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Yearbook 2023/24

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British Automatic Fire Sprinkler Association Yearbook 2023/2024

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Contents

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Foreword

Russell Dixon
Chairman, BAFSA

Welcome to the 2023/2024 BAFSA Yearbook.

For the past 50 years, the British Automatic Sprinkler Association (BASA) now the British Automatic Fire Sprinkler Association (BAFSA) has been promoting the fact that, when installed by certified contractors using approved products and maintained as specified, sprinklers will save lives; protect properties and communities; safeguard businesses, investments and jobs; preserve the environment and protect firefighters.

The BAFSA library of publications enhances our commitment to advise, educate and inform anyone whose professional role includes the protection of life, buildings or the environment from fire and this Yearbook exists to be an essential resource on the subject of automatic water-based suppression – sprinklers and water mist systems – complimenting BAFSA's series of free-to-attend seminars, its expert technical advisory service and the year round expertise of the association's 200 plus members.

BAFSA remains the only true voice for sprinklers in the UK that has sprinkler and water mist installers, manufacturers, designers and suppliers of water-based suppression systems as members… To find a BAFSA member which can fulfil your fire protection needs access the membership Directory at the back of the Yearbook or online at www.bafsa.org.uk/find.

We hope you will find the BAFSA Yearbook an essential reference point in your daily professional life whether you are accessing it on line or keeping it on your desk.

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The current status of sprinklers and applied standards and where we need to go next

Dr Simon Bird
Director, Fixed Firefighting Systems Bureau

Over the last few years, there has been a significant shift in the degree to which sprinklers are relied upon to protect life and property in the built environment. Notable milestones include:

- Wales requiring sprinklers in all new homes (2016)
- England requiring sprinklers in new flats with a storey above 11m in height (2020)
- Scotland requiring sprinklers in all new housing (with the exception of privately-owned, single family homes) (2021)

It is worth remembering that until 2007 sprinklers were usually not required in houses or flats of any height. Government and their departments (those who create the regulations and guidance) had long been of the view that for these applications cost and benefit of sprinklers was unfavourable; i.e. the money could be better spent elsewhere. Related to this position, there was also the view that active fire protection systems like sprinklers were complex systems and therefore likely to be too unreliable to have a primary role in prescribed regulatory fire safety frameworks. It is quite right that reliability is a critical attribute of any system with any reliance placed upon it. These cost-benefit and reliability considerations proved stubborn obstacles to overcome.

Reliability and effectiveness

The significant progress in sprinkler uptake made recently can be seen as a culmination of the success of the industry over several decades. Key to the increasing reliance upon sprinklers is the sustained excellent reliability of the installed systems. This performance is monitored and reported in periodic 'effectiveness' studies (for example NFPA studies in the U.S. and in the U.K. the 2017 study by Optimal Economics, National Fire Chiefs Council [NFCC] and the National Fire Sprinkler Network [NFSN]), which found overall system effectiveness to be '94%' (a simplified summary value from a study with some complexity).

Although sprinkler systems are relatively complex (when compared to, say, traditional passive fire protection measures), the performance data is evidence that the complexity can be managed, and the result is todays sprinkler systems are highly effective. If sprinkler systems became noticeably less effective, cost-benefit analysis would be less favourable and the argument that the systems could not be depended on, when needed, would strengthen. The industry should maintain high system effectiveness (i.e. reliability) levels. Unfortunately, some of the recent success in sprinkler uptake is also likely to be due to catastrophic failures with balancing innovation, safety and quality in other sectors (lessons we can also look to).

So, what gives sprinkler systems the qualities of being reliable and effective?

- Robust research and development: Continuous research, development, and refinement by manufacturers, insurers, and industry stakeholders have played a pivotal role in enhancing sprinkler system performance.
- Learning from mistakes: Failure analysis and feedback loops have enabled the industry to learn from past incidents and improve standards and practices accordingly.
- Prescriptive standards: Standards provide a platform to collect and formalise best practices and lessons learned from mistakes. These standards cover components, design, and installation processes, ensuring consistent quality across the industry.
- Incremental improvements: Careful and incremental changes allow for a better understanding of the consequences, preventing drastic modifications that could compromise system safety.
- Adherence to standards and best practices: Ensuring personnel competency and compliance with established standards and best practices are essential for maintaining the reliability and effectiveness of sprinkler systems.
- Interoperability and standardisation: Standardisation of systems, parts and components promotes availability, long-term maintenance strategies, and price competitiveness within the industry.
- Collaboration and shared responsibility: Trade associations, standards bodies, and collaborations facilitate cooperation among stakeholders, fostering a culture of shared responsibility for maintaining system reliability.
- Independent verification: Third-party testing and certification of equipment, workmanship, systems, and personnel provide additional assurance of reliability.

Hidden to most people, but thousands of mostly very mundane but important details (e.g. is the brass of the sprinkler head body of the same quality it always has been, are the dimensions in tolerance, has there been a software/firmware change, does it impact performance, etc) are reasonably well managed by the above measures.

Balancing innovation and safety

Another factor and a consequence of the measures above is that they are mechanism by which limits and controls on innovation are imposed. It appears that innovation is assumed often to only be positive. The actual definition of the word 'innovation; something new or different introduced' is neutral. The consequences of innovation could be good or bad. If you were taking a flight and the pilot announced '…and on this flight, we will be testing a new design of wing', how would that make you feel? By all means develop new wings without the public being affected, but I would prefer to be carried using the old, fully standardised and approved, fully certified, fully tried-and-test wings.

Clearly innovation is necessary and can be good, but an ongoing trend I have observed at many forums (standards setting, regulation setting, sprinkler, mist and other technologies) is that 'innovation' is seen as something almost sacred and which must not be challenged. Woe betide anyone who dare try and stand in its way. Accusations of restricting trade freely and frequently follow. These accusations often miss the point entirely that in the interests of safety there is a need to set down rules intended to uphold reliability and effectiveness. While innovation can be important, it is crucial to strike a balance between innovation and safety.

Ongoing initiatives and future directions

My biggest current concern for our industry is that there appears to be the risk of a swing too far in favour of inadequately proven innovation. Standards should not be written which unduly promote non-standard proprietary solutions or promote market access rather than proven techniques and sound engineering. Standards should not rely heavily on uncontrolled manufacturers documentation to set key parameters and requirements (i.e. excessive reliance upon manufacturers documentation).

Considering a few examples of recent and current initiatives:

- BS 9251:2014 for residential sprinkler systems has recently been updated BS 9251:2021 . I would hope (declaring the interest that I was involved in the process) it is evident to users that this is a generally reasonable example of incremental change and moderated innovation.
- BS EN 12845 for commercial and industrial sprinkler systems is currently undergoing a lengthy and major revision. It remains to be seen what will emerge.
- BS EN 14972 for water mist systems series development is ongoing. The caution in the document Foreword "The UK committee believes that the standard does not sufficiently cover certain technical and safety matters" is to my knowledge unprecedented and should serve as a stark warning.

I understand it may be very attractive for some to sell innovative, proprietary components and systems with fewer directly competing products and with minimal resistance. However, the point of this piece in my opinion is to highlight that this is not how the successes summarised at the start of this article, and on which our industry is built, were achieved.

Sprinklers in Scotland … A bit done, more to go

Ali Perry
Chief Executive, BAFSA

Scotland has seen significant developments in the requirement for fire suppression systems since March 2021. This followed the work of the Ministerial Working Group on Building and Fire Safety established after the Grenfell Tower fire in June 2017 to oversee a review of building and fire safety frameworks, regulations, and guidance. During my last few years with the Scottish Fire and Rescue Service I was a member of this group and witnessed the commitment of all those involved to improving safety and I am proud of what it has delivered.

The Scottish Government publishes its guidance on achieving the standards in the "Building (Scotland) Regulations 2004" in both the Building Standards Non-Domestic Technical Handbook and the Building Standards Domestic Technical Handbook. Both editions of the Handbook were published in June 2023 [*1] and detail the mandatory standard for Automatic Fire Suppression Systems as reproduced herein.

2.15 Automatic fire suppression systems
Mandatory Standard
Standard 2.15

Every building must be designed and constructed in such a way that, in the event of an outbreak of fire within the building, fire growth will be inhibited by the operation of an automatic fire suppression system.

Limitation:
This standard applies only to a building which:
a) is an enclosed shopping centre
b) is a residential care building

c) [SSI deletes text but does not amend letters assigned to following categories]
d) forms the whole or part of a sheltered housing complex
e) is a school building other than a building forming part of an existing school or an extension to a school building where it is not reasonably practicable to install an automatic fire suppression system in that building or extension
f) is a building containing a flat or maisonette
g) is a social housing dwelling, or h) is a shared multi-occupancy residential building.

*Page 193 *"Scottish Government Building Standards Division Non-Domestic Technical Handbook June 2023 Applicable to works from 5 June 2023 v1.0 – February 2023"*
*Page 157 *"Scottish Government Building Standards Division Domestic Technical Handbook June 2023 Applicable to works from 5 June 2023 v1.0 – February 2023"*

The handbook goes onto refer to the *"…need to ensure all water supply pipework in buildings, including those serving automatic fire suppression systems is designed, installed and maintained correctly."* (*1 page 194) The handbook references the ABI guidance 'ABI Study: Post Grenfell Research on Residential Sprinkler Systems' that reinforces the need to ensure all persons and products in the sprinkler system supply chain are appropriately qualified, certified and approved. BAFSA welcomes these comments which align with our own commitment to third party certification and the provision of proportionate and effective training for the industry.

Building on this great progress BAFSA is continuing to promote the fitting of fire suppression systems across the built environment to improve property, public and firefighter safety. With this in mind there are two key areas of focus:

First, following the publication of the determination of the Fatal Accident Inquiry (FAI) into the tragic deaths of Simon Midgley and Richard Dyson in a fire at Cameron House Hotel on 18th December 2017 Scotland is considering the requirement for fire suppression in historic buildings. The FAI determination includes recommendations regarding the installation of fire suppression systems and improved guidance to raise awareness in duty holders in historic buildings. Scottish government has accepted this recommendation and work is ongoing to frame and form a working group/expert panel including BAFSA, and this should be in place over the summer of 2023. It is of course unfortunate that improvements in fire safety so often result from tragedies, however it is positive that the Scottish Government is accepting the recommendations and seeking to learn the lessons from the incident.

Second, building on the requirements for fire suppression in the latest Non-Domestic Handbook, BAFSA will be building on this progress by campaigning for the retrofitting of sprinklers in residential care homes and sheltered housing complexes.

The position regarding fire suppression in Scotland is improving and continues to move in a positive direction, and the same can be said for Wales; it will be an ongoing focus for BAFSA to push for similar progress in England.

1 Scottish Government Building Standards Division Non-Domestic Technical Handbook June 2023 Applicable to works from 5 June 2023 v1.0 – February 2023

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Sprinklers in Wales ... The story so far and what next

Ritchie O'Connell
BAFSA Representative in Wales

As most readers of this Yearbook will probably be aware, Wales was the first country in the world to legislate for automatic water suppression systems in all new-build and converted dwellings.

In this chapter we will look at how this came about and what (hopefully) could come next.

Building regulation powers were devolved to Wales on 31st December 2011. This provided a window of opportunity to develop legislation in Wales to mandate for sprinklers in dwellings. Due to the sunsetting clauses there was only an opportunity to introduce one new piece of legislation and, following a ballot, Assembly Member Anne Jones, proposed a measure for the introduction of sprinklers in dwellings which resulted in the Domestic Fire Safety (Wales) Measure 2011. This proposed to make automatic fire suppression systems (such as a fire sprinkler system) compulsory in all new and converted residences and enabled Welsh Ministers to introduce regulations setting out the requirements for such systems.

The introduction of the Measure was a great start but moving from the measure to a full-fledged piece of legislation was far from a sinecure.

There was vociferous opposition from the house builders who lobbied strongly against the proposals at every opportunity (and they created additional opportunities to protest whenever they could).

Despite this Anne Jones, ably aided and abetted by, amongst others, Chris Enness and Ronnie King OBE managed to keep up the momentum

A further potential banana skin was the cost benefit analysis conducted by the BRE for the Welsh Government.

The cost benefit analysis found:

- Fitting sprinklers in all new residential premises in Wales was not cost effective.
- Sprinklers were cost effective in new care homes, halls /dormitories.
- Sprinklers may also be marginally cost effective in new blocks of flats, blocks of sheltered flats, traditional HMOs.
- Sprinklers are not cost effective in new single occupancy houses, shared houses, hostels and sheltered houses.

This publication had the potential to seriously jeopardise the Measure, however the hopes of the anti-sprinkler lobby were to be short lived when John Griffiths AM, then Environment Minister made the following statement.

> "We must seek to prevent avoidable death and injury from house fires and need to accept that there is a cost to introducing sprinklers into new properties. These proposals are significant and important in taking forward fire safety. Wales will be at the forefront of reducing fire risk and cutting the number of avoidable deaths and injuries caused by fires in residential premises."

The Domestic Fire Safety (Wales) Regulations 2013 Introduced the intent of the Measure into the Building Regulations by creating a new part 7A of the Building Regulations Provision of Automatic Fire Suppression systems which applies to Wales only. The new part 7A Comprises new Regulations 37(a) & (b).

37A - (1) this regulation applies where building work consists of the erection or material change in use of a building in relation to-

(a) care homes as defined in section 3 of the Care Standards Act 2000

(b) rooms for residential purposes other than rooms in a -

- (i) hostel;
- (ii) hotel;
- (iii) prison or young offender institution; and
- (iv) hospital

(c) dwelling houses and flats

37B. For the purposes of regulation 37A, the requirements of an automatic fire suppression system are the requirements set out in any document approved and issued under section 6 of the Building Act 1984 for the purpose of providing practical guidance as to the requirements of regulation 37A.

The legislation was introduced in two phases:

From 30th April 2014 sprinklers were required in all new or converted

- care homes
- children's homes
- hospices
- student accommodation
- boarding houses
- hostels (other than those used for short stay leisure accommodation)

from 1st January 2016 sprinklers were also required

- in all new or converted houses and flats
- where regulation 37(a) applies

Whilst at the time I was unhappy at this phased introduction, in hindsight it was the correct decision as, at that time, there was not sufficient industry capacity to service all of the demands which would have been engendered by a single phase introduction of the legislation.

The rest, as they say, is history… All new dwellings in Wales are now required to be fitted with sprinklers. This has contributed to a number of Housing Associations deciding to retrofit sprinklers in some properties and the Welsh Government's response to a recent freedom of information request regarding sprinkler actuations in Wales 2021/2022 revealed:

- 21 actuations in residential and domestic properties
- approximately 86% of outcomes fire damage limited to first item ignited or limited to room of origin
- the remaining 14% outcomes recorded as not applicable

In anyone's book that is a success. However, on reflection, amongst the vociferous and often ill-informed arguments put forward by the builders anti-sprinkler lobby, was an argument that is difficult to refute… They opined that fire deaths tended to occur in older houses. Whilst this may have been an unresearched soundbite, we continue in Wales to see fire deaths in older housing stock which are not required to be fitted with sprinklers.

Rather than rest on our national laurels perhaps we should now consider how retrofitting of sprinklers in pre-existing housing stock could be implemented.

Clearly it would be difficult to legislate for retrofitting of all existing housing stock because:

- Who would pay for it?
- Who would implement it and regulate it?
- Is there industry capacity to deliver such a huge programme?
- etc. etc.

The reasons for such a piece of legislation to be unworkable go on and on - it's a non-starter. But as the old adage goes how do you eat an elephant? Answer: one bite at a time.

The requirement to retrofit sprinklers in older housing stock could become a condition of initiatives such as the National Empty Homes Grant scheme, a grant scheme designed to help bring empty homes back into use under which owners of empty homes can receive up to £25,000.

Similar conditions could be applied to the home improvement loan scheme under which Interest-free loans of up to £35,000 are available for those who are eligible.

Whlst this may seem punitive and targets those in need rather than those who can afford to pay it is a harsh reality that it is withing the lower socio-economic groups that most fire deaths in the home occur

To paraphrase Sir Edward Coke (and no, he did not mention Englishmen)

"For a man's house is his castle, and each man's home, **bloomin well ought** to be his safest refuge **so fit sprinklers**."

(My bits are in bold if you hadn't guessed)

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The background to the Sprinkler Rules updates 2022

Dale Kinnersley
Principal Consultant at the Fire Protection Association (FPA)

The background to the development of the Sprinkler Rules arose as the leading insurance companies were developed. The Rules were originally motivated by the need to protect property of high value, large scale stocks, and manufacturing processes. The development of the Sprinkler Rules improved economic efficiency by reducing consequences and losses from fire.

Constant updating of the Rules has been imperative to keep up to date with the ever-changing landscape of construction type, materials, storage processes, size, and complexity. Also, requirements with development in construction practices and building modifications results in the need to service and maintain sprinkler systems in line with the risk(s). As we don't know when a fire will start, sprinkler installations must sit idle for long periods of time before reliably performing their function to control a fire, which is an extraordinary design challenge.

As we know from history, sprinkler systems have been around for circa 130+ years with the first set of rules being developed in 1885 by John Wormald of the Mutual Fire Insurance Corporation Ltd, Manchester, England, and published in 1887. From these initial rulesets, new and updated standards evolved, which were published by the Fire Offices' Committee (FOC) in 1888. Numerous versions have followed over the years, each time with improvements based on loss data, testing, and component development.

The last published version of the FOC Rules was the 29th edition in 1968 which ran until it was superseded in 1990 by the newly adopted British Standard BS 5306 Part 2 (1990). However, this new British Standard, was a 'Life Safety' document that did not consider 'Property Protection' afforded by the FOC Rules (which were insurance standards). To overcome this omission, RICSAuthority (or InFires at the time) developed the LPC Technical Bulletins (TBs) to specifically look at insurers' requirements for property protection. Where insurers are involved, TBs supersede BS requirements by providing resilience in the sprinkler system performance and provide property protection additions to the system.

In 2003, the UK adopted the newly produced European standard BS EN 12845 as the main UK sprinkler standard for life safety. Again, this document did not consider property protection and numerous LPC Technical Bulletins followed to help insurers mitigate their risks. Since 2003, the LPC Rules for Automatic Sprinkler Installations 2015 incorporating BS EN 12845 has been the main sprinkler standard for the UK, and the only standard recognised by UK insurers.

Over the years, modifications, updates, and/or new TBs have been published to keep the LPC Rules up to date with changes to the construction practices, material use, storage arrangements, and building use in general. Together with innovation in system design and the development of new components, this means that the TBs need to be maintained to keep up with the ever-changing landscape.

In the Autumn of 2022, RISCAuthority published a series of new updates to the UK industry. The updates supplement the requirements of BS EN 12845 and have been compiled with significant contributions from the sprinkler industry including BAFSA, the LPCB, insurer members of RISCAuthority, and sprinkler experts. These updates have been based on research and case study experience of real-world fire events (and escape of water or other failure events and component problems), lessons learned, and continuous improvement.

The latest updates to Technical Bulletins:

- LPC Technical Bulletin TB202: Sprinkler protection to buildings featuring residential occupancies – Insurance requirements
- LPC Technical Bulletin TB203: Care and maintenance of automatic sprinkler systems
- LPC Technical Bulletin TB210: Automatic sprinkler pump installation
- LPC Technical Bulletin TB211: Hanging garment storage
- LPC Technical Bulletin TB212: Mobile shelving systems
- LPC Technical Bulletin TB222: Ordinary Hazard Group 3 protection using Enhanced Protection Extended Coverage sprinklers
- LPC Technical Bulletin TB229: LPC Rules for automatic sprinkler installations variations to BS EN 12845:2015
- LPC Technical Bulletin TB230: Protection of roof spaces, floor, and ceiling voids
- LPC Technical Bulletin TB234: Protection of High Hazard Storage (HHS) configurations
- LPC Technical Bulletin TB237: Flushing underground sprinkler mains.

Summary of the updates

LPC Technical Bulletin TB202: Sprinkler protection to buildings featuring residential occupancies – Insurance requirements

This new Technical Bulletin evolved from the most recent delivery of buildings that feature multi-occupancy; buildings that are predominantly residential with a mix of commercial areas. The recent publication from BSI of the updated BS 9251:2021 now permits a small area (72m²/100m²) of commercial space to be sprinkler protected from a residential sprinkler system. Unfortunately, insurers do not recognise British Standards, and therefore the development of this new TB aligned to allow a multi-occupancy building to be sprinkler protected to commercial (LPC) rules with enhanced sprinkler protection within the residential areas. The TB allows the building to be split into separate fit-out contracts that will not preclude the residential contractors for the residential areas only.

The document covers both life safety and property protection, it is insurer approved and has robust water supplies. The document requires all stakeholders to be involved in the consultancy of the sprinkler protection requirements including the building insurer. Selection of the correct

design densities, components (LPCB approved), areas to be protected, hazard classification of areas, sprinkler spacing, zoning, head type selection, and water supplies are very well detailed in the document. For any building owner/occupier/main contractor/specifier etc. who will be selecting sprinkler protection for multi-occupancy buildings, this new TB is the only recognised sprinkler standard that will be accepted for insurance underwriting.

LPC Technical Bulletin TB203: Care and maintenance of automatic sprinkler systems

Service and maintenance of sprinkler systems is vital to the successful operation of a system in a fire situation and the excellent statistics of sprinkler effectiveness. Unfortunately, this is the area where the least amount of money is spent, but one of the most vital disciplines upon which the fire strategy for the building will be dependent.

The updated TB now contains revisions to maintenance procedures such as:

- Servicing and maintenance of sprinkler tanks:
  - New service routine frequencies (was every 3 years, now every 2 years)
  - New maintenance procedures (involving measurements)
  - Requirement of specific tank report on findings (independent)
  - Integrity and condition checks
  - Qualified independent inspections/inspectors (not sprinkler contractors)
  - New requirements at 10 years
- Pump data logging:
  - Weekly, 6-monthly, yearly, routines for logging pump activity
  - Requirement for record keeping
  - Certification of changes to pumps
  - Automatic logging of specific events (risk dependent)
  - Service logging and referencing
  - Identification of pump modifications and commissioning
  - Reinstatement of pump supply to be identifiable
  - Downloading of pump service activity
- Sprinkler head and pipework inspections:
  - Greater confirmation on sprinkler head selection
  - Confirmation on type of heads selected and number required for testing
  - Pipework identification and replacement
  - Insurer requirements for pipe inspections once removed
  - Commentary and recommendation on check of pipe joints and fittings.

In addition to the TB updates, the 'Sprinkler System Service & Maintenance Guidance, Records & Checklists' document has been updated to reflect the new requirements with additional information and new and updated checklists. Available here: https://www.thefpa.co.uk/resource-download/603

LPC Technical Bulletin TB210: Automatic sprinkler pump installation

This existing TB has seen some new additions in the form of pump data logging requirements, information on pump start devices, and updates to the existing figures for clarity. Pump data logging is a new requirement to the UK under the LPC Rules. However, this facility is common in the American standard requirements under F.M. Global which has been used in the UK. Unknown to the majority of the UK sprinkler market, this technology has been available within sprinkler pump control panels for many years.

Following a major fire in the past few years, a sprinkler system designed to American standards included data logging which confirmed the fire pump was isolated during the fire and then switched back on later as the fire was not controlled and had developed. Following this incident, the data logging facility was requested from insurer members of RISCAuthority. Pump data logging provides much detail and interrogation pumps for very little cost and can produce itemised reports providing vital information as required.

Requirements for pump data logging requires a slight modification to the pump panels, and the addition of a pressure transducer and the associated cabling. This new requirement will allow:

- Data retrieval
- Data log downloads onto standard software/hardware devices
- Data specifics such as:
    - Date, time, software version
    - Current system status
    - Current system pressure
    - Total pump run time
    - Last time the pump was run
    - When it was commissioned
    - Evidence of when it was serviced
    - The status of the supply
    - Pressure monitoring
    - Calibration of the pump/transducer
    - Battery status
    - Oil pressure status
    - Manually/automatically started
- Options for pump starting devices, which do not allow soft-start technology (PLC)
- All figures have been redrawn for greater clarity/identification.

LPC Technical Bulletin TB211: Hanging garment storage

This is a new Technical Bulletin requested by insurers. The current BS EN 12845 Annex G requirements were very limited in scope for these type of storage facilities and did not recognise the changes in warehousing and multitude of different storage configurations within these facilities.

The new document now covers the vast majority of hanging garment storage facilities in the UK and provides various different sprinkler protection options and information:

- Ceiling only options
- Ceiling and in-rack option

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- Clarity of sprinkler positions/locations
- Clarity on hydraulics
- Classification on stored goods
- Management system requirements for the facility
- Mezzanine only options
- Water supply options
- Building requirements.

The document was generally based on F.M. Global Data Sheet DS 8-18, and was reproduced with permission of FM Global and drafted in the form of an LPC Technical Bulletin for easier referencing and detailed sketches.

LPC Technical Bulletin TB212: Mobile shelving systems

This new Technical Bulletin was produced to cover storage facility requirements for mobile shelving (roller type racks) that are present in Ordinary Hazard occupancies such as hospitals, offices, and retail storerooms.

The document is written to provide guidance and insurer requirements for limiting fire spread from one storage arrangement to another. The document covers spatial separation, minimum aisle distances, sprinkler head spacing and location parameters, requirements for maintaining aisle/flue spaces (with stoppers), and storage limits. Fire detection and the speed of operation of the detection system (BS 5839-6) and local Fire and Rescue Service response should be considered for these storage facilities and liaison with the building insurer should be sought.

The TB is not for use in High Hazard facilities, it recommends storage height limitations in accordance with Table 1 of BS EN 12845 for ST6 gondola shelving (max width 1.2m) and requires 'quick' response type sprinklers. The TB also includes detailed figures providing greater clarity on the requirements.

LPC Technical Bulletin TB222: Ordinary Hazard Group 3 protection using Enhanced Protection Extended Coverage sprinklers

This update was a minor 'tweak' to the existing Table T222.T5 that confirmed the maximum area per sprinkler in m^2 when relating to the spacing limitations and layout of BS EN 12845 Figure 8 for both standard and staggered sprinkler head layout and is indicated in column 2 by S x D.

LPC Technical Bulletin TB229: LPC Rules for automatic sprinkler installations variations to BS EN 12845:2015

Updates to the existing TB229 include the uplift in hazard classification for car parks and the subsequent increase in design density of discharge and area of operation, clarity on High Rise definition, updates to Figure 5 and table 13 of BS EN 12845 and the maximum area per sprinkler in m^2 when relating to the spacing limitations, and layout of BS EN 12845 Figure 8 for both standard and staggered sprinkler head layout.

The most significant update involved changing car park classification from Ordinary Hazard 2 (5mm/min over 144m^2 - wet) to High Hazard Process 3 (12.5mm/min over 260m^2 - wet) based on the recent research conducted by the NFPA Research Group. There were many convincing factors that resulted in the increase, including aligning with NFPA and F.M. Global's increase in their respected design and hazard classifications for car park facilities. Based upon the evidence

presented to the RISCAuthority Working Group, insurers' data loss on car parks, and fire from cars affecting car park structures, this uplift was deemed technically justifiable.

Within BS EN 12845 clause 3.32 and Annex E, the definition for high rise was seen to be misleading and the 'grey' area was being used to downscale the requirements to not include high rise for certain specifiers. Clarity was needed and an updated description to avoid confusion has been confirmed.

BS EN 12845 sketches for Figure 5 and cross referencing to Table 13 were incorrect. A new Figure TB229.F5 replaces BS EN 12845 Figure 5 and new Table TB229.T12 replaces BS EN 12845 Table 13. There is also a reference in Figure TB229.T12 to the correct clauses in BS EN 12845 for suction chamber requirements for clarity.

A minor 'tweak' to the existing Table T229.T13 (BS EN 12845 Table 19) that confirmed the maximum area per sprinkler in m² when relating to the spacing limitations and layout of BS EN 12845 Figure 8 for both standard and staggered sprinkler head layout and is indicated in column 2 by S x D.

LPC Technical Bulletin TB230: Protection of roof spaces, floor, and ceiling voids

The existing TB230 has not been modified other than a new additional Commentary and Recommendation on TB230.3.2 where perforated ceiling tiles exist. Within this scenario, hot gases and smoke from a fire below the ceiling (within the room) could bypass ceiling-mounted sprinklers and collate in the ceiling void. This has the potential to operate ceiling void sprinklers first and the spray from these sprinklers could then have the potential to 'wet' and 'cool' ceiling sprinklers below and stop them from operating over the fire. The new wording confirms that in this situation, suitable water shields shall be installed over the ceiling-mounted sprinklers considerate to the type of sprinkler installed.

LPC Technical Bulletin TB234: Protection of High Hazard Storage (HHS) configurations

A minor change on the covering page now refers to the new LPC Technical Bulletin TB212 for mobile shelving (roller racking). This confirms that this storage configuration is not considered in High Hazard Storage sprinkler protection.

LPC Technical Bulletin TB237: Flushing underground sprinkler mains

A small clause change in the opening page of this TB (Page 1 clause TB207.1) has been updated to reflect the changes and clause resequencing in TB203.

Sprinkler Rules Webinar 2022

All changes, updates and modifications to the LPC Technical Bulletins were covered during a RISCAuthority webinar on 13 October 2022 which can be viewed here: https://event.on24.com/wcc/r/3989864/355586ED0E2F999FEFF897F431DA7076

About RISCAuthority

The UK LPC Sprinkler Rules are published by the FPA and authored by the insurer membership of RISCAuthority's Active Working Group, in association with industry experts. RISCAuthority is an annually funded research scheme administered by the FPA as the UK's national fire safety organisation, and supported by a significant group of UK insurers that conducts research in support of the development and dissemination of best practice on the protection of property and business.

In the United Kingdom there are very clear dividing lines drawn between stakeholder responsibilities for the protection of lives, and the protection of property and business. Almost without exception, government generated laws and requirements pertaining to the workplace and built environment detail performance up to and no further than the assurance of safety of lives with no further demands on the protection of property or businesses.

RISCAuthority conducts research with a view to influencing and augmenting mandatory requirements for loss prevention and protection. This aims to ensure business resilience is included in the overall protection strategy and that, in the event of fire, more happens following successful evacuation to ensure the ongoing viability of the property and the business conducted within it.

Through a series of technical working groups, RISCAuthority seeks:

- Wherever possible, to anticipate future events that may detrimentally impact upon the business of the UK insurance industry and invest accordingly to mitigate the consequences.
- To identify issues currently affecting UK property insurance and invest accordingly to provide insurers with a means of managing the situation.
- To maintain and improve the industry guidelines that underpin current insurer business and property protection practice.
- To make business and property protection financially and technically attractive to the insured property owner
- To act as a focal point for all stakeholders with interests in business and property protection.
- To encourage commonality with government policy where prudent.

FPA and RISCAuthority have representation at various national and international industry standard committees. The work undertaken is voluntary and vast due to technical modifications, changes, research, testing, and new technologies that need to be considered when updating of standards is required.

The LPC Rules for Automatic Sprinkler Installations continue to present a world-class protection that considers the need for safety of lives and the needs of business insurers to provide an all-round document for sprinkler protection to the vast array of commercial and industrial building types throughout the UK. It must be acknowledged that the LPC Rules is developed with input and in cooperation with UK insurers, the British Automatic Fire Sprinkler Association (BAFSA), and the Loss Prevention Certification Board (LPCB), all of which are essential in delivering the best sprinkler standards for the UK.

Fire Protection Association

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An update on European sprinkler standards

Alan Brinson
Executive Director, European Fire Sprinkler Network

Why do we have European sprinkler standards?

I am often asked why we have European sprinkler standards, including by members of the CEN committee that drafts the standards. It is true that to a large extent European standards are inspired by NFPA standards, FM data sheets and UL test protocols. Innovations are first codified in those documents, partly because most sprinkler research and development is conducted in the US. However a European standard becomes a national standard in the 34 countries, including the UK, that are members of CEN and many governments will only reference national standards in their fire safety regulations and guidance. The UK is an example, with Approved Document B (ADB) only referencing national standards. This is a point of principle because governments do not have any sway over NFPA or FM documents, while they can send officials to CEN meetings, some of which are held in the UK and the rest within a short flight or train journey. Although I have yet to see a government official at a CEN sprinkler meeting, quite a few participate in CEN Technical Committee 127, which writes passive fire protection standards.

Summarising, we write European sprinkler standards because we want ADB and its equivalents in other countries to introduce more requirements and incentives to fit sprinklers and that can only happen if we have national standards to define a sprinkler system. Once we are past that hurdle it is possible in most jurisdictions to obtain approval to use NFPA standards or FM data sheets as an alternative on a project basis.

Component standards

There are five harmonised sprinkler component standards within the EN 12259 series, all written about 20 years ago and covering technology that was well-established at that time. ‘Harmonised’

means that the standards were cited by the European Commission in the Official Journal of the European Union for the purposes of CE-marking. The UK is also using those component standards as the basis for the UKCA mark. The five standards cover:

- Part 1 – spray, sidewall, flat spray, dry, conventional, concealed and flush sprinklers with k-factors of 57, 80 or 115
- Part 2 – wet alarm valve assemblies
- Part 3 – dry alarm valve assemblies
- Part 4 – water motor alarms
- Part 5 – flow switches

CEN does not yet have a mandate from the European Commission to draft more harmonised sprinkler component standards so none of the following standards can be used for CE or UKCA marking. Two have been published:

- Part 9 – deluge alarm valves
- Part 14 – residential sprinklers

Part 12 on pumps (without the driver and controller) has passed the CEN formal vote (a yes/no vote for approval to publish) and will be published later this year. This standard has been fought over for almost two decades so it is encouraging to see that the experts finally agreed on a document. Complementing this standard is EN 17451, for pump sets. As this is an assembly standard, giving guidance on how to combine the pump, driver and controller, rather than a test protocol, it is not part of the EN 12259 series. In the draft revision of EN 12845 (see below) we transferred much of the guidance on pump sets to EN 17451, which has passed the CEN enquiry with 60% of the comments already addressed. Some countries have different, long-standing approaches to certain technology, such as the use of variable frequency drives, or circuit breakers rather than fuses. This held up progress for a while but compromises have been found. Simon Bird, representing BSI on behalf of BAFSA, is leading the CEN task group very effectively.

Part 13 on ESFR sprinklers is about to be circulated for the CEN formal vote and is expected to be approved. It is based on the FM Approvals fire test protocol with some of the physical tests from EN 12259-1. Part 15 on large k-factor, extended coverage and CMSA sprinklers is out for the CEN enquiry (comment phase) until late August. It is also based on the FM Approvals fire test protocols with some of the physical tests from EN 12259-1. British comments can be submitted by BSI through its national CEN mirror committee, FSH/18/2, where BAFSA has representation.

System standards

CEN procedures are not well-suited to a document as lengthy as EN 12845, for which the new draft runs to over 300 pages. To make it more manageable we split it in two, with EN 12845-1 being the main standard, applicable for all projects, and EN 12845-2 being a complementary standard for ESFR and CMSA designs. Part 2 will only be needed for designs which use ESFR or CMSA design approaches. We expect this latter standard will need more frequent updates given the pace of innovations for these technologies. As a separate standard that will be possible without opening everything else for debate. Meanwhile a group of interested delegates and seismic experts has worked on Part 3, which introduces guidance for the design of seismic bracing for sprinkler

systems. Currently EN 12845 is silent on this point, yet guidance is needed in Italy, the Balkans and other parts of Europe prone to earthquakes. Of the three documents Part 3 is the furthest advanced. A recent change of scope has clarified the limits of its applicability, and the standard will soon be circulated for the CEN formal vote, with publication expected this winter.

Part 2 largely follows NFPA and FM data sheet guidance. The tricky issue is what to do when they differ, such as over nine-sprinkler ESFR designs (accepted by FM with strict requirements for obstructions but not yet accepted by NFPA). The plan is to include both approaches, with all the necessary detail. The draft includes designs in combination with in-rack sprinklers, as well as for roll paper and rubber tyre storage. Part 2, which has 56 pages, passed the CEN enquiry in February with 87 pages of comments, mainly from France, Germany and Sweden. A small group will now go through them to recommend solutions to the wider task group. The aim is to address the comments by spring next year and so keep to the CEN timetable, since otherwise we would need to run a second enquiry and delay publication at least a couple of years.

EN 12845-1 passed the CEN enquiry in March 2022 with over 600 pages of comments. We could not address them within the CEN timetable so CEN cancelled the work item. We are nevertheless working through the comments and have addressed almost half. Once we near completion we will request a new work item from CEN and run a second enquiry. We are certainly improving the document, so hopefully there will be fewer comments on the second draft.

EN 12845-1 has reordered the chapters to match the sequence of work during a project, beginning with risk assessment and ending with maintenance requirements. There are also fewer annexes, although some are new and introduce special protection schemes, such as for distilled spirits in wooden barrels, mini-load and record storage protection. As well as system design innovations from North America, the standard includes protection concepts based on full-scale tests conducted in France and Germany.

Risk assessment is covered in far greater detail than before yet non-storage classifications are simplified from nine down to five. There is far more detail for sectors of activity, so that appropriate classifications are assigned to areas of different risk on a site, while for storage risks better account is taken of plastic. Hydraulic design criteria are heavier for higher ceilings, where a fire will be larger before it activates sprinklers. Well-established piping systems such as press-fit, CPVC and cast-in-concrete are recognised and the guidance on pipe wall thickness has been revised with more options. There is guidance for the selection of water supplies (not every country has an equivalent to The FPA Technical Bulletins to cover such gaps) and far more detailed guidance on inspection, testing and maintenance. BAFSA members who make pre-calculated designs have not been forgotten – there is an extensive annex dedicated to pre-calculated design, drafted by British delegates.

Even those who submitted many comments on the draft of EN 12845-1 have admitted there is a lot of good material in it. The intention is that the three parts of EN 12845 should reflect the state of the art in sprinkler system design, incorporating innovations so that sprinkler systems can be designed to be more economic yet even more effective and reliable. Over the next two to three years we will publish the above standards, equipping officials with national references in support of our campaigns for the wider use of sprinklers.

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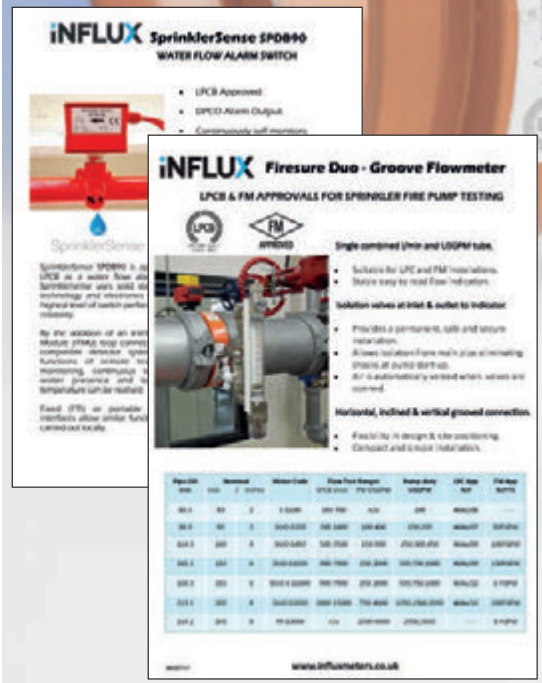

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Sprinklers Saves UK Annual Review 2022/2023

The purpose of this review is to demonstrate the vital role sprinklers play in fire safety arrangements by highlighting real, tangible examples of where they have actuated and in doing so, saved life and protected property. The review also seeks to raise awareness of the importance of collating sprinkler saves from across the United Kingdom so societal awareness of the true value of sprinklers can be increased. A sprinkler save is categorised as where one or more sprinkler heads have activated and contained, controlled or in some cases, extinguished a building fire. The story around the incident provides powerful evidence of the ability of sprinklers to protect life, firefighters, and property from fire.

The review uses information collated from:

- 57 fire incidents from the financial year ending March 2023, in which sprinklers were reported as activating and having an impact. The reported incidents span a wide range of building types and occupancies.
- Interrogating fire data sourced from the home office online Incident Recording System (IRS) for primary fires attended by Fire and Rescue Services (FRS) in which sprinklers were reported as activating and having an impact for 2021/222.

Our vision

Fires are adverse events. They are destructive, with their knock-on effects including toxic and corrosive effects of smoke and the environmental effects of fire water from firefighting operations. The Sprinkler Saves UK website is hosted and coordinated by BAFSA, supported by the National Fire Chiefs Council (NFCC), National Fire Sprinkler Network (NFSN) and Business Sprinkler Alliance (BSA).

We want to enhance protection against fire through the increased acceptance and use of fire sprinklers. We do this by encouraging and promoting the installation of sprinklers and other forms of Automatic Fire Suppression Systems (AFSS) driving a culture change so that they are understood and accepted as the norm for the United Kingdom.

One way to achieve this is by working with our FRS representatives and sprinkler industry colleagues to collate sprinkler activations. The details of the incidents provide further evidence of the reliability and effectiveness of sprinkler systems in containing, controlling, and extinguishing fires, protecting life and preventing fire damage. Promoting these activations via the Sprinkler Saves website, social media, and other communication channels.

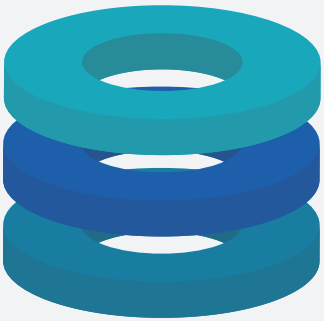
There is clear evidence that fire sprinklers can be effective in the rapid suppression of fires, preventing flashover and can therefore play an important role in achieving a range of benefits for both individuals, firefighter safety and the community in general.

They also provide environmental benefits, reducing fire loss, damage to the environment, reducing carbon emissions and reducing the use of water from the resulting firefighting operations. It is anticipated, year on year, the number of reported sprinkler saves will increase due to:

- The increased use of automatic fire suppression in the built environment across the UK.
- In England, changes in regulatory guidance for the installation of sprinklers in high rise residential premises reducing the building height at which sprinklers are required to 11m.
- The rise of retrofitting projects in large scale residential properties, due to the focussed attention on fire safety in the aftermath of the tragic Grenfell Tower fire.
- We will stimulate growth in reporting through the:
  - Appointment of a designated sprinkler saves coordinator.
  - Increased communication of the reported sprinkler activations via multiple communication channels.
  - Publication of reports that will provide a detailed analysis of compound data on fire incidents in the UK where sprinklers are identified as present or activated.

Review

This review is split into three sections:



1. Part A

Highlighting a sample of sprinkler save case studies, uploaded on to the Sprinkler Saves UK website. Identifying/promoting the many ways fire sprinklers protect lives, firefighters, and property.

2. Part B

Interrogating information, data captured and submitted from 57 reported fires where fire sprinklers were reported as present and having an impact for 2022/23.

3. Part C

IRS fire data, reviewing 260 fires where fire sprinklers were reported as having an impact for the financial year 2021/22.

Part A - Collation of monthly sprinkler case studies

A sprinkler save has been chosen for each calendar month for the 12-month period ending March 2023, focussing on a variety of buildings, occupancies and types of fires.

1. April 2022: Specialised Housing Kitchen Fire

- Occupancy: Specialised Housing
- Where: Hackney, England
- When: 21 April 2022
- Fire Rescue Service: London Fire Brigade (LFB)
- Time of call: 12:36
- Incident: Kitchen Fire
- Automatic fire suppression system (AFSS): Sprinklers

The National Fire Chiefs Council, "*Fire Safety Specialised Housing Guide*" identifies the challenge we face with an aging population and the demographic change in the sheltered housing population. An increased occurrence of mobility difficulties, reduced sensory capability and cognitive issues, all of which bring about greater risk from fire, both in terms of the likelihood and vulnerability of residents.

The benefits of installing fire sprinklers for this type of high-risk occupancy were clearly vindicated following a fire within a kitchen of a four-roomed flat on the second floor. Two sprinkler heads operated containing and controlling the fire prior to the arrival of the LFB with only minor fire damage reported within the flat. No injuries were reported.

Supporting the most recent UK research[1] for fires where the sprinkler operated within specialised housing on 36 occasions, accounting for.

- Sprinklers are 22% effective in controlling or containing the fire.
- Sprinklers are 68% effective in extinguished the fire.

2. May 2022 Academy school fire

- Occupancy: Educational
- Where: Elgin Scotland
- When: 16 May 2022
- Fire Rescue Service: Scottish Fire and Rescue Service (SFRS)
- Time of call: 09:07
- Incident: Toilet Fire
- AFSS: Sprinklers

SFRS were mobilised to a fire within a toilet cubicle on the first floor of a three-storey purpose-built academy. Upon entry to the toilet, firefighting crews established the fire had been extinguished by the activation of the commercial sprinkler system. No further firefighting media was required, with minimal fire and smoke damage reported.

The cause of the fire was recorded as a malicious act; the third reported school fire to Sprinkler Saves UK involving a malicious act within school/academy toilets in Scotland during a 4-month period. Reaffirming the importance that sprinkler coverage is required in areas vulnerable to intentional fire setting like toilet facilities.

Since 2010, all new-built Scottish schools are required to have AFSS fitted, protecting both the occupants and the building in line with Scottish Building Standards for non-domestic buildings.

The benefits of implementing this statutory legislation were clearly demonstrated for the above-mentioned incidents. On each occasion the fire was contained to the compartment of origin.

This is not the case for England, current guidance, when first released in 2007, acknowledged the important role of sprinklers and stated that "all new schools should have fire sprinklers, installed except in a few low-risk schools".

Unfortunately, it is possible for designers and developers to circumvent the installation of sprinklers, by using other building design guidance. The outcome is new-built schools without fire sprinklers being installed.

"The outcome of this fire could have been so much different if this incident had been in England"

When you compare this to the three major school fires in Derbyshire, where fire sprinklers were not fitted, that were all severely damaged by fire in May/October 2020.

- Harrington Junior School fire, 28 May 2020
- St Mary's Catholic Voluntary Academy, in Darley Abbey, 3 October 2020
- Ravensdale Infant School, 5 October 2020

Image credit: Derbyshire Fire Rescue Service
Ravensdale Infant School

Image credit:
South Yorkshire Fire & Rescue Service (SYFRS)

A similar malicious fire was reported by SYFRS within a commercial shopping centre toilet cubicle in Sheffield which was successfully extinguished by the activation of the sprinkler system before the arrival of the FRS.

3. June 2022 Hotel fire

- Occupancy: Hotel
- Where: London, England
- When: June 11, 2022
- Fire Rescue Service: LFB
- Time of call: 18:37
- Incident: Basement Fire
- AFSS: Sprinklers

LFB were mobilised to a fire involving stacked towels (spontaneous combustion) within the basement corridor of a large hotel. On arrival it was established that the fire had been extinguished, containing the fire to the compartment of origin following the activation of two fire sprinkler heads.

The benefits of sprinklers for life safety are well documented but their impact on business continuity however is under reported. The hotel sustained minimal disruption following the fire, allowing the business to resume operations within an hour of the incident and reducing costs to the business by ensuring that in the event of a fire it is only a minor inconvenience.

The vulnerability of hotels to fires was very publicly demonstrated in England within a two-week window in 2019. 18 July a Premier Inn in Bristol was effectively destroyed and on the 2 August the holiday inn at Willenhall suffered a similar fate, sprinklers were not fitted in either case.

Image credit: West Midland Ambulance Service

4. July 2022 Residential tall building fire

- Occupancy: Purpose built residential block of flats, 10 or more storeys
- Where: Watford, England
- When: 12 July 2022
- Fire Rescue Service: Hertfordshire Fire and Rescue Service.
- Time of call: 04:50
- Incident: Secondary fire
- AFSS: Sprinklers

The benefits in the rise of sprinkler retrofitting projects in residential tall buildings, due to the focussed attention on fire safety in the aftermath of the tragic Grenfell Tower fire, were clearly demonstrated following this incident.

Image credit: Watford Observer

In 2019, Watford Community Housing invested £1.5 million upgrading various fire safety measures in two of their high-rise residential blocks, providing a further layer of safety from fire for its most vulnerable residents, which included the installation of fire sprinklers.

In the early hours an external fire developed on the ground floor of the building adjacent to a storage area. Due to the intensity of the fire, the fire spread vertically to the upper floors jumping into two flats directly above the seat of the fire due to the open windows. The residential sprinkler system within the apartments operated which contained the fire preventing further fire spread within the common areas. This incident justifies the approach taken by Watford Community Housing to retrofit sprinklers in their two high-rise residential buildings as part of a holistic approach to reducing the effects of fire.

In 2021/2022, purpose-built high rise residential blocks of flats of 10 or more storeys accounted for 69[2] fires within the UK where sprinklers were present and operated reinforcing that sprinkler systems are very effective when they operate within tall buildings.

- 52% Effective in controlling the fire.
- 39% Effective in extinguishing the fire.

5. August 2022: Commercial unit fire within a multi-occupancy entertainment centre

- Occupancy: Commercial Unit
- Where: Castleford, England
- When: 20 August 2022
- Fire Rescue Service: West Yorkshire Fire & Rescue Service (WYFRS)
- Time of call: 20:16
- Incident: Fire involving an electrical appliance
- AFSS: Sprinklers

Image credit: West Yorkshire Fire & Rescue Service

WYFRS were mobilised to a fire within a commercial unit resulting in 200 people evacuating the premises following the activation of the premises fire alarm and sprinkler system. On arrival, firefighters identified that three sprinkler heads within a commercial unit had activated, extinguishing the fire involving an electrical portable appliance, minimising further fire spread/damage.

The benefits of installing sprinklers for business continuity were reinforced following this relatively small fire:

- The incident was prevented from accelerating into a major fire.
- The entertainment centre was briefly closed immediately following the incident.
- Other commercial units/activity sites were not affected, remained opened as usual following the fire.
- Only minor business disruption to the unit directly involved with the fire which re-opened for businesses within six days.
- Severe damage, loss of earnings and ongoing disruption to the business was avoided.

The outcome of this fire could have been so different if sprinklers had not been installed. A larger fire could lead to building unit being either completely or partially destroyed. The Association of British Insurers report that fire is one of the most expensive property insurance claims with £1.3 billion paid out to customers during 2018.

6. September 2022 Warehouse Fire

- Occupancy: Warehouse
- Where: Northamptonshire, England
- When: 20 September 2022
- Fire Rescue Service: Northamptonshire Fire & Rescue Service (NFRS)
- Time of call: 18:30
- Incident: Fire involving an electrical appliance

- AFSS: Sprinklers

On arrival, firefighters identified that the loading bay within a single storey warehouse distribution centre was heavily smoke logged. Breathing apparatus crews were committed to locate the seat of the fire where it was identified that an industrial cardboard baler had caught fire which had been successfully contained by the activation of one sprinkler head. The remaining hotspots were extinguished by operational crews using a jet.

The premises was handed back to the occupier in less than four hours. Allowing the business to be back up and running within a short period of time.

The contrast between two warehouse fires with and without a sprinkler system can be clearly identified from the following two incidents.

Warehouse fire, London

Image credit: LFB

21 September 2022 a fire involving a mixed-use premises warehouse in Hainault involving 20 fire appliances, 125 firefighters which took nearly 12 hours to contain, the building was extensively damaged by the fire, sprinklers were not fitted.

Warehouse fire, Leicestershire

16 March 2022 a fire took hold in the premises storage racking system which was successfully contained/controlled by the activation of two sprinkler heads. This allowed the FRS to establish their operational tactical pan prior to committing crews to extinguish the fire using firefighting media.

Image credit: Lutterworth Fire Station

7. October 2022 LFB Match Funding, specialised housing fire

- Occupancy: Specialised Housing
- Where: London Borough Barking and Dagenham, (LBBD) England
- When: 16 October 2022
- Fire Rescue Service: LFB
- Time of call: 16:10
- Incident: Fire Involving Smoking Materials
- AFSS: Sprinklers

London Fire Brigade launched a competition in 2014 to incentivise housing providers to install sprinklers to support and promote the authority's sprinkler strategy. This competition promoted the use and adoption of residential sprinkler systems which was vindicated following the fire involving smoking materials at a London specialised housing scheme.

On arrival firefighters identified a fire on the second floor within a two-roomed flat that had been contained by the actuation of three sprinkler heads. Firefighters wearing breathing apparatus were committed, extinguishing the fire with one firefighting jet. The fire is believed to have been accidental, arising from the unsafe disposal of smoking materials.

The decision taken by the LFB to launch the match funding sprinkler competition should be applauded, without this initiative the outcome of this incident could have been so much different.

Clearly demonstrated following the fire at the Newgrange care home, Hertfordshire was the scene of a major fire in 2017 which broke out in the early hours of the morning. The home was occupied by 35 residents and sprinklers were not fitted. The fire resulted in 33 elderly and immobile residents being rescued by firefighters. Sadly two residents died because of the fire.

Following the fire the coroner raised concerns that sprinkler systems are not mandatory in care homes. Hertfordshire Fire and Rescue Service recommended sprinklers be installed. The home was rebuilt – without fire sprinklers.

8. November 2022 Dwelling Fire

- Occupancy: Dwelling, house
- Where: Ebbw Vale, Wales
- When: 20 November 2022
- Fire Rescue Service: South Wales Fire Rescue Service (SWFRS)
- Time of call: 06:28
- Incident: Fire Involving Smoking Materials
- AFSS: Sprinklers

SWFRS were called to a domestic fire within the rear first floor bedroom of a newly built detached dwelling of two floors. On arrival firefighters established that the fire had been extinguished by the actuation of the domestic sprinkler system. From the time of the call to the stop message sent by the Officer in Charge of the incident was within 29 minutes, with no injuries reported.

The outcome of this incident was made possible by the decision taken in October 2013, by the National Assembly for Wales passing new Building Regulations that require sprinklers to be installed in new and converted homes in Wales.

Unlike Wales, sprinklers are not mandatory for new and converted homes in England. In England, for life safety, new residential blocks over 11m are fitted with sprinklers to meet statutory guidance.

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The benefits of installing sprinklers for domestic/residential premises can clearly be identified following this image taken from a similar bedroom fire involving smoking materials which was extinguished following the activation of one sidewall sprinkler head.

9. December 2022 City of London market Fire

- Occupancy: Market
- Where: City of London, England
- When: 14 December 2023
- Fire Rescue Service: LFB
- Time of call: 18:15
- Incident: Fire involving a refrigeration Unit
- AFSS: Sprinklers

The benefits of installing a commercial sprinkler system for business continuity was clearly demonstrated following this incident which took place during one of the busiest trading periods of the year. A fire involving an operational meat market resulting in the loss of three tonnes of meat within a refrigeration unit.

The fire was contained following the activation of the sprinkler system within the compartment of origin, no injuries were reported. The market reopened the same evening with only one shop unit closed due to the fire.

"Sprinklers are the only fire safety system that detects a fire, raises the alarm and suppresses a fire. They save lives and protect property and they are especially important where there are vulnerable residents who would find it difficult to escape, like those with mobility problems."

10. January 2023 Wrexham factory activation

- Occupancy: Factory
- Where: Wrexham, Wales
- When: 5 January 2023
- Time of call: 08:44
- Incident: Fire involving a rubber conveyor belt
- Fire Rescue Service: North Wales Fire & Rescue Service

Image credits: CFRS

This was the second reported fire within seven months, resulting in the activation of the premises sprinkler system. On arrival firefighters identified that seat of the fire involved the industrial granulator which had overheated due to friction involving the industrial rubber conveyor belt. Two sprinkler heads contained and controlled the fire.

A breathing apparatus team consisting of two wearers were committed to the seat of the fire, extinguishing it with one hose reel jet. Minor fire damage was reported to the floor of origin.

The sprinklers prevented a relatively minor fire from accelerating into a major one, limiting business disruption and preventing severe damage.

11. February 2023 Runcorn warehouse activation

- Occupancy: Warehouse
- Where: Runcorn, England
- When: 10 February 2023
- Time of call: 06:10
- Incident: Fire involving liquid petroleum gas (LPG) powered forklift truck
- Fire Rescue Service: Cheshire Fire & Rescue Service (CFRS)

On arrival CFRS, established that the seat of the fire was located on the ground floor within a single-storey warehouse involving the LPG powered forklift truck. The fire was contained by the activation of the sprinkler system with only one sprinkler head operating.

This incident clearly demonstrates the benefits of sprinklers for firefighter safety where gas cylinders are involved. The dangers of fires involving gas cylinders should not be underestimated.

A fire where a cylinder is confirmed to be involved has the potential to be devastating. When exposed to extreme heat gas cylinders are at a risk of failure and may rupture due to overpressure, increasing the risk to firefighters when tackling fires involving cylinders.

It is paramount that fires involving cylinders are immediately cooled with copious amounts of water, reducing the risk of rupture. In this case this was achieved by the activation of the sprinkler system. This allowed time for the Officer in Charge to implement their operational tactical plan, the remaining hot spots were extinguished using firefighting media.

12. March 2023 Farnborough waste recycling centre Activation

- Occupancy: Waste Recycling Centre
- Where: Farnborough England
- When: 9 March 2023
- Time of call: 00:32
- Incident: Fire involving household waste.
- Fire Rescue Service: Hampshire & Isle of Wight Fire & Rescue Service

This incident involved approximately 20 tonnes of household waste contained within a single storey warehouse 32m x 17 m. The fire had been contained/controlled by the actuation of the premises drencher sprinkler system.

Image credit:
Hampshire & Isle of wight Fire & Rescue Service

Operational crews were committed wearing breathing apparatus using firefighting media to extinguish the fire with an onsite mechanical digger which was used to turn over the burning waste.

This demonstrates the green credentials of Automatic Fire Suppression Systems (AFSS) containing the fire before the arrival of the FRS.

On a regular basis, images from major waste fires across the country are published on social media and television news. These images focus on the scale of these incidents with the number of fire appliances and firefighters working to control the fire with the backdrop of a large smoke plumes. The incident is then soon forgotten… old news lost in the clouds.

However, do we consider the adverse consequences on our natural environment?

- Air contamination from the fire/smoke plume and the impact it will have on land and water courses.
- The impact of fire service firefighting activities, specifically the water run-off from firefighting hoses/jets containing toxic products.
- Other environmental discharges or released from burned material.

This incident identifies that active fire protection systems, specifically AFSS should be seen as part of a holistic approach minimising fire damage as part of a greener approach from the fire sector which is often overlooked.

Reporting fire sprinkler activations

The importance of reporting a sprinkler save should not be underestimated. BAFSA wants to enhance protection against fire through the increased acceptance and use of fire sprinklers by encouraging the wider acceptance and installation of fire sprinklers. BAFSA sees this driving a culture change so that fire sprinklers are understood and accepted as the norm in the United Kingdom

The promotion of reported sprinkler activations depends on the goodwill and resources of individual FRS, the majority of which do not have a nominated fire officer responsible for the promotion of AFSS to forward this information to Sprinkler Saves UK.

Likewise, the quality of the IRS data captured is dependent on the fire officer who inputs the data and their training, experience of AFSS and information to complete reporting. Not all fire officers might be able to identify the difference between a sprinkler or water mist system or have the data on the number of sprinkler head activations before leaving the scene for example.

BAFSA has established a working relationship with representatives of individual FRS and sprinkler industry colleagues to share details of sprinkler activations. These events would be recorded within the IRS incident data and forwarded to the Sprinkler Saves coordinator. The outcome of this is Sprinkler Saves UK raising awareness of the benefits to fire safety from sprinklers with details of hundreds of sprinklers saves; publicised with images, details of the event and the impact of sprinklers.

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Part B - Interrogating information, data captured, submitted from 57 reported fires where fire sprinklers were reported as present having an impact for 2022/23

For presentation, the data is analysed for the financial year ending March 2023. Of the 57 incidents where sprinklers were recorded as being present and operated.

30

Residential/domestic premises
accounted for 30 activations

27

Non-residential premises
accounted for 27 activations

On average.

- 4.75 incidents reported per month.
- 1.10 incidents reported per week.

The distribution of these fires is shown in figure 1, detailing the number of fire sprinkler saves reported and where fire sprinkler systems actuated by building type and FRS.

It is interesting to compare this data captured from fire incidents used by the national governments across Great Britain for the period to 2018/19 to 2021/22. 859 incidents were reported in which fire sprinklers were recorded as present and had operated.

On average, just below 215 incidents each year. This would indicate the sprinkler saves in this report represent around 26.5% of the fire incidents where sprinklers are recorded.

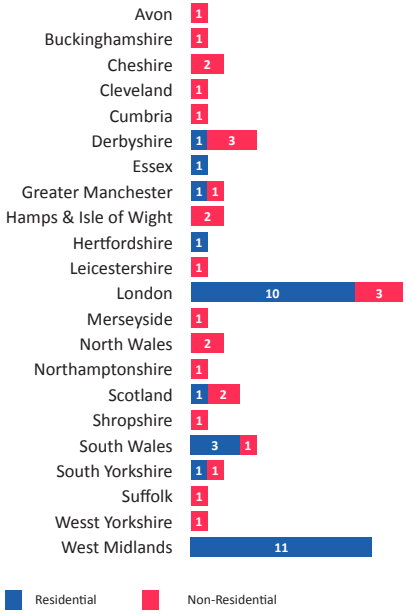

Figure 1- Number of fires reported with sprinkler systems activating by building type, Fire and Rescue Service

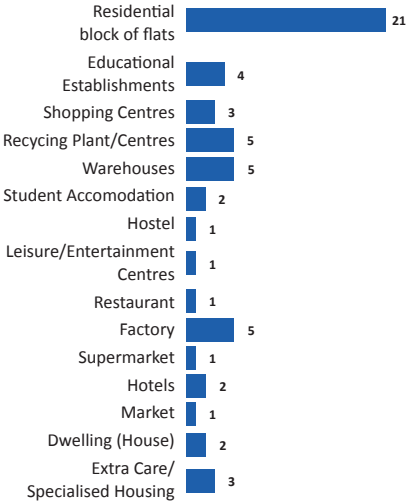

Figure 2- Number of fires where sprinkler systems operated by individual building type.

Figures collated for 2022/23, show the reporting of sprinkler activations have remained relatively static with like-to-like activations compared to 2021/22 with 57 activations an increase of four.

Of the 57 incidents reported for 2022/23, purpose-built block of flats dominated the figures in which sprinklers were reported as actuated, with 21 incidents. Again, it is interesting to compare these to IRS data across Great Britain for the period 2018/19 to 2021/22 for incidents where sprinkler operation is reported. The leading occupancy is once again purpose-built blocks of flats (33% of all incidents), but it is not dominant being closely followed by industrial/factory premises (30% of all incidents).

- What the data is unable to confirm is why 4 incidents were recorded as unknown, further investigation of the IRS data would be required.
- The accuracy of the data cannot be confirmed until the release of official government fire data of fires attended by FRS for the period of April 2022 to March 2023.

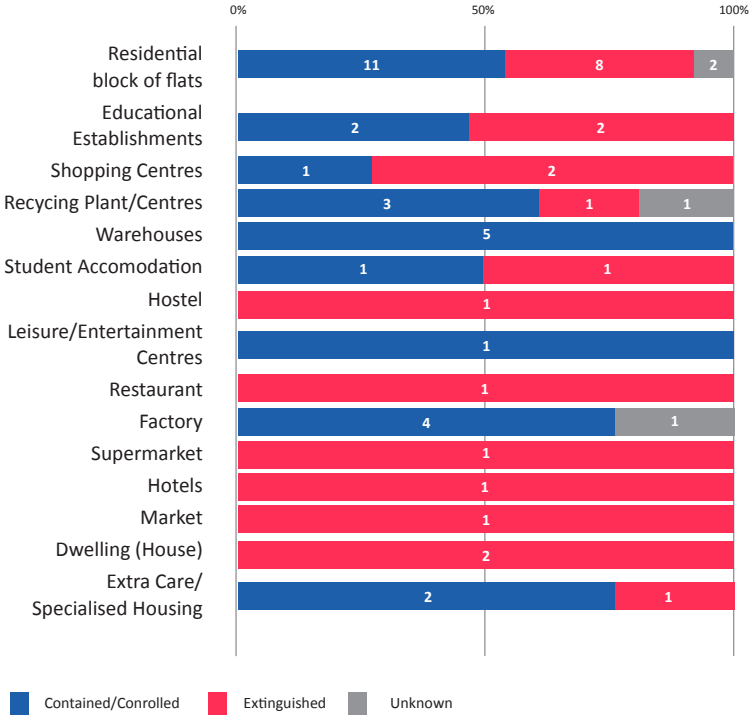

Figure 3 The effectiveness of the sprinkler system containing, controlling, or extinguishing the fire.

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

Across all premises types:

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

The finding of this review reinforces the above-mentioned findings that fire sprinklers have been proven to have a good track record in reducing the impact of fire.

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- Speaking of new warehouses... our Rochdale branch has moved to a brand new, modern, custom built warehouse. Now our Rochdale dispatch and fabrication shop are under one roof.
- We now stock Spears FlameGuard CPVC, available exclusively to all our trade account holders. CPVC is an engineered thermoplastic material that has been fully approved for fire sprinkler applications. We also stock the fully approved clips & fixings for CPVC installations. CPVC training also available upon request.

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Part C – IRS fire data, focusing on fires where fire sprinklers were reported as having an impact for the financial year 2021/22

The Sprinkler Saves Annual Review 2021/22 reported 53 sprinkler activations analysing, interrogating three key areas:

- The number of fires reported within sprinkler systems activating by building type and FRS.
- Number of fires where sprinkler systems operated by individual building type.
- Impact of sprinkler systems by purpose group.

What cannot be defined by this data is the actual number of sprinkler activations captured by the attending FRS. This requires additional data to examine trends across Great Britain. This was obtained via a freedom of information request to the respective teams collating incident data for England, Scotland and Wales. Data was obtained for the financial year 2021/22. It was identified 260 incidents were captured consisting of.

A difference of 203 sprinkler activations when compared to the Sprinkler Saves UK Annual Review 2021/2022 review. The challenge of capturing sprinkler fire actuations is dependent on the goodwill and resources of FRS.

Likewise, the quality of the IRS data captured is dependent on the fire officer who inputs the data and their training, experience of AFSS and information to complete reporting. Not all fire officers are able to identify the difference between a sprinkler or water mist system or have the data on the number of sprinkler head activations before leaving the scene.

A balcony fire at West Hampstead, London on 3 July 2018 involved the actuation of multiple sprinkler heads but the completed IRS data recorded the number of heads having operated as zero. London Fire Brigade conducted a case study of this incident to raise awareness in the residential sector of the benefits of AFSS in a multi-fire residential tall building and identified that in 19 minutes from time of call, five apartments were exposed to fire and 12 sprinkler heads activated.

143

143 Residential/domestic sprinklers actuations

117

117 Non-residential sprinkler actuations

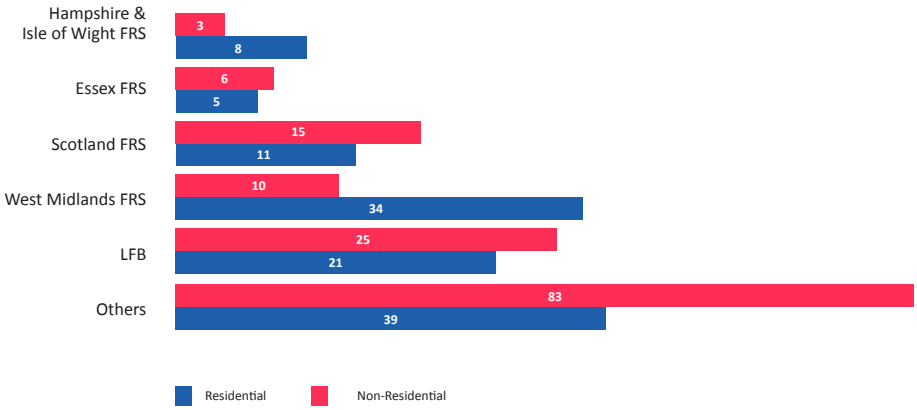

Figure 4 - Reported sprinkler system activations by fire and rescue service, building type.

It is no surprise that LFB dominate the figures within figure 4 with a total of 46 activations but what is surprising is that the figures show that West Midland Fire & Rescue Service dominate the number of residential sprinkler activations with 34.

This could be due to the decision taken by Birmingham City Council to install sprinklers in all their communal bin areas of their residential tall building property portfolio in addition to their three-year programme to retro-fit sprinklers in all their high-rise blocks of flats in 2017.

The benefit of this decision has been re-enforced for one residential block, within the space of a 10-month period, 10 refuse store/chute fires were reported which were either contained, controlled or extinguished by the premises sprinkler system.

BAFSA realises that fire incident data provides powerful evidence of the benefits of fire sprinklers. Publishing a series of reports analysing IRS data on fires in sprinklered buildings from 2018-2022. One report focuses on purpose-built blocks of flats identifying where sprinklers were reported as being present, activated.

It was identified that refuse store fires accounted for the highest number of sprinkler activations outside the flats with 123 fires. What cannot be defined, by the data, is whether the installation of sprinklers within buildings is limited to these refuse stores alone or extended to the occupied flat areas.

The Government publication, “Purpose-built block of flats guide” provides guidance, advice to reduce the risk of fire in refuse and chute rooms including that further protection can be provided by a sprinkler system. This is clear evidence that this is being applied. Of the 260 incidents reported, industrial premises accounted for the highest number (70) of sprinkler activations. This is surprising as there is no regulatory guidance in Great Britain for fire sprinklers in industrial premises. There is guidance for fire sprinklers in single storey warehouse buildings of 14,000 m^2 in Scotland, 20,000m^2 in England and Wales.

This is closely followed by purpose-built block of flats (10+) flats/maisonettes with 69 incidents, which is unsurprising. Post the Grenfell Tower fire, regulatory and sector changes relating to fire safety have occurred. One such change has been the increased installations

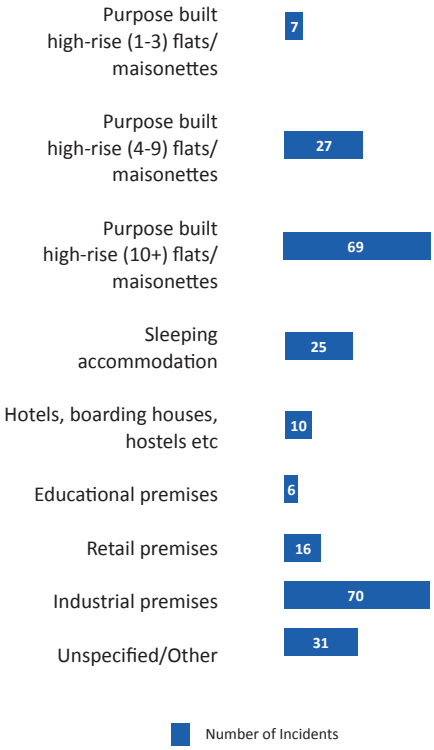

Figure 5 Number of fires where sprinkler systems operated by building type.

of fire sprinklers across the country with housing providers, local authorities and developers voluntarily committing to install fire sprinklers in purpose-built block of flats on a new and retrofit basis.

The London Borough of Croydon were the first council to retrospectively fit fire sprinklers in their 26 high-rise residential blocks over 10 storeys with support and guidance from the London Fire Brigade, completed 2018/2019. The benefits of this project were clearly identified following two separate flat fires in the same residential block in the space of two months in 2021. Both were controlled by the installed fire sprinklers.

What the data is unable to confirm is the rationale behind why a small majority of sprinkler fires were identified as not containing/controlling the fire or recorded as unknown. Further interrogation of the IRS data fields would be required to explore this anomally.

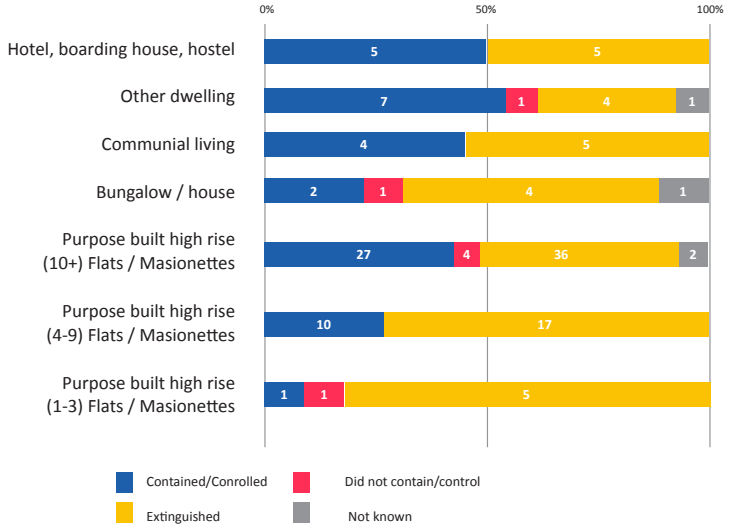

Figure 5 The effectiveness of the sprinkler system in containing the fire across all dwelling type.

Note: A preliminary examination of the instances where sprinklers are reported to have operated and did not control the fire was completed. 5 of the 7 indicated that the sprinklers were not in the room of origin of the fire.

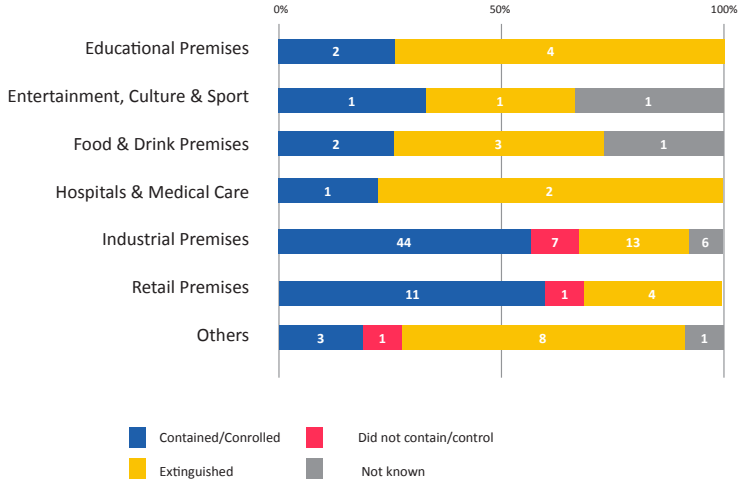

Figure 6 The impact of sprinkler fires in non-residential fires by purpose groups.

Note: A preliminary examination of the instances where sprinklers are reported to have operated and did not control the fire was completed. 2 of the 9 indicated the sprinklers were not in the room of origin of the fire.

Further reading/resources

- **Incident Data Report Focus on Sprinklers**

BAFSA realises that fire incident data provides powerful evidence of the benefits of fire sprinklers and has published a series of reports analysing IRS data on fires in sprinklered buildings from 2018-2022. The aim of these analyses is to identify trends and gain insight on the use of sprinklers within Great Britain to help effect a change so that sprinklers are the norm, not the exception.

The reports focus on a range of building types including purpose-built block of flats, educational buildings where fire sprinklers were recorded as being present and operated having an impact. The fire data around the incidents provides powerful evidence as to the ability of fire sprinklers and other forms of AFSS in protecting our communities from fire.

Fire sprinklers play a significant role as part of an appropriate package of fire safety measures reducing the impact of fire on people, property, and the environment.

- **Sprinkler Saves UK Annual Review** **2021/22**
- **Fire Sprinklers Greater London Review** **2018/21**

The two publications focus on incidents where sprinklers were recorded as being present and operated and having an impact providing powerful evidence as to their ability of fire sprinklers and other forms of AFSS in protecting our communities from fire.

All three publications are available to download from the BAFSA website, www.bafsa.org/bafsa-publications

Nick Coleshill coordinates the Sprinkler Saves website for BAFSA. Any questions or enquiries can be submitted to nick.coleshill@bafsa.org.uk.

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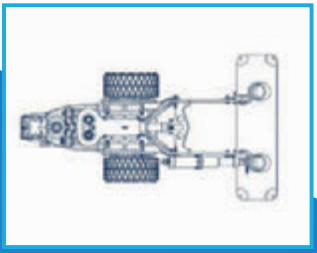

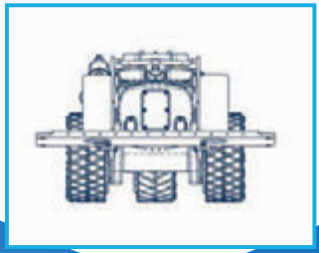

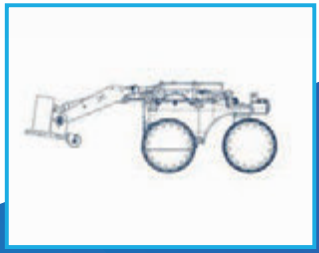

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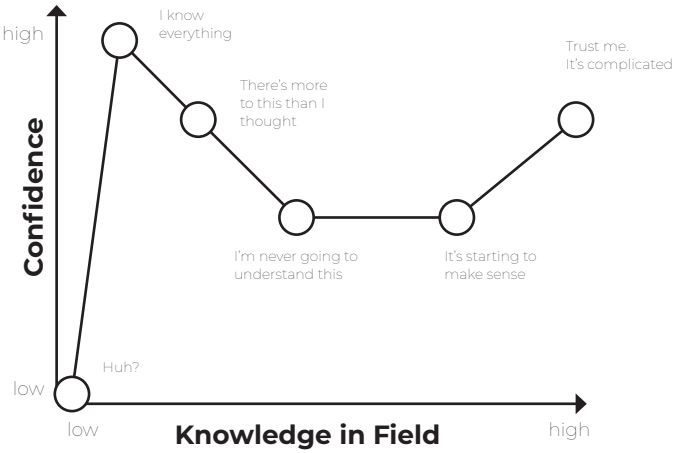
Developing qualifications and training to ensure competency within the sprinkler industry

Ruth Oliver
BAFSA Skills & Qualifications Adviser &
Chair of the BAFSA Skills & Qualifications committee

Underpinning the BAFSA Skills & Qualification Strategy and establishing development of skills and nationally recognised qualifications, whilst evidencing skills and competence of the workforce continues to remain uppermost in the BAFSA vision for the future, along with the challenge of an ageing workforce.

At this point it is worth remembering that there is a difference between skills and competence:



Competency: Knowledge, behaviours, attitudes and even skills that lead to the ability to do something successfully or efficiently.

Skill: Learned and applied abilities that use one's knowledge effectively in execution or performance.

Training and development can play a significant part in the opportunities open to people and therefore the ways they can carve out their career path. Some people will carve out a career path within one company while others will attempt to climb the ladder by moving to other companies.

Alongside skills, training and qualifications we must bear in mind that industry often requires a Skillcard and many construction and site managers request that their workers hold one before coming on site.

Over the next 20 years, the need to provide evidence of training and qualifications will become even more important. The forthcoming Building Safety Bill will require another step up in competence and compliance.

Over 60,000 engineering professionals across the UK depend on a Skillcard to prove to site managers and clients that they are trained and fully qualified for the work they do on site.

The Skillcard process also covers those with supervisory and managerial responsibilities in the building engineering services industry and is also widely used by self-employed and agency workers and those seeking employment in the sector.

Since its launch in 2001, the application and renewal process has been regularly updated and improved so that today it is an online digital exercise and last year the system went fully paperless.

BAFSA has been working with Industry Skillcard for the past three years to ensure that appropriate Skillcards will be available to the fire sprinkler workforce.

Currently, the sprinkler system installer is required to hold a Blue (skilled worker) Skillcard. The card is underpinned by the Level 2 Certificate in Fire Sprinkler Installation qualification which covers residential and commercial installations. Applicants are also required to hold a current H&SE certificate.

In the very near future, it is anticipated that a Blue Skilled Worker card will be made available to those who work in Inspection and Commissioning of Commercial Fire Sprinkler Systems and a Black Skillcard for those who work designing residential sprinkler systems.

BAFSA will offer training leading to the appropriate certification to support applications for the card.

Full information on Industry Skillcards can be found at https://www.skillcard.org.uk/types-of-skillcard.

So whilst BAFSA must look ahead and ensure the industry can continue to evidence competency of the workforce through competency based qualifications it must also bear in mind the importance of Continuing Professional Development (CPD).

Having gained a qualification many years ago does not necessarily mean you retain competency. How many of us passed our driving test years ago? Could we pass it now, years on?

Change is constant, and in the ever-changing world we live in, it becomes almost imperative to keep progressing in our professional endeavours.

CPD stands for Continuing Professional Development and is the term used to describe the learning activities professionals engage in to develop and enhance their abilities.

So what is Continuing Professional Development?

Continuing Professional Development refers to the process of training and developing professional knowledge and skills through independent, participation-based or interactive learning.

CPD can help keep skills and knowledge up to date, plug those gaps in knowledge enabling employees to adapt to the fast-moving world in which they work. It can boost worker confidence, strengthen professional credibility, and help you become more creative in tackling new challenges.

So what does CPD involve?

Formal CPD: This type of CPD involves active and structured learning that is usually done outside the organisation for which you work and can consist of:

- offline and online training programmes
- learning-focused seminars and conferences
- workshops and events

Informal CPD: Also known as self-directed learning, in which the professionals carry out development activities according to their own choice and without a structured syllabus. This form of learning usually consists of:

- reading industry related articles
- listening to industry-specific podcasts and following industry-specific news

In 2023/2024, BAFSA will be working to develop a suggested programme of CPD activity across the sub sectors. Crucially however, BAFSA members, too, need to get involved to ensure that that the suggested programme encapsulates current CPD activities as well as new opportunities.

BAFSA remains aware of one continuing challenge for the future… The ageing workforce. Workers retiring from the sector, taking their skills, knowledge and vast experience with them. There remains an urgent need to attract a new generation of young people into all areas of the sprinkler industry including installation, design, project management and maintenance. In doing so we will be ensuring that the workforce remain fit for purpose and ready for the challenges ahead.

Continuing to develop and offer training across these sectors is imperative, as is the industry raising its profile to inspire those looking for job opportunities that the Fire Sprinkler sector remains a career to look forward to.

BAFSA's Skills & Qualifications committee meets four times a year, in remote format, with their core remit continuing to be *'to develop vocational qualifications and training to ensure competency for persons working within the sector'*. The role of the Committee is to understand, review, advise and comment on all training aspects of fire sprinklers in relationship to training needs for the fire sprinkler sector.

Skills & Development Committee meetings are generally attended by 10-12 members and new recruits to this group are always welcome - please contact quallfications@BAFSA.org.uk

Next generation training

Alan Crichton
BAFSA Design Course Facilitator
Chair of the BAFSA Technical Committee

Like any industry at the moment the fire sprinkler industry is struggling to find the next generation of designers, project managers and installers. Also the fire protection industry has an ageing skillset hence of equal concern is the many competent people who are due to retire leaving a generational gap to fill.

Even more worrying is that the industry itself has grown exponentially. If you consider that the number of systems installed has been increasing over the past 50 years with the main markets changing from industrial systems in the 1970's to retail systems in the 1980's and 1990's moving onto warehousing (and schools) in the 2000's and 2010's. The current focus in sprinkler installations is on domestic and residential and there is also a surge protecting mega warehouses and distribution centres which are popping up on an alarming basis.

So, this is an industry which is growing rapidly with an ageing workforce.

We also have the additional requirements of "The Building a Safer Future Independent Review of Building Regulations and Fire Safety" issued in May 2018 which focused on competency within the fire industry and how polices and procedures need to change to prove clarity on roles and responsibilities and be able to prove that someone is competent to carry out their role.

Thus not only does the industry need to prove its people are competent it also needs to attract the next generation.

So how are we going to do it? Historically the industry is not great at this and there are limited recognised qualifications available to attract the attention of school leavers and college or university graduates.

In short, the industry needs to invest in training and achieve recognised national qualifications for engineers and technical staff. This is not only required to prove competency, but also attract the brightest talent, as ambitious and quality candidates will naturally be drawn to the industries with recognised qualifications with a clear career progression route.

Fortunately, BAFSA and the sprinkler industry is making good progress on this front with the CQF Level 2 Fitters course, two Residential Design courses to CQF Level 5 and a CQF level 3 Inspection and Commissioning course available.

When it comes to commercial design the historic route to prove competency is the LPCB Competency Reviews, however these reviews are only available for companies that are in the LPS 1048 scheme, The challenge moving forward is to get a nationally accepted accreditation for the design and inspection of sprinkler installations that helps proves a person's competency.

Fortunately BAFSA is developing a suite of training courses for new entrants in development for:

- System Classifications and Pre-Calculated design
- High rise buildings and Fhc design for Ordinary hazard systems
- High Hazard Storage and ESFR design.

We envisage these to be up and running before the 2025/2026 BAFSA yearbook is published.

Once this has been done we will look at the "experienced worker" route to qualifications.

We are working closely with the Third-party accreditation bodies, FIRAS, LPCB and WarringtonFire, on the development of these courses so that moving forward they will become recognised as a level of competence with a further level of training to become a verifier of systems.

To ensure the highest quality the training courses will be run through the BAFSA training centre which has secured its ABBE training centre Status.

These courses should be open to people in the industry from directly employed to sub-contractors and potentially consultants.

Some sub-contract designers have passed the LPCB competency exams and some have not. The sub-contract designers who are competent are not allowed to sit them as they are not part of the LPC 1048 scheme.

The construction industry requires people who work on site to have a CSCS card and to gain these you need specific qualifications to get a card, for example you need to have passed an L2 Fitters course for a Blue card, L5 Residential design courses for a Black Card and an L3 Inspection and commissioning course will get you a blue card also.

The required work will require significant investment and buy in from the industry.

The work on this has begun and will start to be delivered in 2024, the full benefits of the new qualifications will take around five years to see the investment bearing fruit and securing the future of the industry for generations to come.

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Raising the bar: Exploring the importance of third-party certification

Sarah Colwell
Head of Technical Standards and Delivery, BRE Global

Sprinklers have protected people and property across the world for over 100 years, and BRE Global has been a part of this journey throughout, providing product and installation assurance to the sector through the Loss Prevention Certification Board (LPCB).

Recent research, carried out by the National Fire Chiefs Council and the National Fire Sprinkler Network, demonstrates the importance of sprinklers as fire suppression tools, showing that sprinkler systems operate on 94% of occasions, and, when they do operate, sprinklers control or put out fires 99% of the time. The results of this research cannot be overstated, and it is the application of third-party approved, competently designed, installed, and maintained sprinkler systems, based on appropriate installation codes and products, that has ensured such high levels of fire protection.

Long before national building regulations, quality assurance or organised standards were introduced on a national scale, fire insurers introduced the concept of third-party certification. The 1860s saw an association for insurers set up, called the Fire Offices' Committee (FOC), to represent their loss prevention interests. The FOC launched its approved product list in the 1880s, with installation 'rules' being added a few years later.

150 years on, LPCB, which is now part of BRE Global, continues to certify fire suppression products, systems and services including automatic sprinklers, water mist, waterspray and deluge systems. These are supported through Loss Prevention Standard (LPS) 1048, which addresses the requirements for approval of sprinkler system contractors in the UK and Ireland.

Third-party certification is a conformity assessment process, providing confirmation that products and services have met, and will continue to meet, the requirements of specified standards. This type of independent certification is now more important than ever, as it is based

on a separation between the certifier and the certified entity, which eliminates conflicts of interest and provides impartial assessment, benefiting a range of stakeholders.

The standards we use for certifying and listing components have been developed to ensure that the components are suitable for use in sprinkler systems. This is complemented by our range of installer schemes which support the design and installation of both commercial and residential sprinkler systems.

Further to our work with sprinklers, BRE also supports the wider built environment through our testing and certification services for cables and electronic, and physical, security products, and our strategic advisory services. We are also pleased to work with a wide range of public sector bodies, from expert research and analysis for central government departments, to housing stock analysis for local authorities and environmental assessments for major building developments and infrastructure projects.

Driving change

BRE's multi-disciplinary teams, which include leading industry experts, work diligently to raise the bar and drive change regarding certification and standards within the fire suppression industry.

Our LPS certification schemes are widely recognised and applied around the world and are constantly under review to ensure relevancy and industry best practice. We recognise the importance of working collaboratively with the industry to ensure optimum outcomes and to drive change - an essential element of these standards is open consultation with all interested parties. To ensure transparency, and encourage collaboration, all LPSs, and a full list of certified products, systems, and services, are available to access for free online through RedBookLive.

To ensure their effectiveness, sprinklers must be designed, installed, and maintained correctly. Our LPS 1048 scheme helps clients select suitable contractors and ensures that sprinkler systems are appropriate for the occupancy and/or hazard class of the premises in which they are installed and will operate reliably in the event of a fire. We are making changes to this standard as of June 2023, so that it meets the continued needs of our membership. From specifiers to contractors, we believe that stakeholders across the industry will benefit from these changes.

BRE collaborates with global influencers, insurers, and Government departments and other public bodies in the UK, and worldwide, to encourage the specification and application of third-party certification and standards. We also work to educate the market to raise awareness of the importance of standards and certification. Through our BRE Academy courses we share knowledge on best practice, and support industry stakeholders with their journey to a safer and greener built environment, in three distinct areas: sustainability, information management and fire safety.

A constantly evolving market

We exist in a constantly evolving market, and we are actively engaged with technical standard development activities through both national and international standards bodies, such as BSI and CEN, as well as working with trade bodies and regulators to ensure that we remain up to date with the latest developments in technology and regulations. We also work with these regulatory bodies to promote the benefits of certification and support its uptake.

Even in an age of heightened industry awareness and growing demand for transparency, the status quo still varies across the market - third-party certification holds the power to not only influence, but also reshape, the prevailing norms throughout the industry. As the understanding of the importance of certification increases, so does the demand for certified solutions. This leads to an increased number of manufacturers developing and manufacturing certified solutions that meet well-recognised standards, benefiting specifiers and end users, and further protecting people and property. Regulatory bodies and the Government also have a significant role to play in encouraging a change of industry mindset, by embracing relevant standards, and promoting the benefits they offer.

We see that providing the industry with the confidence they need to make informed decisions critically is important, and hope to increase the significance of third-party certification and its role in building credibility.

Continuing to drive change with regard to certification and standards

Doug Mackinnon
Schemes Manager, IFC Certification

Established as a Third-Party Certification body for well over 10 years, IFC Certification (now part of the KIWA Group) offers schemes for installers of Residential & Domestic Sprinkler Systems, Commercial & Industrial Sprinkler Systems, Water Mist Systems and more recently Dry & Wet Riser Systems. This is aside from the passive installer and product schemes available, where fire stopping is also of relevant interest within the sprinkler industry.

Whilst our membership is predominantly for the Residential & Domestic Sprinkler installer scheme, the 'fairly recent' change in BS9251:2021 which permits protection of non-residential areas of a mixed use building up to 100m^2, has now naturally developed an interest from our members to obtain certification for our commercial sprinkler installer scheme where these non-residential areas, i.e., offices, cafes, restaurants on the Ground Floor (for example) of a residential development, exceeds 100m^2 in area. We always endeavour to listen to our members and in fact encourage feedback. Therefore, with regard to the specific issue mentioned above, it now means that our members are in a position to tender for all works relating to the fire protection of the mixed-use residential developments where the size of non-residential areas varies. This seems to have developed into our main market. However, we do have members on our residential and domestic sprinkler installer scheme who have decided to be certified with either the LPCB LPS 1048 or FIRAS schemes for their commercial sprinkler element, the reason for which we fully acknowledge.

We are also fortunate that we have access to a variety of colleagues in the fire suppression industry including, contractors, consultants, Fire & Rescue Service, insurance companies, suppliers, manufacturers, training providers, some of which are representatives on our steering committee. Furthermore, we are active members of committees including BAFSA, RSA, FPA, to ensure we are kept informed of current or future standards and general views within both the sprinkler and water mist industry.

Have changes in rules and regulations over the past two years gone far enough?

The major changes in BS9251 in 2021 for residential sprinkler systems, whilst welcome, did introduce some difficult challenges, particularly in terms of interpretation. IFC Certification have found this to have settled recently, partly been down to the issue of the new Technical Guidance document TG1 issued by the Residential Sprinkler Association (RSA).

The latest revision to BS EN 12845, in particular TB202 *Sprinkler protection to buildings featuring residential occupancies – insurance requirement*s, whilst it has provided enhancements which were expected to be included, i.e., increased protection requirements to car parks, we have found that some recommendations do not correlate with the residential sprinkler industry and moving forward, an open dialogue is recommended between the commercial and residential sprinkler industries, including insurers.

Can certification play a bigger role in changing the status quo?

Whilst Third Party Certification should be encouraged (not solely the opinion IFC Certification) and the benefits for installers and the industry moving forward is clear, making it mandatory should be considered carefully. It is evident that a potential mandatory requirement is not being led by government regulation, but instead is unofficially being driven by the industry itself including builders/developers, insurers, consultants and the sprinkler contractors themselves who see the benefit of Third-Party Certification and the pride in achieving this status.

IFC Certification's view is that all applications should be taken on their own merit; some installers are well established and the pre-certification process is fairly straightforward, whereas some lesser established contractors may need some guidance, or in some cases we suggest postponing the pre-certification until both parties feel ready to proceed when the company have all processes in place. We currently have some applications which have been in the pipeline for up to a year and are now successfully midway through auditing. We do not close the door on installer applications upon initial rejection.

There is always room for us to improve as a Third-Party Certification body and our schemes will always be a work in progress, as with any regulation or standard where revisions are made as and when they are deemed necessary. Likewise, we endeavour to keep up to date with suppliers and manufacturers of new fire protection equipment to ensure they meet the current standards and regulations, including testing protocols. This is also the case in terms of evaluating training providers, where IFC Certification actively attend design courses, prior to recommendation or endorsement.

One area which IFC Certification in keen to encourage is an open dialogue between all relevant Third-Party Certification bodies to ensure competencies are consistent and our schemes are aligned to an acceptable level.

Ultimately, we all wish to live in a safe home environment and/or continue our business with limited interruption. Third Party Certification is only one part of a collective effort to achieve this.

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Developing the market for AFSS in heritage and historic buildings

Stewart Kidd
Special Projects Adviser to BAFSA
Chair of the BAFSA Water Mist Working Group

BAFSA has long promoted the wider use of sprinklers in heritage buildings – one of the first BAFSA Information Files (BIFs) issued covered this topic[1]. The latest revision (2017) lists some significant installations. BAFSA has also participated in literally dozens of conferences and seminars promoting sprinklers as a viable alternative to upgrading passive fire protection to ensure Approved Document B compliance. One of the most popular CPD presentations we deliver covers the use of sprinklers in heritage and historic occupancies

Official attitudes

The present situation is that use of AFSS is wholly accepted in Scotland where the local codes accept and encourage the use of sprinklers in premises being refurbished or reconstructed for a change of use. Part 2 of Historic Scotland's *Guide for Practitioners No 7* contains extensive information on how AFSS can be used in such premises and makes it clear that their installation may be actually less intrusive than the alternative methods of achieving code compliance, for example by upgrading structural fire safety measures. Sadly, there is no equivalent document in England so there is no 'official' encouragement.

In Wales, all conversions of buildings into residential accommodation or residential care premises are required to be protected by AFSS. Also in Wales, the National Library of Wales installed a low pressure water mist system in its original building to complement the sprinkler system installed in 1993 in its Building 3.

There are some individuals working for the major heritage organisations in England who are still anti sprinkler or at least 'sprinkler-sceptic' – for example, an English Heritage inspector in 2006 referred to a proposal to install sprinklers in a Gloucestershire museum as 'suicidal'. The then director general of the National Trust (NT) for England and Wales said, following the fire which destroyed a major 18th century building, Clandon Park, that the Trust 'had a policy not to install sprinklers because these potentially pose problems for collections if there is a fault' – although a few NT premises including Styall Mill have subsequently been fitted with sprinklers or water mist systems.

Perhaps the reality is more to do with finances than concerns about reliability. It's a fact that historic buildings are very expensive to own and almost always suffer maintenance shortfalls. However, those working with heritage buildings will always come across misinformed 'experts 'who try to bypass the installation of AFSS on the grounds that they might leak or operate accidentally.

The situation in Scotland is more positive with four National Trust for Scotland properties fully protected. There are also three fully protected Historic Environment Scotland properties fitted with sprinklers or water mist. Work was also underway to install a water mist system in the Glasgow School of Art at the time of the destructive fire in 2014.

The fatal fire in the Category B-listed (=GII*) Cameron House Hotel in 2017 resulted in a fatal accident enquiry[2] which recommended that:

The Scottish Government should consider introducing for future conversions of historic buildings to be used as hotel accommodation a requirement to have active fire suppression systems installed.

A working group set up by the Scottish Government with representation from the fire industry is expected to support wider use of AFSS.

The private sector

Those properties in private hands, usually with owner-occupiers, tend to take their cue from advice given by the government heritage bodies so there are more protected buildings in Scotland than in England. Owners are also influenced by the two National Trusts – often using the same specialist architects and insurers.

The most encouraging possibilities arise from enlightened owners who see the business continuity benefits of AFSS. A sprinkler installer has recently had an enquiry from a large estate which is a popular wedding venue, and which has benefited from the destruction of Clandon Park, which was also a wedding venue. Another, Linton Hall in Cambridgeshire was destroyed in an arson fire which resulted in 15 claims (and possibly litigation?) from couples whose weddings had to be reorganised.

Possible targets

Together with promoting wider sprinkler use in schools, it is suggested that other suitable structures and premises which would benefit from retrofitting AFSS would be the following:

- seaside piers
- large museums, galleries and libraries
- private school boarding houses
- university buildings and residences
- residential care sector
- heritage buildings being converted into hotels

One very large Grade I listed university building has recently commissioned a feasibility study for the installation of an AFSS – mainly to manage fire service criticism of means of escape from an upper floor but also to protect valuable art works and an important chapel. Another university, motivated by the losses at the Glasgow School of Art fires, has commissioned a similar study for an iconic main building.

Future marketing efforts

The change in Building Regulations in Wales will encourage wider use of sprinklers in buildings being refurbished as well as new-build properties – this is already happening in the residential care sector which contains many listed properties. The same is true in Scotland where we anticipate a change in codes which will require retrospective installation of sprinklers in care premises.

I believe that we are getting our message across and gradually eroding the 'anti sprinkler' attitude and believe that the most effective approach is to continue to work on educating architects and building professionals. However I believe we need to be realistic about the extent of the market in the short – medium term and accept that there is little appetite to spend already constrained maintenance budgets on fire protection in the absence of any legal requirement to so do.

1. BIF 3 Heritage Buildings and Sprinklers: www.bafsa.org.uk/bafsa-publications/bifs
2. Determination by Sheriff Thomas McCartney under the Inquiries into Fata; Accidents and Sudden Deaths etc (Scotland) Act 2016 into the deaths of Simon Midgely and Richard John Dyson. Cited as: [2023] FAI 1 B38/21

Sprinklers in car parks – BIF 21: rev 2023

Following major fires in car parks around the world, it is now recognised that "Designers should seriously consider sprinkler provision to avoid multiple vehicle fires, resulting in huge insurable losses and the possible loss of life".

Warning signs

While serious fires in car parks here in the UK had hitherto been rare; major fires in car parks have occurred elsewhere:

- Gretzenbach, Switzerland – seven firefighters were killed when a car park collapsed.
- Ivry-sur-Seine, Paris – 200 cars were destroyed.
- Stavanger airport – hundreds of vehicles damaged and car park partially collapsed

On the evening of 31st December 2017 a fire occurred at the Kings Dock multi-storey car park in Liverpool and the blaze led to the loss of over 1,150 vehicles. The fire so affected the structure of the building that demolition was required. As a result of their investigations, Merseyside Fire & Rescue Service has stated: "Designers should seriously consider sprinkler provision to avoid multiple vehicle fires, resulting in huge insurable losses and the possible loss of life". This car park has been rebuilt and is now protected with sprinklers.

In each case, a single car fire spread to other vehicles parked nearby, creating large conflagrations that eventually resulted in serious structural failure and collapse of the buildings concerned. As a result, fire-fighters and other building professionals have been expressing fears about the potential dangers posed by fires in modern motor vehicles and their methods of storage.

New hazards

Today the average family car is larger and more massive than in the past. Significantly more plastic is used in modern cars. The fuel tank is often plastic and can rupture in a fire, releasing the fuel and rapidly spreading the fire. In short, modern cars can produce fires which are larger and propagate much faster than was previously possible. Electric vehicles are now becoming common and their batteries can burn. When they do, they can produce intense horizontal flames that may ignite adjacent vehicles.

Building regulations

Guidance on the fire precautions considered necessary in the design and construction of car parks can be found in the Approved Document B to the Building Regulations for England and Wales (ADB) and Scottish Technical Standards. This guidance currently does not require sprinklers to be installed in car parks.

Instead, reliance is placed upon smoke ventilation, either natural or mechanical systems; or 'passive protection' such as fire walls and doors. However, this guidance was based on fire tests carried out in the 1960s and on cars which are very different from those manufactured today.

There is a lack of up-to-date data on fire behaviour in the built environment resulting from the latest trends in automotive technology. This lack of up-to-date knowledge has led to concerns that current UK building standards are no longer entirely appropriate for modern day car park risks – particularly where they now contain electric vehicles (with or without charging facilities) or car stackers.

Government concerns

In 2006, Communities & Local Government (CLG) Sustainable Buildings Division commissioned the Building Research Establishment (BRE) to carry out a three-year project looking at the problems associated with fires in car parks. The research provided valuable information for designers and other building professionals about the hazards and risks associated with modern cars, published by CLG in 2010 as, 'Fire Spread in Car Parks BD2552'. This work confirmed that the fire load of a car had indeed significantly increased (due to increased size, mass and use of plastics) since earlier research.

Of particular interest, the report highlights the fact that the provision of an automatic fire sprinkler system can restrict an outbreak of fire to the vehicle of origin – and thus allow safe entry for firefighters to fully extinguish any remnants of a fire.

Indeed, without some form of early fire suppression, a fire may develop and spread quickly, producing very high temperatures, large volumes of smoke and a risk of concrete spalling, with conditions too dangerous for fire-fighters even to enter the building. Yet even this research is now dated, not considering electric vehicles nor plastic fuel tanks.

Modern storage methods

With increasing economic pressure on land use, combined sometimes with planning restrictions imposed on off-road car parking, developers are turning to automated mechanical parking systems – commonly known as 'car stackers' – to provide adequate parking, particularly beneath urban residential developments.

The result is a higher density of vehicles, in both horizontal and vertical arrays. This poses greater dangers to firefighters in accessing and fighting such a fire. Automatic fire suppression in all such developments should be an essential life safety feature. Indeed countries such as Germany and Spain have introduced legislation requiring sprinklers in these types of car parks.

System design and installation

There is nothing mysterious about sprinkler systems. The high reliability and effectiveness of these systems has come about over the years by strict adherence to the Sprinkler Rules and design standards.

Car parks should therefore be protected by automatic fire sprinklers in accordance with BS EN 12845. As car parks are often unheated and highly ventilated areas, particular care and consideration should be given to the risks of sprinkler system water freezing (i.e. it may be necessary to employ a 'dry pipe' sprinkler system design). BS EN 12845:2015 recommends that car park sprinkler systems be designed to hazard classification OH2. These designs have proven able to prevent fire spread between multiple vehicles, affording firefighters time to enter the car park and complete extinguishment of any residual fire (cars are designed to keep rain out so it is unlikely that sprinklers will completely extinguish a vehicle fire). Recently, it has been asked whether OH2 designs can deal with fires in modern cars, in particular electric cars. Research conducted to date by NFPA and RISE in Sweden indicates they can. Nevertheless, FM Global has increased the hydraulic demand for car park sprinkler designs, citing concerns about increased fire load. British insurers have followed suit and now require systems to be designed to HHP3, as in LPC Rules TB229. Such systems require about five times as much water as those designed to OH2. If a system is being installed to comply with Approved Document B, it can correctly be designed to BS EN 12845 without applying TB 229 (i.e. OH2 instead of HHP3). The discrepancy between the two current requirements is conspicuous.

When selecting contractors to design and install sprinkler systems it is essential to choose only those who are capable and competent with established track records and who can offer proof of compliance with an established quality assurance system.

Monica Wills House, Bristol

- In December 2006, a fire occurred at a newly constructed residential care home with underground car parking in Bristol.
- In accordance with established principles for alternate compliance in support of building regulations (Approved Document B) the residential portion of the premises was sprinklered to allow for extended travel distances. However, the car park was not sprinklered as this is not required by Approved Document B.
- Fire destroyed 22 cars and spread to upper levels via external windows.
- One person died as a result of smoke inhalation – 60 residents were evacuated.
- A residential sprinkler system prevented the spread of fire into the residential area and, no doubt, saved many more lives.

BAFSA together with BRE Global has conducted experimental work on car stacking risks and this provides useful information. Copies of this report can be downloaded from the BAFSA website.

Experimental study of fire spread in car parks by BRE Global

A test rig was constructed, measuring 6m x 12m, with space for four cars but leaving one vacant parking space. The structure was enclosed at high level but with low level ventilation.

In test number one, without sprinklers and with small to medium sized family cars, fire spread from the car of origin (car one) to involve all three vehicles. It took twenty minutes to involve car two; however, only twenty-one minutes from ignition to involve car three when the test was terminated to avoid serious damage to monitoring equipment! Nevertheless, with the data gathered revealing a 'peak heat release rate' of 16 megawatts, this test clearly revealed the ability of this type of fire to spread to other vehicles and severely damage buildings.

Similarly in test number 3, but this time using medium to large vehicles, the fire spread to all three cars taking just nine minutes to involve car two and a further one minute to involve car three. Once again, because of the rapid fire spread, the test was terminated early thus avoiding costly damage to the calorimeter.

Test with sprinklers

However, in test number two, again with a similar arrangement to tests number one and three, the opportunity was taken to install a sprinkler system and observe the results; therefore

the rig was provided with a sprinkler system, designed as closely as possible to replicate a typical underground car park sprinkler system, to BS EN 12845 Ordinary Hazard 2. After ignition, the first sprinkler head operated after four minutes and subsequently all heads within the rig operated; but in this case, the fire did not spread to either car two or car three. The test was terminated after one hour with the fire dying down.

Fire Spread in Car Parks' BD2552' published in 2010 by CLG

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Educational buildings – data review

1.0 Educational premises

There are different government approaches to the installation of sprinklers in Schools. In England the installation of sprinklers in schools is only an expectation whilst in Scotland it is required by Regulation and in Wales it is driven by central funding.

According to UK fire statistics,[1] in Great Britain there were 1,937 fires of which 411 were recorded as deliberate in educational premises for the period 2018/19 to 2020/21.

1.1 Educational building types identified with sprinkler systems present

In total, data was provided for 50 fires where sprinklers were identified as being present in educational buildings. The majority of the 50 fires with sprinkler systems reported as present were in Secondary schools accounting for 34 or 68% followed by Infant/primary schools with 9 or 18%.

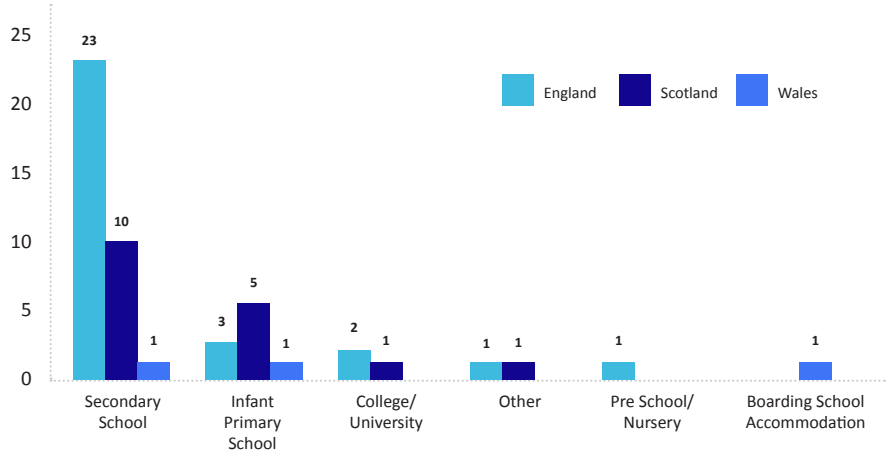

Figure 1. Number of fires within educational buildings installed with sprinkler systems

1 Source: Incident Recording System Datasets relating to primary fires in building attended by FRSs across Great Britain – obtained from England, Scotland, and Wales for the financial years 2018/19 to 2020/21

2.0 Impact of sprinkler system operation

Over the period the data was collated sprinkler systems operated in 18 of the 50 incidents where sprinklers were recorded as present. The majority of incidents 15 (84%) were in Secondary schools with a further 3 (16%) in Infant/Primary schools only.

Of the 18 educational fires where the system operated, data is available for the number of heads that operated.

EDUCATIONAL PREMISES	2018/19	2019/20	2020/21	GRAND TOTAL	%
Infant/Primary School	-	2	1	3	16
Secondary School	6	8	1	15	84
All actuations	6	10	2	18	100
	88.6%	9.5%	1.9%	100%	

Table 1. Number of fires where the sprinkler systems operated by educational premises

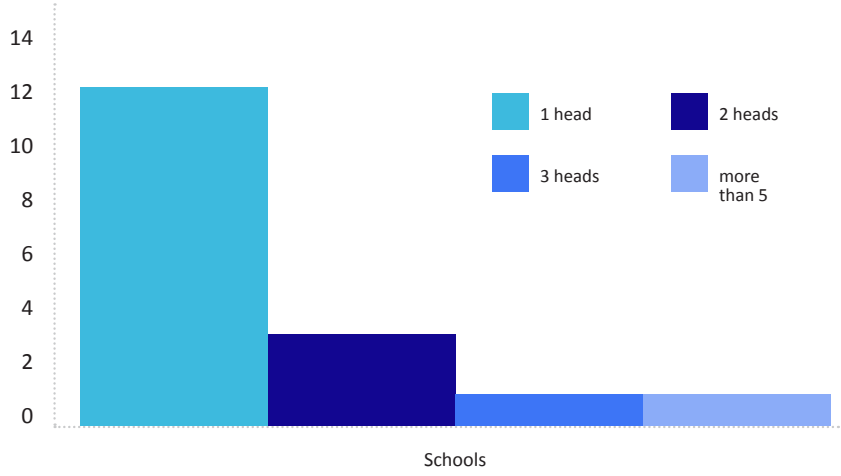

Figure 2: Number of sprinkler heads which operated

3.0 Comments/observations

- It is no surprise that England dominates the figures for the number of educational buildings reported with sprinklers present following a school fire as this accords with school populations. This is reinforced by the British Educational Suppliers Association (2021/2021) which identified 24,413, 5,052 and 1,553 schools in the England, Scotland and Wales respectively.

- In support of this, The Standard Specifications, layouts and Dimensions, Sprinklers for School Building publication was developed specifically for the Building Schools for the Future (BSF) programme. The BSF programme was introduced by the Department for Education with the aim of disseminating best practice for the installation of sprinklers. Principally aimed at secondary school buildings in England.

- Whilst the figures show an increase in the number of reported sprinklers present following a fire in secondary schools compared to infant/primary schools more data is needed to identify if this was due to the then BSF programme.

- The English government is currently consulting on proposed revisions to its fire safety guidance in schools: BB100. Identifying plans to make sprinklers mandatory only in special educational needs schools and schools over 11 metres in height. This means that the vast majority of schools will not be required to have sprinklers installed.

The Scottish Fire & Rescue Service reported three school fires involving a malicious act located in the toilets within the space of 4 months between February – May 2022. On each occasion the fire was contained/controlled or extinguished by the sprinkler system.

21 February 2022, Crieff High School
- 1x sprinkler head actuated
- Extinguished the fire

25 April 2022, Elgin High School
- 1x sprinkler head actuated
- Contained/controlled the fire

16 May 2022 Elgin Academy
- 1x sprinkler head actuated
- Extinguished the fire

Source, Sprinkler Saves UK

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Purpose built blocks of flats – data review

Post the Grenfell Tower fire, regulatory and sector changes relating to fire safety have occurred. One such change has been the increase in installations of sprinklers across the country with housing providers, local authorities and developers committing to install sprinklers in purpose-built block of flats on a new and retrofit basis.

Figures are not available to confirm the number of installations completed, or currently being undertaken across the country. However, data on fire incidents allows us to capture where sprinklers are reported and if they have activated. This provides a means to look at the trend of sprinkler incidents and by extension capture an indication of presence of sprinkler installations in the building population.

Here we focus on the 315 fires recorded where sprinklers were reported as being present in the following building types.

- Purpose built low rise, 1-3 storeys
- Purpose built medium high rise, 4-9 storeys
- Purpose built high rise 10 or more storeys

When the figures are broken down for the 3-year period, England account for the highest number of sprinklers reported as present following a fire.

PURPOSE BUILT FLATS	2018/19	2019/20	2020/21	TOTAL INCIDENTS	%
1–3 storeys	16	4	5	25	7.9
4–9 storeys	17	34	17	68	21.6
10 or more storeys	52	95	75	222	70.5
Grand total				315	100

Table 1. Primary fires attended by fire rescue services in which sprinklers were reported

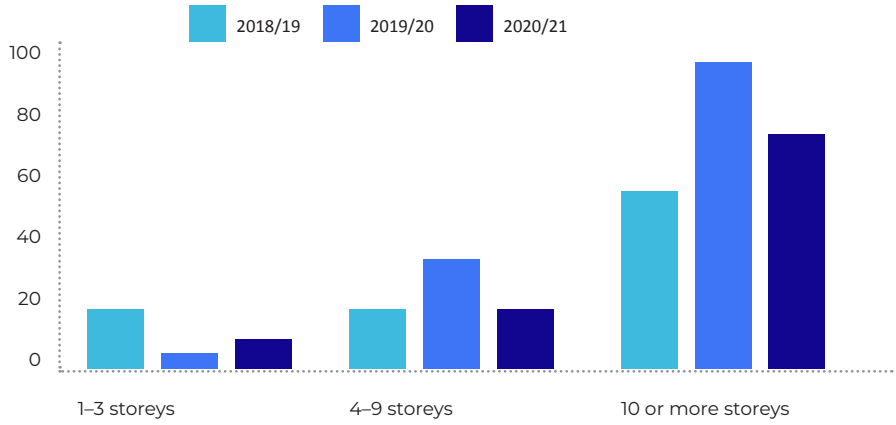


Figure 1: Number of incidents where sprinklers recorded as present by building height and financial year.

PURPOSE BUILT FLATS	ENGLAND	SCOTLAND	WALES	TOTAL
1–3 storeys	23	2	-	25
4–9 storeys	66	1	1	68
10 or more storeys	190	27	5	222
Grand total	279	30	6	315
	88.6%	9.5%	1.9%	100%

Table 2. Primary fires attended by fire rescue services in which sprinklers were reported by country.

1.0 Comments/observations

- The observation from Figure 1 that England dominates the figures is unsurprising based on the variation in the population figures and the number of high-rise residential buildings built since 1949 addressing the housing shortage across the UK.

  Unsurprisingly most reported incidents with sprinklers present are within the category of 10 storeys or more, Table 1. This would be expected given the regulatory guidance from early 2000's.

- Whilst the figures show an increase in the number of reported sprinklers present following a fire more data is needed to confirm a trend.

- The number of sprinklers saves resulting from the 315 incidents reported where sprinklers were present follows this data.

We will now focus on the number of sprinkler heads which have activated in the following building types:

1. Purpose built flats low rise, 1-3 storeys
2. Purpose built flats medium high rise, 4-9 storeys
3. Purpose built flats high rise 10 or more storeys

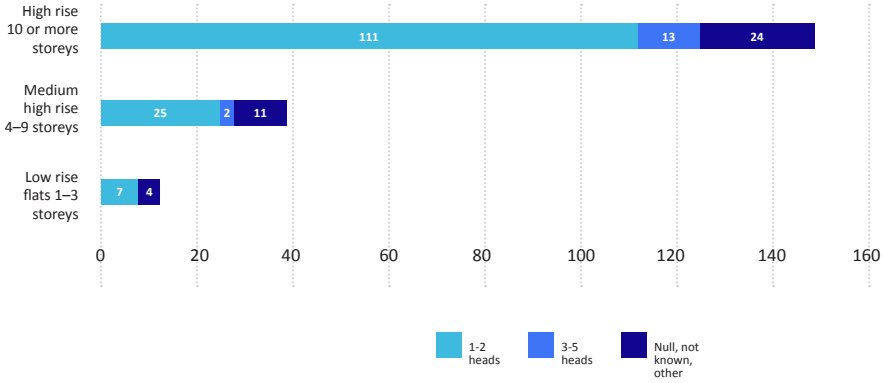


Figure 1. Number of sprinkler heads activated in purpose-built block of flats

73% of all incidents where sprinklers activated recorded 1 or 2 sprinklers heads operating.

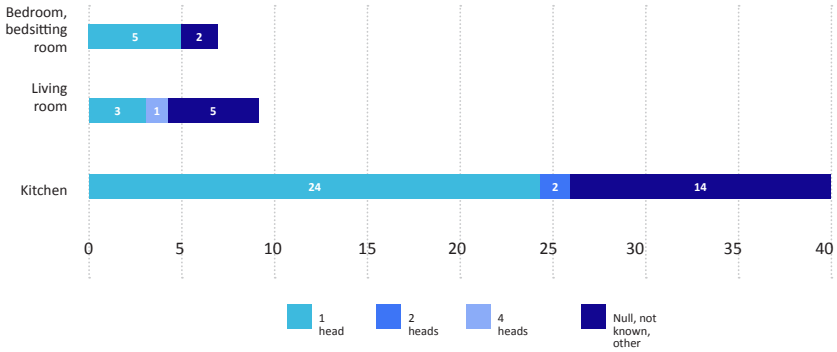


Figure 2. Number of sprinkler heads which activated by location with inside the flat

61% of fire incidents reported as starting inside of flats involved the operation of 2 heads or less. 57% with one head only. The majority as expected were reported to start in the kitchen.

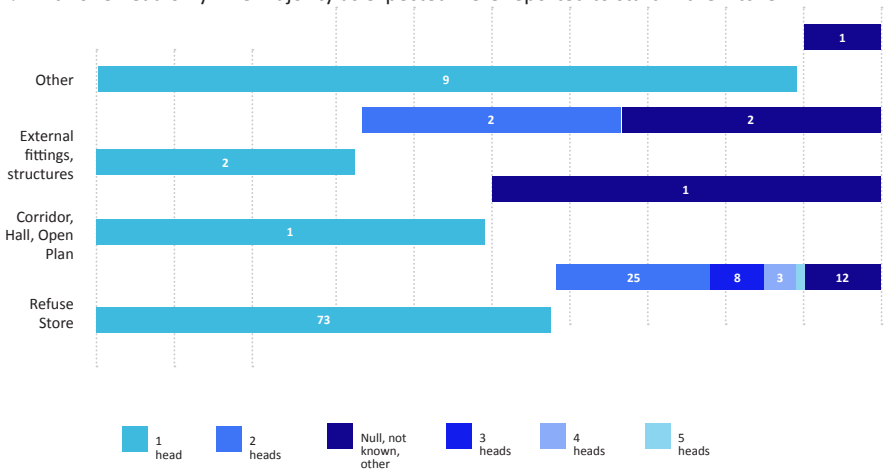


Figure 3. Number of sprinkler heads which actuated by location outside the flats

79% of fire incidents reported as starting outside of flats involved the operation of 2 heads or less. 60% with one head only. The majority as expected where reported to start in the Refuse Store.

General observations

- This fire incident data report is further evidence supporting the most recent UK research[1] commissioned by The National Fire Chiefs Council (NFCC), National Fire Sprinkler Network (NFSN) and supported by BAFSA. The report identified of the 788 incidents, in 65% of fires, only one sprinkler head was activated with a further 20% of fires activating two heads.

- What the data is unable to confirm is the number of heads actuated that are recorded as null, not known, or other or blank. To identify the number of heads for a specific actuation, further investigation. For example an incident reported in the dataset as null heads operating involved a balcony fire which was the subject of a London Fire Brigade report. The West Hampstead balcony fire which reported that 12 sprinkler heads activated in the space of 19 minutes.

1. Efficiency and Effectiveness of Sprinkler Systems in the United Kingdom: An Analysis from Fire Service Data – Optimal Economics 2017

‘Fire sterile areas’ in multi-occupied residential buildings

Ritchie O’Connell
BAFSA Representative in Wales

In the UK generally provisions for means of escape from flats are based on a number of assumptions i.e. fires will generally occur within a flat, the high degree high degree of compartmentation results in a low probability of fire spread beyond the flat of origin, and therefore simultaneous evacuation of the building is unlikely to be necessary; and although fires may occur in the common parts of the building, the materials and construction used there should prevent the fabric from being involved beyond the immediate vicinity.

Frequently however, in communal areas of blocks of flats both general needs and sheltered housing occupancies these assumptions are undermined by the unforeseen, and often unmanaged repurposing of communal areas by residents. In recent years when inspecting/assessing premises of this nature I have repeatedly found communal areas which have been annexed by residents either individually or communally, I have found common corridors, lobbies and stairwells which have been converted to gyms, reading areas/lounges and on one memorable occasion a residents lounge complete with mini bar and fridge!

BS 9251 makes several references to ‘fire sterile’ areas, allowing within these areas a reduction in the number of design sprinklers, or conversely when considering of blocks of flats and sheltered housing which would normally require category 2 sprinkler systems for the category to be increased to category 3 in “non-fire sterile communal building parts”.

This begs the question what is a ‘fire sterile’ area? And just whose responsibility is it to assure that areas designated ‘fire sterile’ remains so?

Approved Document B Volume : 1 Dwellings (2019 for use in England) offers the following in regard to communal areas;

Management of premises

0.6 The Building Regulations do not impose any requirements on the management of a building but do assume that it will be properly managed. This includes, for example, keeping protected escape routes virtually ‘fire sterile’.

“Appropriate fire safety design considers the way in which a building will be managed. Any reliance on an unrealistic or unsustainable management regime cannot be considered to have met the requirements of the regulations.”

Other guidance documents offer different but broadly similar depictions of fire sterile communal areas particularly escape routes BS 9991:2015 considers protected stairways as *"virtually 'fire sterile' areas which lead to places of safety…"*

But what does 'fire sterile' actually mean? In the absence of a specific definition in any of the published guidance documents we are left to form an opinion… In my opinion fire sterile means that an area will be kept free from stored combustibles, the wall and ceiling linings should conform with Building Regulations, there should be limitations on the use of thermoplastics in ceiling lights and diffusers and floor coverings should be of low combustibility - but opinions on this matter vary.

At plan stage the architect draws the building and, on the plans provided, there may be areas with no discernible function i.e. the seemingly purposeless dead end corridor area below.

We may wonder why this space was left fallow, and it may be because the corridor needed artificial light or ventilation, or, particularly in converted buildings, there may be maximum permissible dimensions to flats in order to attract grant funding for affordable homes and having fitted in as many flats as possible within those parameters there are just areas of floor space left over. No problem, right?

At this stage it is just lines on paper and poses no risk, post occupation however this becomes a different prospect!

Are the residents aware that as the area is intended to be 'fire sterile', sprinkler design density may have been reduced? And if they did know would they care? Similarly, is the building management team aware that the area should remain free from/contain only very limited combustibles?

When the plans are submitted to Building Control the building control officer/inspector should comment on these areas, stressing the need for management of them and the necessity for this

information to be disseminated to residents. Similarly, when the plans are submitted to the the Fire & Rescue Services (FRS) for statutory consultation the fire service should raise concerns under the Regulatory Reform Fire Safety Order (RRFSO)? Whilst some do, the increasing pressures on building control bodies and FRS fire safety departments means this is often missed.

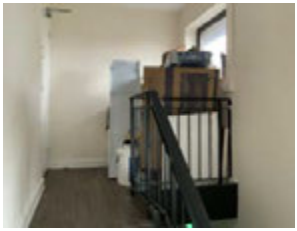
Even if the issues are picked up at Building Regulations consultation stage pre-occupation, the risks are often not effectively managed post-occupation.

There are two broad approaches to the use of communal areas the first of these is 'Zero tolerance' where residents are not allowed to introduce any additional items into communal areas. Sometimes viewed as draconian this policy offers the advantage of being unequivocal.

Alternatively building managers may take a 'managed use' approach and allow certain low risk items to be introduced; viewed as more user friendly, this is often more popular with residents. This approach in theory would include a list of those things which are and are not allowed in communal areas, but as the policy regarding combustibles in communal areas is often not explicit and is left to individual building managers, this can lead to an almost 'laissez faire' approach, particularly if the building manager is not fully aware of the risks. This approach can be more difficult to police as residents may not perceive the difference between the combustibility of one item and another.

Is this, ok?

What about this?



And now?

Additional problems are created when service risers, electrical intake rooms and gas cupboards are not secured.

The situation is compounded by some fire risk assessors also failing to identify the risks. At a recent fire risk assessment at a sheltered housing complex, I found that the communal areas were routinely being used to charge mobility scooters - to the extent a multi[1]point extension lead had been provided by residents for use with the communal fire supply, the common areas had also been furnished with comfortable chairs by the residents. I was accompanied by the site manager who was astonished that this was an issue, as the previous assessor - who had been there on many occasions - had never commented on the situation.

We need greater clarity on what should be permissible in communal areas, with the emphasis taken off' means of escape' as areas which are means of escape adjacent could easily compromise escape routes were a fire to break out.

A definition of fire sterile should be published and made explicit within both Building Regulations and the RRFSO - the Fire Safety Act would be an ideal vehicle for achieving this.

Housing providers and facilities managers/site mangers should be made aware via the Regulation 38 package and the "Golden thread" of the necessity for controlling /eliminating fire loading in these areas.

Where "managed use" is the adopted policy for the control of fire loading areas the policy should be explicit and should be examined as part of the risk assessment/ audit process.

We continue to build premises with single evacuation routes from all or parts of the premises, there is an implicit assumption that these escape routes will always be available, failing to maintain these areas free from combustibles undermines that principle, greater emphasis is required on regulating and policing the fire load present in common spaces in multi occupied residential buildings before we are faced with another preventable tragedy.

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Lithium-ion batteries

A BAFSA Insight

The risks

Some modern buildings, electric vehicles including E-bikes and E-scooters, and many other modern gadgets, are powered by lithium-ion batteries. As an example, an E-bike battery, is made of dozens of small battery cells about the size of an AA battery, over heating or damage to one cell can cause a cascading chain reaction where one cell triggers other cells to fail, which can create a catastrophic fire. Thus, it is essential that they are stored and charged safely to reduce the risk of fire.

In America, the U.S. Consumer Product Safety Commission (CPSC) has reported that at least 19 people have died in the United States in 2022 because of fires or overheating incidents related to battery-powered products such as E-bikes, scooters and hoverboards. In New York City alone, fires caused by lithium-ion batteries powering these micro-mobility devices have been responsible for at least 208 fires in 2023, resulting in 142 injuries and six deaths, a spokesperson for the New York Fire Department (NYFD) said.

As a result, the CPSC, is urging all batteries to be built to UL standards, with demonstrable certification and compliance and the NYFD is seeking greater education for end users with regard to battery care and associated fire risks.

Closer to home, on the 30th June 2023 an E-Bike has been identified as the most likely cause of a fire that tragically resulted in the death of a mother and two children in Cambridgeshire [1]. In 2023, on average, London Fire Brigade (LFB) has been called to an E-bike or E-scooter fire once every two days – a 60 per cent increase in the rate of these fires compared to the same period as last year. According to data collected by the Brigade, most people injured in fires related to E-bikes and E-scooters are in their 20s, and often the fires are in homes where multiple adults are living together without children. The most risky time for these fires to take place are when charging batteries. This is the time that batteries are most likely to fail. Currently there is limited data relating to the number of fires, but London Fire Brigade reported eight fires caused by E-bikes and E-scooters in 2019, so far in 2023, firefighters have attended 55 E-bike and 14 E-scooter fires in London.

The potential fire risk posed by Lithium-Ion Batteries has led to the development of new safety guidance. Fire safety bodies around the world are now issuing guidelines and advice regarding charging E-vehicles which owners and building management teams should heed. They include:

- Charge your batteries in a safe place:
- Do not charge batteries where they may prevent you from escaping in the event of a fire.
- Disconnect the battery and unplug your charger when the charge cycle is complete. Don't leave items on charge continuously, e.g. overnight.
- Do not charge batteries close to combustible materials or hazardous substances.
- Do not charge lithium-ion batteries where high temperatures or sunlight are to be expected.
- Do not cover lithium-ion batteries whilst charging.
- Ensure there are smoke/heat alarms in the vicinity of the charger
- Does your electrical installation have Residual Current Devices fitted that can switch off the power in the event of a fault?
- Do not install batteries not designed for your E-vehicle
- Use chargers for your specific E-vehicle only
- Avoid parking your E-bike near access points and walkways.
- Where possible avoid charging your battery inside your building
- At least a standard ABC or dry chemical fire extinguisher should be at the charging point… Lithium-ion batteries contain liquid electrolytes that provide a conductive pathway, so the batteries receive a Class B fire classification.

BAFSA believes that all occupiers of residential premises should be automatically issued with advice such as this either by the building management team or the fire safety department of the FRS.

LFB have gone one step further. Firefighters across London are meeting delivery drivers to give them safety advice in a bid to reduce the growing number of E-bike fires that are happening in the capital. The delivery driver engagement activity is part of the Brigade's #ChargeSafe campaign which aims to highlight the fire risks associated with lithium-ion batteries. www.london-fire.gov.uk/safety/lithium-batteries/charging-electric-bike-and-electric-scooter-lithium-batteries/.

The outreach work with delivery drivers follows incidents where fire crews have found delivery bags at the scene of fires. Firefighters from 102 fire stations are distributing leaflets at restaurants, takeaways and bars. The info contains a QR code which links to important safety information. The Brigade is also reaching out to delivery companies such as Just Eat, Deliveroo and Uber Eats, so they can support efforts to provide urgent safety messages to their drivers, in order to prevent ferocious fires associated with E-bikes and lithium batteries when they fail.

Guidance

Lithium-Ion batteries are omni-present in warehouses and massive distribution centres, as well as residential buildings and multi storey, mixed use premises throughout the UK and the Fire Protection Association has issued comprehensive guidance on the subject some of which focuses on sprinkler protection:

3.3 Storage

There are currently no specific UK or European guidelines for fire protection of lithium-ion batteries storage. However, practical guidance is available in the following FM Global documents and is summarised below:

- FM DS 3-26 Fire protection for non-storage occupancies (Section 3.3 Lithium-ion batteries), 2021
- FM DS 8.1 Commodity classification (Section 2.4.2 Lithium-ion batteries), 2021 When incidental levels of lithium-ion batteries are stored in areas that are sprinkler protected for ordinary hazard occupancy† :
    - Limit storage area to no greater than 20m^2
    - Limit storage height to 1.8m
    - Separate multiple storage areas by aisles not less than 3.0m wide
    - Maintain a battery state of charge ≤60% F

For sprinkler protected areas where the above incidental storage criteria are exceeded:

- Sprinkler specification: Twelve K320 or K360 sprinklers, operating at 2.4 bar † Protection based on storage of lithium-ion batteries presenting a hazard no greater than the general occupancy hazard, a maximum ceiling height of 9 metres, and CMDA sprinkler protection designed to provide 12mm/min over an assumed fire area of 230m2 for wet systems: 12mm/min over 330m^2 for dry systems. (Based on FM HC-3 occupancies)

Need to know guide RE2 5

- Limit storage to three tiers high (maximum 4.5m high in racks or palletized)
- No other storage is permitted above the batteries
- Maximum ceiling height 12m

The packaging arrangements of lithium-ion of batteries is a key element in the success or failure of sprinkler protection. Fire control is achieved when sprinklers wet and cool cardboard packaging such that chain thermal runaway reactions are prevented and fire spread contained.

Fire control for stored lithium-ion batteries is reliant on the following elements:

- Cardboard packaging with cellulosic and/or unexpanded plastic internal packaging only
- Battery state of charge ≤60%
- Battery electrolyte weight ≤20%
- Battery capacity ≤41 Ah

For storage of lithium-ion batteries in non-sprinklered facilities, fire protection measures similar to those for Battery Energy Storage Systems (BESS) are recommended‡ , including:

- Lithium-ion batteries storage rooms and buildings shall be dedicated-use, i.e. not used for any other purpose.
- Containers or enclosures sited externally, used for lithium-ion batteries storage, should be non-combustible and positioned at least 3m from other equipment, buildings, structures, and storage.

Note: greater separation distances may be appropriate from critical buildings and installations and to meet specified strategic spatial fire separation expectations

- Lithium-ion batteries storage in rooms forming part of buildings should be separated from other areas by minimum 2-hour fire rated construction.

The full document can be found here thefpa.co.uk/advice-and-guidance/free-documents?q=RE2:%20Lithium-ion%20Battery%20Use%20and%20Storage

In June 2023, the BSA commenced a consultation on the draft PAS 63100 Electrical installations – Protection against fire of battery energy storage systems for use in dwellings – Specification

This PAS specifies requirements for fire safety in the installation of domestic and similar small-scale electrical energy storage systems (EESS) utilising secondary batteries as the medium for energy storage.

The PAS defines fire safety requirements for the installation of EESS components including:

- physical requirements for battery units;
- battery management;
- power conversion equipment (PCE); and
- fault management and fail-to-safe operation of all control and monitoring functions.

The PAS covers installation requirements for:

- installation location in respect of safety and external influences that affect fire safety;
- preparation for safe transportation of batteries by installers and maintainers; and
- protection against fire.

The PAS does not cover:

- battery systems with nominal voltages exceeding low voltage as defined in BS 7671;
- transportation of batteries;
- systems incorporating second life batteries;
- EESS that use alternative forms of energy storage;
- EESS in high risk residential buildings (HRRB's); and
- EESS connected before a distributor's cut-out or a consumer's meter (collective PEI and shared PEI).

Note: Existing regulations, The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (CDG), cover the transportation of batteries.

The PAS is for use by designers and installers of EESS forming part of electrical installations of dwellings and similar simple electrical installations.

It may also be of interest to manufacturers of products forming part of the installed EESS and bodies providing independent certification of products forming part of an EESS.

Anyone concerned by the vulnerability of their premises caused by the storage and charging of E-vehicles should consult a qualified fire protection engineer who will understand the risk and can offer insight to provide a reasonable level of protection to mitigate the hazard. BAFSA members can advise when planning a protection plan for a sprinkler system for areas at risk from fires involving lithium-ion batteries.

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Sources
NFPA :Sprinkler Protection Guidance for Lithium-Ion Based Energy Storage Systems – NFPA.org
UK FIA: Guidance on Li Ion Battery Fires (fia.uk.com)

6.5.1.3 Water mist systems

Water mist systems uses small water droplets to provide flame cooling and steam smothering of fires. Their design basis is always determined by full scale fire testing. therefore, water mist should only be used for the protection of lithium-ion batteries where there is an established test protocol. Note: There are currently a number of research projects currently investigating the application of water mist on vehicle fires.

6.5.1.4 Sprinklers systems

Automatic fire sprinkler systems consist of special nozzles, held closed by heat sensitive frangible elements, mounted in steel pipework, at ceiling/roof level, and connected to a dedicated water supply via control valves. The heat from a fire causes one or more sprinklers to open to discharge water onto the seat of the fire and adjacent combustibles. The amounts of water and the number of sprinklers expected to open will increase as the fire load density increases. In heated buildings, they may be charged with water, but in areas subject to freezing, they will be primed with air until a sprinkler opens. In areas where water damage could be problematic, systems may be primed with air and water admitted when smoke is detected ahead of sprinkler operation. Only sprinklers in the immediate vicinity of a fire open when subjected to the heat from a fire. Sprinklers provide direct wetting of combustibles and surroundings. Sprinkler protection of lithium-ion batteries is outside the scope of current standard sprinkler design standards e.g. EN, NFPA/FM, however, specialist standards are being developed for example NPFA 855

6.5.1.5 Water deluge systems

Deluge systems, unlike sprinklers, use open nozzles so that, when actuated, water discharges from all nozzles in the system. Deluge is used primarily as a means of cooling surfaces exposed to fire. When activated by fire detection systems, they can come into operation more rapidly and provide more comprehensive coverage than sprinklers.

Environmental issues

Electrification of transport has multiple benefits but has also raised some concerns. For example, the use of rare metals and their sourcing are concerns from an environmental perspective, the capacity of the electricity network and the limited number of charging stations has been raised as an implementation barrier, and the new fire and explosion risks of batteries have caused concerns amongst users, property owners and rescue services alike society.

Fires starting in the traction batteries (lithium-ion battery) are rare but if the battery catches fire, it can be difficult to extinguish since the battery packs are generally well protected and difficult to reach. To cool the battery cells, firefighters must prolong the application duration of suppression agent. This generally results in use of large amounts of water/fire extinguishing agent, which could carry pollutants into the environment.

In this work, extinguishing water from three vehicle fires as well as from one battery pack fire has been investigated. Large-scale fire tests were performed with both conventional and electric vehicles. Tests were performed indoors at RISE, Borås, which also allowed analysis of combustion gases for both inorganic and organic pollutants in the gas and liquid phase.

It was found that nickel, cobalt, lithium, manganese and hydrogen fluoride appeared in higher concentrations in the effluents from the battery electric vehicle and lithium-ion battery compared to from the internal combustion engine vehicle. However, lead was found in higher concentrations in the effluents from the internal combustion engine vehicle, both in the combustion gases as well as in the extinguishing water. Ecotoxicity analysis showed that extinguishing water from all vehicle and battery fires analysed in this work were toxic against the tested aquatic species.

In this work conducted by RISE Research Institutes of Sweden AB, resulting in the RISE Report 2023:22 ISBN: 978-91-89757-65-3 2023.

This work is a continuation of the RISE project ETOX, results presented in RISE report 2020:90 [1] “Toxic Gases from Fire in Electrical Vehicles” funded by the Swedish Energy Agency (No. 48193-1). Results from ETOX provided a scientific basis for relevant risk assessment dealing with fires in electric vehicles. The results regarding the fire extinguishing water analysis presented in this report has previously been published in Environmental Science and Technology (DOI: 10.1021/acs.est.2c08581).

Latest development

The Model LB11 sprinkler was developed by BAFSA member, Reliable for the protection of lithium-ion batteries in battery manufacturing facilities; specifically in formation, ageing, and shipping/staging racks. There is currently no standard test commodity for lithium-ion batteries. Thus, standard exposed expanded Group A plastic commodity was used in listing tests. Further testing of the Model LB11 HSW sprinkler, beyond the listing, was conducted with lithium-ion batteries as described here reliablesprinkler.com/files/bulletins/084.pdf?x43659

Recent incidents where sprinklers were installed and suppressed fires cause by lithium-ion batteries

Wandsworth Recycling Plant

100 tonnes of mixed household recycling alight located within a waste disposal site

Birmingham 20 Storey Building

An electric bike left on charge in the hallway of the flat, compromised the occupants means of escape.

Quality and Approved

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Think sprinkler ... Think environment sustainability

Nick Coleshill
BAFSA Sprinkler Ambassador

Until I read an online article which identified the environmental benefits of fire sprinklers, the green credentials of sprinklers, never crossed my mind. On reflection, this is a very powerful argument that is under used to promote the benefits of fire sprinklers especially considering the recent United Nations climate change conference held in Glasgow in 2021.

On a regular occurrence, images from major fires across the country are published on social media and television, focusing predominately on both fire appliances, firefighters tackling to extinguish, control the fire, along with managing the large smoke plumes, generated predominately from Industrial and commercial fires.

Our immediate reaction is the financial and physical costs, the impact of losing the contents of the building, business disruption and jobs. The incident is then soon forgotten, old news lost in the cloud. However, do we ever consider the adverse consequences on our natural environment:

- Air contamination from the fire/smoke plume and the impact it will have on land and water courses.
- The impact of fire service firefighting activities, specifically the water run-off from firefighting hoses/jets containing toxic products
- Other environmental discharges or released from burned materials.

At what cost will this have on the environment with the disposal of the contaminated materials by a specialist contractor, the unnecessary waste, the use of resources to rebuild destroyed buildings and the creation of unnecessary carbon emissions.

Carbon is the greenhouse gas with the highest levels of emissions in our atmosphere. The gases absorb solar energy, keeping heat close to the earth's surface, rather than letting it escape into space, which is known as the greenhouse effect.

The impact of carbon emissions on the world should not be underestimated. We are seeing more extreme weather events taking place around the world. Icecaps are melting, sea levels rising alongside unprecedented global wildfires.

The social, community and environmental impacts of fire are far reaching. For example, the tragic chemical warehouse accident at the Sandoz facility in Switzerland in November 1986 described in the Marlair et al research paper[1]. This incident caused major emissions of pollutants to the air; the main environmental impact however was through the emission of toxic chemicals to a nearby water course.

The fire & rescue services (FRS) are fully aware of the environmental impacts of fire publishing sustainability, environmental reports with further guidance published by the government on environmental protection, providing further guidance for FRS on preventing and dealing with incidents with the potential to pollute.

Active fire protection systems, specifically Automatic Fire Suppression Systems (AFSS) should be seen as part of a holistic approach minimising fire damage as part of a greener approach from the fire sector which is currently overlooked.

Fire sprinklers have been proven to have a good track record in reducing the impact of fire. The most recent UK research was commissioned by The National Fire Chiefs Council (NFCC), National Fire Sprinkler Network (NFSN) and supported by BAFSA in the publication, "Efficiency and Effectiveness of Sprinkler Systems in the United Kingdom: An Analysis from Fire Service Data"

Across all premises types:

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

The Business Sprinkler Alliance commissioned Bureau Vertitas to complete a report[2] into the environmental and community impacts in the events where fire sprinklers are installed, and not installed in industrial and commercial buildings. These reports focused predominately on the carbon life cycle assessment of fires in these types of premises.

The methodology, research was conducted through:

- The collation of case study fires
- Reviewing and evaluating relevant research reports and fire incident data
- Interviews and discussions held with various departments, FRS and scientists in this field

The outcome of the report identified that there are a range of environmental and community benefits that come from installing fire sprinklers in these types of premises in England and Wales. These include:

- Water use, if fire sprinklers are installed and activated by a fire, the quantity of water used to fight a fire is 0.02% to 17% of the quantity that would be used if sprinklers were not installed and a fire to occur.
- Annual water use for firefighting would fall to 4,368,000 liters per year
- Reduction of carbon emissions from between 144,000 to 348,000 tonnes of CO_2 a year.
- Installing sprinklers over the 30-year life span of the building, net carbon benefit in buildings greater than 5,000-10,000m²

Smaller dwelling fires

So, what are the key credentials of installing fire sprinklers in a domestic setting? The Home Fire Sprinkler Coalition commissioned FM Global to complete a report[3] focusing on a number of full-scale fire tests comparing the environmental impact of sprinklered and non-sprinklered home fires using identically constructed and furnished residential living rooms.

In one test, fire extinguishment was completed by FRS intervention. In the other test, a single residential fire sprinkler head controlled the fire until final extinguishment was achieved by the FRS.

It was identified that the use of fire sprinklers:

- Reduced, greenhouse gas emissions by 97.8%
- Water usage reduced between 50% and 91%
- Reduction in Pollutants, such as heavy metals found in sprinkler water run off compared to fire hose water
- High pH level, pollutant load of non -sprinkler wastewater

It is a well-known fact: fire sprinklers provide life safety and limit property damage as well as protect firefighters. This report identifies that fire sprinklers can also play a key part in achieving sustainability with their green credentials.

As part of our goal to make the presence of sprinklers the norm, not the exception should we not be promoting the wider ranging benefits of installing fire sprinklers namely reducing the effect of greenhouse gases.

Sprinklers are green ...

1 Guv Marlair-Environmental Concerns of Fires: Facts, Figures, Questions and New Challenges for The Future.
2 Bureau Veritas -April 2011, Assessing the role for fire sprinklers – Bureau Veritas -April 2011.
3 FM Global, (2010) Environmental Impact of Automatic Fire Sprinklers Report. FM Global Research Division. Sprinklersaves.com

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Technical Q&A

Joe Mc Cafferty
BAFSA Technical Support

Every day of the year BAFSA receives enquiries from a variety of individuals who seek clarification or further information with regard to legislation; standards; design and installation; inspection and maintenance and many other issues.

Here is a selection of enquiries received during the past few years and the BAFSA responses to them.

When a maintenance engineer checks our sprinkler system do they have to check every single sprinkler head?

When the engineer does the inspection/review of a hazard, it is expected that any changes affecting the sprinkler system would be picked up. This would be a combination of the inspector looking at the system including heads and the client advising about any work/changes to the system that may affect the sprinklers. It may be impractical for the inspector to get to see every single sprinkler head (i.e. some may be in an inaccessible area like over hazardous operating equipment, hot areas, areas with dangerous fumes etc), so they depend on the client telling them where any work has been done i.e. new partitions/walls, new equipment at the roof, painting or spraying near the sprinkler heads and identifying the areas so the inspector can check. Note: your insurer should also be told about any changes of structure/services etc. In summary it is a combination of the inspector and client's engineers working together to identify any changes, damage, or impairments.

Can sprinklers be installed in a hotel kitchen that has deep fat fryers?

Many industrial deep fat fryers will have their own specialised suppression system installed within the hood exhaust ducts. Sprinklers at ceiling level will usually be installed in a way that the hood acts as a 'baffle' and stops water spraying directly on to the hot oil. The specialised suppression system will most likely operate a lot sooner than the sprinkler system and will most probably extinguish the oil fire before/if the sprinklers are required.

Our client has taken over a warehouse that has an old sprinkler system which was installed over 30 years ago. We are not sure if it is still working or redundant. Are there any rules that state what we should do with the system to get it working if possible?

A sprinkler system installed over 30 years ago was probably designed to LPC Rules for automatic sprinkler installations, incorporating the text of BS 5306-2, which eventually became BS EN 12845. Even a system that old could be brought back into service provided the water supplies are still functional. Any of our BAFSA third party accredited members would be able to advise on its present condition and what steps can be taken to get it working again if possible. You can find a list of members on our website under the 'find a member' heading or in the directory at the back of our yearbook.

Do the Sprinkler Rules specify that the diesel pump must be placed on a raised reinforced concrete base?

BS EN 12845 does not state the pump base requirements but LPC Technical Bulletin 210 in LPC Sprinkler rules 2015 does address it. It states that pumps should be installed on a concrete plinth and a few other base options. It also states that it should be installed to the manufacturers data sheet recommendations.

We have sprinkler systems and water storage tanks in educational buildings and concerns have been raised by a health and safety inspector about the possibility of Legionella infection. What advice can you give?

Legionella bacteria is commonly found in water but becomes hazardous to humans when certain circumstances occur, here are just a couple of them i.e. water temperature is about 20-45°C, a very fine mist/droplet/aerosol (less than 20 microns) is generated.

This is an extract from the UK Insurers regulatory authority document that sums up the current industry thinking: "Neither the British Automatic Fire Sprinkler Association nor the Fire Industry Association has received or recorded any report of incidence of infection relating to wet fire suppression systems. This situation also holds true in North America, Australia, and New Zealand. Additionally, it would appear that there are no reports of outbreaks of legionella anywhere in the world where a water-based firefighting system has been identified as the source." My usual recommendation for minimising risk is: Regular system maintenance, water supply cleanliness i.e., no open top on tanks where, debris, bird droppings etc. can enter the water, regular inspection/ water quality test for bacterial infection and a decontamination programme if considered necessary i.e., chlorination. I do not think there is any statement that will satisfy the 'what if' scenario, so the responsibility is on the building owner to reduce the risk to the satisfaction of the Authority Having Jurisdiction who has the final say. I wish I could give you a much clearer and definitive answer, but I can only base my reply on the current industry thinking. Sprinkler systems have been used for well over 120 years!

Do we have to install sprinklers in our electrical room?

The industrial/commercial Sprinkler Rules BS EN 12845 expect all areas of a building to be sprinkler protected but does allow non-sprinklered exceptions where other fire prevention measures are in place. Electrical rooms are sometimes a concern for end-users as they worry about the very

rare risk of accidental damage or water leaks. Such rooms can be a source of fire and sooner or later water may be used (automatically or manually) to extinguish it. An alternative to sprinklers could be an inert gas extinguishing system. Many of our BAFSA members can supply/install these systems so have a look at our website.

We are a third party accredited residential sprinkler installer. We are hoping to start to install commercial jobs to BS EN 12845. I have commercial design experience and I have done approved training for installation, design and FHC using FHC software for residential systems. I am wondering what qualifications I need to start designing/installing projects? Any information would be greatly appreciated.

To design/install/maintain commercial sprinkler systems (BS EN 12845, LPC Rules etc.) you and your installation/maintenance staff need to be competent in each process. Training for the various design disciplines is critical and designers can sit Designer competence examinations. For installation/maintenance the company should become accredited by organisations like FIRAS, LPCB or WarringtonFire which have commercial sprinkler system accreditation schemes. If you go to their websites or call them, you should be able to find all you need to get started. Note: this is not an 'overnight' process and you must be prepared for many hours of data/document preparation and have suitable sites for the auditors to visit and make their assessments of your competency.

Is there any special requirement for the lettering that identifies where a Dry Riser is installed and can the lettering be recessed in a stone facade?

BS 9990 Clause 8.1 gives details of identification lettering for Dry Risers and there is no mention of recessing the lettering. The lettering should be clear and visible to the FRS in a prominent location and of the dimensions stated in BS 9990.

We recently had a report that stated the water in our sprinkler storage tank should have a pH level between 8.3 and 8.5. Is this a regulation and would we have to send water samples to an accredited laboratory for testing?

I have not heard anyone raising' warning flags about the range of pH levels of water in the UK. The UK Water regulations stipulate that water must be supplied within the pH range of 6.5 to 9.5. (pH 0 is highly acidic, pH 7 is neutral, pH 14 is highly Alkali). Pipe corrosion is most caused by: Microbiologically Influenced Corrosion (MIC), water with suspended debris/contamination, Dry sprinkler pipes that have 'puddles' of water left in them when drained causing 'oxidation/scaling'. It is not usual to hear that high corrosion rates are caused by high/low water pH Levels. The very precise number range mentioned i.e., 8.3 to 8.5 seems very narrow and it would be interesting to find out where it comes from. If the 25-year inspection shows elevated levels of steel pipe degradation i.e., serious pitting or pinhole leaks then I would look for another reason other than pH levels. If pH levels were an issue in your city location, we would have heard reports of high pipe corrosion and leaks. Many sprinkler systems in your area have been in service for well over 50 years and no pH level issues. If you wish you could do a sample test with one of the less expensive kits available, but you need only check for a pH level somewhere around the range allowed by UK Water Regulations i.e., 6.5 to 9.5.

Can we fit bird netting under the sprinklers in our loading canopy?

Open mesh bird netting is not considered a barrier or interference with the sprinkler system provided: a) It is professionally installed and pulled taut. b) It is not 'gathered' to such an extent that it is bulky and could impede the sprinkler spray. Any bunched-up netting areas should be stretched so they are not an impediment to the sprinkler spray. c) The netting should be regularly checked for any build-up of debris i.e., leaves, plastics, paper etc, and cleaned if necessary. d) None of the netting should be allowed to 'snag' on the sprinkler heads as they may get damaged. e) Ideally the netting should be of a material that does not add to the fire load of the area ... I note on internet searches that fire retardant netting is available.

We have been told that we cannot use elbows on our proposed new sprinkler system but must use 'standard bends'. Can you please advise where this is required in the Sprinkler Rules?

Bends usually have a curve to change direction as against and elbow which is nearly a sharp 90° change of direction. The Sprinkler Rules BS EN 12845 only differentiate between bend and elbow in Table 23 for equivalent lengths used for hydraulic calculations. Maybe someone is confusing the requirements of BS9990 for Wet and Dry Risers where it states: All changes in the direction of the run of the piping should be made with standard bends, springs, or long turn fittings. Elbows should not be used.

When we replace our Wet Riser pumps do they have to be of the LPCB approved type, and do we have to fully comply with BAFSA Information File 21 for Wet and Dry Risers?

Pumps for Wet Risers do not have to be listed by a third party like LPCB. But LPCB listed pumps are commonly used for this purpose because we have the reassurance that they comply with a rigorous standard ... I note that a prominent pump supplier default automatically to supplying LPCB listed pumps. Our BIF 21 is just a general guidance/information file for Wet/Dry Risers, it is not a regulation that the law requires you to follow. We would encourage the use of third party listed equipment for peace of mind. What is currently installed, are they LPCB or other approved pumps? If they are then that is what was acceptable to the AHJ's at the time of installation, and it is likely they would expect any replacements to be to an equal or higher standard.

NFPA Sprinkler Rules have been suggested for a new installation in our building. Are these common for use in the UK?

Besides BS EN 12845 Sprinkler Rules the other most commonly used commercial sprinkler design rules used in the UK are NFPA (13 and 20) + F. M. Global Data Sheets. Many American companies who have sites in the UK may have American Insurers and they tend to lean towards using NFPA Rules. Probably because they are more familiar with them than UK/European rules. These American standards, though not the most commonly used, are nevertheless familiar to and used by UK sprinkler system designers.

Can you direct me to any documents that relate to temporary fire protection requirements for a building during construction stage i.e., requirements for Dry Riser / Wet Riser? This will help me plan jobs correctly in the future.

The issue of temporary fire protection requirements during the construction stage of buildings is addressed in BS9990:2015 Paragraph 7.2. It states the following "In order that a fire occurring during the construction of a building can be dealt with effectively, especially in high or extensive buildings where large quantities of combustible materials might be stored, mains should be in an operational condition as soon as any floor of the building reaches 11 m above fire service access level. These mains should be extended and commissioned progressively as work on the building proceeds to provide fire-fighting facilities at all stages of construction. Where wet mains are provided, installation initially can be as a dry main. When construction reaches 50 m, the system should be commissioned as a wet main in accordance with the relevant recommendations of this British Standard."

Will a sprinkler head operate in a 'dead' air space where there is no air circulation and not easy to access. The head has a 74oC fusible link with a 57oC cover plate?

Sprinkler heads in 'dead' / hard to access spaces could be problematic because they are not easy to inspect or could be inadvertently overlooked. BS EN 12845 Sprinkler Rules makes a reference to unventilated concealed spaces in paragraph 14.4 but does not mention the accessibility of the space. It states the following: 'In unventilated concealed spaces it may be necessary to install sprinklers with a higher operating temperature, up to 93°C or 100°C. Sprinkler heads in such spaces will operate if the temperature exceeds their normal operating temperature'.

We are a mechanical company not a sprinkler installer. Our client wants us to strip out their un-needed sprinkler system. Is it OK for us to do this?

I would suggest that you check if there is any paperwork that confirms the sprinkler system has been decommissioned. If it has, then it is like any other water filled pipework system and should be treated with caution when releasing pressure. Open any plug/s slowly and have a container available for any small spillage. As the system has been deactivated there are no regulations that require a specialist to attend. But if you have any doubts, you could contact a BAFSA member installer company and they can help. You will find links to these companies on the BAFSA website. or in the directory at the back of our yearbook.

What is the minimum distance allowed between a sprinkler head and a smoke / heat detector in a residential property?

UK Residential Sprinkler Rules (BS 9251) do not specify an exact distance for sprinkler head from smoke detectors. But it does state the following in paragraph 5.7.1 h): "sprinklers should be positioned such that the sensitivity and discharge pattern are not adversely affected by obstructions, such as constructional beams, smoke alarms, light fitting ..." Sprinkler head manufacturers usually issue data sheets that advise on positioning of their sprinkler head in relation to obstructions.

Our old sprinkler system used to have leather straps and padlocks for securing the main stop valves, but we have now been advised by our new insurer that it must be changed to a metal chain and padlock. Can you enlighten me on why they need to be changed?

UK Sprinkler rules (BS EN 12845) states that straps and padlocks are acceptable for securing the stop valves. It was established that your new insurer works to US Sprinkler Rules and their rules require chains.

If you need technical assistance email joe.mccafferty@bafsa.org.uk. You could also visit the bafsa.org.uk homepage and search our knowledge base.

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Using water mist systems in buildings and structures: a guide to compliant applications

Stewart Kidd
Chair of the BAFSA Water Mist Working Group

This document has been written to provide facts about water mist as a firefighting technology. The general perception is that the application of water mist technology is similar or equivalent to sprinklers or gas extinguishing systems. This is not the case. The use of sprinklers and gas extinguishing systems is guided by prescriptive standards, developed from decades of fire-testing, research and knowledge base of their effectiveness and reliability in real-case fires. Water mist is a performance-based technology. That is, it that requires specific testing to each possible fire scenario. For a limited set of fire scenarios, a set of standardised fire test protocols have been developed. Each manufacturer has developed their own water mist product to 'pass' one or more of these fire test protocols. Thus, all water mist systems are based on proprietary manufacturers' technology and design. The correct use of the design standards for water mist are dependent on an assessment of the application hazard and determination of applicability with the relevant fire test protocol; proof of independent third-party fire testing to that protocol; proof of third-party component approval; and limits of applicability as determined through testing and documented in the manufacturer design manual. There is a requirement to ensure competence in design for water mist systems that is not currently verified through examination, or a LPCB third-party verification scheme, such as LPS1048 or LPS1204 respectively for sprinkler and gas extinguishing systems.

The aim of this document is not to replicate information that exists in standards but to explain the context in which they have been drafted, and to detail considerations and limitations of water mist systems, which are not clearly documented in all standards. It should be a useful document for those who may wish to specify fire suppression systems, have a role in approving these or simply want to increase their knowledge of water mist.

The annexes at the end of the document provide technical and supporting references.

1.0 Introduction

Over the past 30 years, water mist technology has increasingly been considered a viable method of protecting the occupants of buildings and some building equipment and contents. This document provides a guide to what mist systems can (and cannot) do and provides a guide to technology used and the standards that are presently available.

This document does not replicate or replace any specific standard but summarises the knowledge contained within. It aims to set the requirements in context so that they can be better understood by those who wish to procure, specify, or approve water mist systems.

The design of water mist systems is intended to achieve a fire performance objective. This maybe to achieve fire extinguishing, suppression, or control[1]. Manufacturers use differing technology to develop and maximise the efficiency and effectiveness of droplet deployment to achieve the performance objective. This will vary with both the manufacturer and with the application, both for the nozzle and means of water delivery. For each nozzle type there will be a change in nozzle appearance, minimum operating pressure, k-factor[2], spacing, height and activation type; and in different requirements for location, orientation and limitations (for example, use with ventilation).

As discussed in the introduction, water mist, unlike sprinkler or gas extinguishing systems, is wholly application and manufacturer specific. Each particular hazard or occupancy requires its own very specific design which is detailed in the manufacturer's DIOM (Design Installation Operation and Maintenance manual). This DIOM should include limits of applicability (such as fire hazard, temperature, height, ventilation, obstructions, etc). It is therefore not possible to design a mist system simply by reference to one of the standards available. This is unlike sprinkler systems where reference to BS EN 12845 or BS 9251 may suffice, or gas extinguishing systems where the BS EN 15004 series or BS 5306 Part 4 apply. For water mist, the DIOM is the fundamental guide to application and manufacturer specific design instructions whilst the standards per se list the performance requirements of water mist systems independent of manufacturer for the occupancies where fire test protocols exist.

1.1 Definition of water mist

Definitions vary between standards in terms of the method of measurement, but a good working definition is:

"A water spray for which the cumulative volumetric distribution of 90% of water droplets is less than 1,000µm (microns)[3] at the nozzle minimum operating pressure".

1.2 Definition of a water mist system

A fire suppression distribution system connected to a water supply, that discharges water mist where required, that is fitted with one or more nozzles intended to extinguish, suppress or control the fire.

1.3 History of development of water mist

Early maritime water mist applications were introduced following disastrous fires on two large passenger ferries in 1990. In 1993 a series of independent cabin and corridor fire tests were undertaken which led to revised International Maritime Organisation fire safety requirements

for passenger ships and the development of installation guidelines and fire test procedures for alternatives to conventional sprinkler systems.

Early use of land-based water mist technology came at the beginning of the 1990 and was partly linked to the rapid expansion of food processing production plants that were being constructed to cope with the growing demand for ready-prepared meals and other convenience foods. The food industry and their insurers recognised the benefits of correctly installed and tested water mist systems in extinguishing potentially disastrous fires.

At about the same time, following the prohibition on the use of the Halon gases for firefighting in 1989, water mist joined the portfolio of alternative extinguishing media considered and developed by the fire industry.

Early applications were limited to very specific occupancies requiring full scale fire tests. Over the last 25 years however, much research has been carried out and as experience has grown with the subsequent development of fire test standards.

Water mist systems are a now an alternative for gas extinguishing systems for a wider range of hazards including engine rooms, electrical transformers, steam and combustion turbines, and oil cookers. These types of applications were traditionally protected by carbon dioxide systems, but there is general acceptance by insurers and users that a suitably tested and approved water mist system is both safe and effective.

Water mist has also been installed in homes, saunas, and heritage buildings. These types of applications (and others such as schools, offices, and data centres) require a much higher level of fire engineering to determine the suitability of water mist. This will be determined, amongst other factors, on the relevant fire test protocol and the limitations of the design to ensure the water mist system provides the fire protection objective. For an independent assessment of suitable applications, reference should be made to the standard BS 5306 Part 0.

The need for coherent guidance for performance-based water mist technology has led to the production of British, European, US and Maritime Standards for the design, installation, commissioning, and maintenance of water mist systems.

The detail of within each standard differs but the common theme is the water mist system must be performance tested for any given application to meet specific criteria (be that extinguishing, suppression, or control) as defined by a relevant fire test protocol. There are also detailed sections that cover salient matters such as component approval and design competence. At present in the UK there are both UK and European standards used in parallel, and it is an unfortunate fact that this has led to a ‘pick and mix’ approach from less competent designers.

1.4 How water mist works

For a fire to spread, it relies on the presence of the three elements: oxygen, heat and combustible material. This is known as the fire triangle. The removal of any one of these elements can suppress or extinguish a fire.

Water mist removes heat and displaces oxygen and provides a wetting interface between unignited combustibles and the flame front. The physical difference between water mist and sprinklers is simply the droplet size. As the droplet size decreases the following physical changes take place:

The fire triangle

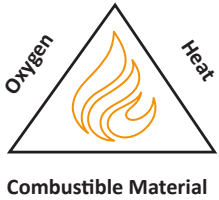

Figure 1: The fire triangle and water droplet size in relation to surface area

1. The mass decreases. This permits a more rapid evaporation of the water. It allows movement of the water within an air stream (entertainment). It lowers its momentum which can inhibit the water from penetrating the heat plume.
2. Per unit volume there are more droplets which increases the surface area available for contact with heat.

The production of small droplets can be achieved through a variety of technologies that include:

1. Using high pressure (typically greater than 60 bar) to force water through very small orifices. The pressure energy is transferred to breaking the water into small droplets that emit at high speed but small mass and pressure (droplet diameter in the range of 50 to 200 microns)
2. Using a deflector that breaks the water into droplets typically between pressures of 4 to 16 bar ('low' pressure). (Droplet diameter in the range of 150 to 350 microns)
3. Using a propellant gas (such as nitrogen or air) to atomize the water at a nozzle at pressures typically 6 to 8 bar (droplet diameter in the range of 10 to 50 microns). These are known as twin fluid systems. Note that they differ from water mist systems where the propellant is used simply to pressurize the water.

Note that pressure is not the defining property of water mist. The performance of the water mist system is all that is relevant. To avoid confusion neither the UK or European standards use the terms high- or low-pressure water mist. There are some performance and application differences between technologies.

Water has unique thermodynamic properties. The first is its specific heat capacity, that relative to other materials is very high. The specific heat capacity is the amount of energy required to heat one kilogram of substance by one degree kelvin[4]. The value for water is 4,200 $J.kg^{-1}K^{-1}$. This means that 4,200J (joules) of energy are required to heat 1kg of water by 1 degree Kelvin (1°C). Conversely cold water put onto a hot surface will extract the same amount of energy per unit mass/temperature drop.

The second important property is the latent heat of vaporisation. Once the water temperature reaches 100°C it changes phase to vapour (steam) without a change in temperature. The energy required for this phase change is known as the latent heat of vaporisation. For water this value is 2,257$kJ.kg^{-1}$. This means that 2,257kJ (kilojoules, or 2.257MJ (megajoules)) of energy is required to change liquid water to vapour. As for the example for specific heat capacity above, this property is used to extract heat.

The smaller the droplet size, the greater number of droplets per unit volume and a greater the surface area with which to absorb the heat. Therefore, smaller droplets equate to greater heat extraction and more rapid cooling.

Water as a droplet or vapour contributes to firefighting through two other mechanisms. The first is dilution of oxygen around the flame which removes a second element of the fire triangle. The second is the attenuation of radiation which prevents heat transferring to adjacent combustibles and structures, such as walls and ceilings.

Not all fires are 'hot' and therefore the effectiveness of water mist depends not only on its droplet size but also the fire class of the material and its burn temperature.

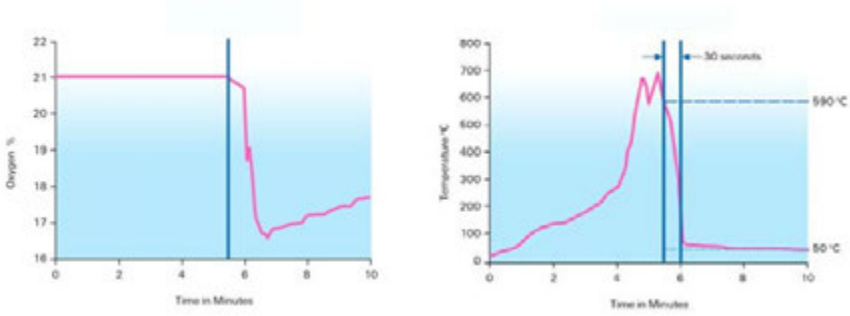

Figure 2: Oxygen reduction and temperature drop for water mist discharged on a Class B fire

Water Consumption 1MW Fire Extinguishment

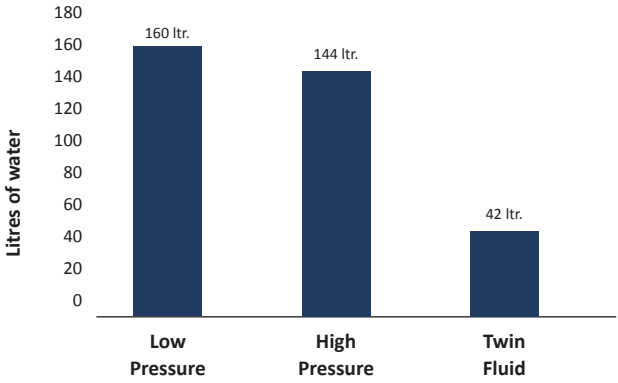

Figure 3: Relative water quantity required to extinguish a 1MW fire per water mist technology – decreasing droplet size reduces the water required

Let us first consider Class B or Class F fuel types. Class B fuels are flammable hydrocarbon liquids or solids that include heptane, oil, paraffin wax, and alcohols. Class F fuels are vegetable or animal fats used in commercial or industrial cooking. Both Class B and Class F fires are characterised by a high temperature burn. The water removes heat energy first through the mechanism of specific heat capacity and then through latent heat of vaporisation. The production of large amounts of steam as the water changes phase depletes the oxygen around the flame front. The fire is extinguished when the oxygen level falls below 15% by volume. The cooling by water mist post extinguishment is equally as important as it will lower the fuel below the ignition temperature, preventing re-ignition.

The application of water mist for Class B or Class F fires is by means of a deluge, or open nozzle system, whereby the water mist is discharged simultaneously through all nozzles. Actuation is via a detection system. The fire test protocols and approval procedures for this type of fire hazard have been long established and it is fair to say, that water mist is probably the de facto choice for these applications.

Test data proves that the smaller droplet sizes are more efficient in terms of water quantities, see is shown in Figure 3.

The design of water mist systems for Class B and Class F applications is of two forms – total flood or local application. In total flood the entire volume is filled with water mist (for example a generator enclosure). Water mist nozzles are required to be installed across uncloseable openings to prevent ingress of external air (oxygen) during the extinguishing process. For local applications water mist nozzles are directed on or around the object to be protected (for example industrial deep fat fryers).

Note that twin fluid systems rely on providing extinguishment to a greater degree through use of the atomising gas. The residual oxygen level is between 10-12% and the water mist provides additional cooling.

If we now consider Class A fuel types, the application of water mist now is more challenging. Class A fuels include combustibles such as wood, paper, and cloth, etc. Also within Class A fire class are plastics, which have unique burn characteristics. Class A fires are also deep-seated. This means that even if the surface temperature is cooled there is often sufficient thermal energy within the material to allow pyrolysis to continue (it is the pyrolyzed (material gas) products that ignite). Thus, whilst extinguishment is desirable it cannot be guaranteed and the objective of (all but one published) fire test protocol for Class A fires is that of suppression, defined by parameters within the protocol. Note that the defining parameters differ between fire test protocols, and it is important to ascertain the application requirement prior to deciding the suitability of a particular fire test protocol.

For Class A applications the water mist system is configured as an automatic system (as a sprinkler system). That is, each nozzle has a heat sensitive element that acts as both detector and actuator. Water will only discharge from each nozzle that has reached activation temperature.

The suppression of Class A fires requires more water than for Class B or F fires, and the larger droplet sizes may produce more efficient systems in terms of water quantity used (as opposed to Class B and F fires). This is thought to be due to the importance of direct impingement and wetting of the material over indirect entrainment.

The effectiveness of water mist against sprinklers is often erroneously compared. As an example, a sprinkler water density is taken as 5mm (5 litres per minute per m^2) for a Class A fire ordinary hazard. This is then compared against a water mist water density of 0.5mm for a Class B fire hazard. Often accompanied by the statement “water mist is 10 x more efficient (or uses less water than) sprinklers”.

2.0 Water Mist Systems

As evidenced through fire testing, the water density to suppress Class A fires for water mist is not constant but increases with fire load density. As an example, for light hazard fire loads (< 150$MJ.m^{-2}$), the lowest water density for a system approved to a light hazard fire test protocol (FM 5560 Appendix G) is 1.5mm and the average across all approvals is 2.5mm. This 50% of a sprinkler design density of 5mm. For higher hazard fire loads, the water mist required density increases to between 3.5 to 4.2mm (based on the BS EN 14972-3 fire test protocol). Note for this hazard application the sprinkler design density is still 5mm. Note that the water mist values are at optimum (maximum) spacing and minimum pressures. In actual designs the water density will be more, which is explained below.

Water mist systems are based on proprietary product; they are not harmonized to a common set of properties. The layout and spacing of nozzles, operating pressure and water capacity will

1. Definitions in BS 8489-1, see Annex 1 of this document
2. The k-factor is a nozzle constant that is used to calculate the flow rate at a given pressure
3. 1,000µm = 1mm
4. The Kelvin is an absolute unit of temperature whose unit value is the same as o Celsius. Zero kelvin is the lowest possible temperature equivalent to -273.16oC, sometimes known as ‘absolute zero’.

differ between manufacturers and technology. It should be noted that nozzles and components are rarely interoperable (which means one cannot use a nozzle from manufacturer on a system installed based on different manufacturer). Nozzle and system designs are customised to the application, based on successful completion of fire testing which result in a variety of nozzle types, spacing and activation methods.

There are however generic water mist application categories.

2.1 Types of systems

2.1.1 Open nozzle or deluge systems

Open nozzle (or deluge) systems are dry pipe activated by a separate fire detection system.

Examples of open nozzles are shown in Figure 4.

2.1.2 Automatic nozzle systems

Automatic nozzles contain a thermal element (normally a frangible thermal link or alcohol filled bulb) at a pre-set activation temperature (for most water mist nozzles tested and approved this is 57°C or 68°C). When the ambient temperature surpasses this value, the element fails (for example a thermal link will melt or the alcohol in the bulb expands breaking the glass). The water then flows from the nozzle. All other nozzles remain closed unless the ambient temperature exceeds their opening threshold value.

Example of automatic water mist nozzles are shown in Figure 5.

Note that automatic nozzles do not currently exist for twin-fluid systems.

2.1.3 Electronically controlled nozzle

A type of nozzle in which the release of water is made by electronic means instead of by mechanical means. An electronic control allows for a predetermined number of nozzles to operate via alternative means, for example a smoke, heat, or flame detector.

Note that at present there are no test standards for this type of nozzle.

Figure 4: Open Nozzle Examples

Figure 5: Automatic Nozzle Examples

2.2 Types of application

2.2.1 Local application

A local application (or object protection) system is used to protect facilities and equipment only, such as individual diesel driven generator sets, transformers, switchgear and deep fat fryers, by discharging water directly onto the hazard and if required adjacent risks. Their use is advantageous when a specific risk is disproportionately higher than the risk in the rest of the space, or the object is small compared with the overall volume. The design requirements for local application are more stringent as the extinguishing method relies much more on cooling than oxygen reduction since the volume is not fully enclosed. (An exception is within the hood of an industrial deep fat fryer).

Local application systems use open nozzle system design. There are currently no published fire test protocols that permit the use of automatic (closed) nozzles in this type of application.

2.2.2 Volume protection

Volume protection systems are used to discharge water mist into an enclosed volume, compartment, or room.

In open nozzle systems the water flows through all nozzles within the protected volume. In automatic systems one or more nozzles activate as required.

2.2.3 Zoned protection

In open deluge systems, each protected volume is controlled by a valve (known as a selector or directional valve). Water mist will only discharge into the volume with a fire. If

Figure 6: Electronically Controlled Nozzle Example

there is sufficient water supply for the largest protected volume this can be an economical way of protecting more than one volume (assuming there will not be multiple fires at the same time where additional water quantities and/or larger piping will be required).

For automatic systems, zoning is a means for sectioning the building to identify where the fire occurs (for example, per floor). Each zone has a valve that will have a flow switch to indicate activation of a water mist nozzle within that zone of the system.

2.3 Water supplies

Water mist can be delivered either through a pre-pressurised system (stored water and propellant gas in cylinders) or a flow generating device (a pump) through the system distribution pipework to the nozzles. In twin-fluid delivery systems there is an additional pipe for the atomizing gas.

2.3.1 Single fluid pumped

A single fluid system generates water mist by delivering water through the nozzle under pressure from a pump system. Pumps for pressures 16 bar and under are centrifugal type (as for sprinklers). Pumps for pressures above 50 bar are positive displacement (or piston) type. Both pump systems require a storage water tank of sufficient working capacity for the duration of discharge required for the size or design area of the hazard.

Centrifugal pumps are available for any flow likely to be required for a water mist system. The characteristic pump curve has a maximum pressure at zero flow (closed head) and the pressure decreases as flow increases.

Piston pumps have a maximum flow up to ~120 litres.min^{-1} and provide a constant pressure throughout the flow range. The head pressure is set by an unloader valve which also acts as a relief valve for unused flow. For example, if a pump provides 120 l.min^{-1} but the nozzle delivery only requires 50 l.min^{-1}, the balance (70 l.min^{-1}) returns to the storage tank or drain, via the unloader valve.

2.3.2 Single fluid pressurized

A single fluid pressurized system generates water mist by delivering water through the nozzle under pressure from a pressurised gas container. The gas (usually nitrogen) does not mix with the water being pressurised; it is only used for pressure/flow generating purposes.

2.3.3 Twin fluid pressurized

A twin fluid system generates water mist by mixing an inert gas or air fed from separate pipework to the water mist nozzle. Such systems are normally container based (as single fluid pressurized).

2.4 System operation types

2.4.1 Wet pipe system (automatic nozzles)

This water mist system uses automatic, heat sensitive, nozzles fitted to distribution pipework that is permanently pressurised with water.

Wet pipe systems are the most common automatic suppression configuration and are typically used to protect areas where temperatures are above 4°C and below 95°C and are unlikely to fall below freezing point.

2.4.2 Dry pipe system (automatic nozzles)

This water mist system uses automatic nozzles fitted to distribution pipework that are permanently pressurised with air, nitrogen, or other inert gas. In the event of a fire, when a nozzle operates, the pressure drop in the distribution pipework activates the system's control valve to release water into the pipework where it is discharged through the nozzle.

These systems are typically used in the same applications as wet pipe systems where the key constraint is the need to prevent freezing of water in the pipes. There is a delay in flow of water because of the time it takes to fill the distribution network with water, which increases with the volume of pipe work to be filled. Because of this delay, such systems are not normally be considered for applications where there is a need for the protection of life.

Note fire test protocols do not test to include the delay in dry pipe systems. Proof will need to be provided in the certification of the maximum delay permitted and that the system will still perform as tested and prescribed.

2.4.3 Deluge system (open nozzle)

A deluge system is designed so all open nozzles discharge simultaneously in the event of a fire. This is achieved when a separate fire detection system is actuated. This in turn operates the pump or container actuator and a valve in the pipe work to release the water through all the open water mist nozzles. Fire detection systems can be electrical, electronic, or pneumatic. The actuation system should comply with BS 7273 Part 5.

As the nozzles are open, the water distribution system is kept dry and unpressurised. The activation of the fire detection system is more sensitive than heat detectors or frangible bulbs.

A deluge system may be zoned. This allows for several areas to be protected but permits a discharge in only one area (zone) at any given time (unless the water supply and pipe diameters are sized for simultaneous discharges).

2.4.4 Pre-action system

Such systems comprise an automatic water mist installation and a fire detection system. The water mist pipe work is dry, pressurised with air, and monitored for loss of pressure. On receipt of a signal from two or more detectors, the main control panel sends a signal to open the pre-action control valve, allowing water to flow into the distribution pipework in readiness for the water mist nozzle(s) to operate.

These systems are commonly used for the protection of high value areas such as data centres, server rooms or communications, or where sensitive electrical equipment and goods are stored. They provide warning of system discharge (through the operation of the fire alarm system) and prevent accidental discharge if a frangible bulb were inadvertently broken or the pipe work damaged.

The actuation should comply with BS 7273 Part 3.

Figure 6: Examples of pipe and fittings stainless (L) and copper (R)

2.4.5 Electronically controlled system

Electronically controlled systems consist of nozzles which incorporate a valve that is operated by a 'controller', actuated by fire sensors to either allow water to discharge or to shut off flow. This permits for a pre-determined number of nozzles to operate. Which nozzles operate will depend on the location of fire identified by the controller. This may be via the use of a detection system or other sensing method. There are also stand-alone, modular domestic systems that use this principle. Such self-contained applications are known as Personal Protection Systems and are designed specifically to protect vulnerable people such as the bed-ridden or immobile. System requirements are detailed in the Loss Prevention Standard LPS 1655.

2.5 System design type

2.5.1 Engineered

Engineered systems require hydraulic flow calculations to determine the requirements of pump pressure and flow and the amount of water storage. The core information will be determined from the type and number of nozzles within the design area. Calculations will be undertaken for the hydraulically most favourable areas (to determine the maximum water quantity and flow required) and the hydraulically most unfavourable areas (to determine pump source pressure and pipe sizes such that the most remote nozzles operate above the minimum design pressure).

2.5.2 Pre-engineered

These systems have pre-determined flow rates and water quantities. This results in very little work to be done by the designer as the pipe diameters can be derived from look-up tables verified by testing and included in the DIOM. These systems generally are limited to simple deluge systems, for example the protection of small enclosures for the protection of Class B fuel hazards.

2.6 Water mist pipework and fittings

The material used for the pipework and fittings of a water mist system should be governed by the operating pressure and other requirements of the water mist system (such as water purity) and the environment surrounding the installed pipe. This may include resistance to heat, or chemical corrosion.

All water mist systems require the use of non-corrosive materials such as stainless steel, copper, or brass. Twin fluid systems can use galvanized or steel pipe for the atomising agent as there is no direct contact with water.

Further details of pipe types can be found in the FIA-BAFSA Piping Document.

3.0 Using water mist

Given the performance-based design of water mist systems and their proprietary nature, the design of water mist systems does not follow the prescriptive approach as detailed for other fire suppression systems (i.e. sprinklers, gas extinguishing systems, etc). As a result, system component manufacturers have much more involvement and responsibility in demonstrating the suitability and performance of their water mist system and must show necessary competence in assessing suitable applicability and design.

3.1 Legislation

The primary legislation for life safety fire protection in England and Wales is contained in the Building Act 1984. In Scotland, the applicable legislation is the Building (Scotland) Act 2003. The applicable fire safety guidance is given in Approved Document B (ADB) Volumes 1 and 2 including the latest date amendments.

Codes of practice for fire safety in the design, management and use of buildings are detailed in BS 9991 (residential) and BS 9999 (commercial and industrial). Note that the current requirements of the building regulations of 2018 have superseded certain sections of BS 9991 (a 2021 revision is in preparation).

ADB does not include reference to water mist, but BS 9991 (2015 edition) and BS 9999 do.

In Wales, the design and installation of water mist systems, where installed as an alternative to sprinkler systems must comply with Regulation 37A of Building Regulations and the Domestic Fire Safety (Wales) Measure 2011.

3.2 Water mist standards

At the time of publication (June 2023), there are two British Standards and one suite of European Standards covering the design and installation of water mist systems in the UK (see Annex 2).

As new products and test protocols for applications are in continuing development, there may not necessarily be a standard to guide manufacturers and buyers to the suitability of every solution. This may have to be done on a case-by-case basis with the creation of a bespoke fire test protocol and by referring, if relevant, to a similar real-life application. BS EN 14972 Part 1 Annex A details the methodology to develop a fire protocol where one does not yet exist. An example of a well-established application which only recently has had a standard for it is that of data centres.

We try to protect children from danger, sprinklers will protect them from fire

British Automatic Fire Sprinkler Association

bafsa

FIRE KILLS
SPRINKLERS KILL FIRES

'Prisons' do not yet have such a protocol although water mist was proven by testing commissioned by Scottish and English Prisons some years back.

Clause 8 Method B of BS 5306-0:2020 provides guidance on the how deviations from standards and out of scope systems can be assessed for the intended application. Application of due diligence by examining the proposed installation of a non-standard solution is essential. As is the by assurance that a proposed standardised system does indeed comply to the standard in the manner it states it does. This is the key reason for the value of third-party certification and the disclosure of the manufacturer's DIOM manual to all stakeholders involved. Method B warns that: "Innovative, engineered or otherwise non-standard solutions can be significantly higher risk in many respects. However, they can offer overall benefit where there is a genuine need for such a solution. At least equivalent performance (to the closest applicable standardised technology) should be sought".

It is often the case that the contracting parties are unaware of the size and type of fire load. Thus, it is not always possible to determine if the water mist system is suitable. As an example, BS 8489 Part 1 Table 1 lists two fire test protocols for light hazards. The first is FM 5560 Appendix G (most commonly available from water mist manufacturers) which has a maximum fire test load of 150 MJ.m-2. The second is BS 8489 Part 7 that tests for fire loads up to 500 MJ.m-2 (less available from manufacturers). Thus, if the FM protocol were used for a fire load of 250 $MJ.m^{-2}$ (instead of a BS 8489 Part 7 tested system) the performance of the system will be at best unknown, and at worse ineffective.

At the time of writing, the published British Standards for water mist include for limited application in residential and domestic occupancies (BS 8458) and industrial and commercial occupancies (BS 8489).

The European standards are covered in the BS EN 14972 series that is still in development.

BS 8489 Part 1 and BS EN 14972 Part 1 set out the design and installation requirements of water mist systems and subsequent parts of these standards detail fire test protocols for certain applications. BS 8458 is a stand-alone document that includes design, installation, and the requirements of fire testing.

Note that the UK were active contributors to EN 14972 Part 1. However, there were certain important technical and fire safety aspects that were not agreed with CEN prior to publication. The UK concerns, with additional guidance, are detailed in the National Forward and National Annexes of BS EN 14972 Part 1. It is important that these are fully considered and documented prior to any adoption of this standard.

See Annex 2 for full details of published BS EN standards relating to water mist systems and components.

The International Water Mist Association (IWMA) holds up to date information covering international published standards for water mist.

3.3 Fire test protocols

The design and installation methods of water mist systems are based on proprietary information, so systems will vary between manufacturer and with each application, so their effectiveness in fighting fires must be verified by standardised tests. This standardised test is known as a fire test protocol which has a set of parameters that define the system performance objectives. Fire test

protocols have only been published for a selected range of fire hazards and occupancies. Note that the type and size of fire loads used for the fire test may not represent those of the application hazard. In addition, each test protocol will have limiting parameters which will limit the system performance and validation of certification. Such parameters include, but are not limited to, height, ventilation, ceiling slope, activation temperature, obstructions, etc. It is these aspects that requires suitable competence in fire engineering to determine whether water mist is appropriate for any given hazard/occupancy.

The introduction of BS 8489 Part 1 states "The water mist system is to be…tested in accordance with a recognised test protocol". This means that the system specified for an occupancy not covered in the standard requires the designer and installer to produce evidence that the proposed system is fit for purpose for the proposed application. This must include one or more of each of the following:

- Fire testing undertaken in an approved fire laboratory with BS EN ISO/IEC 17025 accreditation
- Reference to third-party verified fire tests already undertaken elsewhere for such an application

Care should be taken by manufacturers and installers to avoid claims appearing to fulfil these criteria but which on closer inspection do not.

3.4 Component standards

There is a significant amount of accumulated knowledge of the ways in which fire suppression system components can fail over time depending on the material with which they are made, method of construction and operation, and the environment that they are exposed to. Some of the tests and best practices embedded in these standards may include ageing tests, over-pressure tests, and material choices. The only UK national water mist component standard is for nozzles - BS 8663 Part 1.

There is in development a CEN standard for nozzles, EN 17450 Part 2. However, at present (June 2023) this does not include a high-temperature ageing test that BRE have verified is critical for proving the reliability of automatic nozzles that use dynamic polymeric O-rings. It is likely that this test will be an optional (normative) test, that would be required for the UK market. This will be confusing as a two-tier standard would exist with users, in general, being unaware of the differences.

Note: The problem of dynamic O-rings is well-documented with sprinklers and has been observed with water mist nozzles. The O-ring can harden that can cause leaks and/or fail to actuate when required.

3.5 Third-party verification

Third-party testing and verification of the performance and composition of the system must be proven by certification, often publicly listed (for example LPCB Red Book Live). Although not mandated by law in the UK, certification provides one element of surety to stakeholders. This is because certification is an assessment by an independent competent body, and evidence that the manufacturer is willing to have their manufacturing processes and systems' performance

thoroughly scrutinised. Robust certification also performs important functions such checking that the supplier has not changed their materials, or design, without obtaining full revalidation. Certification also provides additional routes to problem and dispute resolution.

Certification laboratories have, for many years, undertaken work in testing products to national standards but also (usually in the absence of such standards) to their own standards. For example, as there is no UK standard for personal protection water mist systems, the LPCB developed LPS 1655. LPCB have also been published approval documents for fire suppression systems in kitchens - including water mist. Such documents are invariably developed by test laboratories in conjunction with stakeholders who are expected to fund the work. Certification laboratories also have the autonomy to extend their testing and assessment program to promote confidence of the systems tested beyond the consensus found in national standards.

Certification laboratories which have experience with water mist components internationally are FM, LPCB, UL and VdS.

3.6 Types of certifications

3.6.1 Fire test protocol

A certificate detailing the performance to a specific fire test protocol. The certificate will detail factors including as a minimum nozzle spacing, height, operating pressure and k-factor and limitations.

3.6.2 System certification

This is certification of the fire performance for the specific application and is closely linked to the requirements of the standard in addition to specific test laboratory criteria. The test laboratories will certify systems which have successfully been tested either to specific fire test protocols (above) as listed in BS 8489 (parts 4 to 7), BS 8458 or BS EN 14972. Other fire test protocols in standards exist in the standards FM5560, UL2167 and VdS 3188.

Certification is based upon satisfactory evaluation of the product and the manufacturer in the following major areas:

- Examination and tests on production samples performed to evaluate:
  - The suitability of the product.
  - The performance of the product as specified by the manufacturer and required by the testing organization; and, as far as practical,
  - The durability and reliability of the product.
- A thorough review of the proposed water mist DIOM manual.

There are occasions where a variation of a standardised product or a completely different product (which is out of scope of existing standards) is proposed. Invariably, there will not be a certification scheme for such systems which will rely on a certifier who is willing to adapt or create a test protocol for that product. The certifier may adapt existing test protocols for system and components but might also need to develop custom fire test protocols following the guidance in Annex A of BS EN 14972-1. This can be a lengthy process, but it is the typical path for a product category to then become standardised. Conversely, a system which is within the scope of a standard implies that certification schemes are readily available and there is therefore no reason for these systems not to be able to be fully certified.

3.6.3 Certification of equipment

As with other fire protection equipment, certification of the components should be the norm. A certified component provides evidence the component has been third party scrutinised and therefore is reliable, but it is not a guarantee on its own and should not be confused with the system performance validation. There should also be a link (through a reference in the DIOM) on what components and what certifications have been achieved for which applications.

Therefore, specifiers of water mist systems must ensure that the components that make up a water mist system are listed as approved by a recognised approval body. It is essential that specifiers are supplied with copies of the relevant listing or certificates, which should normally be included in the tender submission or specification document.

Components which typically undergo certification are:

- Control valves, water pumps, water, and gas pressure containers.
- Distribution pipework, couplings, and fittings.
- Water mist nozzles.
- Fire detection and alarm control panels, fire detection sensors, alarm sounders, indicators, and actuators.
- Non-electrical equipment such as pneumatic, hydraulic, or mechanic control valves and equipment.
- Manual actuation equipment.

In addition to compliance with the minimum test requirements for individual components according to the relevant standards, it is essential that the assembly of components is tested together as a system and as such, the system also carries a system approval. To ensure the efficacy of a system, an independent third-party certification body must examine and test that system to establish its firefighting performance and the compatibility of all components.

3.6.4 Certification of installers

The third essential element of quality requirements for installations is an assurance that the designer/installer of the system is fully competent to undertake this work. It is the only certain way to ensure that the requirements in BS 8458, BS 8489 and BS EN 14872-1 to design and install the system are 'entrusted to appropriately qualified and experienced people'. This is typically done using a certification standard which is based on a national standard as specified above.

Third-party certification is key because it is an external assessment of competence. However, given the proprietary nature of water mist, it will not necessarily capture the specific requirements from different manufacturers. Therefore, just as important, is evidence that the installers' workforce have been trained by the manufacturer and can demonstrate competence for that specific product. This evidence should be available from manufacturers, so stakeholders should ask for sight of references and training certificates from system or component manufacturers.

Note that designer competence requires skills and experience in fire engineering; determining applicability and suitability of a fire test protocol to the fire hazard and occupancy; the ability to determine design areas; and undertake hydraulic flow calculations. It will also require an understanding of pump curves; actuation; system interfacing; electrical loads and system resiliency. These are just some of the examples. Such an engineer is likely to be qualified to at least

degree level, have many years' experience in the fire suppression industry, be registered with the IFE and be either an Incorporated or Chartered fire engineer or scientific equivalent.

As stated, a key part of the regime which ensures that water mist systems will be effective and reliable is the correct installation of the water mist system, which depends on the attestation of the competence of the designer and installing company.

It is important to note the distinction between accreditation and conformity assessment. Accreditation ensures that those who carry out testing, certification and inspection are competent to do so, it therefore applied only to approval and testing bodies accredited by the United Kingdom Accreditation Service. (https://www.gov.uk/guidance/conformity-assessment-and-accreditation) 'Approvals' by organisations who are not so accredited should be viewed with care.

Conformity assessment is a service provided by an accredited body such as an UKAS accredited (or European Notified Body) to providers of products or services. As a result, installers, products, and components can only be certified (or conformity assessed), they cannot be accredited.

Given the changes necessitated by the withdrawal of the UK from the EU, CE marking is no longer appropriate for use in the UK. The new UKCA mark is now available for use and runs in tandem with the old CE mark until 31 December 2024. See: https://www.gov.uk/guidance/using-the-ukca-marking

UKAS accredited certification bodies which are presently providing third party certification for water mist installers are LPCB, IFCC and FIRAS.

Note that at present there is no equivalent LPCB third-party installer scheme in the UK to LPS 1048 for sprinklers. FIRAS and IFCC operate third-party schemes for residential and domestic systems, but these are essentially verifications of tests undertaken against selected annexes in BS 8458. TPC is not based on a common, harmonized standard.

3.7 DIOM – Design, Installation, Operation and Maintenance manual

The DIOM is the document that contains all the key information from the manufacturer of the water mist system. These will vary between manufacturers and with different applications even with the same manufacturer. These documents should be available to the specifier, and AHJ to review suitability of the proposed water mist system and compliance with the design objectives.

The DIOM should not be used in isolation and must reference the standard to which the system has been designed. If the system is stated to comply with a specific standard, documented evidence of compliance to all clauses, or justifications for variations to clauses, must be provided. Details of the fire test protocols against which the system has been tested should be provided with full details of the results obtained and the details of the laboratory which undertook testing. National Annex B to BS EN 14972-1 provides the critical list of items to be included in the DIOM, such as:

- General Information regarding the type of system.
- Limits of application, for example height, ventilation, obstructions, etc.
- Description of components and the standards to which they are designed.
- Testing of the specific system/s and details of the fire test protocols against which they have been tested and the results of such tests.
- Approvals and certifications gained in respect of systems and components.
- Declaration of conformity to applicable product safety directives.

- Planning, Design and any specific qualifications or approvals needed by the designer.
- Nozzle maximum and minimum spacings, height, working and standby pressure.
- Minimum design area (AMAO), minimum number of nozzles in design area.
- Discharge duration per application.
- Water supply requirements including details of acceptable water quality.
- Installation process.
- Testing and placing in service (commissioning).
- Inspection and audit.
- Maintenance.
- Typical hazards applicable to the fire testing (including fire type and maximum fire loads).
- Hazard description.
- Types and sizes of fire loads tested.
- Nozzle k-factor.
- Interaction with other fire systems (detection, alarm, smoke control).

4.0 Choosing a Water Mist System

4.1 Introduction

Before any fire protection system is specified the methodology as detailed in BS 5306 Part 0 clause 4 should be followed. BS 5306-0 contains tables that explain the suitability of different fire protection systems for different applications.

Standards detail best practice and are for the guidance of the wise, not an avenue to 'pick and choose'. It is not whether a system simply 'complies' to a standard but rather how it conforms to each of the clauses within. This highlights the importance of the DIOM in detailing the design constraints and performance limitations of the proposed water mist system with respect to the referenced standard, supported by the evidence of fire testing and third-party certification. Equally, this is the reason that the system manufacturer must make the full text of the DIOM available to specifiers and regulators.

One of the principal perceived benefits of water mist is its ability to solve a water supply or storage constraint. This subject it is important to clarify. As an example, for light hazard systems for Class A fires the design is not based on achieving a water density, as with sprinklers. It is based on the layout of the nozzles in accordance with the DIOM, the number of nozzles within the design area, and the respective pressure and k-factor at those nozzles. Often, contractors quote the minimum water density of the water mist system, which is only achieved at maximum spacing and minimum operating pressure. This is rarely possible as room layouts are rarely dimensioned to fit an exact number of nozzles and there will always be obstructions that require additional nozzles. In addition, the operating pressure will always be above minimum. As an example, a manufacturer claims a water mist density of 2mm based on 16m^2 maximum spacing a minimum tested operating pressure. The layout of the room and obstructions mean that the spacing is reduced to 12m^2 per nozzle, the water density increases by 2.66mm. If the pressure at that nozzle is x% above minimum, then the flow will increase by square root of the increase. The water supply is based on most favourable hydraulic calculation that could be defined by either the most nozzles within the

design area and/or the maximum pressure at which they are subjected. A frequent observation during third-party audit of water mist designs is that contractor either does not determine the design area (and number of nozzles within) correctly or understand the effect of hydraulic gradient. The same applies to the working tank capacity required, with often gross tank capacities being used instead.

Consultation with the relevant stakeholders should first take place to seek approval where any protection system is being considered, regardless of whether the system is an elective install (providing addition protection to an otherwise compliant building), to meet Building Regulations, or for property protection or for business continuity purposes:

- The building control authority or approved inspector.
- The fire authority.
- The water supply undertaker (This is usually essential to comply with Water Regulations).
- The insurer(s) of the premises and premises' contents.
- The owners and property managers.
- Residents' associations.

Note that in England, the use of water mist is presently not approved in the Building Regulations. A 'suitable automatic fire suppression system' as detailed in Regulation B3(3) is defined in Approved Document B as a sprinkler system designed to BS 9251 or BS EN 12845.

The DIOM should be comprehensive enough to provide answers to all questions from any of these stakeholders. So that project approvals can been given, whether from building control or the insurer, it is essential that the specifier is provided with a full, written technical specification from the installer, authorised by the manufacturer, on how the system will be designed, installed, commissioned, tested, and maintained in accordance with the DIOM.

4.2 Effectiveness and reliability

as for any fire protection installation, the system must be able to perform as designed and intended. For that, it needs to be demonstrated that the system will be effective for the intended application. Effectiveness depends on the suitability of the proposed system for the application and that it has been designed and installed correctly so that it works as intended. It must also be available to operate, without delay, whenever required.

Once a decision has been made that a water mist system is appropriate, three conditions must be satisfied:

a) the system chosen must be suitable for the proposed fire hazard and fire load (the application).
b) the system must be designed, installed, and commissioned correctly by a competent contractor using approved equipment.
c) the system must be maintained so that it is ready to operate (available).

Only when there is evidence that this has been done can the system be expected to perform reliably once installed.

Note that there is little data on either reliability or effectiveness for water mist systems. There is extensive international data for sprinklers, harmonized standards, and rigorous component

certification. One of the fire engineering decisions in risk analysis and design is that of reliability and effectiveness. PD 7974 gives detailed quantitative guidance for sprinklers that does not currently exist for water mist.

4.3 Suitability

There are several factors that need to be considered before a water mist system is considered suitable for the building, asset or occupant being protected. Ignoring any of these could be deemed to evidence of negligence and in the case of life safety systems in the UK, a breach of fire regulations. Adequate specification and due diligence should take the following into consideration.

4.3.1 Fire test protocol applicability

The proposed installation must refer to the fire test protocol which has been used to validate the performance of the proposed system. This test must be relevant to the application being considered and carried out with the same components and systems being specified in the installation.

4.3.2 Third party evidence

A declaration of compliance is a first-party declaration but verification such as certification is a key demonstrator of long-term reliability and compliant performance. This should be sought for systems and components where such schemes are available.

4.3.3 Tenability

Tenability is governed by exposure to heat (convective, conductive and radiation all have difference threshold values) and the Fractional Effective Dose (FED). FED is normally determined by CO_2 and CO levels but can also be measured by levels of by-products of combustion such HCN and HCl.

Water mist has been shown to provide tenability within protected spaces, but dependent on the fire test protocol this may be limited to temperature only. Further evidence may be required if tenability is a core criterium.

4.3.4 Protection of glazing

Water mist system may possibly be used for the protection of glazing but there are no published fire tests protocols for verification. Any data presented by the manufacturer must be third-party verified against as set of performance criteria acceptable to the AHJ and user.

4.3.5 Smoke scrubbing

Smoke is made up of mostly solid substances entrained with toxic gases. While water mist may not be able to fully ‘scrub out’ all the particulates in smoke it has been shown to be capable of capturing some water-soluble gases. Specific fire testing is required for verification of applicability and limitations as this is not detailed in the published fire test protocols.

4.3.6 Reduction in visibility

Water mist effect visibility that must be considered relevant to the evacuation of normally occupied areas. These are:

- Reduction of visibility through the mist (akin to walking in mist or fog).
- Light diffraction in various directions and a loss of visual contrast that could lead to people within the area becoming disoriented.
- Cooling and mixing with the smoke layer that reduces the buoyancy and causes the smoke layer to fall.

With these facts in mind, the system designer should specify measures to safeguard occupants. Guidance in BS 9991 and BS 9999 must be followed.

4.4 Water supplies

It is critical for the operation of the water mist system that the installation can provide the flow and pressure that the system needs to operate in all scenarios.

The amount of water (and pressure) required is governed by the fire hazard, design area, manufacturer details (DIOM), and most favourable (and unfavourable) hydraulic calculations.

If an enhanced availability system is required there must be resilience in water supplies. Guidance is given in the standards albeit conflicts between the published UK and EN standards remain unresolved.

4.4.1 Water discharge times

The minimum duration for water discharge is prescribed in the relevant standards and is a factor of the type of hazard and occupancy. For domestic dwellings this will be a minimum of 10 minutes; and residential at least 30 minutes. For commercial and industrial light hazard occupancies it will be a minimum of 60 minutes.

The water quantity required assumes that all the nozzles in hydraulically most favourable design areas are operating.

For extinguishing systems which are required for local and total flood applications involving flammable liquid fires, up to and including 260m^3, and for industrial oil cookers, the duration discharge should be at least twice the time taken to extinguish the fire and to prevent reignition, and a minimum of 10 minutes. For larger volumes (>260m^3) this discharge time may need to increase to 60 minutes dependent on the certified test results from the fire test protocol.

4.5 Ventilation considerations

As the mass of the water droplets decreases the droplets will be more affected by air movement (both natural and forced ventilation).

It is essential that where ventilation is above the limit prescribed in the fire test protocol that measures are taken to turn-off or reduce the ventilation to within the tested limit. It may be that a judgement must be made as to whether a sprinkler system may be more appropriate (since the heavier droplet makes sprinklers less vulnerable to air flow).

Ventilation may also delay the activation of heat sensitive nozzles through dispersion of the convective heat plume, and conductive cooling at the frangible element surface.

4.6 Enclosure integrity of enclosure

Water mist systems used for the protection of enclosures containing Class B fuels are required to have the enclosure sufficiently leak tight that oxygen cannot be drawn into the fire during discharge. Openings will need to be automatically closed prior to discharge of the system. Some fire test protocols permit the installation of nozzles over openings to exclude oxygen if this is proven in the testing.

These form part of the design and additional nozzles should be included in case automatic vent closure fails. This will require that the water supply quantity is increased.

4.7 Nozzle positioning

Nozzle positioning is a key parameter in water mist system design. Obstructions will affect the coverage and distribution of water mist and appropriate variations of nozzle locations, as tested, and approved, should be detailed in the DIOM.

Water is two dimensional (not three dimensional as gas), so is unlikely to penetration enclosures (such as cabinets) useless there is heat for entrainment, or ventilation.

4.7.1 Nozzle heights and spacing

Installation of nozzles at the heights and spacings which have been validated by the nozzle manufacturer's tests is a crucial requirement. The maximum and minimum nozzle height and spacing must be detailed in the DIOM.

Installation of nozzles above or below the maximum or minimum heights is unproven and may result in the failure of the system to perform as tested.

For Class A fire hazards many fire test protocols have a maximum ceiling height of between 2.4m and 5m. Higher heights may be permitted in the fire test protocol if the performance criteria are still met.

For Class B fire hazards the height is generally in the range of 5m to 8m. Again, as above larger (or lower) heights must be proven by testing and detailed in the DIOM.

4.7.2 Nozzle temperature ratings or setection specification

Where a thermal element (such as a frangible bulb) is used, the type of application will determine its temperature rating as certain occupancies may generate unwanted activations if the activation temperature is low (for example, in saunas and plant rooms). The temperature rating selected should be 30°C above the maximum ambient temperature. Higher temperature rated elements must have been proven by third-party fire tests and included in the DIOM.

The specification of systems which are activated by separate detection systems must be included in the DIOM and be the same or equivalent as those proven in fire testing.

4.8 Installation and commissioning

The installation and commissioning procedures are critical to ensure that the system is put into service as intended by the design and proven by fire testing. Additional requirements beyond those in the standards should be detailed in the DIOM. If these are not followed there is a significant risk that the system will not function as intended.

The water mist contractor must provide the client/specifier with a copy of their DIOM that contains the design and installation rules for the system.

Particular attention should be given to the condition of the distribution pipework. It should be confirmed that prior to installation, the pipework has been cleaned and is completely free of any sharp edges, swarf or debris that could impair the functional efficiency of the system.

Open and automatic nozzle systems are subject to hydrostatic pressure tests as required in the standards. Note that these tests only check for pipe integrity at static pressures, not dynamic pressures. Where pipe work is subject to sudden shock, for example an open nozzle system increasing from zero pressure to 100 bar instantaneously, it is imperative that suitable fittings are used where there is a change of direction, for example a bend, else the pipe may come apart at the fitting.

Where pumps are installed, provision should be made for testing at full flow.

All valves in the critical water path (for example inlet to tank, pumps, and valves to the hazards) should be ensured as locked open and/or monitored.

The quality of water and filtration should be verified as within specification for the system.

The commissioning engineer must take responsibility for testing all aspects of:

- Electrical detection and signalling.
- Electrical or mechanical actuation.
- Pumps and tanks and/or water storage and gas container vessels.
- Valves including main control, isolation, zone, deluge and pre-action as required.
- Correct calibration of unloader valves and/or regulators as required.
- Discharge testing and/or pump flow tests (note that for multiple pumps it is important that there is a provision to test maximum flow demand from all pumps, not just per individual pump).
- Providing the client/specifier with a Completion Certificate stating that the system conforms to all the appropriate recommendations of the relevant British Standard and DIOM. All details of deviations from these documents MUST be notified and recorded. Review by a competent auditor is essential.

4.9 Availability and maintenance

Correct installation of the water mist system is only the start of its life in service. For it to be effective, it needs to be “available” during its lifetime. Regular maintenance is required to verify that the environment, hazard, or occupancy have not changed significantly over time as well as to verify that none of the components have been tampered with or damaged.

Note that water mist nozzles are not interoperable, so that if nozzles are required to be replaced, only those of the original manufacturer can be used. Where nozzles are unavailable (for example manufacturer has ceased trading) then it is probable that all the installation may become redundant.

The DIOM should include detailed maintenance instructions covering all the individual weekly, monthly, quarterly, and annual test procedures including additional measures required to those detailed in the referenced standard.

As with many building systems the internet has increased the adoption of remote monitoring and testing of systems to report faults or the need for maintenance. The same principles are being adopted by water mist suppliers. The aim is to provide notification of faults well before the annual check takes place, resulting in, potentially, a more efficient and effective on-demand maintenance as opposed to a reactive or scheduled maintenance. The objective is to maximise availability and reduce the possibility and the time of system downtime due to a fault which would only be observed during routine maintenance. Note this function is dependent on the resilience of the internet, interconnecting routers and servers, and the management software in both system control panel and maintainer off-site monitoring equipment.

Annexes

1.0 Definition of performance objectives

Fire Control - limitation of fire growth and structural damages (by cooling of the objects, adjacent gases and/or by pre-wetting adjacent combustibles)

Fire Extinguishment - complete elimination of any flaming or smouldering fire

Fire Suppression - reduction in the heat release rate and prevention of re-growth of a fire over the discharge duration

2.0 Published BS/EN Water Mist Standards

BS 8458: 2015 Fixed fire protection systems – Residential and domestic watermist systems – Code of practice for design and installation

BS 8489 Fixed fire protection systems – Industrial and commercial watermist systems
Part 1:2016 Code of practice for design and installation
Part 4:2016 Fire performance tests and requirements for watermist systems for local applications involving flammable liquid fires
Part 5:2016 Fire performance tests and requirements for watermist systems for the protection of combustion turbines and machinery spaces with volumes up to and including 80m^3
Part 6:2016 Fire performance tests and requirements for watermist systems for the protection of industrial oil cookers
Part 7:2016 Fire performance tests and requirements for watermist systems for the protection of low hazard occupancies

BS 8663 Fixed fire protection systems – Components for watermist systems
Part 1:2019 Specification and test methods for watermist nozzles

BS EN 14972 Fixed firefighting systems. Water mist systems

- 14972-1 Design, installation and maintenance of water mist systems
- 14972-2 for shopping areas
- 14972-3 for offices, school classrooms and hotel
- 14972-4 for non-storage occupancies
- 14972-5 for car garages

- 14972-6 for false floors and false ceilings
- 14972-7 for low hazard occupancies
- 14972-8 and -9 machinery spaces
- 14972-10 atrium protection
- 14972-11 for cable tunnels
- 14972-12 commercial deep fat fryers
- 14972-13 for wet benches
- 14972-14 and -15 combustion turbines
- 14972-16 for industrial oil cookers
- 14972-17 for residential occupancies

See comments in 3.2 for concerns expressed by the UK BSi Mirror Committee for watermist regarding content of BS EN 14972-1.

BS EN 17450 Fixed firefighting systems — Water mist components
Part 1:2021 Product characteristics and test methods for strainer and filter components
- prEN 17450-2 nozzles
- prEN 17450-3 check valves
- prEN 17450-4 control deluge valves and actuators
- prEN 17450-5 pressure switches

3.0 Other standards & references

Approved Document B: 2019 incorporating 2020 Amendments
Volume 1: Dwellings
Volume 2: Buildings other than Dwellings

Automatic water mist systems for domestic and residential premises (Welsh Government August 2021 https://gov.wales/water-mist-systems-guidance

BS 5306 Fire protection installations and equipment on premises
Part 0:2020 Guide for selection, use and application of fixed firefighting systems and other types of fire equipment

BS 7273 Code of practice for the operation of fire protection measures
Part 3:2008 Electrical actuation of pre-action water mist and sprinkler systems
Part 5:2008 Electrical actuation of water mist systems (except pre-action systems)

BS 9991:2015 Fire safety in the design, management and use of residential buildings – Code of practice

BS 9999:2017 Fire safety in the design, management and use of buildings – Code of practice
BS EN ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories

FIA – BAFSA Guidance Document on Piping

FM5560:2021 Examination Standard or Water Mist Systems

LPS1655:2015 Requirements and Test Methods for the LPCB Approval of Personal Protection Water Mist Systems

UL2167:2021 Water Mist Nozzles for Fire Protection Service

VdS3188en:2020 Water Mist Sprinkler Systems and Water Mist Extinguishing Systems (High Pressure Systems) Planning and Installation

BAFSA celebrates 50 years in 2024

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Hydraulic formulae information: sprinkler system design

THIS PART OF the Yearbook shows various hydraulic formulae and information that should be of value to a wide audience in the sprinkler industry. Suggestions for additional items in future editions of the Yearbook will be gratefully received by the editor.

1. Hazen-Williams formula for calculating the friction loss in pipework

The Hazen-Williams formula has long been used for calculating the friction loss in pipework for fire sprinkler systems. This equation uses the coefficient C to specify a pipe's roughness.

$$p = \frac{(6.05 \times 10^5)}{(C^{1.85} \times d^{4.87})} \times L \times Q^{1.85}$$

Where:
p is the pressure loss in the pipe, in bar;
Q is the flow through the pipe, in litres per minute;
d is the mean internal diameter of the pipe, in mm.
C is a constant for the type and condition of the pipe
L is the equivalent length of pipe and fittings, in metres.

2. Value of C for use in the Hazen-Williams formula

Table 3 lists the values for the coefficient C, which can be used in the Hazen-Williams formula for different design standards. The value of C represents a pipe's roughness, with higher values of C giving lower friction losses. The values allow for pipe degradation over a period of approximately 20 years.

Table 3. Values of C for various pipe types

Type of pipe	C (BSEN 12845)	C (BS 9251)	C (NFPA 13)
Cast-iron	100	-	-
Cement-lined cast-iron	130	-	140
Copper	140	140	150
Ductile iron	110	-	100
Galvanised steel	120	-	120
Mild steel	120	120	120
Mild steel (dry and			
pre-action systems)		-	100
Plastic (CPVC, MDPE)	-	150	150
Spun cement	130	-	-
Stainless steel	140	-	150

4. Hazen-Williams Simplified formula

The Hazen-Williams formula can be simplified to:

$p = k \times L \times Q^{1.85}$ using the k values shown in Table 3.

Where:
p is the pressure loss in the pipe, in bar;
Q is the flow through the pipe, in litres per minute;
k is the constant in Table 16.4 in columns 3,5 and 7.
L is the equivalent length of pipe and fittings, in metres.

Table 5. k values for various pipes

	EN 10255 Series M		EN 10255 Series H		CPVC	
Nominal diameter	ID mm	C = 120 value of k	ID mm	C = 120 value of k	ID mm	C = 150 value of k
20	21.70	2.67 x 10-5	20.50	3.52 x 10-5	22.20	1.58 x 10-5
25	27.35	8.66 x 10-6	25.75	1.16 x 10-5	28.00	5.11 x 10-6
32	36.05	2.25 x 10-6	34.45	2.81 x 10-6	35.40	1.63 x 10-6
40	41.95	1.08 x 10-6	40.35	1.30 x 10-6	40.60	8.36 x 10-7
50	53.05	3.44 x 10-7	51.25	4.07 x 10-7	50.90	2.78 x 10-7
65	68.75	9.72 x 10-8	66.95	1.11 x 10-7	61.50	1.11 x 10-7
80	80.75	4.44 x 10-8	78.75	5.02 x 10-8	75.00	4.21 x 10-8
100	105.05	1.23 x 10-8	103.25	1.34 x 10-8		
150	155.20	1.84 x 10-9	154.40	1.89 x 10-9		

6. How is the Mean Internal Diameter (ID) calculated?

BS EN 10255 specifies the manufacturing tolerances for pipes. It shows the maximum and minimum outside diameters allowed and also the wall thickness required, these are used to calculate the number in the Internal Diameter (ID) column of Table 5. For 100mm (4") pipe the maximum OD is 115.00mm and the minimum OD is 113.10mm, the wall thickness is 4.5mm. This is how the ID for 100mm Medium pipe is calculated:

$$\left(\frac{Max\ OD + Min\ OD}{2} \right) - 2 \times Wall\ Thickness$$

$$\left(\frac{115.00 + 113.10}{2} \right) - 2 \times 4.5 = \left(\frac{228.1}{2} \right) - 9 = 114.2 - 9 = \mathbf{105.05mm}$$

7. How is the value of k in Table 5 calculated?

i.e. 1.23×10^{-8}

Using this part of $\frac{6.05 \times 10^5}{c^{1.85} \times d^{4.87}}$ of the H+W formula the value of **k** can be

calculated $\frac{6.05 \times 10^5}{120^{1.85} \times 105.05^{4.87}}$ $= 1.23 \times 10^{-8}$

8. Pressure loss calculation example

Use Hazen-Williams simplified formula to calculate the pressure loss in 25m of 50mm EN 10255 Series M pipe at a flow rate of 500 L/min:

The **k** value for 50mm pipe in the table 5 is 3.44×10^{-7}.

Calculate as follows:
$p = k \times L \times Q^{1.85}$

p = *Pressure loss to be calculated*
k = *3.44 x 10-7 (from table 16.5)*
Q = *Flow (500 l/min) to the power of* $^{1.85}$

$500^{1.85} \times 3.44 \times 10^{-7} \times 25 = 0.846$ bar = **846mb pressure loss.**

9. Velocity in pipe

Some sprinkler rules limit the velocity through pipes and valves in sprinkler systems. BS EN 12845 limits velocity to 6m/s through valves and flow switches and 10m/s at any other point in the system. The velocity limits for pump suction pipes are 1.8 m/s for Positive Head and 1.5 m/s for Suction Lift conditions.

Note: Pressure loss due to velocity is normally ignored when designing sprinkler systems to BS EN 12845 sprinkler rules.

The case for limiting velocity is that the Hazen- Williams formula is less accurate outside its normal range and equivalent pipe lengths for fittings, which are generally used, start to lose their validity. Some authorities believe that velocity is self-limiting since pressure losses increase exponentially as velocities increase, so pipe size must be increased to make use of available water supply pressure.

$$v = 21.22 \quad \frac{Q}{d^2}$$

v = velocity m/s
Q = flow of water in L/min
d = internal diameter of pipe in mm

10. Examples of how to calculate Velocity, Flow and pipe ID.

To calculate V (m/sec) in 155.22 ID M pipe with a flow of 2250 (L/min).

$$v = 21.22\ x \quad \frac{Q}{d^2}$$

$$v = 21.22\ x \quad \frac{2250}{155.2^2}$$

v = 1.98 m/sec

To calculate ID (mm) with a known flow (L/min) and Velocity (m/sec)

Example: What ID pipe is required for: flow = 6811 L/min, maximum velocity = 6 m/sec.

$$d\ (mm) = \sqrt{\quad \frac{21.22\ x\ Q}{v}}$$

$$d\ (mm) = \sqrt{\quad \frac{21.22\ x\ 6811}{6}}$$

d (mm) = 155.2mm

To calculate FLOW (L/min) with a known ID (L/min) and Velocity (m/sec)
Example: What FLOW is required for: ID = 155.2 mm, maximum velocity = 10 m/sec.

$$Q = \quad \frac{v}{21.22} \quad x\ d^2$$

$$Q = \quad \frac{10}{21.22} \quad x\ 155.2^2$$

Q(L/min) = 11351 L/min

Table 11. Maximum flows for velocities of 6 and 10m/s in M and H pipe

Nominal diameter mm	EN 10255 Series M 6m/s	EN 10255 Series M 10m/s	EN 10255 Series H 6m/s	EN 10255 Series H 10m/s
20	133	222	119	198
25	212	353	187	312
32	367	612	336	559
40	498	829	460	767
50	796	1326	743	1238
65	1336	2227	1273	2122
80	1844	3073	1767	2923
100	3120	5201	3014	5024
150	6811	11351	6741	11234

12. Sprinkler head and nozzle calculations

The discharge from, K factor and pressure for sprinkler heads or nozzles can be calculated using the following formulae:

$Q = K \times \sqrt{p}$ Example: $K = 80$, $P = 0.5$ gives a flow Q of 56.57 L/min

$p = \left(\frac{Q}{K} \right)^2$ Example: $K = 80$, $Q = 100$ gives a pressure P of 1.563 bar

$K = \frac{Q}{\sqrt{p}}$ Example: $Q = 113$, $P = 2$ bar gives a Sprinkler K factor of 80

Where *Q = Flow in L/min,*
p = Pressure in bar
K = K factor for sprinkler head or nozzle

Always refer to the sprinkler head manufacturers' data sheets for 'k' factor and operating pressures.

13. Unit Conversions

Pressure conversions

bar x 14.5	=	psi	kPa x 0.01	=	bar
bar x 100	=	kPa	m Head x 0.098	=	bar
bar x .001	=	mbar	mbar x 1000	=	bar
ft head x 0.02986	=	bar	psi x 0.06895	=	bar

Table 14 BS EN 12845 k-factors for sprinkler heads

When a sprinkler system is designed using **The Loss Prevention Council Rules (LPC Rules)** Technical Bulletin TB207.Table TB207.T1 must be used.			
Hazard Class	**Design Density mm/min**	**k-factor L/min/bar$^{0.5}$**	**Minimum pressure bar**
Light Hazard	2.25	57	0.7
Ordinary Hazard	5	80	0.35
High Hazard Process (HHP) Roof Sprinklers	≤ 10 > 10	80, 115, 160 115,160	0.5
High Hazard Storage (HHS) Roof Sprinklers	≤ 10 > 10	80, 115, 160 115,160	0.5
High Hazard Storage (HHS) In-Rack Sprinklers	Calculated with a minimum in-rack head pressure	80 115	2.0 1.0

Table 15 LPC Rules k-factors for sprinkler heads

When a sprinkler system is designed using **The Loss Prevention Council Rules (LPC Rules)** Technical Bulletin **TB207.Table TB207.T1** must be used.			
Hazard Class	**Design Density mm/min**	**k-factor L/min/bar$^{0.5}$**	**Minimum pressure bar**
Light Hazard	2.25	57	0.7
Ordinary Hazard (O.H)	5	80	0.35
TB 222 (EPEC) O.H Room protection	6.0 and 6.5 See TB222	115 (EPEC)	FHC See TB222 Table T3
TB 223 (EPEC) O.H Ceiling voids	See TB223 Table T1	80 and 115 See TB223 Table T1	FHC See TB223 Table T1
High Hazard Process (HHP)Roof/ Sprinklers	≤ 10 > 10 ≤ 12.5 >12.5	80 and 115 115 160	0.5 0.5 0.5
High Hazard Storage (HHS) Roof Sprinklers	7.5 ≥ 10 < 12.5 ≥ 12.5 ≤ 18.5 ≥ 19 ESFR	80 115 160 ≥ 240 ≥ 200	FHC See TB234 See TB.209
High Hazard Storage (HHS) In-Rack Sprinklers	Calculate with a minimum in-rack head pressure	115	1.0

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ACCREDITATIONS	Members of ECA, ISO9001, SMAS WORKSAFE.
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AM Fire Systems Ltd is a privately owned independent fire protection company specialising in active fixed fire protection. Our facilities and expertise ensure that systems are designed, installed and managed to an excellent professional standard. Our designs and installations would be to LPC, NFPA and FM standards for Fire Sprinklers, Special Hazard Systems (medium & high velocity water spray), Foam Enhanced, Foam / Water Deluge installations, BS EN 12845 commercial systems and BS 9251 residential.

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ACCREDITATIONS	LPCB – LPS 1048 Level 4 LPCB - ISO 9001 - 2015 LPCB - ISO 14001 - 2015 LPCB - ISO 45001 - 2018
CONTACT	Alex Paolozzi – Technical Sales Manager

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Our mission is clear - providing quality and efficient fire protection solutions nationwide to keep protecting premises and saving lives.

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CONTACT	Andrew Mock, Managing Director

AFT Group (Wales) Ltd is a privately owned, multi-disciplined fire safety company, specialising in numerous aspects of passive & active fire safety. Services include - Residential Fire Sprinklers, Gaseous Extinguishing Systems, Fire Alarms, Fire Stopping, Fire Doors (Timber, Steel & Composite), Automated Doors & Barriers, AOV's, CCTV, Intruder Alarms & Refuge Systems. FIRAS, BAFE, NICEIC, ECA, ADSA, GateSafe, SSAIB & F-Gas Accredited. AFT proudly incorporates a sister company; AFT Corporate Facilities Ltd (aft.fm). Delivering planned cyclical M&E packages, ad-hoc works, reactive works, project management & refurbishment. GasSafe & ECA accredited.

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ACCREDITATIONS	The Chartered Insurance Institute (CII) – Corporate Chartered Status, The Safety Assessment Federation (SAFed), UK Accreditation Service (UKAS)
CONTACT	Andrew Miller / Alan Whitehead / Lee Theobald

Allianz Insurance plc is one of the largest general insurers in the UK, and part of the Allianz Group. We employ 147,000 employees worldwide across 70 countries. In the UK, we offer commercial insurance with a full range of products for sole traders, right up to large commercial organisations. We also provide musical insurance, legal expenses insurance and pet and equine insurance.

Also:
- Worldwide insurance partner of the Olympic & Paralympic movements
- Inclusive top 50 UK employers 2021/22

Alphasprinklers

Suite G25, Innovation Centre, Evolution Park, Haslingden Road, Blackburn, Lancashire BB1 2FD

TELEPHONE	01254 584669
EMAIL	info@alphasprinklers.co.uk
WEB	alphasprinklers.co.uk
CATEGORY	Commercial & Residential Installer
ACCREDITATIONS	LPCB - Level 2
CONTACT	Mebs Yusuf

Alpha Sprinkler Protection Ltd provides design, installation and servicing of fire sprinkler systems within retail, commercial and residential properties. At Alpha, engineers have years of experience across a diverse array of projects, installing automatic sprinkler systems, dry risers, wet risers and water mist systems.

We undertake projects nationwide and each project is managed in a cost effective and timely manner, whilst ensuring quality stays at the forefront.

Alpine Fire Engineers LTD

Alpine House, Hollins Brook Park, Bury BL9 8RN

TELEPHONE	Main: 0161 791 4500 Service: 0161 791 4511
EMAIL	enquiries@alpinefire.co.uk
WEB	alpinefire.co.uk
LINKEDIN	company/alpine-fire-engineers-limited
CATEGORY	Associate, Installer, Commercial & Industrial
ACCREDITATIONS	LPC Level 4, FM Global, CHAS, Safe Contractor, Achilles Building Confidence, EuroSafe UK, Avetta, SEMA.
CONTACT	Louise Plant, Service and Business Development Director

Alpine Fire Engineers has unrivalled experience delivering highly integrated bespoke fire protection solutions. With regulatory reforms, various insurance requirements, numerous design standards and a constantly evolving service sector it is vital that a project is supported and commissioned by an accredited company.

Alpine is an LPC level 4 accredited company which ensures that their clients receive accurate, up to date and invaluable information at whatever stage of the process it is required. The Project Engineering team, who are fully conversant with both LPC BS EN 12845 and FM Global specifications, engage early to support their customers from the initial planning stage right through to interpreting employer's requirements.

As important as the design and commissioning is the ongoing planned maintenance and testing of the system by appropriately trained personnel or certified companies as noted by the LPCB guidelines.

Alpine directly employs a nationwide team of highly skilled Service Engineers who will inspect automatic fire suppression systems as part of a planned and preventative maintenance regime, which is vital to ensure deployment and optimal performance when the system is needed.

Amsco Fire Ltd

Unit G9, Atlas Industrial Park, Harbour Road, Rye TN31 7TE

TELEPHONE	01424 813131 (8 lines)
EMAIL	kaj@amsco.co.uk
WEB	amsco.co.uk
FACEBOOK	/amsco automatic sprinkler systems
TWITTER	@amscofire
CATEGORY	Associate
ACCREDITATIONS	IFC

CONTACT Kaj Haines, Managing Director

Amsco design and install fire and mist sprinkler systems within Domestic & Residential, and Commercial properties including Schools, Hotels, High Rise properties, Care Homes, Housing Developments, Vulnerable properties and homes of all shapes and sizes.

Aon

3 The Embankment, Sovereign Street, Leeds LS1 4BJ

TELEPHONE	+44 (0)7425 637793 (Gary Eaton mobile) +44 (0)113 393 6354 (Gary Eaton landline)
EMAIL	gary.eaton@aon.co.uk
WEB	aon.com/unitedkingdom/default.jsp
LINKEDIN	/aon
ACCREDITATIONS	Gary Eaton BSc (Hons), FCII, MCILA
CONTACT	Gary Eaton

Aon plc (NYSE:AON) is a leading global professional services firm providing a broad range of risk, retirement and health solutions. Our 50,000 colleagues in 120 countries empower results for clients by using proprietary data and analytics to deliver insights that reduce volatility and improve performance.

Applications Engineering Ltd

Liberty House, Unit 9C Michael Way,
Ashdown Business Park, Maresfield TN22 2DU

TELEPHONE	01825 764737
EMAIL	info@appeng.co.uk
WEB	appeng.co.uk
CATEGORY	Supplier Manufacturer
ACCREDITATIONS	ISO 9001, LPCB
CONTACT	Sam Goddard

Applications Engineering Ltd are a UK based company who have established a reputation for service and quality within the Residential and Domestic fire sprinkler industry. We offer our very own LPCB approved flow switch to accompany our range of turnkey Fire Sprinkler Control Valve Sets, using high quality equipment configured to the clients specific requirements. Options include check valves, CPVC adapters, MDPE fittings and Pressure Reducing Valves. We hold large stocks which allows us the ability to supply next day where possible. We also offer ball valve monitoring and pump auto test panels.

APW Fire Protection Ltd

Unit A Marfield Factory, Front Road, Drumbo, Lisburn BT27 5JY

TELEPHONE	02890 827 046 07813 671 556
EMAIL	Adrian.mulholland@apwfp.com
WEB	apwfp.com
CATEGORY	LPCB – Level 3 Sprinkler Installer
CONTACT	Adrian Mulholland

APW Fire Protection Ltd was founded in 2007 and is now recognised as one of the leading designers and installers of Automatic Fire Sprinkler Systems within N. Ireland. Our professionalism and technical competence have earned us a well-deserved reputation for excellence across all the sectors we serve. We offer a friendly, knowledgeable and highly competent service via our specialist engineers. APW Fire Protection conducts rigorous in-house mandatory training courses, and all materials and components used are approved to the highest quality standards available. We provide 24hr call out cover to give you complete peace of mind.

Aquablaze

Unit 6, Pheonix Industrial Estate,
Stirling FK7 7SG

TELEPHONE	01786 357 738 07771 666 238
EMAIL	william@aquablaze.com
WEB	aquablaze.com
ACCREDITATIONS	FIRAS
CONTACT	William Ferguson, Managing Director

We install firas third party certified residential fire sprinkler systems. We only use fully product testde components in our system. We issue real third- party certification for our systems. We have worked in a range of projects including btr, student residences, apartments, care homes, heritage buildngs

Aquaspray Fire Protection Ltd

61 Horringer Road, Bury St Edmunds, Suffolk IP33 2DQ

TELEPHONE	01284 754335 / 07811 679644
EMAIL	jscmonteiro@aol.com
CATEGORY	Associate
CONTACT	Joaquim Monteiro, Director

We have been carrying out design works and engineering services on a sub-contract basis for the sprinkler industry for over 20 years.

Aquatech Pressmain (formerly Aquatronic Group Management Ltd)

AGM House, London Road, Copford, Colchester, Essex CO6 1GT

TELEPHONE	01206 215 121
EMAIL	km@agm-plc.co.uk
WEB	aquatechpressmain.co.uk
CATEGORY	Associate Manufacturer
CONTACT	Kostas Manousakis, Products Director

Aquatherm UK

9 Saracen Close, Gillingham, Kent ME8 0QN

TELEPHONE	01444 250500
MOBILE PHONE	07884 265781
EMAIL	chris.willis@aquatherm-uk.com
WEB	aquatherm.de/?lang=gb
LINKEDIN	Aquatherm UK
CATEGORY	Supplier Manufacturer
ACCREDITATIONS	LPCB
CONTACT	Chris Willis, Business Development Manager

Aquatherm are a manufacturer and supplier of polypropylene pipework for use in sprinkler systems. Our pipes are LPCB approved and connected by fusion welding so there's no leak path. We offer many sustainability benefits over steel alternatives.

Argus Fire Protection Company Limited

Hendglade House, 46 New Road, Stourbridge, West Midlands DY8 1PA

TELEPHONE	+44 (0)1384 376 256
EMAIL	info@argusfire.co.uk
WEB	argusfire.co.uk
LINKEDIN	company/argus-fire
CATEGORY	Level 4 – Installer
ACCREDITATIONS	LPCB – LPS 1048 Level 4, LPCB – LPS 1014, LPCB – LPS 1204, LPCB – ISO 9001 – 2015, LPCB – ISO 45001 – 2018, Constructionline – Gold, CHAS, Safe Contractor, Achilles Building Confidence
CONTACT	Simon Woodings, Executive Director Matthew Lincoln, Executive Director Ben Smith, Executive Director John Gormley, Executive Director

Argus Fire is one of the largest, privately owned fire protection companies in the UK. We specialise in the design, installation, service and maintenance of fixed fire protection and detection systems, with an area of operation covering the UK and Europe. Our head office in Stourbridge West Midlands established in 1982, specialises in the full turnkey package from initial design concept through to end user training and servicing and maintenance. This includes the full range of fixed fire protection systems such as automatic sprinklers, dry & wet risers, water mist, special risk, gas suppression and fire detection systems.

Armstrong Integrated Ltd

Wolverton Street, Manchester M11 2ET

TELEPHONE	08444 145145
FAX	08444 145146
EMAIL	nsyson@armstrongfluidtechnology.com kgingell@armstrongfluidtechnology.com
WEB	armstrongfluidtechnology.com
CATEGORY	Manufacturer
ACCREDITATIONS	LRQA ISO 9001: 2000, ISO 14001: 2004. Pumps approved to FM 1311, 1319 and 1371: LPS 1131
CONTACT	Neil Syson (UK North) Ken Gingell (UK South) - Global

Manufacturer of centrifugal and reciprocating pumps, pressurisation units, booster sets and packaged pump room enclosures for fire protection installations.

Peter Armstrong (Life Member)

Armstrong Priestley Ltd

Seventy Seven Holbeck Lane, Leeds LS11 9UL
Office locations: Leeds, Manchester, South Shields and Maidstone

TELEPHONE	0113 3944040
EMAIL	info@armstrongpriestley.co.uk
WEB	armstrongpriestley.co.uk
CATEGORY	Commercial Installer & Residential Installer
ACCREDITATIONS	LPCB 1048 Level 4 Approved Sprinkler Contractor FIRAS (Domestic and Residential) Sprinkler Contractor LPCB ISO 9001:2015 Quality Management System
CONTACT	Terry Bennett, Commercial Director

Armstrong Priestley are specialists in automatic fire suppression systems with over 45 years of experience providing our clients with a wealth of expertise in the design, supply, installation and maintenance of:

- Wet and Dry sprinkler systems Deluge sprinkler systems
- Low Pressure Water Mist
- Special Risk applications (tank deluge)

- Low and High Expansion Foam systems (aircraft hangar protection) Gas suppression
- Wet and Dry Risers

There is no project that Armstrong Priestley cannot undertake, with experience in: Industrial sprinkler applications (warehousing, production and manufacturing facilities) Commercial applications (pharmaceuticals, hotels, office blocks, fire stations) Education (schools, colleges, early learning)
Retail (from minor alterations to full shop fit-outs) Residential (care homes, high rise blocks)

Our Service & Maintenance team provide a 24/7 call out service 365 days of the year.

ASAP Fire Systems

Unit 22, Silver Birches Business Park, Bromsgrove, Worcestershire B60 3EU

TELEPHONE	01527 574259
EMAIL	service@asapfiresystems.co.uk
WEB	asapfiresystems.co.uk
LINKED IN	ASAP Fire Systems LTD
CATEGORY	Residential & Commercial
ACCREDITATIONS	FIRAS, ISO 9001: 2015 Service and Maintenance of Sprinkler systems and Wet / Dry risers.
CONTACT	Claire Hewitt, Operations Director

ASAP Fire Systems Ltd specialise in the service, maintenance and installation of wet mechanical fire protection products.

- Commercial and Residential sprinklers Systems,
- In house fire pump engineers
- Wet /Dry risers,
- Fire hydrants
- Hose reels.
- Amerex Kitchen suppression.

Centrally located in Bromsgrove Worcestershire we are cover all over the UK and offer a 24/7 call out facility. We work in accordance with all standards including BS/ LPCB/ NFPA /FM. At ASAP Fire, we prioritise client satisfaction by offering customised service agreements that cater to your individual needs. From installation to ongoing maintenance and servicing, our highly-trained technicians are readily available to ensure the compliance and optimal performance of your systems.

ASCP Group Limited

11 Campbell Court, Bramley, Hants RG26 5EG

TELEPHONE	+44 01256 548040
EMAIL	enquiries@corgitechnical.com
WEB	corgitechnical.com | ascp.org.uk agsm.uk.com | aesm.uk.com

TWITTER @ASCP_UK

CONTACT Sam Browne

The Association of Safety and Compliance Professionals (ASCP) is the leading professional membership organisation for asset safety management and compliance within social housing and facilities management. We are the only industry organisation raising standards in safety and compliance; informing, supporting and empowering members, and representing their views by being the voice of safety and compliance in the sector. Via the ASCP National Academy we also provide a range of quality training and industry recognised qualifications to those with an involvement in, or responsibility for, compliance, gas safety and electrical safety.

ASLR Fabrication Services Ltd

Opal Way, Stone Business Park, Stone, Staffordshire ST15 0SS

TELEPHONE 01785 286060
EMAIL sales@aslr.co.uk
WEB aslr.co.uk

ACCREDITATIONS BRE Global assessed to ISO 9001:2015, Quality Management
CONTACT Chris Shenton

ASLR Fabrication Services Ltd provide prefabricated, powder coated steel pipework for Fire Sprinkler systems. Quality and timely service from our Midlands base delivering to all areas of the UK & Ireland.

Associated Fire Systems Ltd

4a Oakwood Parade, Loughton, Essex IG10 3EL

TELEPHONE 0208 508 3330
FAX 0208 502 5074
EMAIL ppatten@afs-ltd.co.uk
WEB afs-ltd.co.uk

CATEGORY Sprinkler and High Pressure Water Mist Installer
CONTACT Peter Patten, Director

Automatic Sprinkler Solutions ltd

144 Brownspring Drive, New Eltham SE9 3LD

EMAIL mick@autosprinklersolutionsltd.co.uk
WEB autosprinklersolutionsltd.co.uk

CATEGORY Domestic and Residential
Design, supply, install, test & commission
ACCREDITATIONS FIRAS R&D
CONTACT Mick Sheaf, Managing Director, Operates nationwide

Avon Fire & Rescue Service

Police & Fire HQ, PO Box 37, Valley Road, Portishead, Bristol BS20 8JJ

TELEPHONE	0117 9262061
EMAIL	Fire.Safety@avonfire.gov.uk
WEB	avonfire.gov.uk
ACCREDITATIONS	MIFireE, EngTech
CONTACT	Business Fire Safety Officer Richard Bobruk Richard.bobruk@avonfire.gov.uk

B

B4 Fire Protection

Unit 6 Summerhill Trading Estate, Goodman Street, Birmingham B1 2SS

TELEPHONE	0116 2960782
MOBILE	07852 503 893
EMAIL	sean.cooper@b4fireprotection.co.uk
WEB	b4fireprotection.co.uk
CATEGORY	Installer Level 3
ACCREDITATIONS	FIRAS - Domestic and Residential Scheme
CONTACT	Sean Cooper, Director

B&C Fire Engineering Ltd

Booth Hall Farm, Clamgoose Lane, Kingsley, Stoke on Trent ST10 2EG

TELEPHONE	01782 206144
EMAIL	kim.smallwood@bandcfire.net
WEB	bandcfire.net
FACEBOOK	/B-C-Fire-Engineering- Ltd-347426195309204
TWITTER	@BandCFire
LINKEDIN	company/b-&-c-fire-engineering-limited
ACCREDITATIONS	FIRAS - Level 4 (Commercial, Domestic and Residential)
CONTACT	Kim Smallwood, Managing Director

We are one of the UK's leading designers, suppliers, installers, service, and maintenance provides of fire suppression systems in the UK and have been helping to protect buildings since 1972. BS EN 12845, FM Global, NFPA, VDS, BS 9251, BS 16925 and bespoke hybrid solutions.

Bailey Fire Services Ltd

Unit 15, Colin Sanders Business Centre, Mewburn Road, Banbury OX16 9PA

TELEPHONE	01295 817657
EMAIL	info@baileyfire.co.uk
WEB	baileyfire.co.uk
CATEGORY	Installer Residential & Domestic, Commercial & Industrial
ACCREDITATIONS	Level 1 LPCB
CONTACT	Peter Bailey, Director

Balmoral Tanks

Rathbone Square, 24 Tanfield Road,
Croydon CR0 1AL

TELEPHONE	0208 665 4100
EMAIL	tanks-website@balmoral.co.uk
WEB	balmoraltanks.com
TWITTER	@BalmoralTanks
LINKEDIN	/balmoral-tanks-direct
ACCREDITATIONS	FM Approvals Class 4020; BS ISO 9001:2015; BS ISO 14001: 2015; Achilles UDVB Member
CONTACT	Clive Milton, Sales Manager

Balmoral Tanks is a globally-renowned designer and manufacturer of liquid storage solutions and associated services. Offering project-specific choices of hot press moulded GRP sectional, steel and coated steel bolted cylindrical tanks, Balmoral will guide you through the firefighting sprinkler tank specification process and carry out installation if required.

Base Fire Sprinklers

TELEPHONE	0800 009 6906
MOBILE	07709 807 847
EMAIL	info@basesprinklers.co.uk
WEB	basesprinklers.co.uk
LINKEDIN	company/base-fire-sprinklers
ACCREDITATIONS	FIRAS
CONTACT	Mark Gordon

At Base Fire Sprinklers, we provide a turnkey solution for the design, supply, installation, servicing, and maintenance of sprinkler systems across the UK. Our focus is on delivering high-quality systems that adhere to the latest industry standards, specifically BS9251:2021, using approved materials and installed by fully qualified engineers. We are proud to hold 3rd party accreditation through the reputable FIRAS scheme.

With our dedicated in-house design and project management team, we offer an end-to-end approach, applying our knowledge from the start of the development process to ensure a compliant solution that perfectly meets your requirements.

Contact us today to explore how we can collaborate on your next project

Bedfordshire Fire and Rescue Service

Southfields Road, Kempston MK42 7NR

TELEPHONE	01234 845000
EMAIL	tim.birchall@bedfire.gov.uk / firesafetyadmin@bedsfire.gov.uk
WEB	bedsfire.gov.uk
FACEBOOK	/bedsfire
TWITTER	@bedsfire
CATEGORY	Associate
CONTACT	Tim Birchall, Fire Safety Technical Officer

Blue Shield Fire Protection Ltd

9 Sovereign Park, Cleveland Way, Hemel Hempstead, Hertfordshire HP2 7DA

TELEPHONE	01442 828000
EMAIL	sales@blueshieldfire.co.uk
WEB	blueshieldfire.co.uk
CATEGORY	Commercial Installer
ACCREDITATIONS	LPCB ISO 9001:2000
CONTACT	Ashley Gorton, Director

BMS Ltd t/a BMSprinklers

Unit 4, 55 Olympus Close, Ipswich IP1 5LJ

TELEPHONE	01473 748355 07815 115773
EMAIL	info@bmsprinklers.co.uk
WEB	bmsprinklers.co.uk
ACCREDITATIONS	LPCB Installer : Level 1 FIRAS
CONTACT	Mark Bedford, Director - Operates nationwide

BMSprinklers is a Suffolk based company specializing in the design, installation and maintenance of Residential Sprinkler systems. We pride ourselves on a bespoke personal service ranging from single dwellings right through to Blocks of Flats and Care Homes. We over 20 year's continuous experience we are confident that can design and install a Sprinkler system to meet your needs

BRE

Bucknalls Lane, Watford, Hertfordshire WD25 9XX

TELEPHONE	+44 (0)333 321 88 11
EMAIL	CustomerServices@bregroup.com
WEB	bregroup.com
TWITTER	@BRE_Group
LINKEDIN	company/building-research-establishment-bre-/
CONTACT	Customer Services

BRE Global is an independent, third-party approvals body offering testing, inspection and certification of fire, security, microgeneration (MCS), environmental profiles and sustainability of products and services to an international market.

BRE Global is owner of the internationally recognised Loss Prevention Certification Board (LPCB), BREEAM and BRE Global certification schemes.

LPCB is responsible for the approval of fire and security products and services listed in the Red Book. LPCB also operates installation and service maintenance schemes, and provides inspection services.

Buckinghamshire Fire & Rescue Service

Service Headquarters, Stocklake, Aylesbury, Buckinghamshire HP20 1BD

Buckinghamshire Fire & Rescue Service serves a population of more than 800,000 in Milton Keynes and Buckinghamshire.

EMAIL	FireSafetyEnquiries@bucksfire.gov.uk
WEB	bucksfire.gov.uk
CATEGORY	Associate
CONTACT	Steve Hawkins

Burgate Fire Limited

Registered Office: Onega House. 112 Main Road, Sidcup, Kent DA14 6NE
Correspondence address only: 16 Baxter Way, Kingshill, West Malling, Kent ME19 4BB

TELEPHONE	07774128188
EMAIL	burgatefire@gmail.com
WEB	burgatefire.com
CATEGORY	Residential & Domestic Fire Sprinklers to BS9251;2021
ACCREDITATIONS	BS9251 Sprinkler design and installation – Ceasefire commercial kitchen & fire suppression systems approved supplier. Approved agent for the ico fire mist system.
CONTACT	Jim Pooley, Director

Burgate Fire Ltd is fully accredited, and has been in the mechanical contracting industry for over 30 years, and as such are able to offer a complete package of design supply & fitting or retrofitting into existing residential blocks or high risk homes with Fire fire suppression systems.

Burgate Fire Ltd is Manufacturer approved to supply & fit the Ceasefire range of commercial kitchen fire suppression systems, using both chemical & high pressure mist.

In addition, Burgate Fire Ltd are also Manufacturer approved, to Design, Supply & Fit the ico fire mist system, Together with a full range of Dry riser solutions for any application.

We look forward to assisting you in the future burgatefire@gmail.com

C

C&H Fire Protection Ltd

Unit 8, Ilford Trading Estate, Paycocke Road, Basildon, Essex SS14 3DR

TELEPHONE	01268 293199
MOBILE	07543 267507
EMAIL	enquiries@chfireltd.co.uk
WEB	chfireltd.co.uk
LINKEDIN	C&H Fire Protection LTD
FACEBOOK	/profile.php?id=100053256803772
CATEGORY	Fire Protection
ACCREDITATIONS	Firas, CHAS, BAFSA
CONTACT	Mark Cooling

C&H Fire Protection Ltd are a Third-party Firas Level 2 approved sprinkler company based in Basildon that was established in July 2020 with a view to deliver high-end technical ability in all aspects of sprinkler protection.

With nearly 20 years in the industry, we have experience on all types of commercial, residential and domestic sprinkler systems with a great understanding of British Standards BS9251/BS16925, BSEN12845 FM and NFPA.

We can offer design, repair and servicing of the below equipment:

- Wet sprinkler systems
- Dry/alternate sprinkler systems
- Pre-action systems both electrical and mechanical
- Deluge and special risk systems
- Watermist systems
- Dry and wet risers
- Hydrants
- Fire Pump servicing
- Electrical installation

We have achieved our Advanced CHAS accreditation and more recently became Firas Level 2 approved and became members of BAFSA. We are currently pursuing our ISO 9001 to enable us to increase our operational efficiency to improve product quality and services for both us and our clients.

Cambridgeshire Fire & Rescue Service

Hinchingbrooke Cottage, Brampton Road, Huntingdon, Cambridgeshire PE29 2NA

TELEPHONE	01480 444500
EMAIL	steve.fleming@cambsfire.gov.uk
WEB	cambsfire.gov.uk
CATEGORY	Associate
CONTACT	Steve Fleming

Canute LLP

15 Queen Square, Leeds LS2 8AJ

TELEPHONE	0113 328 0350
EMAIL	info@canutesoft.com
WEB	canutesoft.com
CATEGORY	Associate

Canute specialises in hydraulic calculations software for the fire protection industry and offers training, support and consultancy within the United Kingdom, which has helped us become the UK leading provider. We have thousands of satisfied users in over 50 counties and support both national and international design standards. The FHC hydraulic calculation software can be used for any water-based fire protection system, including fire sprinkler, water mist, foam enhanced, water cannon, fire hydrants, hose reels and deluge. We support the following design standards BS EN 12845, BS EN 16925, BS 9251, BS 8458, BS 8486, NFPA 13/13D/13R, NFPA 750, FM global, Vds CEA 4001, CP52, ASIB and many others.

CertifiedPro Installs Ltd

Tile Cross Road. Birmingham B33 0NW

TELEPHONE	0121 7796548
EMAIL	info@certifiedproinstalls.co.uk
WEB	certifiedproinstalls.co.uk
CATEGORY	Commercial Service & Maintenance
CONTACT	Chris Bagnall

Cheshire Fire & Rescue Service

Winsford, Cheshire CW7 2FQ

TELEPHONE	01606 868700
EMAIL	fireadvice.shq@cheshirefire.gov.uk
WEB	cheshirefire.gov.uk
CATEGORY	Associate organisation
CONTACT	Tracey Carter, Business Safety Manager

Cheshire Fire and Rescue Service is a massive advocate of sprinkler systems. Officers and fire authority members proactively promote the installation and use of sprinklers and work tirelessly to educate and encourage building owners and developers to install these systems alongside campaigning and lobbying for greater mandatory sprinkler installation requirements within building standards.

Churches Fire & Security

Fire House, Mayflower Close, Chandlers Ford SO53 4AR

TELEPHONE	0370 608 4350
EMAIL	lee.tompkins@churchesfire.com
WEB	churchesfire.com
CATEGORY	Commercial & Industrial, Residential & Domestic Installer

Established in 1992, Churches Fire & Security is a nationwide company dedicated to supplying customers with the best fire safety and security solutions. We deliver comprehensive fire protection from fire alarms to the installation, service and maintenance of sprinklers. We also design, supply, install and commission several security services including CCTV, intruder alarms and access control. We are always fully aware of the latest legislation and have worked hard to ensure that our customers are fully compliant. Our third-party quality assurance and accreditations show that customers can rest assured that their legal fire safety responsibilities are taken care of.

Clarke Fire Protection Products

Lomond Road, Coatbridge ML5 2NN

TELEPHONE	01236 429946
FAX	01236 427274
EMAIL	rlivingston@clarkefire.com
WEB	clarkefire.com
CATEGORY	Supplier Manufacturer
ACCREDITATIONS	Diesel Engines Approved / LPS 1239, UL 1247 & FM 1333
CONTACT	Ross Livingston

Clarke Fire are the global supplier of emergency standby diesel fire pump engines. Established in 1964, we have nearly 60 years' experience in developing diesel engines to meet demanding fire pump requirements and providing end users with piece of mind that their sprinkler systems source of power is guaranteed in times of emergency. Clarke partners with renowned engine OEM's John Deere, CAT, Kohler and Doosan, which allows us to support sprinkler installations from basic commercial sites, to high value energy assets. We specialise in NFPA 20, FM Approved, UL Listed & LPCB Approved applications, we also supply country code compliant engines.

CMT Engineering Ltd

Corngreaves Road, Cradley Heath B64 7DG

TELEPHONE	01384 563200
EMAIL	sales@cmtengineering.co.uk
WEB	cmtengineering.co.uk
TWITTER	@cmt_engineering
CONTACT	Anjali Agrawal, Steve Pickett

Our range: Tube to BS EN10255/10217-1&2 (BS 1387); Machine Shop Cutting Screwing VICTAULIC roll & cut grooving; Mild Steel fittings BS EN10241 (BS 1740 & BS 1387); Jinan Malleable fittings EN10242 (BS143); Jinan Anvil Mech Brand Grooved Fittings; Gauge Syphons Manufactured in house; Stainless Steel 150lb screwed fittings; CNC Machining; Genuine Unicone® Pipe System

Coda Octopus Martech Ltd

17 Mereside, Osprey Quay, Portland, Dorset DT5 1PY

TELEPHONE	01305 770440
EMAIL	sales@firesprinklerwatchdog.com
WEB	firesprinklerwatchdog.com / martechsystems.co.uk
TWITTER	@MartechWeymouth
LINKEDIN	company/3134710/

CATEGORY	Associate
ACCREDITATIONS	ISO9001:2015, Cyber Essentials Plus
CONTACT	Paul Baxter

Designed and built in the UK, Martech's Fire Sprinkler Watchdog2 is a simple to install BS9251-2021 fire sprinkler controller that is 'plug & play' out of the box, but can also be configured to suit non-standard installation requirements. Integrating dual pressure sensors, a flow sensor and low water sensor as standard, Watchdog2 provides full automatic control and management of the sprinkler system, including jockey mode pressure maintenance, automatic periodic whole-system test, fault detection and fire mode operation. Compatible with single phase pumps up to 3kW and incorporating volt-free outputs for alarms and a 230V solenoid valve connection, no additional hardware is required to create a compliant installation.

Compco Fire Systems Ltd

Cleeve House, Malvern Road, Lower Wick,
Worcester WR2 4YX

TELEPHONE	01905 741600
FAX	01905 741620
EMAIL	matt.baker@compcofire.co.uk

High Banks House, Lawn Lane, Hemel Hempstead, Hertfordshire HP3 9HR

TELEPHONE	01442 242821

Cadzow House, Cadzow Industrial Estate, Hamilton ML3 7QU

TELEPHONE	01698 368790
WEB	compcofire.co.uk
CATEGORY	Installer level 4
ACCREDITATIONS	LPCB - Level 4
CONTACT	Matt Baker, CEO

COMPCO Fire Systems is one of UK largest fire engineering companies, based in the Midlands with branch offices in Hemel Hempstead, Swansea, Wetherby, and Hamilton.

Founded in 1988, the company has carried out work in the UK and Europe. Its team of engineers has a wealth of experience to carry out contracts for active fire protection systems of any size or complexity, with expertise in automatic sprinkler systems being a particular strength. COMPCO works closely with clients at every stage of a project to provide them with a quality yet competitively priced package of solutions and support.

Congruent Design Solutions Limited

Cross Keys House, 3rd Floor, 22 Queen Street, Salisbury SP1 1EY

TELEPHONE	01722 567110
EMAIL	enquiries@congruent-design.com
WEB	congruent-design.com
CONTACT	Eamon O'Kelly, Director
CATEGORY	Associate

We understand the construction process and help our clients achieve successful project delivery by enabling collaboration between disciplines. Our team includes qualified sprinkler designers and Chartered Engineers with extensive experience stemming from M&E services and wider construction related backgrounds. We provide a rare offering of expertise that can support your project at every stage.

Typically appointed at the early stages of design, we assist in developing the interface between utilities, sprinklers, M&E services and architecture. We work closely with the design team to navigate the consultation process, refine the Fire Strategy and provide design input, scoping documents, compliance reports and more, including assistance with commissioning witnessing and handover. CDS can aid you manage risk, enable compliance, but also optimise your scheme for cost-efficiency and effectiveness.

Cornwall Fire & Rescue Service

Tolvaddon, Camborne, Cornwall TR14 0EQ

TELEPHONE	0300 1234 232
EMAIL	fire@cornwall.gov.uk
WEB	cornwall.gov.uk/fire-and-rescue-service
CATEGORY	Associate organisation

Covac

Eagle House, Bilton Way, Lutterworth Leicestershire LE17 4JA

TELEPHONE	+44 1455556631
EMAIL	craig@covac.co.uk
WEB	covac.co.uk
CATEGORY	Supplier / Manufacturer
CONTACT	Craig Phillips, Director

We undertake the internal and external preparation, repair and lining/relining of water and liquid retaining structures including sprinkler tanks made from steel, concrete and GRP using a high performance, solvent free polyurethane coating – Acothane DW. Every project we undertake is guaranteed for a minimum of 10 years against leaking, corrosion and erosion.

CST Industries Ltd

Unit 11A Farmwell Lane, Castlewood Business Park,
South Normanton DE55 2JX

TELEPHONE	01773 835321
EMAIL	sales@cstindustries.com
WEB	cstindustries.com/vulcan-galvanized-tanks-uk/
FACEBOOK	/CSTIndustries
TWITTER	@CSTIndustries
CATEGORY	Supplier / Manufacturer
ACCREDITATIONS	LPCB & FM Sprinkler Tanks with CE Marking Accreditation
CONTACT	Danny Gibbons, General Manager

CST Industries (UK) Ltd specialises in the design, manufacture and construction of CE marked cylindrical and VersaTank galvanized steel bolted storage tanks. These tanks are primarily used for storing water in the fire sprinkler market with LPCB & FM approvals. CST also offer aftermarket services such as ROV Inspections to TB203, remedial works and replacement tanks.

Cumbria Fire & Rescue Services

Service HQ - Fire Safety, Carleton Avenue, Penrith CA10 2FA

TELEPHONE	01768 812612
EMAIL	Justinl.robinson@cumbria.gov.uk enquiries.fire@cumbria.gov.uk
WEB	cumbriafire.gov.uk
CATEGORY	Associate organisation
CONTACT	Justin Robinson, Group Manager in Fire Safety

D

Damien Shannon

Kilcolgan, Maryborough Hill, Douglas, Cork, Ireland T12 V30 E

TELEPHONE	+353 86 7888222
EMAIL	damshannon@gmail.com
CATEGORY	Associate Individual
CONTACT	Damien Shannon, Freelance Sprinkler Designer

DCI Fire Protection Limited

Unit 12, Enterprise Way, Newport, Wales NP20 2AQ

TELEPHONE	01633548350
EMAIL	lawrence@dcifireprotection.co.uk
WEB	dcifireprotection.co.uk
CATEGORY	Installer Level1
ACCREDITATIONS	FIRAS Domestiic and Residential
CONTACT	Lawrence Clarke , Director

DDS Sprinklers Scotland Ltd

23 Bentinck Grange, East Kilbride G74 5PL

TELEPHONE	07900911896
EMAIL	Dougie@ddssprinklers.co.uk
WEB	ddssprinklers.co.uk
ACCREDITATIONS	FIRAS
CONTACT	Dougie McMahon

We have over 25 years' experience in the Design and Installation of Commercial, Residential & Domestic sprinkler systems. Currently FIRAS approved for the installation of Residential & Domestic sprinkler systems and in the process of obtaining approval for BSEN:12845 installations. Our design team are capable in both AutoCad and Revit.

Decca Plastics Ltd

Victoria Mill, Lincoln Street, Preston PR1 6RE

TELEPHONE	+44 772 825 757 MOBILE
EMAIL	sales@deccatanks.co.uk
WEB	deccatanks.co.uk
TWITTER	@Decca_Tanks
LINKEDIN	/decca-plastics-ltd
FACEBOOK	/deccaplastics
CATEGORY	Manufacturer
ACCREDITATIONS	WRAS, CHAS, SSIP, Construction Line Gold, ISO9001
CONTACT	Shaun Peacock

We would like to take this opportunity to introduce DECCA PLASTICS LIMITED. A major force in the manufacture of glass reinforced plastic cold water storage cisterns since 1973; Our comprehensive range of British standard size storage units consists of DECCA one-piece from a nominal 18 litres to 12000 litres.

Additionally, we can supply a full range of DECCA two-piece and DECCA sectional cisterns assembled from a dual range of contact moulds (SFCM) or alternatively hot press (HPM).

To compliment our GRP Range of cisterns we also manufacture and install a wide range of GRP HOUSINGS with a vast range of accessories for tanks and housings to suite customer requirements.

All DECCA GRP products are manufactured in our own factory under strict quality conditions, with dedicated moulds and skilled contact moulders, providing an Environment Friendly, maintenance free product which will withstand the rigours of the severest climatic conditions.

Deltak Associates

45 Lackford Road, Chipstead, Surrey CR5 3TB

TELEPHONE	+44(0) 1737 271896 +44(0) 7908 816285
EMAIL	Noel.Kennedy@deltakfire.com
WEB	deltakfire.com
ACCREDITATIONS	LPCB Level 1 LPS 1048 Fire sprinkler installers for commercial and residential sprinkler installations
CONTACT	Noel Kennedy

Deltak fire offer a full design and installation package for all aspects of active fire protection for any client requiring expertise from the industry. Commercial and residential, high rise to care homes, retail to schools and colleges, Deltak deliver on budget and on schedule for all our customers ensuring systems conform to latest codes and standards.

Derbyshire Fire & Rescue Service

Butterley Hall, Ripley, Derbyshire DE5 3RS

TELEPHONE	01332 771221
EMAIL	gplatts@derbys-fire.gov.uk
WEB	derbys-fire.gov.uk
FACEBOOK	/DerbyshireFRS
TWITTER	@DerbyshireFRS
CATEGORY	Associate
CONTACT	Gary Platts, Group Manager Fire Protection

DIS Sprinklers

Falcon Close, Cranham House,Green Farm Business Park, Quedgeley, Gloucester GL2 4LY

TELEPHONE	+44 1452 304927
EMAIL	wdavies@dis-ltd.co.uk
WEB	dissprinklers.co.uk
ACCREDITATIONS	LPCB Level 3 Approved, ISO9001:2015, SafeContractor, ISO14001:2015
CONTACT	Wayne Davies

Discovery Fire Sprinklers Ltd

Unit 4 Taygate Trading Est, 5 Coldside Road, Dundee DD3 8DF

TELEPHONE	01382 624000 07904 994117
EMAIL	james@discoverfiresprinklers.com

We design fabricate and install commercial & residential and domestic fire sprinklers , wet and dry risers all to the current standards

Domestic Sprinklers Ltd

16/17 Hamm Beach Road, Portland,
Dorset DT5 1DX

TELEPHONE	01305 765763
EMAIL	email@domesticsprinklers.co.uk
WEB	domesticsprinklers.com sprinklersgroup.co.uk
ACCREDITATIONS	IFC (domestic, residential & commercial)
CONTACT	Claire Harper, Managing Director

Offering a Nationwide service for residential and commercial projects. All of our work force are fully qualified direct labour, providing a local service at competitive rates. Established 23 years ago, we are the longest running residential sprinkler company in the UK and are proud to be a member of BAFSA and fully support the values it promotes.

Dorset & Wiltshire Fire & Rescue Service

5 Rivers Health & Wellbeing Centre, Hulse Road, Salisbury SP1 3NR

TELEPHONE	01722 691395 07798 517445 Fire Safety general 01722 691717
EMAIL	tim.gray@dwfire.org.uk
WEB	dwfire.org.uk
FACEBOOK	/DWFire
TWITTER	@DWFRSfiresafety
YOUTUBE	youtube.com/c/dwfire
CATEGORY	Associate
ACCREDITATIONS	GIFireE
CONTACT	Tim Gray GIFireE, Group Manager Protection

Dorset & Wiltshire Fire and Rescue Service actively promotes the inclusion of fire sprinklers within homes as well as in commercial or public buildings, such as schools. We work with our local authority building control departments to consider the use of sprinklers where the risk to life or property would benefit from the inclusion of sprinklers.

Dorset Fire Sprinkler Systems

15 Factory Road, Upton, Poole BH16 5SN

TELEPHONE	01202 658470
EMAIL	enquiries-defa@axisuk.org
WEB	firesprinklersdorset.co.uk
CATEGORY	Residential Installer
ACCREDITATIONS	IFC, RSA
CONTACT	Rob Thompson

We are Dorset Fire Sprinkler Systems based in Dorset and we provide a domestic and residential fire sprinkler installation service to customers around the south of the UK. Over the last few years, we have supplied and installed hundreds of domestic and residential sprinkler systems.

- We offer all of our clients completely free, no-obligation quotes
- Our work is covered by a guarantee for your peace of mind
- Our work conforms to all regulations and legislation
- We tailor our installations to suit your specific requirements
- We work with architects, local builders, building control and the fire brigade to suit your needs.

DPJ Sprinklers Ltd

Unit 19 , Tabrums Farm, Tabrums Lane, Battlesbridge, Essex SS11 7QX

TELEPHONE	+44 01245 325299
EMAIL	Helpdesk@dpjsprinklers.co.uk
WEB	dpjsprinklers.co.uk
LINKEDIN	DPJ Sprinklers Ltd
ACCREDITATIONS	ISO9001, Safecontractor, BAFSA, Firas

DPJ Sprinklers Limited is an industry-leading independent sprinkler specialist, offering an unrivalled level of expertise, technical competence and above all, the often-forgotten ethos of good customer service. DPJ Sprinklers Ltd offers a full range of services including design, supply, installation, commissioning and maintenance. We have built our reputation on listening to clients' requirements and specifications to provide an outstanding service. We have the people, the products and the financial resources to manage any size project from start to finish. We provide leading-edge design and engineering resources, with the latest in technology and all our design work is carried out strictly to the latest British Standards in line with our ISO, Firas, BAFSA and Safecontractor accreditations.

E

East Sussex Fire & Rescue Service

Headquarters, Church Lane, Lewes, East Sussex BN7 2DZ

TELEPHONE	01323 462409
EMAIL	BusinessSafety@esfrs.org
WEB	esfrs.org
FACEBOOK	/eastsussexfrs
TWITTER	@EastSussexFRS
CATEGORY	Associate organisation
CONTACT	Nicholas Coleshill, Sprinkler Lead Nicholas.Coleshill@esfrs.org 07950 877208

East Sussex Fire Authority is committed to reducing the impact of fire on people, property and the environment. We will play a key leadership role in promoting a better understanding of the benefits of sprinklers and will encourage building managers, owners and developers to install sprinklers where there is a risk-based case for doing so. Wherever it is able to influence, the Authority will lobby for the creation of a legal requirement to fit sprinklers in domestic dwellings, high rise premises, care homes, schools and other buildings where the risk to life and property from fire are most significant.

Easyheat

McDermott House, Inveralmond Ind Est, Perth, Perthshire PH1 3TS

TELEPHONE	01738445222
MOBILE	07540559981
EMAIL	alan@mcdermottgroup.co.uk
WEB	mcdermottgroup.co.uk
CATEGORY	Installer Level 1
CONTACT	Alan Clark, Projects

Elmech Ltd

Unit 1, 30B Wilds Rent's, London SE1 4QG

TELEPHONE	02037511110
EMAIL	office@elmech.co.uk dobrekm@elmech.co.uk
WEB	elmechltd.co.uk
CATEGORY	Residential and domestic – design, installation and commissioning
ACCREDITATIONS	FIRAS - Domestic and Residential Scheme, ISO 9001: 2015, RSA, SMAS, CHAS, NICEIC
CONTACT	Dobs Mikosinski, Head of Fire Sprinkler Department

Elmech Ltd is a family run business formed in 2012. We specialise in domestic and residential sprinkler systems (design, installation and commissioning), mechanical/ electrical services installation including design. Our head office is based near to London Bridge and we cover whole United Kingdom. Every project, large or small, is important to us and we exert every effort to ensure a successful contract. Our skilled work force take pride in finding individual solutions for every site-specific requirement, placing great emphasis on build quality and striving to achieve excellence through attention to detail.

EMTEC Fire Systems

Ellismuir Way, Tannochside Park, Uddingston G71 5PW

TELEPHONE	01698 808030
EMAIL	stuart.mackay@emtecgroup.co.uk
WEB	emtecgroup.co.uk/fire-systems
ACCREDITATIONS	LPCB - Level 3
CONTACT	Stuart Mackay

Emtec Fire Systems specialise in the design, installation, commissioning, and verification of essential fire suppression systems. Our expert teams are experienced in working in a variety of sectors and work closely with our clients to gain an in depth understand of your requirements and offer a tailored solution to meet your needs whilst ensuring compliance with the latest standards.

Our systems include the following:
- Commercial and Industrial Fire Sprinkler Systems Residential Sprinkler Systems
- Deluge Systems Pre-Action Systems Dry and Wet Risers Fire Hydrants
- Fire Extinguishers Service and Maintenance
- Out of Hours emergency call out

Our Accreditations include: LPCB LPS 1048 Level 3 Approved Sprinkler Contractor LPCB ISO 9001:2015 Certified; Member of The British Automatic Fire Sprinkler Association Limited - BAFSA Constructionline Gold Member; Acclaim Accreditation

Electrical Plumbing & Gas Services Ltd

Unit 5 Nelrose, Princess Road, Manchester M20 2LT

TELEPHONE	+44 0161 881 1883
EMAIL	info@epg.services
WEB	elecplumbgas.co.uk
CATEGORY	Installer Residential & Domestic
ACCREDITATIONS	IFC, ISO 9001
CONTACT	John Goss

Based in Manchester, Electrical Plumbing and Gas Services Ltd (EPG Services), are a provider of gas, electrical and plumbing services including residential sprinkler design and installation nationwide to the domestic and commercial residential sector.

Essex County Fire & Rescue Service

ECFRS HQ, Kelvedon Park, Rivenhall, Witham CM8 3HB

TELEPHONE	07785 977419
FAX	01376 570466
EMAIL	mike.sparrow@essex-fire.gov.uk mark.earwicker@essex-fire.gov.uk fire.engineering@essex-fire.gov.uk
WEB	essex-fire.gov.uk
CAT EOGRY	Associate organisation
CONTACT	Mike Sparrow, Fire Safety Protection

Eversafe Fire Protection Ltd

Unit 2, Conqueror Court, Vellum Drive, Sittingbourne, Kent ME10 5BH

TELEPHONE	01795 713123
07730 817785	
EMAIL	info@eversafefire.com
WEB	eversafefire.com

FACEBOOK	/eversafefp
TWITTER	@eversafefp
LINKEDIN	/eversafefp
INSTAGRAM	@eversafefp
ACCREDITATIONS	LPS 1048 Approved Sprinkler Contractor
CONTACT	Stuart Verga

We carry out the consultation, design, installation and commissioning of commercial, residential and domestic sprinkler systems and dry and wet risers. We offer maintenance for all fixed fire protection systems including a 24/7 emergency call out.

F

Fire Defence Servicing Limited

Crown Bray House, Bucknell Way, Pathfields Business Park, South Molton EX36 3LH

TELEPHONE	01769 574070
EMAIL	fds@fire-defence.com
WEB	fire-defence.com
FACEBOOK	Fire Defence Servicing Ltd
TWITTER	@FDS_Firedefence
LINKED IN	Fire Defence Servicing Ltd
CATEGORY	Level 4 Contractor Commercial & Industrial/ Residential & Domestic – FIRAS Accredited
ACCREDITATIONS	ISO9001:2015, Constructionline Gold, Facilitiesline Gold, SAFEContractor Plus, CHAS Advanced, Acclaim, Altius CDM
CONTACT	Norman Rider

Fire Defence Servicing Ltd is a Fire Protection Engineering Contractor specialising in the Consultancy, Design, Supply, Installation, Commissioning, Service, Maintenance and Remedial Repair of Automatic Sprinklers, Deluge Water Spray, Dry Pipe, Foam Suppression, Pre-Action, Water Mist and Wet Pipe systems to also include Wet & Dry Risers, Fire Hydrants, Fire Pumps/Tanks. National coverage across the whole of the UK including Northern Ireland.

Fire Protection Association

London Road, Moreton in Marsh,
Gloucestershire GL56 0RH

TELEPHONE	+44 (0)1608 812537
MOBILE	+44 (0)7483 066314
EMAIL	sprinklers@thefpa.co.uk
WEB	thefpa.co.uk
TWITTER	@thefpa_uk
LINKEDIN	The Fire Protection Association
CATEGORY	Sprinkler services
ACCREDITATIONS	All our training and consultancy services are approved by Lloyds Register and certified to BS EN ISO 9001:2015. We are also UKAS accredited to conduct BS 8458 testing on residential and domestic watermist systems.
CONTACT	Nicholas Walker

The Fire Protection Association (FPA) is the UK's national fire safety organisation. We work to identify the dangers of fire and help our clients reduce any fire-related risks.

The FPA is at the forefront of sprinkler expertise, specialising in system inspections, head and pipe testing, and water mist testing. Inspections are carried out by qualified experienced professionals who provide a detailed and comprehensive report.

The LPC Sprinkler Rules are published by the Fire Protection Association and authored by the insurer membership of RISCAuthority's Active working group, in association with industry experts based on testing, research and best practice.

Fire Protection Centre Limited

15 Atkinson's Way, Foxhills Industrial Estate, Scunthorpe DN15 8QJ

TELEPHONE	01724 854199
EMAIL	sales@ fireprotectioncentre.com
WEB	fireprotectioncentre.com fpcdatacentre.co.uk
CATEGORY	Supplier
ACCREDITATIONS	ISO 9001:2015 CONTACT
CONTACT	Tim Lincoln, Commercial Director Barrie Holden, Managing Director

Fire Protection Centre Limited is an established, independent supplier of quality approved fire sprinklers, fire sprinkler valves, flow control and ancillary products. With our unrivalled customer service and industry expertise we offer customised solutions and personal service to help you satisfy project, contract, and budget demands.

Fire Protection Services Ltd

Unit 16 Oxwich Court, Valley Way, Enterprise Park, Swansea SA6 8RA

TELEPHONE	+44 1792 774085 Option 1
MOBILE	07498753190
EMAIL	alan@fpsfire.co.uk
LINKEDIN	FIRE PROTECTION SERVICES LIMITED
FACEBOOK	Fire Protection Services Limited
ACCREDITATIONS	firas, Safe Contractor
CONTACT	Alan Futcher - 07198753190

Fire Protection Services are a small privately owned solely Welsh based company that specialises mainly in the installation & maintenance of Fire Sprinkler Systems to the Domestic & Residential marketplace. In addition, we have a portfolio of clients in the Commercial Fire Sprinkler, Dry Riser/Underground Fire Hydrant Testing & Fire Pump maintenance sectors.

FPS were one of the 1st handful of installers who became FIRAS accredited. In 2015 we were proud to achieve our 3rd party certification which tested & continues to test our ability to provide fully compliant systems. This ongoing audit of our installations and processes ensures that our customers will have peace of mind in their relationship with us. With nearly 30 years' experience in the fire protection industry, we are proud to provide the highest level of service protecting people and property from fire.

Fire Prevention Works Ltd

1 Long Craig Rigg, Edinburgh EH5 1QT

TELEPHONE	0131 552 7772
EMAIL	info@fireprevention.scot
WEB	firepreventionuk.com
FACEBOOK	Fire Prevention Ltd
TWITTER	@Prevention_Fire
CATEGORY	Domestic & Residential
ACCREDITATIONS	FIRAS
CONTACT	Gary Bennett, Managing Director

Fire Prevention Works Limited, trading as Scotia Fire, is the leading dedicated residential fire sprinkler specialist in Scotland. Designing and installing fire sprinkler systems to BS 9251, and offering a robust and thorough maintenance service, we are the ideal partner for Scotland's leading house- builders seeking competency, quality and know-how. Third party accredited through FIRAS, we are one of the only residential fire sprinkler companies with an in-house fire engineering team.

Our combined skill set greatly benefits clients and enables us to follow and understand the role played by fire sprinklers within an overall fire engineered solution.

Fire Sprinkler Design Ltd

20 Hamm Beach Road, Portland Marina, Portland,
Dorset DT5 1DX

MOBILE	+44 7515777465
EMAIL	colin@firesprinklerdesign.co.uk
WEB	firesprinklerdesign.co.uk

CATEGORY	Residential Design/Installer
ACCREDITATIONS	IFC,RSA
CONTACT	Colin Taylor

Fire sprinkler design is a critical aspect of fire protection engineering, aimed at safeguarding buildings and their occupants from the devastating effects of fires. There are several key points to consider in fire sprinkler design.
It requires careful consideration of coverage, water supply, system layout, system type, hydraulic calculations, backflow prevention, and ongoing maintenance and testing to ensure the effectiveness and reliability of the system in protecting lives and property from fires.

We have over 23 years experience in designing sprinkler systems and specialise in Listed Buildings and water supplies.

We offer free friendly advice and technical support for any projects.

Fire Sprinklers Scotland

Unit 17, 32 Dryden Road, Bilston Glen Industrial Estate, Loanhead, Midlothian EH20 9LZ

TELEPHONE	0131 581 5399
MOBILE	07809 114 304
EMAIL	Info@firesprinklers-scotland.co.uk
WEB	Firesprinklers-Scotland.co.uk

CATEGORY	Domestic & Residential Specialist
ACCREDITATIONS	FIRAS 3rd Party Accreditation
CONTACT	Craig Jamieson. Managing Director

Design, Supply, Installation & Servicing.

Fire Sprinklers Scotland Specialise in the Design and Installation Of Domestic & Residential Sprinkler Systems.

We work with some of the country's biggest house builders and main contractors as well as private individuals and provide a personalised, professional approach to all our clients focussing on, budgets timescales and compliance.

Fire Sprinkler Systems (UK) Ltd

Unit 3 Insch Business Park, Insch AB52 6TA

TELEPHONE	01467 647122
EMAIL	terry@firesprinklers.uk.com
WEB	firesprinklers.uk.com
CATEGORY	Residential Installer
ACCREDITATIONS	FIRAS - Domestic and Residential Scheme
CONTACT	Terry Wallace, Managing Director

Fire Sprinkler Systems (UK) Ltd are North East Scotland's leading Residential Fire Sprinkler installers and system designers.

We ensure compliance with BS9251:2014 We use fully approved system components All of our installations are fully tested and certified, and our Designers and Installers fully trained by the RSA and/or BAFSA (via XACT Training) We hold FIRAS 3rd Party Certification.

FireFighter 247 LLP

Unit 4 Old Sawmills Estate Broughton Gifford, Melksham SN12 8PY

TELEPHONE	01225 782120
FAX	01225 783711
EMAIL	dp@fssuk.net
WEB	firesprinklersystemsuk.com
CATEGORY	Installer level 2
ACCREDITATIONS	FIRAS - Level 2
CONTACT	Dean Price, Operations Partner

Firemain Engineering Ltd

Unit 6, Harrier Court, Eurolink Business, Park St Helens, Merseyside WA9 4YR

TELEPHONE	01744 850063
FAX	01744 812014
EMAIL	info@firemain.com
WEB	firemain.com
FACEBOOK	/firemainengineering
CATEGORY	Supplier Manufacturer
ACCREDITATIONS	ISO 9001:2015
CONTACT	Phil Bayliss, Managing Director

Firemain - The UK's leading independent supplier of fire fighting foam systems and equipment. Fire protection professionals know that fire suppression is all about choosing the right option - The type of hazard dictates the fire fighting medium. When itcomes to fighting fires in large inventories of flammable liquid there is only usually one choice - foam. Firemain provide a support service to clients' fire protection and firefighting needs. We work closely with end users, consultants, engineers and fire professionals to provide the best solution for a given situation, from application engineering, project supply, commissioning and maintenance.

Firetech Design Ltd

Office 25 – Northlight Pendle, northlight Parade, Brierfield, Nelson, Lancashire BB9 5EG

TELEPHONE	01282 222630
EMAIL	craig.thompson@firetechdesign.co.uk
CATEGORY	Design, Consultancy, Installation, Service & Maintenance
CONTACT	Craig Thompson

Fire-Mech Fixings Ltd

Unit 3, Urban Park, Kingsway, Rochdale OL16 4GR

TELEPHONE	0333 123 3472
EMAIL	phollis@fire-mechfixings.co.uk
WEB	fire-mechfixings.co.uk
FACEBOOK	/firemechfixings
TWITTER	@firemechfixings
LINKEDIN	/fire-mech-fixings-limited
ACCREDITATIONS	LPCB ISO Approval Pending
CONTACT	Paul Hollis

Fire-Mech Fixings offer a wide range of products and services for the installation of Fire Sprinkler Systems with extensive product knowledge and years of experience within the industry. Established in 2015 we now have three locations (Rochdale, Halesowen & East Kilbride, Scotland) serving the whole of the UK and Ireland with our unique branded product range offering full certification and traceability of all our products. We offer a one-stop shop tailored to your individual needs, saving you time, money and hassle.

Fire-Mech Fixings specialise in providing Fabricated Bracketry and stock a comprehensive range of Pipe Supports & Fixings, Tube, BSI Kite Marked Malleable Iron Fittings, ANVIL Gr8LOK LPCB & FM Approved Grooved Fittings & CPVC Pipe, Fittings & Supports for Fire Sprinkler Installations.

Fireworks Fire Protection

Amber House, Station Road, Attleborough Norfolk NR17 2AT

TELEPHONE	01953 458420
EMAIL	enquiries@fireworks-ltd.com
WEB	fireworks-ltd.com
CATEGORY	Commercial, Industrial and Residential installations
ACCREDITATIONS	FIRAS Water Mist Installations, BS 8489
CONTACT	Lee Haines, Sales Director

Fireworks Fire Protection is the UK's leading expert on Water Mist fire suppression systems. Water Mist is used in a wide range of sectors – from data centres to tall buildings – in fact wherever the protection of lives and assets is crucial. Fireworks are able to offer you total support, from consulting and custom-design, to installation and maintenance. For more information visit www.fireworks-ltd.com or call 01953 458420 for free, independent advice on your projects.

First Fire Protection Ltd

Unit 3, Network 4, Lincoln Road, Cressex Business Park, High Wycombe HP12 3RF

TELEPHONE	01494 522 031
EMAIL	enquiries@firstfireprotection.co.uk
WEB	firstfireprotection.co.uk
ACCREDITATIONS	LPCB Level 3
CONTACT	Mr R P Tickner, Mr S A Tickner, Miss S A Tickner, Directors

We are an LPCB Level 3 registered company specialising in the Design, Installation commissioning and Servicing of industrial & commercial and residential & domestic fire sprinkler systems. We design systems to match our customer's specific needs for all types of sprinkler installations. From consultancy to contract handover and planned maintenance, we are able to provide a concise, competitive and professional service for all small to major projects.

We undertake projects in the Central and Greater London areas, as well as in the counties of Buckinghamshire, Berkshire, Oxfordshire, Northamptonshire, Surrey, Sussex, Hampshire, West Midlands and the majority of the South West.

Fixed Firefighting Systems Bureau Ltd

22 Summers Way, Moreton-in-Marsh; Gloucestershire GL56 0GA

TELEPHONE	07460 723741
EMAIL	simon.bird@ffsb.co.uk
WEB	ffsb.co.uk
ACCREDITATIONS	Chartered Engineers
CONTACT	Simon Bird, Director

FFSB is an independent source of information to help users of Fixed Firefighting Systems successfully navigate the increasingly complex associated regulatory and standards frameworks. We pride ourselves on providing high quality, independent technical advice to anyone who needs it; insurers, regulators, enforcement bodies, end-users, specifiers and designers, the trade, equipment suppliers and other professions. Our expertise is widely recognised. We actively participate in sector standards writing processes including BSI (British Standards Institution) and CEN (The European Committee for Standardisation).

FM Global (FM Insurance Co Ltd)

Voyager Place, Shoppenhangers Road, Maidenhead SL6 2PJ

TELEPHONE	01753 750 330
FAX	01753 868 700
EMAIL	allan.macpherson@fmglobal.com
WEB	fmglobal.com
CONTACT	Allan Macpherson, Tom Roche

Franklin Hodge Industries Ltd

Jubilee Building, Westfields Trading Estate, Faraday Road, Hereford HR4 9NS

TELEPHONE	01432 269605
FAX	01432 277454
EMAIL	sales@franklinhodge.com
WEB	franklinhodge.com
CATEGORY	Supplier Manufacturer
ACCREDITATIONS	LPCB & FM Tanks
CONTACT	Nigel Snee

FVS Ltd

Broom Street, Off Huddersfield Road, Newhey, Rochdale OL16 3RY

TELEPHONE	01706 848599
EMAIL	gareth@fvslimited.co.uk
WEB	fvslimited.co.uk
CATEGORY	Commercial & Residential Installer
ACCREDITATIONS	LPCB - Level 3
CONTACT	Gareth Fitton, Director

FVS Limited is an LPCB Approved Sprinkler Contractor for the Design, Installation, Service & Testing of Fire Sprinkler Systems. FVS Limited has been protecting properties from fire since 1982, and over that time we have grown and developed from a small servicing company into a well-established company and are at the forefront of Design, Installation, Service & Testing of all sprinkler systems. Today we have our own in-house

design team who use the latest in modern technology to ensure we meet today's high standard in fire protection systems. Yet while we have grown and modernised, excellent customer relationships are still at the heart of all we do and we know that our continued success lies with our talented employees.

G

Gordonson Fire Protection Ltd

Unit 2, Tawney Farm, Tawney Common, Theydon Mount, Essex CM16 7PU

TELEPHONE	0207 237 6707
07956 856 718	
EMAIL	johnm@gordonson.co.uk
WEB	gordonson.co.uk
ACCREDITATIONS	Level 3 Installer
CONTACT	John Martin

We are a family owned/run business founded in 1994 and are well established in the Fixed Fire Protection Industry. Based in Essex, we work throughout the U.K. We pride ourselves on quality engineering, the right job, first time, on time, safely and within budget. The Company's objectives are synonymous with the quality and speed of operation. Its systematic approach has firmly established its name with clients, many of which are household names.

All staff including design, project managers and our installation engineers in the field are directly employed, PAYE employees, giving you, the customer, extra piece of mind.

Grundfos Pumps Ltd

Grovebury Road Leighton Buzzard, Beds LU7 4TL

TELEPHONE	01525 850000 (Service)
01942 263628	
EMAIL	grundfos-uk@sales.grundfos.com
WEB	uk.grundfos.com
FACEBOOK	/Grundfos
TWITTER	@grundfos
LINKEDIN	GRUNDFOS
ACCREDITATIONS	Pumps approved to LPS 1131
CONTACT	Philip Ilsley

Grundfos Pumps Ltd are a UK leader in the supply of pumps and pump systems for domestic, commercial building services and process industry applications, as well as being a major supplier to the water supply and treatment industries. As a prominent pump manufacturer, Grundfos also offer a wide range of fire pump systems that are designed to operate within both sprinkler and water misting applications. These

systems can be installed in a range of situations that include: individual homes, a wide range of commercial and industrial applications, as well as within high-rise settings. Grundfos' systems can be retrofitted to address existing risk as well as being deployed in new builds.

H

Hall & Kay Fire Engineering

Sterling Park, Clapgate Lane, Woodgate,
West Midlands B32 3BU

TELEPHONE	0121 421 3311
FAX	0121 422 7312
EMAIL	kerry.solomon@hkfire.co.uk
WEB	hkfire.co.uk
FACEBOOK	/hkfireengineering
LINKEDIN	/hall-&-kay-fire-engineering
CATEGORY	Commercial & Residential
ACCREDITATIONS	LPS1048 Level 4, LPS1204, LPS1014
CONTACT	Kerry Solomon

We are consultants, designers, installers, service and maintainers all forms of fixed fire protection systems. Hall & Kay is one of the UK's largest fire suppression company, With over 300 staff and 500+ approved subcontractors spread throughout the regions. We bring advanced product technology, the highest standard of professional expertise and service to our core business of fire protection and detection in all areas of industry and construction. By excelling at customer satisfaction based on our unique skills and strengths, we aim to be the first choice of our customers, shareholders and employees.

Hampshire and Isle of Wight Fire and Rescue Service

HIWFRS Headquarters, Leigh Road, Eastleigh SO50 9SJ

TELEPHONE	02380 644000
EMAIL	FireSafety.Advice@HantsFire.gov.uk
CATEGORY	Associate
CONTACT	Fire safety support unit

As the fire authority of Hampshire and Isle of Wight, we will on request provide advice in line with the Fire and Rescue Services Act 2004 and Regulatory Reform (Fire Safety) Order 2005, with regards to how to prevent fires and restrict their spread in buildings and other property, and, the means of escape from building and other property in case of fire, for the common goal of making Hampshire and Isle of Wight safer for our residents.

Harmony Fire Ltd

Clarence House, Watercombe Lane, Lynx Trading Estate, Yeovil BA20 2SU

TELEPHONE	020 3196 6996
EMAIL	info@harmonyfire.co.uk
WEB	harmonyfire.com
FACEBOOK	/harmonyfireltd
TWITTER	@harmony_fire
LINKEDIN	/harmony-fire-ltd
ACCREDITATIONS	LPCB 1301,BAFE Fire Alarm System Provider, BAFE Fire Extinguisher Service Provider, NHS SBS Approved Framework Supplier, BAFSA, Fire Protection Association
CONTACT	Connor Mitchell

Harmony is a leading fire and life safety company servicing the public and corporate sectors across the world. We're a people-oriented company priding ourselves with individually working with our clients to manage risks or fire and other hazards, to ensure protection of life, assets and business continuity. Harmony provides a comprehensive consultancy, design, project delivery and maintenance strategy for a wide range of sectors giving clients a complete end-to-end solution and a unique service offering added value and time savings.

Harrijess Ltd

Unit 2, Belton Lane Industrial Estate, Grantham, Lincs NG31 9HN

TELEPHONE	+44 (0)1476 516677
MOBILE	+44 (0)7835 203802
EMAIL	dcarter@harrijess.com
WEB	harrijess.com
CATEGORY	fire pump controller manufacturer
ACCREDITATIONS	FACTORY MUTUAL, ISO9001
CONTACT	David Carter

We design and manufacture fire pump controllers, according to various standards such as LPC 1236/1237, TB210, EN12845, NFPA20, FM1321/1323 and BS9251:2021 for commercial, domestic and residential applications. Including; jockey pump controllers, electric and diesel controllers and remote alarm panels. We also stock a large range of spare parts for the fire pump house, including; pressure transducers, magnetic pick-ups, engine starter solenoids, fuel spill, flood and various control panel components.

Hertfordshire Fire & Rescue Service

Postal Point CHO 331(Room 346), Old Block, County Hall, Hertford SG13 8DQ

TELEPHONE	01707 292310
FAX	01707 292477
EMAIL	administration.cfs@hertfordshire.gov.uk
WEB	Hertfordshire.gov.uk
CATEGORY	Associate
CONTACT	Tony Smith, Group Commander, FP

Humberside Fire & Rescue Service

Public Safety, Summergroves Way, Hessle HU7 4BB

TELEPHONE	01482 567468
FAX	01482 508635
EMAIL	probson@humbersidefire.gov.uk
WEB	humbersidefire.gov.uk
CATEGORY	Associate
CONTACT	Paul Robson

Hydrotech Fire & Mechanical Ltd

Units 3-8 Woodrow Business Centre,
Manchester M44 6NN

TELEPHONE	0161 413 6960
EMAIL	s.walker@hydrotechfire.co.uk
WEB	hydrotechfire.co.uk
CATEGORY	Associate
CONTACT	Steve Walker, Managing Director

Hydrotech has an enhanced PRV range and can offer approvals to suit all markets such as Kitemark , DNV and FM. Our residential Valves sets now offer a full range of monitored solutions and also a new gauge isololation feature which allows for a gauge to be tested or replaced without draining the system . Hydrotech Residential Riser Valves are designed and tested in the UK.

Hydrov Ltd

20 Low Cudworth, Cudworth, Barnsley,
South Yorkshire S72 8EF

TELEPHONE	03333 660267
EMAIL	sales@hydrov.co.uk
WEB	hydrov.co.uk
FACEBOOK	@hydrov.co.uk
CONTACT	Robert Longley

With over 25 years experience in the water storage industry, Hydrov offer the complete package from surveying water storage tanks using the latest underwater ROV technology, to complete remedial work packages if required. Our site engineers have many years of experience based around the surveying, service & maintaining of water tanks, ensuring the surveyed infrastructure is safe, well maintained and compliant with the latest industry regulations. Hydrov also offer a unique service which allows us to clean sprinkler tanks of sediment and debris while the tank remains online, without the need for costly drain downs and insurance impairments.

I

IFC Certification Ltd (part of the KIWA UK Group)

Ground Floor, Building 2, Bear Brook Office Park, Walton Street, Aylesbury HP21 7GQ

TELEPHONE	01844 276920
EMAIL	doug.mackinnon@kiwa.com
WEB	ifccertification.com
CATEGORY	Associate
CONTACT	Doug MacKinnon, Schemes Manager

IFC Certification Ltd is an independent UKAS accredited provider of high quality and customer focused 3rd party certification, in support of fire safety and security (including schemes for Installers of Residential & Domestic and Commercial & Industrial Sprinkler Systems. We also have a scheme for Installers of Commercial, Residential and Domestic Water Mist Systems and Dry & Wet Riser Systems. We have over 20 years' experience of successfully delivering independent certification schemes to a vast array of clients who design, manufacture, install, maintain fire protection products and systems, in order that they can demonstrate to the market their capabilities and credibility. IFC Certification Ltd. is also a UKAS Accredited Inspection Body whose scope includes Inspection of Sprinkler Systems.

Ignus Fire Services

34 Doeshill Road, Wickford, Essex SS12 9RD

TELEPHONE	01268 973 370
EMAIL	alex@ignusfire.co.uk
CATEGORY	Associated Installer
ACCREDITATIONS	CHAS, BAFSA, IFEDA

Ignus Fire Services Ltd service and maintenance of all fire protection systems. Covering home counties, London, Kent and Essex. Also providing 24/7 call outs, remedial repairs.

Incendia Ltd

Foresters Hall, Norwood, London SE19 3RY

TELEPHONE	07595 023 192
EMAIL	enquire@incendia.uk
WEB	incendia.uk
FACEBOOK	/Incendia Ltd
TWITTER	@incendiaonline
ACCREDITATIONS	Institution of Fire Engineers
CONTACT	Richard Cebreiro

We can provide a broad range of fire systems engineering consultancy services and professional expert advice.as a principal consultant or as a member of a professional team. We provide design and engineering services for all manual and automatic fixed water and gaseous based fire control and suppression systems.

We provide 3rd Party Independent design verification, site inspection and system commissioning services for all manual and automatic fixed water suppression systems.

Indigo Fire Systems Ltd

IN3 Invincible Building, Daedalus Park, Daedalus Way, Lee On Solent, Hants PO13 9FX

TELEPHONE	02392 602944
EMAIL	info@indigofire.co.uk
WEB	indigofire.co.uk
ACCREDITATIONS	FIRAS - Domestic and Residential Scheme FIRAS – Commercial & Industrial Scheme
CONTACT	Simon Shoesmith, MD

Design, installation & Maintenance of commercial, industrial, residential & domestic sprinkler installations & Wet/Dry Risers.

Infinity Fire Preventions

Infinity House, 38 Riverside, Sir Thomas Longley Road, Medway City Estate, Rochester, Kent ME2 4DP

TELEPHONE	0330 0 102 203
MOBILE	07599 999 951
EMAIL	enquires@infinityfireprevention.com
WEB	infinityfireprevention.com
ACCREDITATIONS	FIRAS
CONTACT	Manj Mahal

Infinity Fire Prevention Ltd are a leading UK specialist in the provision of passive fire protection (FIRAS Certification Registration Number BR2140). The company consists of over 50 highly skilled operatives along with a handpicked management team with fire backgrounds; specialising in all aspects of passive fire protection including Timber and Composite Fire Doors, Penetrations Sealing, Compartmentation and Class 0 Paint.

Influx Measurements

1A Bennett House, The Dean, Alresford SO24 9BQ

TELEPHONE	01962 736736
FAX	01962 736737
EMAIL	sales@influxmeasurements.com
WEB	influxmeasurements.com
FACEBOOK	/InfluxMeasurements
TWITTER	@influxmeters
CATEGORY	Associate
ACCREDITATIONS	LPCB ISO 9001:2015. Flowmeters approved to LPS 1045 requirements and FM Class 1046. SprinklerSense approved to EN-12259-5
CONTACT	Mark Towner, Managing Director

Influx manufacture LPC and FM approved ‘Firesure’ flow meters for testing fire pumps and the LPC approved ‘SprinklerSense’ intelligent flow switch. ‘Sprinklersense’ provides a unique approach in the continuous monitoring of automatic sprinkler systems and the routine testing of flow switches.

International Plastic Systems Ltd (IPS Flow Systems)

Seaham Grange Industrial Estate, Seaham, Co Durham SR7 0PT

TELEPHONE	0191 5213111, 07796 148 314
EMAIL	pwright@ipsflowsystems.com
WEB	ipsflowsystems.com/flameguard.html
LINKEDIN	/ips-flow-systems
INS T AGRAM	@ips_flow_systems
ACCREDITATIONS	UKAS 3rd Party CPVC Training
CONTACT	Paul Wright, Business Development Manager

IPS Flow Systems are a leading supplier into the Fire sector. IPS is the only European Master Distributor for Spears® products and has a proven track record for service and reliability. Spears® FlameGuard® CPVC fire sprinkler systems offer all of the protection and reliability of traditional piping systems whilst offering some unique advantages to the contractor. The ease of installation ensures that Spears® FlameGuard® provides savings in the total installed cost. IPS are also the UK supplier for Prevent Systems Mist Nozzles which are LPCB approved are a great compliment to the RM Pressfit range and the Spears® FlameGuard® system.

J

J&J Design Limited t/a J&J Fire Engineering

Ewood Bridge Mill, Manchester Road, Ewood Bridge, Lancashire BB4 6LB

TELEPHONE	01706 223414
EMAIL	info@jjfe.co.uk
WEB	jjfe.co.uk
TWITTER	@jjfireeng
ACCREDITATIONS	LPC Level 4
CONTACT	Adrian Lucas, Director

J&J Fire established for over 30 years with offices in Lancashire and London Stanstead we operate nationally. Experienced in large scale commercial and residential projects including wet risers. Service and Maintenance team offering nationwide coverage and 24 hour help line.

J G Truty Sprinkler Installations Ltd

Unit 3, Whitelocks Farm, Garsons Lane, Warfield, Bracknell, Berkshire RG42 6JA

TELEPHONE	01494 443 339 07800 844 268
EMAIL	info@jgtrutysi.co.uk christruty@jgtrutysi.co.uk
WEB	jgtrutysi.co.uk
ACCREDITATIONS	LPS 1048 – Level 3 Approved Sprinkler Contractor
CONTACT	Chris Truty (Operations Director)

Specialists in design, installation & servicing of fixed fire protection systems including commercial fire sprinkler systems, residential fire sprinkler systems, dry risers and wet risers.

J S Wright & Co Ltd

The Atlas Building, Portland Street, Birmingham B6 5RX

TELEPHONE	01213224000 FAX 01213224001
EMAIL	jswright@jswright.co.uk
WEB	jswright.co.uk
TWITTER	@jswrightcoltd
ACCREDITATIONS	IFCC 3rd party
CONTACT	Lee Driffield, Fire Protection Manager leedriffield@jswright.co.uk 07740820969 Matthew Coy, Contracts Director MatthewCoy@jswright.co.uk 07970563014

J S Wright & Co Ltd are one of the leading building services engineering companies nationwide in the UK. We produce the Residential & Domestic sprinkler systems from our mechanical packages, ensuring the systems installed within our projects are the best they can be, concentrating on the design/ calculation/installation & commissioning of Residential & Domestic sprinkler systems within our new build projects nationwide.

JEM Fire Pumps Ltd

JEM House, 4 Rochdale Industrial Centre, Albion Road, Rochdale OL11 4HN

TELEPHONE	01706 860534
EMAIL	admin@jempumps.com
WEB	jempumps.co.uk
ACCREDITATIONS	LPCB - Pumps
CONTACT	Andrew Leech- Director; Patrick Chetram-Director; Simon Lee, Engineering Team Leader

John Stephens (Life Member)

110 Eastmoor Park, Harpenden AL5 1BP

EMAIL	j.n.stephens@ntlworld.com

Johnson Controls

Tyco Park, Grimshaw Lane Newton Heath,
Manchester M40 2WL

TELEPHONE	0161 259 4000
FAX	0161 875 0491
EMAIL	kate.scourfield@jci.com
WEB	johnsoncontrols.com
CATEGORY	Sprinkler head manufacturer
ACCREDITATIONS	LPCB – Other Sprinkler Components LPCB – Tyco Sprinkler Heads
CONTACT	Kate Scourfield, Head of Sales W&M, UK, Ireland, Israel & BeNeLux

K

Kent Fire & Rescue Service

Headquarters, Straw Mill Hill, Tovil, Maidstone ME15 6XB

TELEPHONE	01622 692121 ext 8358
EMAIL	mark.woodward@kent.fire-uk.org
WEB	kent.fire-uk.org
CATEGORY	Associate
CONTACT	Mark Woodward, Head of Technical Fire Safety Customer Engagement and Community Safety

King Industries

Old Barn Farm, Welford Road, Husbands Bosworth, Lutterworth LE17 6JL

TELEPHONE	07501164844
EMAIL	rking@kingindustries.co.uk
WEB	kingindustries.co.uk
CATEGORY	Associate Member

Knowsley SK

Centrepoint Marshall Stevens Way, Trafford Park, Stretford, Manchester M17 1AE

TELEPHONE	+44 1618727511
EMAIL	pelder@knowsleysk.co.uk
WEB	knowsleysk.co.uk
CATEGORY	Associate Member
CONTACT	Peter Elder

L

Lancashire Fire & Rescue Service

Headquarters, Garstang Road, Fulwood, Preston PR2 3LH

TELEPHONE	01772 862545 01772 866956
EMAIL	listerhaworth@lancsfirerescue.org.uk ewanduncan@lancsfirerescue.org.uk
WEB	lancsfirerescue.org.uk
CATEGORY	Associate
CONTACT	Lister Haworth (Protection Support) Ewan Duncan (Built Environment Risk Management)

Liberty Specialty Markets

Commercial Risk Engineering, Level 22, 20 Fenchurch Street, London EC3M 3AW

TELEPHONE	02037581721
EMAIL	Richard.wilkinson@libertyglobalgroup.com
WEB	libertyspecialtymarkets.com
CATEGORY	Associate
CONTACT	Richard Wilkinson, Head of Risk Engineering - Property

Lincolnshire Fire & Rescue Service

Fire and Police Headquarters, Deepdale Lane, Nettleham, Lincoln LN2 2LT

EMAIL	Daniel.Moss@Lincolnshire.gov.uk
WEB	Lincolnshire Fire and Rescue – Lincolnshire County Council
FACEBOOK	/Lincolnshire Fire and Rescue
TWITTER	@LincsFireRescue
CATEGORY	Associate
CONTACT	Dan Moss, Area Manager Prevention, Protection

Liquitech Ltd

The Old Post Office House, East Street Pembridge, Herefordshire HR6 9HA

TELEPHONE	01544 388883
EMAIL	andrew@liquitech.co.uk
WEB	liquitech.co.uk
FACEBOOK	/LiquitechLtd
LINKEDIN	/liquitechltd
ACCREDITATIONS	ISO 9001 :2015
CATEGORY	Associate
CONTACT	Andrew Searles, Director

London Fire Brigade

Fire Safety Regulation, 169 Union Street, London SE1 0LL

TELEPHONE	0208 555 1200
FAX	sprinklers@london-fire.gov.uk
WEB	london-fire.gov.uk
FACEBOOK	London Fire Brigade
CONTACT	AFSS Coordinator

Lubrizol Advanced Materials Europe BVBA

Chaussee de Wavre 1945, 1160 Brussels, Belgium

TELEPHONE	+44 077114 20904
FAX	00 32 2678201
EMAIL	adam.hessel@lubrizol.com

WEB blazemaster.com
TWITTER @blazeMaster.eu

CATEGORY Supplier Manufacturer
CONTACT Mr Adam Hessel

M

M&P Dry Risers Limited

Unit 12 Viewpoint, Boxley Road, Maidstone ME14 2DZ

TELEPHONE 0800 0431974
EMAIL info@mpfireprotection.com
WEB mpfireprotection.com

CATEGORY Residential Installer
CONTACT Paul Atkins, Director

Experts in the Design, Installation and Servicing of Fire Protection Systems.

Marioff Limited (A Carrier Company)

25 Earl Haig Road, Hillington Park, Glasgow G52 4JU

TELEPHONE 08453 880 880
EMAIL sales.marioff.co.uk@carrier.com
WEB Marioff.com

CATEGORY Commercial & Residential Installer
ACCREDITATIONS FIRAS - Water Mist installations
CONTACT Gregor Toland, Sales Director

Marioff was founded in 1985 with a motivating mission: to protect people, property and business from fire. Today Marioff is a leading supplier of water mist fire protection systems, the HI-FOG® brand has become the standard for water mist fire protection with a reputation for superior fire suppression performance. The company's extensive research and development program, which is carried out in association with leading independent authorities and fire testing laboratories has been key to this success. Marioff's greatest reward is the growing list of references and the fires suppressed or extinguished by HI-FOG®.

There should only be 1 listing in the name of Marlowe Fire & Security. Remove the Marlowe Fire & Security Group listing

Marlowe Fire & Security

Lowry House, 5 Ohio Avenue, Salford Quays, Greater Manchester M50 2GT

TELEPHONE	0333 010 2000
EMAIL	hello@marlowefireandsecurity.com
WEB	marlowefireandsecurity.com
CONTACT	Resident Sprinkler Expert: Ian Stamps

Marlowe Fire & Security is one of the UK's leading providers of comprehensive fire life safety and security solutions.

With over 40 years' industry experience and a commitment to protecting people's lives, properties and businesses, we offer a comprehensive suite of advanced services tailored to meet the your specific needs.

Our team of dedicated sprinkler experts offer everything from design, supply and installation, through to ongoing maintenance and have experience working on every scale of project in sectors such as social housing, student accommodation and residential blocks through to nursing homes and care homes.

If you're looking for a trusted provider that prides itself on delivering superior service quality and exceeding client expectations, you've found us.

Marsh Risk Consulting

5 George Square, Glasgow, G2 1AR

TELEPHONE	07585 803 706
EMAIL	Heather.McLeish@marsh.com
WEB	marsh.com
FACEBOOK	Marsh
TWITTER	@marshglobal
CATEGORY	Associate
CONTACT	Heather McLeish

Managing Consultant Marsh is a global leader in insurance broking and risk management. A dedicated Property Risk Consulting practice enables organisations to strategically manage risks associated with their portfolio of physical assets. Property Risk Consulting capabilities include a global team of more than 250 specialists in 40 countries, deep technical engineering expertise combined with Marsh's strong understanding of the insurance industry and underwriting. A commitment to leadership in fire protection includes involvement in global fire protection committees.

Maurice Johnson & Partners Ltd

Anchorage, Charlotte Quay, Dublin 4, Ireland

TELEPHONE	+353 1 661 8086
EMAIL	info@mjp.ie
WEB	mjp.ie
CATEGORY	Consultant
CONTACT	Stefan Hyde, Fire Engineering Consultancy

MB Firepumps Ltd

12 Teal Court, Starling Way Strathclyde Business Park, Bellshill, Glasgow ML4 3NN

TELEPHONE	01698 442411 07814 812903
EMAIL	michael@mbfirepumps.com
WEB	mbfirepumps.com
LINKEDIN	MB Firepumps Ltd
ACCREDITATIONS	ISO9001, Safe Contractor, Avetta,
CONTACT	Michael Brogan

Service, Repair and Installation of new and retro fit fire pump equipment. Operating throughout Scotland, The Islands and North East and North East England, 24-7-365 emergency service to provide truly comprehensive cover for your business. Engineers are fully mechanical and electrically qualified for working on fire pump systems and have many years experience within the industry. We offer advice and fire pump testing training for sites that wish to weekly test by themselves.

Mercury Engineering

Mercury Engineering, Mercury House, Ravens Rock Rd, Sandyford Business Estate, Foxrock, Co. Dublin, Ireland

TELEPHONE	00 353 1 216 3000
EMAIL	fireprotection@mercuryeng.com
WEB	mercuryeng.com
FACEBOOK	Mercury
LINKEDIN	Mercury
INSTAGRAM	@Mercury
ACCREDITATIONS	LPCB - Level 4
CONTACT	Christian Murphy, General Manager

Merseyside Fire & Rescue Service

Bridle Road Bootle, Service HQ, Bridle Road, Liverpool L30 4YD

TELEPHONE	0151 296 4626 0151 296 4102
EMAIL	philgarrigan@merseyfire.gov.uk
WEB	merseyfire.gov.uk
CATEGORY	Associate
CONTACT	Phil Garrigan

Mid and West Wales Fire and Rescue Service

Fire Service HQ, Lime Grove Avenue, Carmarthen SA31 1SP

TELEPHONE	0370 6060699
EMAIL	s.slaymaker@mawwfire.gov.uk
WEB	mawwfire.gov.uk
CATEGORY	Associate
CONTACT	Siôn Slaymaker, Head of Business Fire Safety

Midland Heart

TELEPHONE	07961 173827
EMAIL	david.hodgkins@midlandheart.org.uk
WEB	midlandheart.org.uk
CATEGORY	Associate
CONTACT	David Hodgkins MIFSM, AIFireE, Fire Safety Manager

Our mission is to be a leading housing organisation, delivering homes and services across the Midlands that enable people to live independently We own and manage 33,000 homes.

Our Vision is to:
- Remain true to our charitable aims of providing truly affordable homes.
- Deliver a range of housing options,
- Build desperately needed new homes for social and affordable rent ,
- Continue to work with commissioners to protect and deliver our Supported Living services.
- Be the first point of call for others in the sector

MillHarbour Sprinklers Limited

City Reach, 5 Greenwich View Place, Docklands, London E14 9NN

TELEPHONE	07720076679
EMAIL	paul.graham@millharboursprinklers.co.uk
CATEGORY	Installer Level 1
ACCREDITATIONS	FIRAS - Domestic and Residential Scheme
CONTACT	Paul Graham, Managing Director

Mike Murphy (Atelier Ten)

19 Perseverance Works, 38 Kingsland Road, London E2 8 DD

TELEPHONE	07768457707
EMAIL	mike.murphy@atelierten.com
WEB	atelierten.com
CATEGORY	Associate Individual, Fire Engineering Consultants
CONTACT	Mike Murphy, Senior Fire Engineer

MJ Fire Safety

Unit D16 Lion Business Park, Dering Way, Gravesend Kent DA12 2DN

TELEPHONE	+44 1322382515
EMAIL	ross@mjfire.co.uk
WEB	mjfiresafety.co.uk
CATEGORY	Associate Member

MJA Designed Solutions

2 Hedley Lane, Carlton Coleville, Lowestoft, Suffolk NR33 8BN

TELEPHONE	07938734607
EMAIL	mark@MJA-Designed.co.uk
LINKEDIN	/mark-ashdown-031a714a
CATEGORY	Associate
ACCREDITATIONS	Fully Qualified LPCB Designer
CONTACT	Mark Ashdown, Fire Protection Design Engineer & Consultant

2D & 3D Design, Surveying and Consultancy for the Fire Protection Industry.
QUALIFICATIONS
Over 30 Years Experience
Fully Qualified LPCB, Basic, Int & FHC Exams FM & NFPA Experience
Revit MEP Accredited Training

Canute FHC - BAFSA Accredited Training
Effective Sprinkler Design – FM Global Accredited Training BIM Level 2 Fundamentals – BRE Certified
Offering AutoCAD 2D & 3D design, full hydraulic design and analysis and Surveying & Consultancy including: -
SERVICES
Autodesk - AutoCAD 2D & 3D design
Autodesk - Revit, Fabrication CADmep & Navisworks Autodesk AEC Collection – Subscription Holder.
Autodesk – BIM360 Collaborate Pro – Subscription Holder. BIM Level 2 Certified
Full Hydraulic Design and Analysis Canute FHC
AutoSPRINK RVT - Subscription Holder. MicroBIM Fire - Subscription Holder.

N

Nationwide Fire Sprinklers Ltd

Swinton Bridge Industrial Estate, White Lea Road, Mexborough, Rotherham S64 8BH

TELEPHONE	0345 505 2540
EMAIL	sales@nationwidewatersolutions.com
WEB	sprinklertank.co.uk
CATEGORY	Residential Installer
ACCREDITATIONS	FIRAS - Domestic and Residential Scheme, IFCC-water mist residential and commercial schemes
CONTACT	Michael Brightmore

We are a leading sprinkler tank refurbishment company, using Butyl, EPDM and Polypropylene linings along with a range of Fibreglass Repair systems. Other services include sprinkler tank roof and purlin replacement, 3kw immersion unit replacement, new ball valves and low level access hatch manufacture and installation.We deliver products and services which meet and exceed regulatory requirements.

Working across a broad range of sectors, we provide water storage solutions for sprinkler systems in public buildings, such as hospitals, schools and care homes, as well as industrial premises, commercial outlets and residential developments. Whether you need a new on-site sprinkler tank or require work to re-line, refurbish, repair or inspect an existing tank, we have got the expertise to deliver high quality, guaranteed products and services.

Nationwide Water Solutions

Unit BA22 & 23, The Store Room, Fitzwilliam Road,
Rotherham S65 1SL

TELEPHONE	0345 5052540, 07796 090310
EMAIL	sales@nationwidewatersolutions.co.uk
WEB	sprinklertank.co.uk
CONTACT	Michael Brightmore

We are a leading sprinkler tank refurbishment company, using both EPDM linings and Fibreglass Repair systems. We deliver products and services which meet and exceed regulatory requirements. Working across a broad range of sectors, we provide water storage solutions for sprinkler systems in public buildings, such as hospitals, schools and care homes, as well as industrial premises, commercial outlets and residential developments.

Whether you need a new on-site sprinkler tank or require work to re-line, refurbish, repair or inspect an existing tank, we have got the expertise to deliver high quality, guaranteed products and services.

Nick Groos

24 rue Dicks, L-8085 Bertrange, Luxembourg

TELEPHONE	+352 621 159736
EMAIL	nick@groos.lu

North Wales Fire & Rescue Service FSHQ

Ffordd Salesbury, St Asaph Business Park, St Asaph, Denbighshire LL 17 0JJ

TELEPHONE	01745 535259
FAX	01743 535296
EMAIL	paul.scott@nwales-fireservice.org.uk
WEB	nwales-fireservice.org.uk
CONTACT	Paul Scott, Senior Fire Safety Manager.

Nottinghamshire Fire & Rescue Service

Joint Fire & Police Headquarters, Sherwood Lodge, Arnold, Nottingham NG5 8PP

TELEPHONE	0115 8388100
TEXT	07766 299 999 (Aimed at Deaf Communities)
EMAIL	jonathan.holford@notts-fire.gov.uk
WEB	notts-fire.gov.uk
CATEGORY	Associate
CONTACT	Jonathan Holford, Head of Fire Protection

NPHS Fire Sprinklers Limited

Pinetree Centre, Durham Road, Birtley, Co. Durham DH3 2TD

TELEPHONE	0800 505 3225 07802853297
EMAIL	paul@nationalphs.co.uk
WEB	nphs.co.uk
CATEGORY	Water Mist Installer
ACCREDITATIONS	IFC Certified Water Mist Installer
CONTACT	Paul McFarling, Director

We design, install and maintain Domestic and Residential high pressure and Low-pressure water mist systems throughout the UK. NPHS are 3rd party accredited with the IFC.

NPTC Group

1 College Green Port Talbot, Afan Campus, College Green, Margam, Port Talbot, Neath SA13 2AL

TELEPHONE	01639 648209, 01639 648000
EMAIL	paul.rogers1@nptcgroup.ac.uk business@nptcgroup.ac.uk
WEB	nptcgroup.ac.uk
ACCREDITATIONS	BAFSA Approved Training Centre
CONTACT	Paul Rogers

NPTC group currently deliver a range of courses that are suitable for candidates looking to start their journey into the fire sprinkler industry, through to those with several years of experience looking to upskill or gain a recognised qualification. NPTC group use a variety of face to face, remote and blended learning that allows candidates to complete various assessments in their own time, reducing the need to physically attend college. Further information can be found on our website alternatively, please contact the college to discuss suitability, availability and anticipated start dates.

O

Orange Fire Protection Group

Queens Court, 24 Queen Street, Wakefield WF 1 1LE

TELEPHONE	+44 1924566320
MOBILE	+44 7872174887
EMAIL	info@orangefiregroup.co.uk
WEB	orangefiregroup.co.uk

TWITTER	@orangefiregroup
LINKEDIN	/orange-fire-protection-group-ltd
FACEBOOK	/orangefireprotectiongroup
CATEGORY	Residential and Domestic sprinkler and low pressure water mist systems
ACCREDITATIONS	IFC, FPA, FIA, Constructionline, Safecontractor
CONTACT	Lewis Klimo or Richard Ledger

Orange Fire Protection Group Ltd are designers, suppliers, installers and maintainers of fire protection and fire detection systems. With over 60 years of combined experience within the fire protection industry, we have provided systems and subsequently service and maintenance packages to hundreds of properties in a wide variety of market sectors. With our experience, we can provide a solution for the following systems:

- Fire Sprinkler Systems
- Water Mist Fire Suppression Systems
- Wet & Dry Risers
- Kitchen Fire Suppression Systems

Our engineers carry the latest, up to date equipment and a large quantity of spares on their vehicle thus allowing us to carry out maintenance and repair works to fire protection and detection systems on the spot.

P

Partners& Ltd

MRIB House, 25 Amersham Hill, High Wycombe, Buckinghamshire HP13 6NU

TELEPHONE	0113 887 3805 / 07764 492847
EMAIL	tom.kendall@partnersand.com
WEB	partnersand.com
FACEBOOK	Partners&.
TWITTER	@Partnersand_
LINKEDIN	Partners&.
INS T AGRAM	@partners.and
YOUTUBE	Partners&.
CATEGORY	Chartered Insurance Broker
CONTACT	Tom Kendall, Client Partner

Bespoke risk and insurance protection advice that protects tomorrow for members, their companies and their families from advisers who understand the fire protection industry. As a next generation insurance advisory business, Partners& combines the best traditions of broking, such as technical advice and client service, with modern thinking and intelligent use of technology, to enhance the client experience and create a dynamic workplace for our talented team.

Potter Electric Signal

13723 Riverport Drive St. Louis, MO 63043

TELEPHONE	001 314 595 6900
MOBILE	+44 7803206590
EMAIL	steveb@pottersignal.com
WEB	pottersignal.com
TWITTER	@potterelectric
CATEGORY	Supplier Manufacturer
ACCREDITATIONS	LPCB - Other Sprinkler Components; VdS; FM; UL; ULc; E
CONTACT	Steve Broadley, Potter Sales Europe

At Potter Electric Signal Company, QUALITY is the first order of business. Since 1898, we have served the Fire industry on a world-wide basis. Today, we manufacture a full line of sprinkler monitoring devices, corrosion monitoring, testing, and treatment products, as well as fire alarm systems and releasing control panels.

Powerpro UK Limited

Middlemore Lane West, Aldridge, Walsall WS9 8BG

TELEPHONE	0800 2321986
EMAIL	James@powerprouk.com
WEB	powerprouk.com
CATEGORY	Associate
CONTACT	James Roberts, Director. Kurt Walters, Technical Engineering Manager Paul Clarke, Senior UK Technician

Powertec Pumps Ltd

Units 7 & 8 Powertec House, Calleva Park, Aldermaston, Reading RG7 8PN

TELEPHONE	01189 409970
FAX	01189 814893
EMAIL	davidnewman@powertecpumps.com
WEB	powertecpumps.com
CATEGORY	Associate
CONTACT	David Newman, CEO. Mark Spiers, Operations Manager

Preheat Engineering

Unit A2, Deseronto Trading Estate, St Mary's Road, Langley, Berks SL3 7EW

TELEPHONE	+44 20 8848 1912
EMAIL	sales@preheat.co.uk
WEB	preheat.co.uk
CATEGORY	Associate
CONTACT	Melanie Frobisher

Established in 1954, Preheat Engineering is the British manufacturer of the PEREGRINE and FALCON engine heaters. We supply generator manufacturers, maintenance and servicing companies operating in Genset, Fire Safety, Fuel Storage, Marine and more. Our design and manufacturing experience makes us a key supplier to these sectors.

Project Fire Products Ltd

Pasturefields Lane Hixon, Staffordshire ST18 0PH

TELEPHONE	01889 271271
EMAIL	info@projectfire.co.uk
WEB	projectfire.co.uk
FACEBOOK	/projectfireproducts
TWITTER	@project fire
LINKEDIN	/projectfire
YOUTUBE	ProjectFireProducts
ACCREDITATIONS	ISO 9001:2015, ISO 14001:2015, products approved with LPCB, VdS, UL, ULE & FM.
CONTACT	Andrew Fisher, Product Manager

Project Fire Products Ltd have been a part of the sprinkler industry for over 45 years. Having previously been a contractor, we now focus on selling our range of approved innovative and sustainable products into the marketplace. Our products aim to bring benefits for all such as saving space, saving water, saving time, making testing & maintenance easier, improving reliability, enhancing monitoring & record keeping and saving operational expenditure. Project Fire is also dedicated to training and education to promote best practice to the wider construction industry and within the sprinkler community.

Prokon Fire Solution

Chestnut House. Kingswood Business Park. Holyhead Road, Albrighton.
West Midlands. WV7 3AU

TELEPHONE	01902906150
MOBILE	07850530731
EMAIL	ken.williams@prokonsolutions.com
WEB	prokonsolutions.com
ACCREDITATIONS	Constructionline gold, IFSM, FPA, NFPA
CONTACT	Ken Williams

Our management and engineers have experience collectively in all forms of water based, gaseous and foam suppression systems together with the full spectrum of fire detection and alarm systems. We offer a range of services including consultancy, auditing, surveys, project management, design (2D and 3D), calculations, fire risk assessments, and independent third party inspections

Protect and Detect Systems Limited

Units 2-4, Greenwich Business Park, Greenwich Close, Ipswich, IP3 0DD

TELEPHONE	+44 1473 340144
MOBILE	07885 367061
EMAIL	michael.hadley@protectanddetect.co.uk
CATEGORY	Installer – Residential & Domestic
CONTACT	Michael Hadley

Pure Power Ltd

Daisy Bank Lane, Unit 49 Cosgrove Business Park, Northwich CW9 5PN

TELEPHONE	+44 7497 612517
EMAIL	jason@purepoweruk.com
CATEGORY	Associate
CONTACT	Jason Cooper, Director Matthew Ragdale, Service Manager matt@purepoweruk.com

Pyro Protection Limited

Saddleworth Business Centre, Huddersfield Road, Delph, Oldham OL3 5DF

TELEPHONE	01457 879 222
FAX	01457 879 888
EMAIL	info@pyroprotection.co.uk
WEB	pyroprotection.co.uk

CATEGORY	Installer level 4
ACCREDITATIONS	LPCB - Level 4
CONTACT	Matthew Smith

Pyro Protection Ltd are independent specialists in the provision of fire sprinkler protection and allied fire suppression fields. We provide consultation, proposals, design, project management, commissioning, training and ongoing service and maintenance. Our areas of expertise encompass not only sprinkler systems but also deluge systems, foam enhancement, low/medium/high expansion foam systems, wet/dry risers, fire hydrants and hosereels.

We are engineers and although we often produce innovative solutions to fire protection challenges we also ensure that our system designs are compliant with recognised international standards, including LPC Rules Inc. BS EN12845, NFPA and FM Global, using approved equipment throughout the UK.

R

R Tindall Fabricators Ltd

Unit 1, West Point Industrial Estate, Oldham OL9 9ND

TELEPHONE	0161 6243961
EMAIL	joe@tindall-fabricators.co.uk

CATEGORY	Associate
CONTACT	Joe Yearn, Director

Rapidrop Global Ltd

Rutland Business Park, Newark Road, Peterborough PE1 5WA

TELEPHONE	01733 847 510
FAX	01733 553 958
EMAIL	rapidrop@rapidrop.com
WEB	rapidrop.com

CATEGORY	Supplier Manufacturer
ACCREDITATIONS	LPCB, UL, FM, and VdS, Assessed to ISO 9001 & ISO 14001
CONTACT	Martyn Willimer, Sales Director Afolabi Akinsanya, UK Sales Manager

Rapidrop Global Ltd is comprised of British sprinkler head manufacturer Rapidrop, as well as sprinkler system monitoring solution specialists FloWatch plus our building products division IFI. Rapidrop are the only independent manufacturers of fire sprinkler heads in the UK, offering a full range of equipment including the market leading Rapidrop flexible sprinkler connection, alarm control valves, isolation valves and much more.

Supplying sprinklers and fire suppression systems to projects worldwide, Rapidrop provide tailored solutions to both residential and commercial projects and serve in excess of 80 countries with a team speaking more than 15 languages. Investing in research and development is part of our commitment to fire safety with our state of the art testing and training facilities at our headquarters in Cambridgeshire.

Reliable Fire Sprinkler UK (Ltd)

Origin One, 108 High Street, Crawley, West Sussex RH10 1BD

TELEPHONE	01342 316800
EMAIL	uksales@reliablesprinkler.com
WEB	reliablesprinkler.com
CATEGORY	Supplier / Manufacturer
ACCREDITATIONS	LPCB Approved to ISO 9001 and assessed to ISO 14001
CONTACT	Chris Gavin – Director of Sales EMEA Brian Gallagher – UK North & Ireland George Glover – UK South

The Reliable Automatic Sprinkler Co. Inc. is one of the world's largest producers of automatic fire sprinklers and sprinkler system control equipment. The company was founded in 1920 and has continued to expand, now encompassing a 467,000 ft² facility in South Carolina, USA, with sales offices located throughout the world.

Reliable aims to be the leading worldwide manufacturer of innovative, quality-oriented fire sprinklers and systems devices; to be a leading supplier of fire sprinkler system components; and to be the leader in providing the highest level of operational excellence in customer service.

Reliable produces an unparalleled range of fire sprinklers and system control valves including alarm, dry, deluge and pre-action. Reliable products are listed and approved by approval bodies including FM, UL, LPCB and VdS.

Residential Fire Protection Ltd

Units 1 & 2 Charlotte Court, 14 Law Street, Cleckheaton BD19 3QR

TELEPHONE	0113 426 3400
MOBILE	07557023689
EMAIL	rh@residentialfire.co.uk
WEB	residentialfire.co.uk
CATEGORY	FIRAS Residential & Domestic
ACCREDITATIONS	FIRAS - Domestic and Residential Scheme
CONTACT	Richard Haines, Director

Residential Sprinklers Ltd

No 1 Parkside Court, Greenhough Road, Lichfield, Staffordshire WS13 7FE

TELEPHONE	07855 807945
EMAIL	mat@residentialsprinklersltd.co.uk
WEB	residentialsprinklersltd.co.uk
CATEGORY	Residential & Domestic installer
ACCREDITATIONS	Firas - Residential & Domestic
CONTACT	Mat Rushton, Director

Residential Sprinkler Solutions

Little Manor, 49 The Lagger, Chalfont St Giles, Buckinghamshire HP8 4DJ

TELEPHONE	020 8864 3914 07807 450724 / 07766 163021
EMAIL	info@residentialsprinklers.co.uk
WEB	Residentialsprinklers.co.uk
ACCREDITATIONS	FIRAS Domestic and Residential Installer
CONTACT	Mark Gibson & Paul Moody

RIFT Actuators Ltd

Shaw House, 110-114 Barnards Green Road, Malvern WR14 3ND

TELEPHONE	+44 1684 368523 (Main Office)
MOBILE	+44 7368 334847 (Katrina Kerr – Operations Director)
EMAIL	sales@riftactuators.com
WEB	riftactuators.com
TWITTER	@RIFT_Actuators
LINKEDIN	rift-actuators/mycompany/?viewAsMember=true
YOUTUBE	@riftactuators111
CATEGORY	Manufacturer
ACCREDITATIONS	ISO5211 Herefordshire & Worcestershire Chamber of Commerce BAFSA Worcestershire Works Well (Level 1)
CONTACT:	Katrina Kerr – Operations Director (07368 334847)

RIFT Actuators, through certified fire regulated partners is supporting the fire suppression and construction industries with a range of electric actuator products. Providing ultra-low energy solutions, ultimate reliability, easy install and low lifetime cost, our RIFT Actuators are the perfect solution for automated systems. With a huge feature set, including failsafe, monitoring of valve longevity and analytics to better understand the practical usage of the systems and provide for better planned maintenance. At RIFT, we are constantly striving to do more and be better in providing the best products on the market.

Risk Consulting (davidrsmith) Ltd

7 Rectory Close, Barby, Rugby CV23 8TY

TELEPHONE	078 720 12 720
EMAIL	david@riskconsultingltd.co.uk
WEB	riskconsultingltd.co.uk
CONTACT	David Smith

David Smith has many years of general risk consultancy work across several disciplines both within the UK and internationally. Currently providing a service across three areas. Sprinkler system hazard review in accordance with BSEN12847 and general guidance and support over new and old sprinkler systems. This extends to experience with water mist systems. Fire Risk Assessments. David holds FPA CO6 certificate. Narrative reports are provided that include a checklist as opposed to being solely check list based. General risk reviews including sprinkler systems for the insurance industry. These reviews also cover general property risks and H&S.

Royal Berkshire Fire & Rescue Service

Newsham Court, Pincents Kiln, Calcot, Reading RG31 7SD

TELEPHONE	0118 9384000
EMAIL	jamesj@rbfrs.co.uk, waltersl@rbfrs.co.uk, Thomast@rbfrs.co.uk
WEB	RBFRS.co.uk
CATEGORY	Associate
CONTACT	Jess James, Group Manager, Project Lead – Protection, Lynn Walters, Tregear Thoma

RSP Fire Sprinkler Systems

Unit D, Distribution Way, Dyffryn Business Park, Caerphilly CF82 7TS

TELEPHONE	0800 954 5999
EMAIL	info@rspsprinklersystems.co.uk
WEB	rspsprinklersystems.co.uk
CATEGORY	Residential and Domestic installer
ACCREDITATIONS	FIRAS – Residential and Domestic
CONTACT	Sian Dunlop, Sales & Marketing Manager

RSP was the first contractor in Wales to achieve third party certification for the design and install of residential and domestic sprinkler systems. Widely recognised as experts in our field, we are keen collaborators and work with our customers to ensure the system is tailored to the job without risking quality. When choosing RSP, you will benefit from our breadth and depth of experience gathered from a diverse range of projects including housing estates, retrofits, high rises, care homes and social housing. We guarantee compliance but is complemented by our consultation which aims to keep the system cost-effective and concealed.

S

Sale Engineering Products Ltd (SEP)

45 Lambeth Road, Reddish, Stockport, Greater Manchester SK5 6TW

TELEPHONE	+44 161 428 1180
EMAIL	info@saleengineering.co.uk
WEB	firesprinkler.co.uk
TWITTER	@SaleEngineerPro
LINKEDIN	sale-engineering-products-limited
CONTACT	Rob Bell, Managing Director

SEP is well-known throughout the UK fire sprinkler industry as a manufacturer and supplier of specialist products for the industry. Air compressors, pump initiation boards, LPCB/FM-approved zone test assemblies (ZONE GUARDIAN), jockey/booster/residential pumps, Priority Demand Valves are just some of our specialities alongside a full range of gauges, switches, orifice fittings and many other spares and ancillaries. Our Ethos encompasses top quality, unrivalled customer service and almost endless flexibility – all factors which have seen us grow significantly over recent years with the help of our valued customers.

Scottish Fire & Rescue Service

Westburn Drive, Cambuslang G72 7NA

TELEPHONE	01851 705051 / 01463 227000
EMAIL	Iain.Macleod4@firescotland.gov.uk
WEB	firescotland.gov.uk
CONTACT	Iain Macleod, Deputy Assistant Chief Officer, Head of Prevention and Protection

Shawston International

Office 33 The Forum, Tameside Business Park,
Windmill Lane, Denton M34 3QS

TELEPHONE	0161 336 3818
EMAIL	benji@shawston.co.uk
WEB	shawston.co.uk
LINKEDIN	/shawston-holdings
CATEGORY	Supplier Manufacturer
CONTACT	Benji Crossley

As the UK's leading fire protection supplier Shawston are skilled in working with project managers, fire safety engineers and contractors to ensure that adequate and appropriate fire safety products are available to minimise the risk of injury or loss of life in the event of a fire. Shawston work hard training and advising our fire team on relevant regulations and approvals required within the fire sector. Working with premium brands to ensure all components comply with BS5041, BS5306, BS990 & building approval regulations, our range guarantees high product quality, manufactured to ISO 9001, authenticated with certification, supplied through our nationwide branch network.

Offering fire safety products including Victaulic, BlazeMaster CPVC, fire sprinkler heads, test valves, brackets, supports, dry and wet riser cabinets, flow and monitoring switches, wet riser valves, tubes, and fittings. All delivered from our nationwide locations via our own vehicle fleet with unrivalled customer service.

SIKA Instruments Ltd

8 Astley House, Cromwell Business Park,
Chipping Norton, Oxfordshire OX7 5SR

TELEPHONE	07944 453718
EMAIL	sales@riserteq.com
WEB	riserteq.com
TWITTER	@SIKAInstruments
LINKEDIN	company/78105487
ACCREDITATIONS	LPCB product certification
CONTACT	Chris Cocklin

SIKA Instruments Ltd is the UK subsidiary for SIKA Dr. Siebert & Kuhn in Germany. SIKA manufacture high quality flow switches for the Residential and Domestic fire sprinkler industry and is a family owned group which was founded in 1901. The latest product offering is the VKF flow detector Switch which is LPCB certified to EN 12259-5 and WRAS approved, making it suitable for EN 16925:2018 and also BS 9251 installations. The flow switch alarm comes in sizes from 1" through to 2", best suited for confined spaces and ideal for use with the RISERTEQ™ manifold valve set solutions.

SnapDrill AS

Koppholen 9, Sandnes 4313 Norway

TELEPHONE	+47 95058125
EMAIL	martin@snapdrill.no
WEB	snapdrill.no
CATEGORY	Associate Member

Snowdonia Fire Protection Ltd

The Old Smithy, Waunfawr, Caernarfon LL55 4YS

TELEPHONE	01286 650235
FAX	01286 650413
EMAIL	sion@snowdonia-fire.co.uk
WEB	snowdonia-fire.co.uk
CATEGORY	design,install D&R
ACCREDITATIONS	FIRAS
CONTACT	Sion Greasley

Solent Fire Protection Services Ltd

12 Heritage Business Park, Herigate Way, Hampshire PO12 4BG

TELEPHONE	023 9251 0230
FAX	023 9251 1510
EMAIL	info@solentfire.co.uk
WEB	solentfire.co.uk
CATEGORY	Commercial, Residential, Domestic & Industrial Installer
ACCREDITATIONS	LPCB - Level 3
CONTACT	Simon Tooth, Managing Director

South Wales Fire & Rescue Service

HQ Forest View Business Park Llantrisant Pontyclun CF72 8LX

TELEPHONE	General 01443 23 2000
EMAIL	firesafety@southwales-fire.gov.uk
WEB	southwales-fire.gov.uk
ACCREDITATIONS	BSC (HONS) Fire Safety Engineering L5 Diploma Fire Engineering Design
CATEGORY	Associate
CONTACT	Barrie Dickinson 07887 632355 Business Fire Safety – Risk Reduction b-dickinson@southwales-fire.gov.uk

South Wales Fire and Rescue Service continue to support, educate and promote the installation of sprinkler systems to further reduce the risk from fire in existing building stock. The changes to Welsh legislation in 2014 focused on residential property reflecting the will and determination of the Welsh Government to change the way developers and providers "THINK" about fire safety and design of their properties and to direct measures towards a reduction in deaths and injuries from fire. It is our aim to protect the sustainability of new-build residential premises, encourage the protection of existing properties and safety of first responders in Wales.

South Yorkshire Fire & Rescue Service

Training Centre, Beaverhill Road, Handsworth, Sheffield S13 9QA

TELEPHONE	0114 2532935
EMAIL	rbrason@syfire.gov.uk
WEB	syfire.gov.uk
CATEGORY	Associate
CONTACT	Roger Brason, Business Fire Safety (BFS)

SPP Pumps Ltd

1420 Lakeview ,Arlington Business Park, Theale,
Reading RG7 4SA

TELEPHONE	0118 932 3123
FAX	0118 932 3302
EMAIL	alex_playfair@spppumps.com
WEB	spppumps.com
CATEGORY	Supplier Manufacturer
ACCREDITATIONS	LPCB - Pumps
CONTACT	Alex Playfair

Sprinkler Tech Ltd

Unit B1, Leasows Court, Hortonwood West, Telford TF1 7AF

TELEPHONE	0800 040 7738
EMAIL	dave@sprinklertech.co.uk
WEB	sprinklertech.co.uk
CATEGORY	Residential Installer
ACCREDITATIONS	FIRAS - Domestic and Residential Scheme
CONTACT	Dave Vicarey, Director

Sprinktec Ltd

TELEPHONE	+44 07477906105
MOBILE	+44 07477906105
EMAIL	Admin@sprinktec.co.uk
WEB	sprinktec.co.uk
LINKEDIN	SPRINKTEC
CATEGORY	Fire sprinkler system Consultant
ACCREDITATIONS	SQA Approved Training Centre & BAFSA Approved training provider.
CONTACT	Alan Crichton

Sprinktec is the Leading Fire sprinkler system consultancy in the UK and Ireland, we carry out consultancy work for end users, builders and MEP Consultants, on line design training and we also carry out sprinkler designs for end users and Installers.

Staffordshire Fire & Rescue Services

Central Prevent & Protect, Headquarters, Pirehill, Stone, Staffordshire ST15 0BS

TELEPHONE	01785 898752
FAX	01785 898395
EMAIL	Mark.Wetherill@staffordshirefire.gov.uk
WEB	staffordshirefire.gov.uk
FACEBOOK	/StaffsFire
TWITTER	@StaffsFire
CATEGORY	Associate
CONTACT	Mark Wetherill

Staffordshire Fire and Rescue Service plays a key leadership role in promoting a better understanding of the benefits of automatic fire sprinklers and work continually to encourage building owners and developers to install these systems where there is a risk-based case for doing so. Whilst automatic fire sprinkler systems reduce the human, economic and environmental costs of fire in any building they are installed in, our focus is directed to those properties where the most significant impact can be achieved.

Suffolk Fire & Rescue Service

8 Russell Road Ipswich, Endeavour House IP1 2BX

TELEPHONE	07780956439, 01473 260588
EMAIL	philip.cornford@suffolk.gov.uk
WEB	Suffolk Fire and Rescue Service - Suffolk County Council
CONTACT	Philip Cornford, Station Commander

SureFire Sprinklers

Mill Road, Sharnbrook, Bedford MK44 1NP

TELEPHONE	01234 880514
MOBILE	07557413005
EMAIL	matt@surefiresprinklers.com
WEB	surefiresprinklers.com
CATEGORY	Installer
ACCREDITATIONS	Firas, Construction Line Silver and Acclaim
CONTACT	Matthew Lander

Sureserve Fire & Electrical Ltd

Wilson House, North Heath Lane, Horsham West Sussex RH12 5QE

TELEPHONE	01444 460 140, 0845 226 2223, 07955 855 818
EMAIL	colin.packer@sureserve-fe.co.uk
WEB	sureserve-fe.co.uk
LINKEDIN	/sureserve-fe
ACCREDITATIONS	Level 1 Installer
CONTACT	Colin Packer

Sureserve Fire & Electrical, a specialist in the design, supply, installation and maintenance of Fire Safety Systems. This covers a comprehensive range of physical infrastructure and fire safety materials required for a building to respond to the outbreak of fire, save lives & protect buildings.
Based in West Sussex, we have operatives distributed nationwide, allowing us to offer a comprehensive service maintaining and servicing nationwide offering the following services: -

- Sprinklers (BS9251) (Warrington FIRAS)
- Fire alarms (BS5839) (BAFE Accredited)
- Passive Works & Fire Doors (Warrington FIRAS)
- Emergency lighting (BS5266) (BAFE Accredited)
- Dry risers & Smoke vents (BS9990)
- Firefighting extinguishers (BS5306) (BAFE Accredited)
- Fire safety signage (BS:5499)
- Electrical compliance services (EICR Works) (NIC)
- Fire Evacuation Systems
- No Technical Fire Safety Checks

T

Tandi Sprinklers LLP

Unit 17, Furmston Court, Letchworth Garden City, Herts SG6 1UJ

TELEPHONE	01462 671301
EMAIL	info@tandisprinklers.co.uk
WEB	tandisprinklers.co.uk
CATEGORY	Residential & Commercial Installer
ACCREDITATIONS	FIRAS residential / FIRAS commercial
CONTACT	Ian Hemmingfield

Target Fire Systems

Otters Holt, 3 West Lodges, Dunston Business Village, Stafford, Staffordshire ST18 9AB

TELEPHONE	+44 1753 549496
EMAIL	sales@target-fire.co.uk
WEB	target-fire.co.uk
CATEGORY	Associate Member

Team Services

Stroud Road, East Kilbride, Glasgow G75 0YA

TELEPHONE	+44 1355 454494
EMAIL	daniel@teamservicesscotland.co.uk
WEB	teamservicesfiresystems.com
CATEGORY	Installer: Residential & Domestic; Industrial & Commercial
ACCREDITATIONS	LPCB Level 1
CONTACT	Daniel Jarvie

Thameside Fire Protection Ltd

Unit 4 Sovereign Park, Cranes Farm Road, Basildon, Essex SS14 3JD

TELEPHONE	01268 597999
FAX	01268 597998
EMAIL	andy.belsey@thamesidefire.co.uk john.allen@thamesidefire.co.uk darko.petrovic@thamesidefire.co.uk
WEB	thamesidefire.co.uk

CATEGORY	Installer Level 3
ACCREDITATIONS	LPCB - Level 3
CONTACT	John Allen, Chairman; Andy Belsey, Managing Director; Darko Petrovic, Managing Director

Design, fabrication, installation and maintenance of all fire sprinkler systems. All related fire protection work undertaken: fire alarms, extinguishers, dry risers, passive fire protection etc. Established 1985. Systems designed to BS EN 12845, BS 9251 and NFPA and FM Standards. Fabrication facilities. National coverage, including service contracts and 24 hour breakdowns Directly employed installation and service staff Special risk work and confined space operations Health and safety paramount Environmental accreditation to BS 14001. Emphasis on client satisfaction which brings 85% repeat business All market sectors covered, from high street retail to petrochemical

Thermocable Flexible Elements

Pasture Lane, Clayton, Bradford BD14 6LU

TELEPHONE	01274 882359
FAX	01274 882229
EMAIL	philipwilkie@thermocable.com
WEB	thermocable.com

CATEGORY	Supplier Manufacturer
CONTACT	Philip Wilkie, Manufacturing & Compliance Director.

Thermocable is a world leading UK based manufacturer with over 50 years experience in the design & manufacture of specialised heaters along with cable based sensing & detection technologies. Thermocable carries approvals with many global testing authorities. Our ProMinder range of products are designed to meet the requirements of BS12845 for trace heating and control of sprinkler pipe frost protection and can be operated as stand alone systems or can be interfaced with many common communication/fire control panels. The range consists of our ProMinder Standard control units and our ProMinder Advanced systems.

ProMinder Standard control units can operate with any fixed wattage heater tapes, up to 3Kw loading along with self regulating heater tapes with a maximum loading of 2Kw. Our ProMinder Advanced system consists of a control unit and Thermocable's own ProMinder Advanced trace heating cable. The system offers dual heating circuits within the same cable for additional reliability and has a power boost feature that provides rapid heat- up in extreme cold temperature.

Thermotech Fire Protection

Prestbury House, Bamford Business Park, Stockport SK4 1PL

TELEPHONE	0161 476 5551
FAX	0161 476 2998
EMAIL	info@thermotechsolutions.co.uk
WEB	thermotechsolutions.co.uk
CATEGORY	Commercial & Residential Installer
ACCREDITATIONS	LPCB - Level 3
CONTACT	David Prendergast

Thor Fire Limited

Kennet Suite, Earl Business Centre, Earl Mill, Dowry Street, Oldham OL8 2PF

TELEPHONE	01613397736, 07950907222
EMAIL	aaron@thorfire.co.uk
WEB	thor-fire.co.uk
CATEGORY	Installer level 1
ACCREDITATIONS	LPS1048 Level 1
CONTACT	Aaron Ashton, Director

Tornatech Europe SA

Rue Des Sablieres Numero 45 Unite 68, 1435 Mont-Saint-Guibert, Belgium

TELEPHONE	+32(0)10 84 40 01
MOBILE	07503 215628
EMAIL	saleseu@tornatech.com
WEB	tornatech.com
TWITTER	@Tornatech
LINKEDIN	/company/tornatech-inc
FACEBOOK	/tornatech
CATEGORY	Manufacturer of UL/FM EN12945 LPC Fire Pump Controllers
ACCREDITATIONS	UL/FM
CONTACT	Dean Chilvers

Founded in 1985, TORNATECH is a family-owned company specializing in the conception and manufacturing of fire pump controllers listed by UL and approved by FM and in accordance with the widely recognized NFPA 20 Standard. In addition, we have developed controllers that meet various local standards and approvals such as A2P (France) and LPCB (UK), to name a few. We also manufacture related specialty products. We have manufacturing capabilities in Canada, Europe, and Dubai, a sales office in Singapore as well as sales representatives in the United States.

TPT Fire Systems Group Ltd

Avocet House, Aviary Court, Basingstoke RG24 8PE

TELEPHONE	01256 365000
FAX	01256 365005
EMAIL	info@tpt-fire.co.uk
WEB	tpt-fire.co.uk
TWITTER	@TPTFireProjects @TPTFireMaint
CATEGORY	Commercial & Residential Installer & Maintenance
CONTACT	Gareth Richards

At TPT Fire, we have over 40 years' experience working with clients in London and beyond. Experts in installations, servicing and maintenance of your fire protection systems, we make it our priority to protect everything that matters most to you.

With our comprehensive service and maintenance package, you can be confident that your domestic or commercial property is fully protected.

Triangle Fire Systems

Haywood Way Hastings TN35 4PL

TELEPHONE	01424 812557
EMAIL	info@trianglefiresystems.co.uk
WEB	trianglefiresystems.co.uk
TWITTER	@trianglefiresys
CATEGORY	Residential Installer
ACCREDITATIONS	FIRAS, LPCB ISO 9001:2015, ISO 14001: 20015
CONTACT	Daniel Chantler, Head of Estimating.

Triangle Fire Systems (TFS) specialise in the design, supply, installation, testing and commissioning of fire sprinkler systems, dry & wet riser systems and passive fire protection. Our technical expertise, attention to detail, quality of support, on site supervision and workmanship has seen us establish a sound reputation within the fixed fire fighting systems industry. In addition to our Hastings Head Office we now have a London Office and Midlands Office. In 2019 and 2020, TFS was listed by the London Stock Exchange Group (LSEG) as a company to inspire Britain.

Tubetrade plc

Berry Hill Industrial Estate, Ten Acres, Droitwich WR9 9AQ

TELEPHONE	01905 791000
EMAIL	david@tubetrade.com
WEB	tubetrade.com
CONTACT	David Howells, Managing Director

Stockists EN10255/EN10217 Dual Certified Medium & Heavy tubes in Red, Galvanised & Self Colour, Plain, Screwed & Socketed & Grooved Ends. API 5L Sch 20 Line Pipe, Qclamp Galvanised Malleable Iron fittings, Flanges and Weld Fittings

Tyco Fire & Integrated Solutions (UK) Ltd

Tyco Park, Grimshaw Lane Newton Heath,
Manchester M40 2WL

TELEPHONE	0161 455 4400 07980 716642
EMAIL	paul.berry@jci.com
WEB	www.johnsoncontrols.com
CATEGORY	Commercial & Residential Installer
ACCREDITATIONS	LPCB Level 4
CONTACT	Paul Berry, Sales Director

Tyco manufacture, configure, design and install the full range of fire suppression systems, all in accordance with the recognised British, European and International Standards. Our product range includes sprinklers and valves, special hazard systems and a wide range of related components and fittings. We serve a UK-wide client base through our network of branch offices and use in-house software to assist our teams in designing bespoke systems to meet a client's individual requirements. Fire suppression solutions from Johnson Controls can help you meet your most vital missions: safety and protection of people and property.

U

UK Sprinklers Ltd

Alma House, Grimshaw Lane, Middleton, Manchester M24 1GQ

TELEPHONE	0161 762 0225
EMAIL	sales@uksprinklersltd.co.uk
WEB	uksprinklersltd.co.uk
FACEBOOK	/UKSprinklersLtd
TWITTER	@SprinklersUk
CATEGORY	Commercial & Residential Installer
ACCREDITATIONS	FIRAS – Domestic and Residential Scheme FIRAS – FHC self Certification (Equivalent to LPCB 1048 – level 4)
CONTACT	Steve Griffiths, Director

UK Sprinklers are part of PTSG Fire Solutions Group within PTSG Plc a niche service provider. UK Sprinklers carries out installation of residential, mixed-use, commercial sprinkler systems and dry/wet riser systems across the UK and Ireland. UK Sprinklers are FIRAS FHC and FIRAS R&D Certificated and can carry out self certification of all types of residential and commercial fire sprinkler systems. UK Sprinklers specialise in tall buildings with a residential bias and have installations in buildings up to 78 floors.

V

Victaulic

Units B1 & B2, Unit 14, The io Centre, off Gunnels Wood Road, Stevenage, Hertfordshire SG1 2NB

TELEPHONE	01438 310690
FAX	01438 310699
EMAIL	nick.scull@victaulic.com
WEB	victaulic.com
FACEBOOK	/VictaulicCompany
TWITTER	@Victaulic

CATEGORY	Supplier/Manufacturer
ACCREDITATIONS	LPCB - Other Sprinkler Components, LPCB – Sprinkler Heads
CONTACT	Nick Scull

Since 1919, Victaulic's innovative solutions and design services continue to increase construction productivity and reduce risk, ensuring projects are completed safely, on time and within budget. With more than 3,500 employees and 40 international facilities, Victaulic helps customers in 120 countries succeed in the global construction industry. Learn more about how our solutions engineer confidence into every build at victaulic.com

Viking SupplyNet Ltd

Unit 2, Byram House, Newborn Court,
Chapel Street, Epworth DN9 1HQ

TELEPHONE	01427 871000
FAX	01427 873917
EMAIL	vikinguk@viking-emea.com
WEB	viking-emea.com
LINKEDIN	/viking-emea
YOUTUBE	/channel/UCG-4sF2HxRr9cBhYYEiLuYw
CATEGORY	Supplier Manufacturer
ACCREDITATIONS	LPCB - Other Sprinkler Components, LPCB Sprinkler Heads, Foam, Water Mist, Gas Suppression & Detection, Cibse CPD Course Provider
CONTACT	Stuart Stacey, Sales Manager, UK & Ireland

For more than 100 years, Viking has been a dependable partner in fire protection. We supply high quality fire protection technologies from Minimax Viking's research, development and manufacturing facilities, and complimentary quality products from other manufacturers. Installers, specifiers and users of fire protection systems are able to access a full range of components for water, water mist, foam, detection and gas-based fire suppression systems. Excellent technical support and high levels of product availability complete the market leading service offering. In addition, Viking understands the fire risks of various vertical markets such as hangars, oil & gas, data centers, logistics and more, and offers solution advice.

Vipond Fire Protection (a trading name of Chubb Fire and Security Limited)

10/12 Glenfield Road, Kelvin Industrial Estate,
East Kilbride G75 0RA
Branch Offices throughout the UK & Ireland

TELEPHONE	01355 237525
EMAIL	alastair.wilson@vipondltd.co.uk
WEB	vipondfire.co.uk
CATEGORY	Installer Level 4
ACCREDITATIONS	LPS 1048 certificated sprinkler installer. LPS 1014, LPS 1204, FIRAS Residential & Domestic. LPCB iSO 9001:2000. LPCB Level 4
CONTACT	Alastair Wilson

Total Fire Protection by means of design, supply, install, commission and service of Fire Sprinkler, detection and gas suppression systems, dry and wet risers, Water Mist. High and Low Pressure. Special Hazard systems including water, foam. To BSEN 12845, NFPA, FM and BS9251 standards. We provide a first class, installation, service and provide training for the operation and maintenance of customers' fire protection systems. Our dedication ensures that our customers receive the most advanced, custom-designed fire protection system using the best products available. Among our specialisms is the installation of sprinkler systems in new and existing buildings, both commercial and residential.

W

Warrington Certification Ltd

Holmesfield Road, Warrington WA1 2DS

TELEPHONE	01925 646666
FAX	01925 646667
EMAIL	ian.donlon@warringtonfire.com
WEB	warringtonfire.net
CATEGORY	Active Certification
CONTACT	Ian Donlon

Warwickshire Fire & Rescue Service

Fire Service HQ, Warwick Street, Leamington Spa CV32 5LH

TELEPHONE	01926 466263
EMAIL	firesafety@warwickshire.gov.uk
WEB	warwickshire.gov.uk/fireandrescue
FACEBOOK	/Warwickshire Fire and Rescue Service
TWITTER	@WarksFireRescue
CATEGORY	Associate
CONTACT	Zach Villers (Group Manager) or Daryl Townsend, (Fire Protection Manager)

WFRS's Fire Protection department is responsible for delivering fire safety advice and enforcement within the five districts of Warwickshire. We will strongly encourage the use of sprinklers in all residential properties, especially; high-rise, social housing, houses in multiple occupation. We also encourage the use of sprinklers in; educational, heritage and large commercial premises through legislation, partnership & relationship management and lobbying of each sector.

West College Scotland

Paisley Campus, Renfrew Road, Paisley, Renfrewshire PA3 4DR

TELEPHONE	0800 052 9612
EMAIL	energy@wcs.ac.uk
WEB	westcollegescotland.ac.uk
FACEBOOK	/WestCollegeScotland
TWITTER	@WCS_EnE

West College Scotland has three campuses in Clydebank, Greenock and Paisley, and we are proud to be the only college in Scotland to deliver and certificate fire sprinkler installation courses in association with BAFSA.

West Midlands Fire Service

Fire Service HQ, 99 Vauxhall Road, Birmingham B7 4HW

TELEPHONE	07973 810 882
EMAIL	Craig.berridge@wmfs.net
WEB	wmfs.net
CATEGORY	Associate
CONTACT	Craig Berridge, Fire engineering Team

West Sussex Fire & Rescue Service

Horsham Fire Station, 72 Hurst Road Horsham, West Sussex RH12 2DN

TELEPHONE	03302223333 03302224648
EMAIL	Nicholas.horner@westsussex.gov.uk debi.booker@westsussex.gov.uk
WEB	westsussex.gov.uk/fire
CATEGORY	Associate
CONTACT	Nicholas Horner Debi Booker, Support Officer

West Sussex County Council (WSCC), is the Enforcing Authority for the Regulatory Reform (Fire Safety Order) 2005. WSCC is also the enforcing authority for the Safety of Sports Grounds Act 1975 and the Fire Safety and Safety at Places of Sports Act 1987. The contact details above should be used for queries regarding: Fire Safety Enforcement; General Fire Safety Advice -if there is no conflict with Fire Safety Order 2005 matters; information required under the Fire and Rescue Act 2004 Section 7 (ii) d – which is required to ensure that incident commanders have up to date risk information to enable them to make effective tactical plans to resolve incidents; and Fire Investigation.

Woodward & Co Fire Protection Ltd

The Courtyard, Severn Drive, Tewkesbury, Gloucestershire GL20 8GD

TELEPHONE	01684 850005
EMAIL	Richard.thompson@woodward.uk.com
WEB	woodward.uk.com
ACCREDITATIONS	LPCB, FPA, ISO 9001, ISO 14001, ISO 45001, CHAS Premium Plus
CONTACT	Richard Thompson

Woodward & Co Fire Protection Ltd are a Level 3 LPCB accredited company who can provide the full package of design, supply, installation and commissioning of Fixed Fire Protection systems such as Sprinklers, Water Mist, Wet/Dry Risers, Hydrant Mains, Special Risk and Gas Suppression. We work nationally in all sectors including Commercial, Retail & Leisure, Manufacturing, Health & Education and Residential & Domestic.

Writech Industrial Services Ltd

NNewbrook Business Park, Mullingar Co Westmeath

TELEPHONE	00 353 44 934 9857 0161 820 5762
FAX	00 35344 934 9858
EMAIL	info@writechltd.com tenders@writechltd.com
WEB	writechltd.com
CATEGORY	Associate
ACCREDITATION	LPCB Level 3 / Fireas FHC Self Certification (Equivalent to LPCB Level 4)

Writech Industrial Services Ltd is an international Fire Protection Engineering company that offers a complete and comprehensive service in the Design, Fabrication, Installation, and Maintenance of ALL automatic fire suppression systems. Our Service department covers the whole of the UK (Including Northern Ireland, ROI, Germany, Holland, Sweden & Norway). We are fully conversant with all usual Fire Protection/ Suppression design standards such as BSEN12845, BS9251, NFPA, FM, VDS, FG, SDS. We can also work with other client/insurance-driven specifications to provide the required fire suppression solutions to suit client requirements.

X

Xylem Water Solutions UK ltd

Millwey Rise Industrial Estate, Axminster, Devon EX13 5HU

TELEPHONE	07785 760749
FAX	01297 630200
EMAIL	daniel.hazlehurst@xyleminc.com
WEB	xylemwatersolutions.com
CATEGORY	Associate
CONTACT	Daniel Hazlehurst

Z

Zurich Resilience Solutions

6th Floor, The Colmore Building, 20 Colmore Circus, Queensway, Birmingham B4 6AT

TELEPHONE	0161 683 5214
EMAIL	stuart.1.lloyd@uk.zurich.com
WEB	zurich.co.uk/business/our-expertise/risk-engineering
CONTACT	Stuart Lloyd, Global Practice Leader - Fire Protection

Zurich Resilience Solutions has a Global risk management field team of more than 900 staff with over 150 in the UK using our insight and expertise to provide risk management solutions beyond insurance programs, including climate change, cyber risk, supply chain and fire protection.

Guiding and supporting new and existing customers on selection, design, installation, acceptance testing and maintenance of all types of active fixed fire protection and detection systems, including sprinklers, gaseous, foam, wet chemical and water mist.

Developing and testing new fire system technology and solutions to meet customers' needs, Strong representation in multiple UK, European and Global standards committees, and research activities to provide a more sustainable future for business, premises and people against the risk of fire and other perils.

All of these and more are available to download at bafsa.org.uk

British Automatic Fire Sprinkler Association

bafsa

This is the tenth British Automatic Fire Sprinkler Association Yearbook published by BAFSA and, as in previous years, we intend that it will become an essential reference source and form a valued part of any fire safety professional's library.

Despite evolving technologies, BAFSA continues to provide the Yearbook in hard copy – if you are reading a colleague's copy why not request your own via marketing@bafsa.org.uk or you could get it online from bafsa.org.uk/bafsa-publications/