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# Sprinklers & Healthcare Premises

**Whilst the use of automatic fire sprinklers is recommended and encouraged by all UK fire and rescue services, sprinklers are not used as widely in the healthcare environment as they are in other areas such as the retail sector.**

The demand on hospitals and healthcare premises in the UK is growing with over 1257 premises including Trust Hospitals and additional private premises seeing an average of 1,469,720 inpatients every quarter and 5.4 million Emergency Department patients in the last quarter of 2018 alone.

The impact on UK hospitals and healthcare premises from fire is significant with 636 fires in hospitals in the year to September 2019<sup>1</sup>.

The government's fire standards for the NHS briefly mention, but do not commit to, the installation of sprinklers. The guidance also repeatedly states that where sprinklers are used, other fire prevention measures may be reduced to prove cost-benefits and design flexibility.

Despite this even some new builds have not included sprinklers and almost no mental health trusts have sprinkler systems.

All sprinkler systems will save lives and:

- Protect firefighters
- Limit the size of a fire
- Control fire spread
- Provide additional time to evacuate
- Limit fire damage
- Be beneficial in terms of business continuity
- Compensate for any impairments in passive fire protection measures

## PROGRESSIVE HORIZONTAL EVACUATION

A major concern in hospitals in particular is the impact of a fire on dependent and 'very high dependency' patients who cannot easily be evacuated - particularly those undergoing surgical procedures or in intensive or critical care units.

Many healthcare premises use Progressive Horizontal Evacuation (PHE), to initially evacuate patients to an adjoining fire compartment or sub-compartment, providing an extended evacuation period. The installation of sprinklers can increase the

time available for evacuation still further and reduce the numbers who require evacuation.

The use of PHE requires the building to be designed to accommodate the evacuated patients and the beds and equipment required for their care. In buildings over 12m high where no hospital street is provided, at least four compartments should be provided each having a minimum floor area of 500m<sup>2</sup>. In sprinklered buildings the minimum floor area of each compartment may be reduced to 350m<sup>2</sup>.

## BUILDING STANDARDS

Sprinkler systems are widely referenced in the guidance to the Building Regulations, Scottish Building Standards, and Health Technical Memoranda 2014. These are deemed to satisfy the requirements of Part B – 'Fire Safety' of the Building Regulations 2019.

In Wales, buildings in purpose groups 1a, 1b, 1c, 2a and 2b, (where Regulation 37a of the Building Regulations applies) which may include group homes and nursing homes, it is recommended that advice is sought from the appropriate building control body before commencing any work within premises of this type. Scottish Building Standards impose similar requirements.

## FIRECODE; HEALTH SERVICES' TECHNICAL MEMORANDA 05-02 & HTM 88, SHTM 82

There are, at present, no statutory requirements for sprinklers to be provided in hospitals with the exception of high rise buildings (in excess of 30m) and in certain commercial enterprises contained within hospitals, however hospital designers are expected to comply with HTM 05 02 'to consider the advantages that might be gained by installing life-safety sprinklers throughout the building or to specific areas.'



1257

UK HOSPITAL &amp; HEALTHCARE PREMISES



OVER

1.4m

INPATIENTS PER QUARTER



636

FIRES IN HOSPITALS IN 2019

Sprinklers may be used in all or specific parts of the building, where partial protection is provided. Firecode and BS EN 12845, require sprinkler protected areas to be separated from non-sprinkler protected areas by at least 60 minute fire-resisting construction. This does not apply in small areas such as en-suite facilities in patient rooms.

Where sprinklers are used, there are often significant design freedoms or compensations available which can offset the cost of the sprinkler system and allow for greater flexibility in design, increased use of open spatial planning and extended travel distances.

In addition to the design freedoms and flexibility discussed above, a number of specific derogations are allowed in the Firecode where sprinklers are installed, they include:

- In fully sprinklered healthcare buildings the fire resistance of compartment walls on floors up to 12m above ground can be reduced from 60-minutes to 30-minutes (integrity and insulation).
- In some locations thermally activated dampers may be provided instead of fire and smoke dampers linked to the fire alarm and detection system.
- The maximum size limits on un-insulated glazing located in sub-compartment walls is not applicable where sprinklers are provided, this can offer a significant cost saving and greater design flexibility.
- Where full sprinkler protection, is provided periods of fire resistance to elements of structure can be reduced by 30 minutes compared to a non-sprinklered building.
- Identified fire hazard rooms should be enclosed in 30 minute fire-resistant construction, unless sprinklers are provided, in which case the need to enclose fire hazard rooms in fire-resistant construction should be risk assessed.
- External fire spread space separation distances required between buildings or facing compartments can be halved and external envelope protection requirements for re-entrant angle protection (i.e. 1m storey height fire resistant banding and 3m fire resistant protection to low level roof abutments) can be relaxed if sprinklers are provided.
- The number and location of firefighting shafts required may be reduced, subject to the height above ground, the number and location of firefighting shafts is determined by the floor area and maximum hose layout distances e.g. where one shaft is required for every 1000m<sup>2</sup> or part thereof. This ratio can be increased to 1:1500m<sup>2</sup> where sprinklers are provided thus reducing the number and costs of firefighting shafts.
- Mechanical smoke extracts are allowed in basements where sprinkler protection is provided.

The above list is indicative only and further details should be sought from the relevant Firecode document.

#### SPRINKLER SYSTEM OPERATION

Sprinkler systems offer a way of automatically applying water quickly and directly to the seat of a fire. All sprinkler protected parts of the building are covered by a pipework grid with sprinkler heads fitted at regular intervals. Water is fed to the sprinkler heads from a dedicated water supply, either from a dedicated tank/s and pumps or from the service (towns') main.

It is a myth that all sprinkler heads will operate simultaneously throughout the premises... Only the sprinklers in the direct vicinity of the fire open, the others remain closed. This limits the water damage to areas where there is a fire and reduces the amount of water used.

Sprinkler heads are generally located near the ceiling and spaced so that there is always a sufficient flow of water to combat fire in the likely area of operation. The flow is carefully calculated so that each head delivers enough water to control a fire, taking into account the size and construction of the building, its use and nature of the contents stored in it. As the water from the sprinkler heads is applied in small droplets, in a finely divided stream, there is little danger of electrical conduction via the sprinkler water and it is equally safe to use sprinklers in kitchens.

In most premises, if a sprinkler opens and water flows through the control valve it also actuates a mechanical alarm outside the building. This feature provides a local alarm without the need for electrical connections. At the same time, most modern systems, are usually fitted with a flow switch which can be connected to the building's fire control panel and provide a local and remote alarm – this will provide a signal to call the fire and rescue service. The sprinkler flow alarm signal can be 'piggy-backed' on any fire or security detection system using a connection to an alarm receiving station.

Many fires are actually extinguished by sprinkler systems leaving little for the fire and rescue service to do on their arrival.

#### TYPES OF SYSTEMS

There are several types of sprinkler installations but the one most commonly used in healthcare premises is the wet type, where the installation is permanently filled with water.

#### STANDARDS

There are two main standards for sprinkler systems within the UK: **BS EN 12845:2015+A1 : 2019 Fixed firefighting systems. Automatic sprinkler systems. Design installation and maintenance.**

This standard refers to commercial industrial premises as applied to buildings such as Shopping Complexes, Warehousing, Hospitals and Schools. Supplemented in the UK by the LPC Technical Bulletins.

**BS 9251:2014 Fire sprinkler systems for domestic and residential occupancies. Code of practice**

This is a domestic and residential standard which may be applied in some Residential Care Premises, certain HMO's and domestic dwellings.

The following standards may also apply:

**BS EN 16925 : 2018**

Fixed firefighting systems - Automatic residential sprinkler systems - Design, installation and maintenance

**BS EN 12259-9 : 2019**

Fixed firefighting systems. Components for sprinkler and water spray systems. Deluge alarm valves

#### CODE OF PRACTICE

This is a domestic and residential standard which is applicable to the installation of sprinklers in new or existing residential properties including Residential Care Premises, certain HMO's and dwellings.

#### ENVIRONMENTAL ISSUES

There are a good number of environmental reasons for reducing the size and frequency of fires. Any reduction will minimise the volume of toxic gases released to the atmosphere. Even in a minor fire, the products of combustion, including CO<sub>2</sub> will pollute the atmosphere and contaminate the firefighting water. This contaminated water is very difficult to contain and often finds its way into water courses and drainage systems.

*If you have a question or seek advice regarding automatic water-based fire suppression systems, please email the team : [ian.gough@bafsa.org.uk](mailto:ian.gough@bafsa.org.uk), [joe.mcafferty@bafsa.org.uk](mailto: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/](http://bafsa.org.uk/sprinkler-systems/faqs/)*