonage of potential contaminants into the water supply.

Check meter
A meter not used for collecting revenue.

Check valve
Device to ensure that water only flows in the single intended direction in a pipe.

Cistern
Water storage vessel with a water surface exposed to atmospheric pressure.

Communication pipe
The section of service pipe owned and maintained by the Water Undertaker.

Domestic supply
Supply to points of demand within premises using water for domestic purposes, i.e. drinking, cooking, washing, bathing, sanitary purposes, central heating, food preparation. For a full definition refer to Water Industry Act 1991, section 218.

Downstream
In the direction of normal flow of the water in a pipe.

Priority demand valve
Device automatically operated by control system to isolate the flow to the domestic system in the event of a fire, thus ensuring all available pressure and flow is directed to the sprinkler system.

Pump and tank supply
Supply of water from a storage cistern via a booster pump to ensure adequate pressure and flow to meet sprinkler system requirements.

Service pipe
The branch from a water main to the first internal stop valve intended to provide a supply of water to a specific customer or group of customers.

Sprinkler head
The outlet fitting from which water is discharged in a spray pattern to control fires.

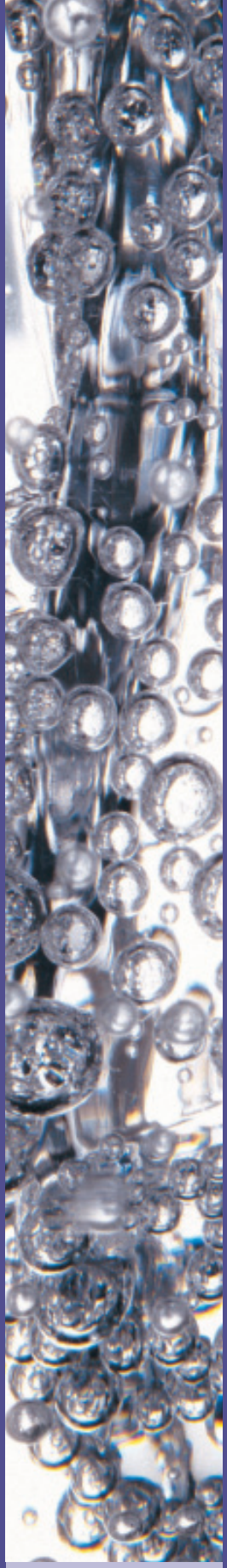
Sprinkler system
The assembly of pipes, fittings and valves to distribute water under pressure to sprinkler heads.

Stop valve
Device to isolate the supply of water. Also referred to as a ‘stop tap’.

Supply pipe
The section of service pipe owned and maintained by the customer.

Upstream
In the direction opposite to the normal flow of water flow in a pipe.

Water main
Pipe belonging to the Water Undertaker (Water Company) installed with the purpose of providing a general supply of water.



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Presented by:
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