

# Think Sprinkler

**London Fire Brigade  
Automatic Fire Suppression  
System Information Toolkit**

March 2020

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# 1 Introduction

Automatic Fire Suppression Systems (AFSS) are proven to save lives and property, improve firefighter safety, minimise environmental damage and reduce economic loss. This is why Fire and Rescue Services (FRS) have been calling for them to be used more widely. We want to see the installation of AFSS becoming the norm, not the exception.

This is also reflected within "One voice", the national sprinkler promotion strategy developed by [the 'Local Government Association](#) (LGA) and the [\\*National Fire Chiefs Council](#) (NFCC).

This strategy includes its own "Sprinkler Toolkit" which every FRS has agreed to support and treat as "-One Voice" for the Fire sector. It represents the FRS vision and direction on the issue of mandatory sprinklers for vulnerable groups of society.

This document reflects the work performed within London, by the London Fire Brigade (LFB) playing a key leadership role in promoting a better understanding of AFSS, and ensuring the concept of encouraging building owners and developers to install these systems is reaffirmed, especially in domestic, residential and educational premises where vulnerable people live or regularly visit.

This toolkit provides information, advice and case studies, useful in raising awareness on the benefits of AFSS.

\*Its responsibilities are administered by the Fire and Rescue Chiefs/Commissioners, The aim is to drive improvement and development throughout the United Kingdom (UK) FRS.

<sup>1</sup>Represents the views and concerns of the fire sector working on the future direction of the Fire and Rescue service.

## 2 Why Sprinklers? (Automatic Fire Suppression Systems)

AFSS are designed to operate automatically and control /suppress a fire in the early stages of development.

Evidence and research gathered over many years proves the effectiveness of AFSS in the rapid suppression of fires by providing a vital additional layer of fire safety before the arrival of the FRS.

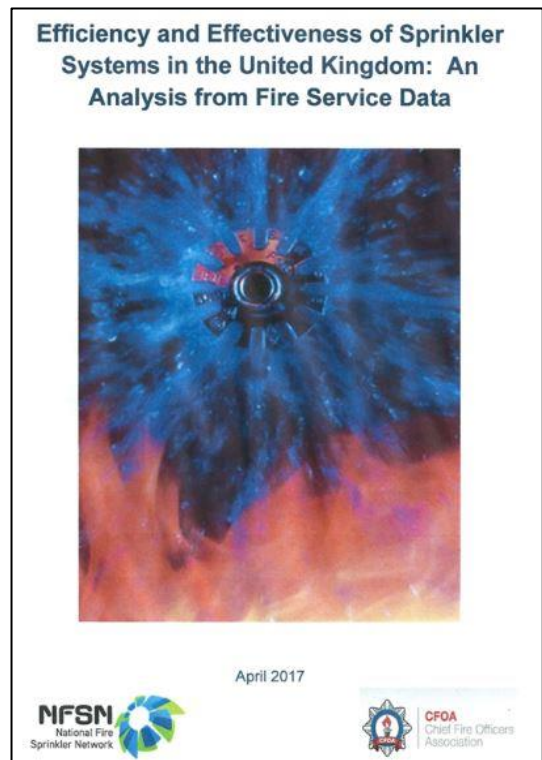
The most recent UK research was commissioned by The [National Fire Chiefs Council](#) (NFCC) and the [National Fire Sprinkler Network](#) (NFSN) in the publication, "[Efficiency and Effectiveness of Sprinkler Systems in the United Kingdom: An Analysis from Fire Service Data](#)".

Key data revealed that:

- Sprinklers are 94% efficient in their ability to operate.
- Sprinklers are 99% effective in extinguishing or controlling a fire.

In support of this publication, a supplementary publication [Incidence of Deaths and Injuries in Sprinkler Buildings](#) has now been published.

This document focuses on the argument that sprinklers also have a role to play in reducing harm and protecting vulnerable people in particular, supporting the case for a greater inclusion of sprinklers in purpose built blocks of flats.



Main findings from this publication:

- In a dwelling, the chances of being injured when sprinklers are fitted reduces to one in every 10-11 fires – indicating you are only 10% likely to be injured
- In buildings other than dwellings, the chances of being injured are also reduced by 50%.
- There were no recorded fatalities in buildings other than \*dwellings where there was a functioning sprinkler system.
- If you are unlucky enough to be harmed then you are 22% less likely to need hospital treatment, and 18% more likely to only need a precautionary check than any medical assistance.

\*A study of these fatal dwelling fires, found that the circumstances of the fire fell outside the life-saving operating parameters of the system's design. Typically the casualty was directly involved in the fire with either their clothing or bedding ignited - often by smoking materials. Typically, they were also unable to move away from the fire or remove clothing due to mobility issues. Often, they were medically more likely to succumb to burns or smoke inhalation due to age or infirmity

There are a range of organisations and companies that share and support the LFB/NFCC position on AFSS including:

- Zurich Insurance plc, a leading insurance company in the UK and across the world. Its business is providing protection to its customers with a strong mandate for fixed fire protection, including AFSS, to provide protection against fire and reduce its impact on the family, school, business or enterprise.
- The [Business Sprinkler Alliance](#) (BSA), which advocates greater business resilience by enhancing protection against fire through the increased acceptance and use of fire sprinklers in commercial and industrial premises.

### **3 Current Work and Our Vision for Future Promotion**

We want to increase our engagement with the development of innovative technology to influence our partners to install AFSS to protect the most vulnerable and for firefighter safety in all kinds of housing. We also want to encourage the promotion of AFSS both within London and nationally, to meet the aims and objectives contained within the LFB, [London Safety Plan](#) and AFSS Position Statement. Reducing the impact of fire on people, property and the environment.

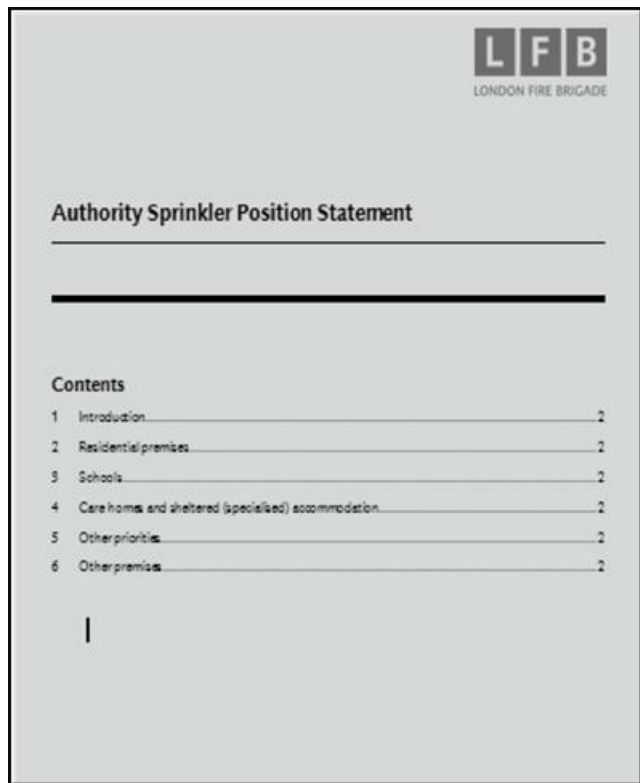
There is clear evidence that AFSS can be effective in the rapid suppression of fires and can therefore play an important role in achieving a range of benefits for both individuals and the community in general.

LFB wants to see a greater inclusion of AFSS in London, making it the safest global city in the world. We also seek to influence building control officers, planning teams, architects, designers and development at every stage, so that the benefits of fire suppression can be considered before the design and costing decisions are so far advanced that it is too late to include them.

LFB continues to work with our partners to demonstrate the benefits, provide evidence, and advise politicians, developers, designers and the general public of the benefits of suppression, specifically to encourage the installation of AFSS in the homes of the most vulnerable people.

Vulnerable people in relation to fire, are individuals that have particular behaviour characteristics that put them at greater risk if a fire should start and are potentially less likely to react quickly to a smoke alarm, or are unable to move quickly to escape, or a combination of such factors.

Figures published by the LFB in 2018 showed that there is, on average, more than one fire every day in such buildings housing some of the the capitals most residents. Of 428 fires, AFSS were installed in just five of the incidents, with three of these fires seeing fatalities, and 53 people injured in total.



LFBs vision is that fitting AFSS will address the challenges of a changing demography including an ageing population, and policy changes to the models of health and social care provisions, and the supported housing landscape.

The tragic deaths of fourteen residents at Rosepark care home in South Lanarkshire, in 2004, provided a powerful argument for the installation of AFSS, especially after the results of the coroners report. That was 15 years ago, what has changed? There is now a requirement to have AFSS fitted to all new built care homes in Scotland. Similarly since 2014 there has been a requirement to fit automatic fire sprinklers to all new built care homes in Wales. Sadly this has not been the case in England.

Across the country, examples where AFSS are being installed in more cost effective ways are well underway. When the cost of these systems are compared to the value of damage caused by fires, they are very financially efficient. The LFB therefore believes that there are opportunities for councils and housing providers to use AFSS in order to protect the lives of residents, save money and protect property.

Improvements in the type, design and installation technique means that installation of a fire suppression system can be easily achievable in almost any type of premises. These systems are designed to operate with minimal use of water without compromising the effect it has on fire. Sample installation costs within a residential property for different types of suppression systems are detailed further on within this toolkit.

In the 2016/17 LFB budget, £1 million was allocated into a Community Safety Investment Fund (CSIF). The parameters for how this investment should be allocated were to ensure that it was directed into the homes of the most vulnerable people across London, to be spent on fire safety equipment such as AFSS and telecare systems.

Prior to the launch of the CSIF project, LFB launched a sprinkler match funding competition in February 2014 where local authorities and private housing providers could apply for match funding to assist meeting the costs of installing AFSS within premises that housed the most vulnerable.

This resulted in a range of residential properties having AFSS installed providing a further layer of safety to the most vulnerable from fire before the arrival of the FRS. LFB are working hard to make sure this number

increases with the support of a full time AFSS Coordinator to promote the clear benefits that AFSS can bring to protecting the most vulnerable.

## 4 Retrofitting

A number of authorities and housing providers in London have announced their intention to retrofit sprinklers into their high-rise residential blocks.

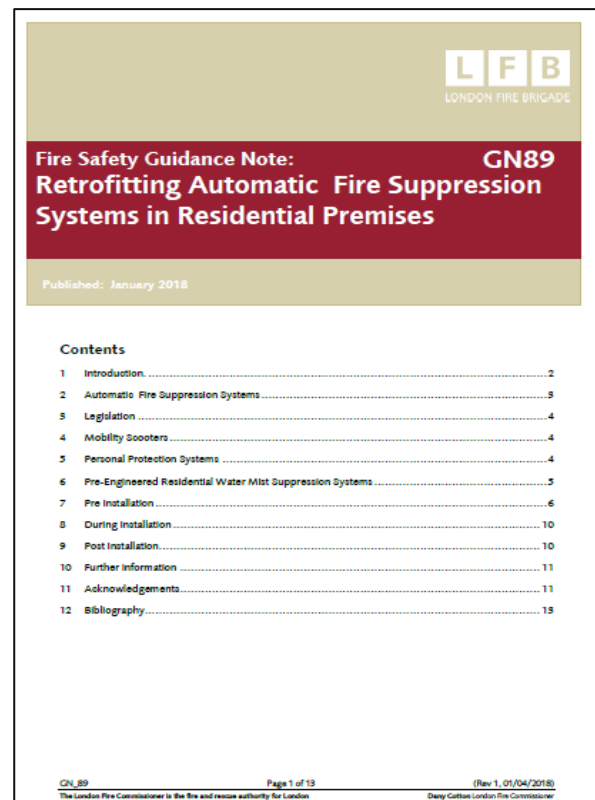
LFB are supporting local authorities and housing suppliers in providing them with guidance and support, the outcome of which will allow systems fit for purpose to be installed in accordance with the appropriate standards and codes.

Croydon, being an example of local authority who benefitted from this approach, are currently retrofitting all their high rise properties above 10 floors. Completion of all 26 blocks is expected in the summer 2019.

LFB fully support the view that existing high-rise residential blocks over 18m in height should be retrofitted, subject to a risk based approach which should include consideration of the vulnerability of the residents.

Retrofitting is part of a holistic, risk based approach, and should be considered as part of a package or enhancement . In all cases, the system being installed

needs to be fit for purpose and appropriate. In support of this approach, LFB have published the following Fire Safety Guidance Note providing fire safety advice in respect of retrofitting, [GN89 Retrofitting Automatic Fire Suppression Systems in Residential Premises](#).



## 5 Sprinkler Myths and Answers

AFSS offer a proven method of protecting life and property. However, there are many myths and misconceptions about how they actually work

### Myth 1

***In a fire, every sprinkler head will activate, flooding my property.***

1. Only the sprinkler heads in the immediate vicinity of a fire will operate. Each head is set to operate individually, and it will only be triggered to spray water onto a fire when it reaches its predetermined operating temperature. This varies, but it's often around 68°C.

### Myth 2

***Water damage from an AFSS will be more extensive than fire damage.***

1. Water egress from an AFSS will be far less severe than the damage caused by water from firefighters' hoses. A residential concealed nozzle head releases 49 litres of water per minute, compared to 700 – 4,000 litres per minute discharged by fire service hoses and jets.

- II. We recommend that AFSS can be connected to an alarm monitoring company, which will contact the fire service, should the system operate. On arrival, the fire & rescue service will take immediate action to minimise any water egress following the extinguishment of the fire.

**Myth 3**

***Sprinklers are ugly and will spoil the look of my building.***

- I. Concealed residential sprinklers are almost invisible - they're recessed, flush with the ceiling, and covered by a flat plate (ideal for clean areas, locations with restricted headroom, or where vandalism is a potential problem).
- II. Actually sprinklers in the specification for an unconventional or unusual building design can often offer design freedoms while still achieving Building Regulations compliance cost-effectively.

## 6 What is the approximate cost of an AFSS?

We are often asked 'How much does an AFSS cost?' Of course it is very difficult to answer this without knowing the details of the project. It should be noted that LFB are not sprinkler contractors.

Many people perceive the installation of AFSS as expensive and complex so never seriously consider the benefits. However LFB recognise that it is difficult to make the decision to seriously consider having an AFSS installed unless you have some indication of the costs.

Costing can vary depending on whether the project is a new build or a retrofit. An analysis of retrofitting work in high rise residential blocks completed from 2012-2017 by the [Residential Sprinkler Association](#) confirms that costs per flat average between £1,500 and £2,500.

Figures from a third party accredited, British Automatic Fire Sprinkler Association AFSS contractor support these costs for high rise/low rise retrofitting and new build projects.

15 storey retrofitting high rise block	15 storey high rise block retrofitting (boxing in to client specification)	3 storey retrofit low rise
60 x apartments	60 x apartments	60 x apartments
Per apartment £2,308.33	Per apartment £3,933.33	Per apartment £2,213.33

15 storey high rise new build residential block	4 storey new build low rise block
60 x apartments	60 x apartments
£999.10 per apartment	£875.00 per apartment

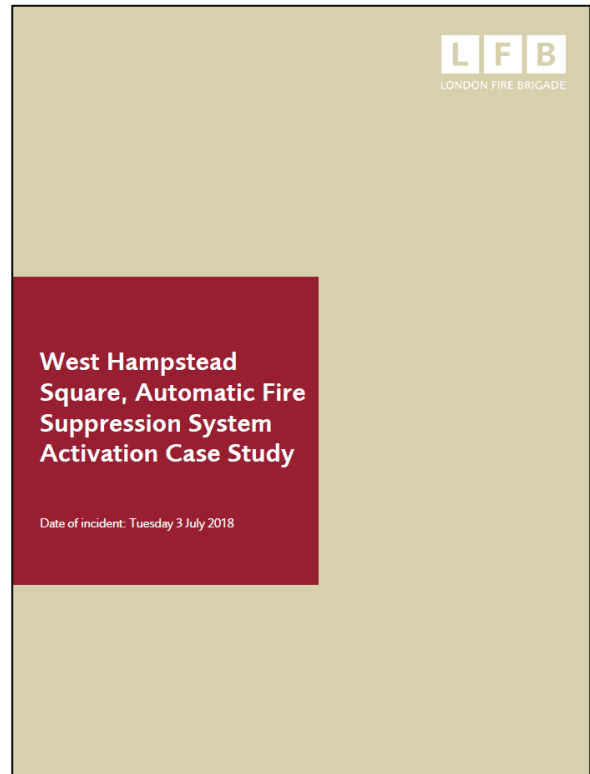
For a full breakdown of costs, see Appendices 1 and 2

## 7 Collation of Sprinkler (AFSS) saves

This collation of sprinkler saves provides powerful evidence as to the ability of sprinklers to greatly reduce the effects of fire. A sprinkler save is when a fire starts in a building and one or more sprinkler heads activate to control or extinguish the fire before the Fire & Rescue Service arrive.

### i. West Hampstead Balcony Fire Case Study Report

In this case an external balcony fire where in the space of 19 minutes from the actuation of the first nozzle head, 5 apartments were exposed to fire and heat, activating 12 nozzle heads - which is unprecedented in a residential fire.



In summary

Without the installation of the AFSS, the outcome could have been more serious and potentially fatal resulting in 5 separate compartment fires over 5 floors.

- The importance of employing a third party accredited sprinkler contractor allowing a correctly designed AFSS to be installed to the appropriate standard.
- Careful consideration must be given to materials and structural design to mitigate the risk of a balcony fire spreading to other parts of the building.
- With regard to Business continuity, AFSS can help to protect valuable assets from fire or can significantly mitigate the effects that a fire has upon assets, helping to achieve business continuity.
- AFSS can lead to cost savings, innovative and flexible design options, open plan living is one example because the need for fire doors, walls and compartmentation is removed.

**This case study can be downloaded from our web site:**

<https://www.london-fire.gov.uk/safety/property-management/sprinklers/>



A similar balcony fire took place in London 2019, AFSS was not installed on this occasion. The outcome resulting in widespread damage in a number of apartments. The difference in damage is clearly visible in the two photographs below.



## ii. **Primary school fire in Lambeth**

Fortunately the fire broke out before the school was occupied and originated within the plant room. One head operated and the fire was extinguished causing less than 5 m<sup>2</sup> of direct damage. Total damage and loss was minimal and the fire had little effect on the continuity of the school. If there had not been a fire suppression system installed, in this case it is possible that most of the school would have been damaged by fire where the cost of damage would have been estimated at £500,000 This is not just about saving money; when a school is closed it disrupts a child's education, impacts on the local community and affects parents by closing breakfast and after school clubs

### iii. **Warehouse fire in Newham**

Fire started within a plant room and was contained/controlled by one head operating on the fire suppression system. Minimal damage was incurred and no fatalities or injuries were reported from this incident. If there had not been a AFSS installed in this case, the cost of fire and smoke damage would have been estimated at £ 7 million.

### iv. **Office block fire in the City of London**

This particular fire started within a wastepaper bin located in the goods lift lobby. One sprinkler head operated and extinguished the fire causing less than 5 m<sup>2</sup> of direct damage. The fire detection system raised the alarm and all occupants of the building were able to escape safely. If there had not been a fire suppression system installed in this case, fire and smoke damage could have spread throughout the lift lobbies on all floors. The cost of damage would have been estimated at £10,000.

### v. **Market unit fire within a large building in Hackney**

The electrical fire started within a small shop unit that directly accesses a large indoor market hall. Staff attempted to tackle the fire using portable fire extinguishers but it was eventually controlled by one head actuating from the AFSS.

Less than 5m<sup>2</sup>of direct damage and no fatalities or injuries were reported. Total damage was limited and restricted to the individual unit. If there had not been a fire suppression system installed in this case, the fire could have easily spread into the main building and the cost of damage would have been estimated at £200,000 +.

### vi. **Hall of Residence fire in Tottenham**

This accidental fire started from unattended cooking in the kitchen and was extinguished by the fire suppression system causing less than 5 m<sup>2</sup> of direct damage. No fatalities or injuries were reported from this fire incident and the total fire damage was limited to mainly the kitchen with minor smoke damage caused to the bedroom. Living area was refurbished and reoccupied by the tenant within 2 months. If there had not system installed, refurbishment would have taken much longer and the cost of damage would have been estimated at around £6000.

**The total cost savings from these six examples where fires have been controlled /extinguished by a fire suppression system is estimated at being in excess of £7 million, and this does not take into account the disruption that would have been caused, and the environmental impact**

## **8 Cost to Benefit Analysis for Automatic Fire Suppression Systems**

The examples above make up only a few of the total amount of AFSS actuations across London and the cost savings that are evident far outweigh the cost of the systems installation. The cost of water damage caused by these systems compared to fire damage is less than 10%, while the benefits AFSS can provide in terms of saved lives, improved survival rates, and protection of property are priceless.

### **Fire suppression system benefits:**

- Reduce death and injury from fire
- Reduce the risks to firefighters
- Protect property and heritage
- Reduce the effects of arson
- Reduce the environmental impact of fire

- Reduce the costs and the disruption to communities and business
- A potential reduction of insurance costs and premiums.
- Permit design freedoms and encourage innovative, inclusive and sustainable architecture

### **Economic costs of fire in residential properties**

- According to information published by the [Association of British Insurers](#) in 2018, fire was one of the most expensive property claims, with £1.3 billion being paid out to customers.
- According to [Home Office fire statistics](#) , there were 263 fire related deaths in Britain (2017/18) that occurred in residential dwellings.
- LFB figures show 19 fire related deaths in 2018 were of people receiving care in their homes. In the last five years there have been an average of 22 fires every week linked to smoking.

## **9 Automatic Fire Suppression Systems for Residential and Domestic Occupancies**

*More information on Fire sprinkler systems can be found in:-*

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

**BS EN 16925:2018** Fixed Firefighting systems-Automatic Residential sprinkler systems Design, Installation and Maintenance

**BS EN 12845: 2015.** Fixed Fire Fighting Systems. Automatic Sprinkler Systems. Design, Installation and Maintenance.

### **Personal Protection and Water Mist Type Systems**

The unit is portable, which means that fire protection can be moved with the resident or re-used as required and is an ideal solution for protection to escape routes, vulnerable people and risk critical areas. Its main function is to protect the location where the person usually is for example in their chair/bed, and can be installed in a relatively short time.

There are, of course, limitations to how effective the system is and the size of fire loading it can deal with. A risk assessment should be carried out prior to installation to ensure that it is suitable for the individual vulnerable person, as this type of unit may *not* be suitable for all situations, e.g.

- Hoarding environments (as the fire may be shielded or the fire load may be greater than what the PPS system is designed for);
- Premises where the identified risk may be in more than one room (as the PPS system has a limited area of operation and needs to be directed at the expected fire source).

The unit consists of a pressurised tank of water, and an intelligent control panel which monitors the environment, linked to a multi-criteria smoke detector enabling fast and effective response. There is even an option to provide automatic connection to an existing monitored fire detection or care system or directly to an Alarm Receiving Centre to raise an alarm upon activation if required.

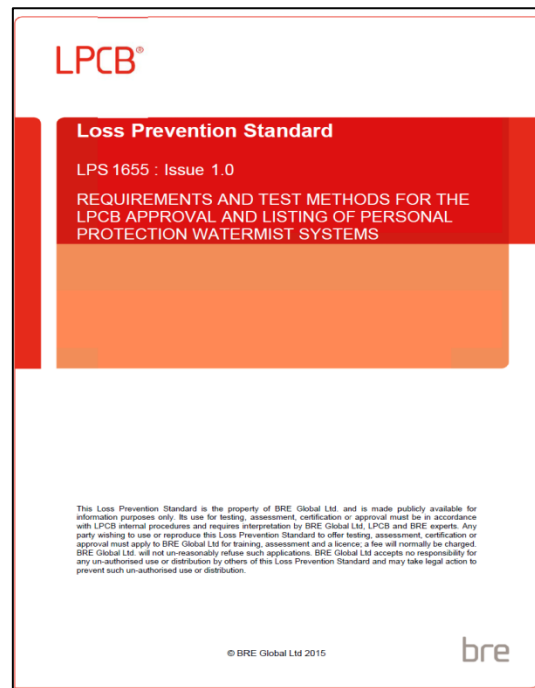
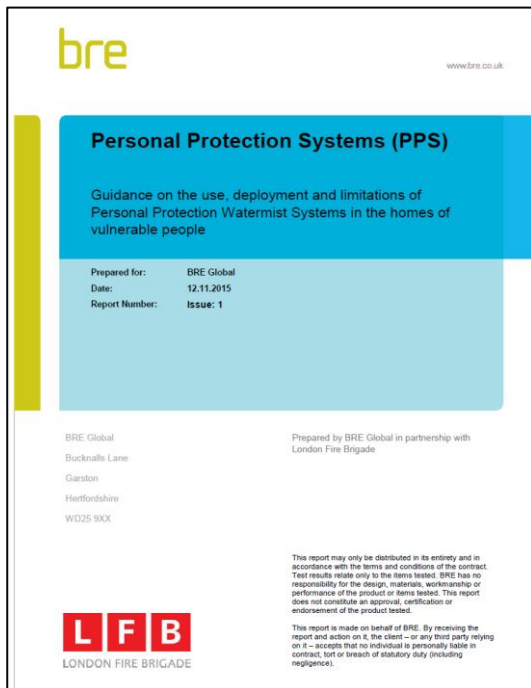
The system attacks the fire in the same way as a water mist system but with the benefit of it being portable, and simply plugs into the nearest electrical socket. It has an internal battery for continuous operation should the mains electricity fail. It is operated by an electronic smoke or flame detector or a combined fire sensor for fast detection and reaction.

The most significant physical features of units which are currently available are of a pre-engineered construction providing a duration of water discharge of 10 minutes.

Typical installations of such systems are for the protection of vulnerable people who have a high likelihood of a fire and who because of mobility or cognitive difficulty, are unable to easily self-evacuate. There is clear evidence that these types of systems have saved lives across the UK.

More information on Personal Protection water mist systems including guidance can be found in:

- i. [Loss Prevention Standard \(LPS\) 1655: issue 1.0 –published June 2015](#)
- ii. [Personnel protection systems – Guidance on the use, deployment and limitations of Personal Protection Water mist Systems in the homes of vulnerable people- published November 2015](#)



## Water Mist systems

A water mist system is a fire protection system which uses very fine water sprays (i.e. water mist). The small water droplets allow mist to control, suppress or extinguish fires by:

- Cooling both the flame and surrounding gases by evaporation
- Displacing oxygen by evaporation
- Reducing radiant heat by providing a barrier

At operation, the water mist system discharges a cone of spray containing small water droplets that fill the protected zone with water mist, and maintain a concentration of small droplets for a sufficient time to meet the objective of the protection. These systems are designed to use far less water than a standard sprinkler system and therefore are likely to cause less water damage.

More information on water mist systems can be found in:-

## British Standards

**BS 8458:2015.** Fixed fire protection systems. Residential and domestic water mist systems. Code of practice for design and installation.

**BS 8489-1:2016.** Fixed fire protection systems. Industrial and commercial water mist systems. Code of practice for design and installation.

## 10 Targeting the Most Vulnerable with Limited Resources

Identifying those residents that are most vulnerable will require some initial investigation and 'Person Centered Fire Assessments' to be completed. In most cases, this is likely to be in premises where the risk to persons in a fire situation is increased where they are either asleep and/or have cognitive or mobility impairments. Following this the local authorities or housing providers will then need to ascertain which is the best type of fire suppression system for the risk and/or the building it is to be fitted within.

Once this has been confirmed, a cost / benefit analysis will need to be completed and it is therefore recommended that all the different types of AFSS are reviewed and quoted for.

The installation of a fire suppression system within individual homes, where the resident has been classed as high risk, can allow that resident to stay in their own home for longer and prevent the disruption and costs of relocating them to a supervised or warden controlled premises, especially when these are costly and do not necessarily represent the best option for that individual. This supports the drive to keep people living independently for longer.

It is recognised that the process of installing a AFSS will be very disruptive so it is essential to plan ahead. It may be a good solution to consider the installation of the system whilst the premises are vacant.

Vulnerable people may inhabit many different types of premises on both long term and short term basis. These can be a single private dwellings, flats located within a sheltered accommodation block, hostels, residential rehabilitation premises or care homes.

The type and size of care homes can vary from a small house with limited care provided (supported living / shared lives) up to a purpose built multi bedroom care home that will have fully qualified staff on duty 24 hours a day.

Most boroughs across London understand the benefits that fire suppression systems can give and are therefore proactively working towards identifying premises, and installing various types of fire suppression systems within homes of the most vulnerable residents.

If you want to find out more about sprinklers please contact us at [SPRINKLERS@london-fire.gov.uk](mailto:SPRINKLERS@london-fire.gov.uk)

The following organisations are also a useful source of information:

The National Fire Sprinkler Network: [www.nfsn.co.uk](http://www.nfsn.co.uk)

National Fire Chief's Council: [www.nationalfirechiefs.org.uk](http://www.nationalfirechiefs.org.uk)

BAFSA: [www.bafsa.org.uk](http://www.bafsa.org.uk)

Fire Protection Association: [www.thefpa.co.uk](http://www.thefpa.co.uk)

Business Sprinkler Alliance: [www.business-sprinkler-alliance.org](http://www.business-sprinkler-alliance.org)

International Water Mist Association: <https://iwma.net/home>

Fire Industry Association: [www.fia.uk.com](http://www.fia.uk.com)



## Appendix 1 – Costings of retrofitting AFSS in a high rise /low rise retrofitting project

The figures quoted are for the cost of retrofitting AFSS in a high rise /low rise retrofitting project completed in London/Reading in 2018/19 by a third party accredited, British Automatic Fire Sprinkler Association, AFSS contractor

### 15 story tower block retrofit - 60no apartments - own water supplies & boxing to client specification

Item	Description	Qty	Cost
1	Water Supplies - including 6m3 actual tank, single pump and wiring	1 item	£ 15,000.00
2	Panel and Signal Wiring	1 item	£ 7,500.00
3	Residential Riser Kit and Wiring	17 no	£ 7,000.00
4	Apartment Isolation Valves	62 no	£ 3,500.00
5	Exposed Sprinklers and Guards to Buggy Stores and to protect Sprinkler Main into the Building	23 no	£ 2,000.00
6	Sidewall Sprinklers to Apartments	330 no	£ 40,000.00
7	Distribution Main (Black tube)	212 m	£ 6,000.00
8	One Test per Apartment and Distribution of Materials to each Floor	1 item	£ 12,000.00
9	Trace Heating and Lagging to Distribution Main in Ground Floor	1 item	£ 2,500.00
10	<b>Builderswork comprising of:</b> 1) Core Drilling in Riser Cupboard for new Pipework and Electrical Works 2) Core Drilling through Buggy Stores on Ground Floor to Boiler Room 3) Labour Cost of Boxing in of Pipework within the Apartments 4) Painting of Exposed Pipework in Lobby Areas in White Gloss 5) Fire Stop all necessary holes and sleeve on all floors 6) Cover and Clean Apartments as required	1 item	£ 60,000.00
11	Boxing of Pipework - Full Length of Room Materials	1 item	£ 25,000.00
12	Trace Heating and Lagging for Buggy Stores	1 item	£ 3,500.00
13	Design of Works	22 days	£ 10,000.00
14	Project Management and Supervision of Works (Full Time)		£ 40,000.00
15	Hire of Cabins and Plant		£ 2,000.00

**TOTAL** £ 236,000.00

### 15 story tower block retrofit - 60no apartments - own water supplies

Item	Description	Qty	Cost
1	Water Supplies - including 6m3 actual tank, single pump and wiring	1 item	£ 15,000.00
2	Residential Riser Kit and Wiring	17 no	£ 7,000.00
3	Sidewall Sprinklers to Apartments	330 no	£ 40,000.00
4	Distribution Main (Black tube)	212 m	£ 6,000.00
5	One Test per Floor	1 item	£ 6,000.00
6	Trace Heating and Lagging to Distribution Main in Ground Floor	1 item	£ 2,500.00
7	<b>Builderswork comprising of:</b> 1) Core Drilling in Riser Cupboard for new Pipework and Electrical Works 2) Fire Stop all necessary holes and sleeve on all floors 3) Cover and Clean Apartments as required	1 item	£ 10,000.00
8	Design of Works	22 days	£ 10,000.00
9	Project Management and Supervision of Works (Full Time)		£ 40,000.00
10	Hire of Cabins and Plant		£ 2,000.00

**TOTAL** £ 138,500.00

3 storey low rise retrofit - shared water supplies

Item	Description	Qty	Cost
1	Residential Riser Kit and Wiring	17 no	£ 3,000.00
2	Concealed Sprinklers to Apartments	383 no	£ 40,000.00
3	Distribution Main (Black tube)	606 m	£ 18,000.00
4	One Test per Flat	1 item	£ 4,800.00
5	<b>Builderswork comprising of:</b> 1) Core Drilling in Riser Cupboard for new Pipework and Electrical Works 2) Fire Stop all necessary holes and sleeve on all floors 3) Cover and Clean Apartments as required 4) Access Hatches (7 per flat)	1 item	£ 42,000.00
6	Design of Works	18 days	£ 8,000.00
7	Project Management and Supervision of Works (Part Time)		£ 15,000.00
8	Hire of Cabins and Plant		£ 2,000.00

**TOTAL** £ 132,800.00

**PER APT** £ 2,213.33

## Appendix 2 – Costings of new build AFSS in a high rise/low rise new build project

Example 1	Cost to Install for materials, labour and design only	
15 story high rise residential block 60 dwellings	Plant room on ground floor Water Supply, cold water boosted supply <ul style="list-style-type: none"> <li>• 60no lockable apartment isolation valves</li> <li>• 15no residential valve groups</li> <li>• Dedicated sprinkler riser, connecting at the base of the riser from full-bore monitored lockable ball valve and double/single check valve BSP thread (provided and left by others)</li> <li>• Priority demand valve installed at the base of the BCWS riser (by others)</li> <li>• Flow switch at base of sprinkler riser</li> </ul> All electrical works / wiring by others	£56,946.00
Maintenance costs £175 per valve group/flow switch	15no valve groups and 1no flow switch	£2800.00
Average price per dwelling (excluding maintenance charge)		£999.10



Example 2	Cost to Install for materials, labour and design only	Costs
4 story low rise block  60 dwellings	Plant room on ground floor  Water Supply, cold water boosted supply <ul style="list-style-type: none"> <li>• 60no lockable apartment isolation valves</li> <li>• 4no residential valve groups</li> <li>• Dedicated sprinkler riser, connecting at the base of the riser from full-bore monitored lockable ball valve and double/single check valve BSP thread (provided and left by others)</li> <li>• Priority demand valve installed at the base of the BCWS riser (by others)</li> <li>• <b>Dedicated sprinkler drain</b></li> <li>• Flow switch at base of sprinkler riser</li> <li>• All electrical works / wiring by others</li> </ul>	£63,057.00
Maintenance/Service	cost per annum  4no valve groups and 1no flow switch	£1,050.95
Average price per dwelling (excluding maintenance charge)		£875.00

**Making London the Safest Global City**