British Automatic Fire Sprinkler Association
bafsa

INFORMATION FILE

#13

Water Supplies

In many thousands of buildings throughout the UK, permanently installed automatic fire sprinkler systems are used to control fires and protect life and property. The water supply to the sprinklers is a fundamental element. Some systems are fed directly from the water mains, others via a storage tank and pump arrangement.

Property owners should be aware that the Fire and Rescue Service may have based its firefighting tactics on the assumption that an effective fire sprinkler actuation will control the fire, whilst the availability of adequate water supplies for conventional firefighting will also be crucial. A failure of either or both of these components at a critical time could seriously jeopardise operations, thus endangering the lives of occupants and firefighters.

Similarly, fire safety requirements made under the Building Codes in use in England, Wales and Northern Ireland and Building Standards in Scotland relating to fire safety measures to be incorporated into the design and construction of buildings may have been relaxed in acknowledgement of the fitting of an automatic fire sprinkler system.

Because of the importance of automatic fire sprinkler systems as an efficient means of detecting, controlling or extinguishing fires before they become a significant threat to life, property and the environment, it is important to secure the water supply, both for maintaining the effectiveness of existing systems and for ensuring that new systems are installed and maintained correctly.

UK FIRE SPRINKLER STANDARDS

Water supply capacities, pressures and flow requirements vary, according to the classification of the fire hazard in the protected premises. In the UK the majority of existing sprinkler systems in commercial buildings are designed and installed to the requirements of BSEN 12845 or The LPC Rules for Automatic Sprinkler Systems incorporating BS EN 12845. Older sprinkler systems were designed and installed to BS 5306 Part 2 which is now withdrawn. Sprinkler systems that are intended for the protection of domestic and residential property are to be designed, installed and maintained to BS 9251 or BS EN 16925.

FIRE SPRINKLER WATER SUPPLY OPTIONS

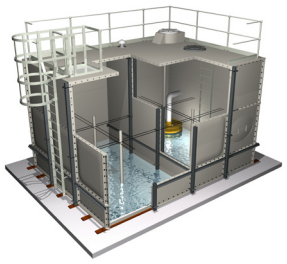
1: Direct Connection to the Water Main

For operational reasons such as the minimisation of leakage, the reduction of disruption due to burst mains and the reduction of power usage, water suppliers actively manage water pressures in the mains water supply network. In doing so it is the water supplier's aim to maintain water pressure at a level commensurate with the provision of an adequate supply to domestic users whilst meeting regulatory standards.

Domestic and residential occupancies including dwellings, residential care facilities, houses in multiple occupancy (HMOs), hostels and high rise apartments, may be protected by automatic fire sprinkler systems directly supplied by mains water, designed in accordance with BS 9251.

However, it should be noted that, though a rare event, mains water supplies may be interrupted, subject to pressure fluctuations, or for maintenance work, or 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 which are to be supplied directly with water from a service main.

Water suppliers have a duty to enforce the statutory requirements placed upon customers which ensure installations are designed and installed to: avoid waste; undue consumption; misuse; contamination of water; erroneous measurement; ensure compliance with the regulations throughout the life of the installation. The Water Supply (Water Fittings) Regulations 1991 apply to firefighting systems which are to be supplied with water (directly or indirectly) from the public water supply system. The following key elements should be noted to ensure compliance with these requirements:



WATER UK:

- SUPPORTS THE PROVISION OF A WATER SUPPLY FOR FIREFIGHTING AND TO A WELL-DESIGNED DOMESTIC FIRE SPRINKLER SYSTEM.
- WILL ENGAGE WITH THE INTERESTED PARTIES TO AGREE STANDARDS, GOOD PRACTICE, GUIDELINES AND FRAMEWORKS FOR THE WATER SUPPLIER, THE SYSTEM DESIGNER AND INSTALLER, THE SYSTEM USER AND THE SYSTEM MAINTAINER.
- RECOGNISE THE VITAL ROLE THAT FIRE SPRINKLER SYSTEMS HAVE IN CONTROLLING FIRES IN COMMERCIAL AND DOMESTIC PROPERTIES AND THE BENEFITS THAT THEY HAVE IN TERMS OF PREVENTING LOSS OF LIFE AND MINIMISING PROPERTY DAMAGE.

- advanced notification to the water supplier of any proposals to install or alter firefighting systems.
- all materials and fittings used in the system must comply with the requirements set out in these regulations; 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 in accordance with BS 1710.

It is BAFSA's understanding that, in accordance with section 147 of the Water Industry Act 1991[2], no charge may be made for water used for firefighting, testing firefighting equipment or training people for firefighting. This equally applies to automatic fire sprinkler systems.

The connection from the service main to an automatic fire sprinkler supply must be fitted with an isolating valve, and an appropriate check valve to protect against backflow from the automatic fire sprinkler system into the potable water supply.

Some water suppliers actively discourage 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 may be made for automatic fire sprinkler systems, subject to agreeing details with the water supplier.

2: Pump & Tank Supplies

Automatic fire sprinkler systems are designed to supply water at various rates depending on the premises and hazard being protected. To determine the design flow of water to the sprinkler heads, water supply requirements are calculated in accordance with the relevant standards or guidelines being employed.

Pumps can be either electric or diesel driven or a combination of both and water storage can be provided by any of the following arrangements:

- a storage tank, with sufficient capacity for the systems design flow for the specified time,
- a storage tank, with reduced capacity that depends on the inflow from a water supply to make up the design capacity
- a gravity supply from an elevated storage tank
- inexhaustible reservoirs (lake, canals, rivers)
- a pressure tank with sufficient capacity and pressure to supply design flow for the specified time

ISSUES FOR WATER COMPANIES AND SPRINKLER CONTRACTORS

The preferred water supply for the sprinkler industry is a direct supply from the mains. However this may not be possible taking account the available pressure and flow and the ability of water companies to guarantee future performance. Where direct connection is not achievable then a pressure booster pump or tank and pump supply can be utilised.

Some water companies have expressed a preference or requirement for the water supply for sprinklers to be metered. The reasons given for this are to minimise loss through leakage and the potential theft of water. The pressure loss through a meter has been the subject of research within the industry.

Whilst direct connection to the mains may provide adequate water for most domestic and some residential sprinkler installations, systems for larger commercial premises will normally require a stored water facility to ensure adequate water is available.

LIAISON WITH WATER COMPANIES

The Water Liaison Group was established in 2002 to facilitate liaison between the water and sprinkler industries together with representatives from fire and rescue services. Their role is to provide a forum to discuss the provision of water for sprinkler systems and to develop guidance to support the installation of sprinklers whilst satisfying the requirements relating to water provision.

Since its inception it has sought to identify and encourage good practice for both the water and sprinkler industries.

In 2004 the water industry, in conjunction with a number of stakeholders, produced a policy position statement providing guidelines for designers, installers and water companies on the supply of water to these systems. In 2015 this document was revised by Water UK and adopted by the chief executives of member companies.

In addition, a fire controlled by a sprinkler will generally have a much lower demand on the water network than one controlled by water taken from a fire hydrant thus reducing the risk of quality or supply problems to other network users. Although the number of systems installed in domestic properties has been low, the scope for proliferation of domestic fire sprinklers is high. In Wales fire suppression sprinklers are now enshrined in legislation for all new properties. The Water UK Policy Position Statement can be found at: http://www.water.org.uk/publications/policy-positions-and-briefings/water-supply-domestic-fire-sprinkler-systems

WATER SUPPLY REGULATIONS AND ASSOCIATED LEGISLATIONS

It is important that, for each new installation, advanced applications are made to the local water supplier to ensure that the correct application and certification is received for the provision of the fire sprinkler system and incoming water supply.

England and Wales:

(a) The Water Industry Act 1991 (as amended) Note: charging for firefighting is covered in Section 9A; and
(b) The Water Supply (Water Fittings) Regulations 1999.

Scotland:

(a) The Water Industry (Scotland) Act 1980 (as amended) and 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) (Scotland) Byelaws 2014.

Northern Ireland:

(a) The Water and Sewerage Services (Northern Ireland) Order 2006 which prescribes requirements for the supply of water for non-domestic purposes in Northern Ireland. Note, charging for firefighting is covered in Article 207; and
(b) The Water Supply (Water Fittings) Regulations (Northern Ireland) 2009.

PRESENTED BY

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If you have a question or seek advice regarding automatic water-based fire suppression systems, please email the team: Ritchie.oconnell@bafsa.org.uk or joe.mcafferty@bafsa.org.uk. If they do not have an answer for you, they will know someone who has! FAQs can be found at bafsa.org.uk/sprinkler-systems/faqs/