IN THE FIRST-TIER TRIBUNAL
PROPERTY CHAMBER
(RESIDENTIAL PROPERTY)

Case ref: LON/00BJ/LSC/0286

In the Matter of: The Landlord and Tenant Act 1985; Section 27A

B E T W E E N:

THE MAYOR AND BURGESSES OF THE
LONDON BOROUGH OF WANDSWORTH

Applicant/ Landlord

and

VARIOUS LEASEHOLDERS OF
100 HIGH-RISE RESIDENTIAL BLOCKS
IN THE LONDON BOROUGH OF WANDSWORTH

Respondents/ Leaseholders

APPENDIX [28 – Think Sprinklers: Automatic Water Fire Suppression System Information Toolkit LFB]

TO THE STATEMENT OF CASE
ON BEHALF OF
THE LONDON BROUGH OF WANDSWORTH

LONDON FIRE BRIGADE

Think Sprinkler

Automatic Water Fire Suppression System Information Toolkit.

August 2016

Contents

1 Introduction

Automatic water fire suppression systems save lives, prevent property damage and reduce economic loss. This is why Fire and Rescue Services (FRS) have been calling for them to be used more widely.

This is also reflected within "One voice", the national sprinkler promotion strategy, developed by the Local Government Association (LGA) and the Chief Fire Officers Association (CFOA).

This strategy includes its own "sprinkler toolkit" which every Fire Rescue Service has agreed to support and treat as "one voice" for the fire sector. It represents the FRS vision and direction on the issue of mandatory sprinklers for vulnerable groups of society.

This document is an extension of the national strategy toolkit to reflect work performed within London, particularly regarding vulnerable people.

The toolkit provides information, advice and case studies, useful in raising awareness with local authorities, housing providers and national decision-makers.

2 Why Sprinklers? (Automatic Water Fire Suppression Systems)

Automatic water fire suppression systems are all designed to operate automatically and control / extinguish a fire in the early stages of fire development. Each of the systems have differences in design and operation but in this toolkit they will all be referred to as 'fire suppression systems'. They are all proven to save lives and property, improve firefighters safety, minimise environmental damage and reduce economic loss. In support of these aims the London Fire Brigade (LFB) proactively endorses the installation of fire suppression systems in a variety of premises, especially in domestic, educational and residential premises where vulnerable people live or regularly visit.

There is clear evidence that fire suppression systems can be effective in the rapid attack and control of fires and can therefore play an important role in achieving a range of benefits for both individuals and the community in general. There are a range of organisations and companies that share and support the Fire Brigades position on sprinklers. A few examples of these are:-

FM Global Insurance are a worldwide company and are a massive supporter of sprinklers. They are proud to be known as such and have over 1500 engineers around the globe actively encouraging their clients to install sprinklers.

Marks and Spencer plc support the installation of sprinklers and understand the benefits they give towards protection of people, property and stock.

Zurich Insurance plc is a leading insurance company in the UK and across the world. Its business is providing protection to its customers. Zurich Insurance plc are a strong supporter of fixed fire protection, including sprinklers to provide protection against fire and reduce its impact on the family, school, business or enterprise.

3 Current Work and Our Vision for Future Promotion

The LFB is committed to reducing the impact of fire on people, property and the environment. These is clear evidence that sprinklers and other forms of fire suppression systems can be effective in the rapid suppression of fires and can therefore play an important role in achieving a range of benefits for both individuals and the community in general.

Effective work is continuing, however we must make sure that progress is being made and the promotion of fire suppression systems is encouraged wherever possible. We therefore intend to work more closely in

partnership with developers, the London boroughs and social housing providers to encourage the installation of fire suppression systems in the homes of the most vulnerable people. Vulnerable people in relation to fire are people that have particular behaviours that increase the risk of a fire starting, are potentially less likely to react quickly to a smoke alarm or are unable to move quickly to escape or a combination of factors.

We also seek to influence building control officers, planning teams, architects, designers and development at every stage so that the benefits of fire suppression can be considered before the design and costing decisions are so far advanced that it is too late to include them.

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

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

Our primary focus will be directed to those properties where the greatest benefit can be gained. These are sites and buildings where the most vulnerable inhabit and regularly frequent. For example schools, residential care homes, residential sheltered accommodation, domestic/high rise premises housing the most vulnerable and premises that present a significant risk due to their size, construction and use. There are already more than 5000 retro-fit fire suppression systems installed within dwellings across the UK and approximately 100 residential building have been fitted with a form of fire suppression system within London since 2012. The LFB are working hard to make sure this number increases in the near future by promoting installations within London Boroughs.

4 Sprinkler Myths and Answers

Myth 1
In a fire, every sprinkler head will activate, flooding my property.

i. Individual sprinkler heads will only activate when the room temperature reaches a certain point. The heads operate as individual heat sensors – water is only released in the area where there is a fire. In the past five years, LFB statistics indicate that circa 60% of cases, fires are controlled or extinguished by the spray from one sprinkler head. Firefighters often use 15 times more water from hoses to do the same job as a sprinkler does alone.

ii. A water mist type sprinkler system is designed to use less water than a standard system and therefore is likely to cause even less water damage.

Myth 2
Fire suppression systems are too expensive to install.

i. In new buildings, the costs of installing a fire suppression system, considered over the life span of the building, work out economically – roughly equivalent to carpeting the same building.

Below are examples of the costs in specific types of buildings:

- 125-150 pupil primary school – Total costs. £105,000, equivalent to £10-15 per m2
- Typical 3 to 4 bed house – Total costs £3000-£3500 equivalent to 1-2% of build costs
- High rise flats – Total costs around 1 - 2% of build costs, equivalent to £18-25 per m2
    - Retro-fit sprinkler and low pressure water mist systems - Total cost is around £1500 - £2000 per residential unit.
    - Personal protection systems – Total cost of supply and installation is around £3000 including VAT, however this is not a permanent installation so should a vulnerable person have to move, this type of unit can easily be relocated by a qualified engineer.

Myth 3
They are too expensive to maintain.

i. According to The British Automatic Fire Sprinkler Association (BAFSA) the annual maintenance costs of domestic fire sprinkler systems is £50 for a single family home and between £10 - £20 per flat.

ii. Annual maintenance costs of the personal protection system is around £200.

(That is a lot less than the cost of replacing home contents if a fire should occur.)

Myth 4
They are ugly and affect the design of a building.

i. Sprinklers (automatic water fire suppression systems) actually allow design freedoms, if considered when a building is being designed. They may allow larger rooms and a reduction in partitioning, or allow adaptation of layouts to better meet the occupier's needs. Sprinklers can be recessed or flush-mounted and unobtrusive.

Myth 5
They are unreliable.

i. European statistics and LPC (UK) statistics revealed that accidental discharge of water from all causes is 1 in 500,000 per year of service and accidental discharge of water due to manufacturing defects is 1 in 14,000,000 per year of service.

Myth 6
They only work on fires that can be put out with water.

i. Sprinklers can now be foam enhanced to control flammable liquid, chemical and petroleum fire.

ii. Domestic sprinklers will easily and safely control any kitchen fire, even involving deep oil cooking.

iii. Tests undertaken by BRE on behalf of LFB show that a conventional domestic sprinkler system can extinguish even the substantial fuel loads involved in hoarding behaviour.

5 Examples in London of Suppression System Successes

Residential block of flats fire in Wandsworth
The fire started from unattended cooking in the flat kitchen and was quickly extinguished by the fire suppression system causing less than 5 m2 of direct damage. No fatalities or injuries were reported from this fire and total damage to the flat was minimal. If the system had not been installed, the cost of damage would have been estimated at £5000.

Primary school fire in Lambeth
Fortunately the fire broke out before the school was occupied and originated within the plant room. One head operated and the fire was extinguished causing less than 5m2 of direct damage. Total damage and loss was minimal and the fire had little effect on the continuity of the school. If there had not been a fire suppression system installed in this case it is possible that most of the school would have been damaged by fire where the cost of damage would have been estimated at £500,000.

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

Office block fire in the City of London
This particular fire started within a wastepaper bin located in the goods lift lobby. One sprinkler head operated and extinguished the fire causing less than 5m2 of direct damage. The fire detection system raised the alarm and all occupants of the building were able to escape safely. If there had not been a fire suppression system installed in this case, fire and smoke damage could have spread throughout the lift lobbies on all floors. The cost of damage would have been estimated at £10,000.

Market unit fire within a large building in Hackney
The electrical fire started within a small shop unit that directly accesses a large indoor market hall. Staff attempted to tackle the fire using portable fire extinguishers but the fire was eventually controlled by one head actuating from the fire suppression system. Less than 5m2 of direct damage and no fatalities or injuries were reported. Total damage was limited and restricted to the individual unit. If there had not been a fire suppression system installed in this case, the fire could have easily spread into the main building and the cost of damage would have been estimated at £200,000 +.

Shop fire within a shopping centre in Chelsea
The fire started from an appliance electrical fault within the main customer shop floor. The fire suppression system extinguished the fire promptly causing less than 5m2 of direct fire damage and minimal water damage. No fatalities or injuries reported from this incident as all persons escaped safely. If there had not been a fire suppression system installed in this case, the cost of damage would have been estimated at £100,000 +.

Shop fire within a shopping centre in Ealing
Fire started within the store room of a very large shop unit and was extinguished by the fire suppression system causing less than 5m2 of direct damage. Only one head operated in the vicinity, all persons escaped safely with no injuries reported. Damage and loss was minimal within the store room and it was confirmed that

if the premises had not had the fire suppression system installed the cost of fire/heat and smoke damage would have been estimated at £150,000 +.

Fire within a supermarket in Sutton
This was an arson fire within a customer toilet and was extinguished by the fire suppression system causing less than 5m2 of direct damage. No fatalities or injuries reported from this incident and total damage and loss was minimal. Due to the contents stored and open plan design of the premises it is likely that fire and smoke would have affected most of the building. If there had not been a fire suppression system installed in this case, the cost of damage would have been estimated to be in excess of £1 million.

Hall of Residence fire in Tottenham
This accidental fire started from unattended cooking in the kitchen and was extinguished by the fire suppression system causing less than 5m2 of direct damage. No fatalities or injuries were reported from this fire incident and the total fire damage was limited to mainly the kitchen with minor smoke damage caused to the bedroom. Living area was refurbished and reoccupied by the tenant within 2 months. If there had not been a fire suppression system installed in this case, refurbishment would have taken much longer and the cost of damage would have been estimated at around £6000.

New office block fire in Westminster
The fire started from an electrical fault within the main intake room located within the basement of the 7 storey building. Two wet heads and three dry heads actuated to control the fire until the fire brigades intervention. Less than 5m2 of direct fire damage was caused and water damage was limited. The total damage and loss from this fire is currently calculated at £40k, however due to the type, size, use and location of the premises, if there had not been a fire suppression system installed in the compartment where the fire started, the cost of fire damage has been estimated at over £1million.

***The total cost savings from these ten examples where fires have been controlled / extinguished by a fire suppression system is estimated at being in excess of* £10 million and this does not take into account the disruption that would have been caused and the environmental impact.**

6 Cost to Benefit Analysis for Automatic Water Fire Suppression Systems

The 10 examples above make up only a few of the total amount of fire suppression system actuations across London and the cost savings that are evident far outweigh the cost of the systems installation. The cost of water damage caused by the these systems compared to fire damage is less than 10% and the cost it can achieve on life safety and survival is priceless.

Fire suppression system benefits (information from BAFSA, CFOA and LGA)

- Reduce death and injury from fire
- Reduce the risks to firefighters
- Protect property and heritage
- Reduce the effects of arson
- Reduce the environmental impact of fire
- Reduce the costs and the disruption to communities and business
- A potential reduction with insurance costs and premiums.
- Permit design freedoms and encourage innovative, inclusive and sustainable architecture

Costs in residential properties

- According to information published on the (CFOA) web site in 2013, the average cost of a fire in a domestic property is estimated at £24,900
- According to a publication from the (CFOA), 380 fire related deaths in Britain in (2011/12), 287 occurred in residential dwellings
- DCLG estimate the cost of a fire fatality at £1.65m and £185,000 for a serious injury
- According to a publication from (CFOA), sprinklers on average represent only 1–2% of the build cost of a new home
- Information provided by BAFSA states that where the water flow pressure are adequate, sprinklers can be connected directly to the service main eliminating the need for a water tank and pump and reducing the costs of the system in single family houses by up to £1000.
- According to a publication from (CFOA), residential fires have more non fatal casualties than any other location: in 2010/11 there were 199 non fatal casualties per 1,000 fires, compared with 49 per 1,000 for other building fires
- Experience in Scotland after a £2.6 million fatal fire in a 15 storey tower block revealed that of the 77 residents, only 1 had household insurance.

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

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

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

7 Personal Protection and Water Mist Type Systems

Personal Protection System

The unit is portable, which means that fire protection can be moved with the resident or re-used as required, and is an ideal solution for protection to escape routes, vulnerable people and risk critical areas. Its main function is to protect one room or part of a room and can be installed in a relatively short time. There are of course limitations to how effective the system is and the size of fire loading it can deal with. A risk assessment should be carried out prior to installation to ensure that it is suitable for the individual vulnerable person as this type of unit may *not* be suitable for all situations. e.g.

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

The unit consists of a pressurised tank of water, an intelligent control panel which monitors the environment is linked to a detector enabling fast and effective response. There is even an option to provide automatic connection to an existing monitored fire detection or care system or directly to an Alarm Receiving Centre to raise an alarm upon activation if required. The system attacks the fire in the same way as a water mist system but with the benefit of it being portable and simply plugs into the nearest electrical socket and has an internal battery for continuous operation should the mains electricity fail. It is operated by an electronic smoke or flame detector of a combined fire sensor for fact detection and reaction.

The most significant physical features of units which are currently available are of modular construction and have a duration water discharge of around 10 minutes.

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

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

Loss Prevention Standard (LPS) 1655: issue 1.0 – published June 2015
Personnel protection systems – Guidance on the use, deployment and limitations of Personal Protection
Watermist Systems in the homes of vulnerable people- published November 2015

Water Mist systems

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

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

At operation, the water mist system discharges a cone of spray containing small water droplets that fills the protected zone with water mist and maintain a concentration of small droplets for a sufficient time to meet the objective of the protection.
These systems are designed to use far less water than a standard sprinkler system and therefore are likely to cause less water damage.
These systems are not currently designed to be fitted as a retro fit within a building and therefore have to be considered, designed and installed at construction stage.

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

British Standards

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

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

8 Targeting the Most Vulnerable with Limited Resources

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

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

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

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

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

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

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

The LFB has conducted a competition where funds of £180,963 was made available to assist towards the cost of retro fit sprinkler systems within premises that contain vulnerable residents. There was significant interest from Local Authorities and Housing providers with 5 being successful and awarded funding.