



Nationwide Fire Sprinklers Ltd

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Domestic and Residential Fire Sprinkler Systems A Building Control Officers Guide

An introduction to the principles and costs to install sprinklers and the benefits and trade off's available.

What's the difference?

A *residential* sprinkler installation is for HMO's care homes and similar applications where several or many residents occupy one building with common or shared facilities.

A *domestic* sprinkler installation is for single family occupancy dwellings, single apartments within a building, shared dwellings with 3 or less occupants such as student lets.

A residential system is designed to operate up to 4 sprinkler heads for 30 minutes

A domestic system is designed to operate up to 2 sprinkler heads for 10 minutes

Building Regulation Changes

The 2006 part B allows Building Control Officers to consider alternative methods of overcoming fire precautions in dwellings where a loft conversion takes the property to 3 or more stories. These notes might help you when considering alternative solutions.

One option allowable is to install sprinklers to protect the escape route where compartmentation should be in place but is either undesirable or not possible to achieve.

At a Glance -

Possible trade off's for loft conversions (& other applications)

- No compartmentation above ground floor level using the A-VENT system
- No fire doors if the dwelling is fully sprinkler protected
- No enclosures to stairwells- open plan ground floor to stairwell can be permitted with the A-VENT system
- Open plan areas permitted at ground floor
- No secondary escape in 4, or more, storey dwellings provided the dwelling is fully sprinkler protected
- Double escape travel distances- permitted in ADB with full sprinkler protection

Registered Office: 129 Middleton Boulevard Nottingham NG8 1FW. Company Registration No. 5860048





Cost Advantages Overview

- Omission of fire doors and resetting door frames
- Omission of upgrading upper floors
- Omission of partitioning for protected escapes
- Additional benefit of “aesthetic value” of open plan
- Less construction work in existing habited areas
- On developments where the access is limited for fire tenders the road width can be reduced to a minimum to offset fully the cost of installing our fire sprinklers(ABD PART 5)
- Sprinklers cost less than the above so clients are financially better off
- Revisions to evacuation strategies in care homes reduces staff levels required

Research by nationwide Fire Sprinklers and Derbyshire Fire and rescue

Work completed in January 2012 where a dwelling was used as a test bed for live fire testing to monitor the effects of smoke travel on a stairwell with and without separation of upper floors revealed a new and unique strategy for dealing more effectively with the safety of occupants other than in the room of origin.

More details reports and the film made are all available at;

<http://www.nationwidefiresprinklers.co.uk/sprinkler-demonstration.htm>

NHBC foundation open plan apartments research

The foundation, the research arm of the NHBC, commissioned the Building Research Establishment to produce a study on open plan apartments to provide a more coherent approach for designers and monitoring authorities.

Dr Jeremy Fraser- Mitchell and colleagues from the BRE spent a year carrying out scenario computer modeling for a guide published in September 2009 by the foundation.

The conclusions of the study are that in the three apartment types, and in all tests, the open plan non compliant designs were, when sprinkler protected, 4 times more survivable with sprinklers than if constructed to be part B compliant.

Apartments built non compliant open plan, but with increased smoke detection, were more deadly than compliant constructed apartments.

So there is now a solid body of evidence demonstrating the advantages of open plan arrangements using sprinkler protection and demonstrating that in all applications sprinklers will enhance survivability in the room of origin by a factor of 4.



OVE ARUP Fire Engineers Study

A two year long fire engineering study on care homes in final draft at present, due to be published in Spring 2010, concludes that the benefits of sprinklers give vastly increased tenability and vision by smoke reduction both in the room of origin and adjacent corridors, allowing adjoining residents to have a safe effective means of escape along the passageways outside the room of origin to a point of safety.

Computer aided simulations produced clear evidence that in an unsprinklered fire within a bedroom, not only did the room itself become untenable but smoke logging quickly spread into the corridor and into the other bedrooms within that compartment of the building removing vision from other occupants.

Conversely, the sprinklered scenario both controlled the fire and the smoke logging, giving the occupant in the room of origin a chance of survival, but more importantly all but eliminating the spread of smoke beyond the room of origin for a hugely extended time period.

What Are Sprinklers?

This is a sprinkler cover plate. It sits flush on the ceiling and all the components are hidden inside it. All you see is a flat white plate on the ceiling.

Tamperproof, these covers neatly conceal a virtual fireman in every location. Only a sprinkler in the room on fire will activate. Sprinklers issue less than 5% of the water the fire brigade would need to put out a fire. Failure rate is 1 in 16 million.



Sprinklers are heat activated and only set off in the event of a real fire.



We use special CPVC pipes made by Blazemaster in the USA. Lightweight and semi ridged they are easily handled inside homes.

Joining is a special chemical welding process which requires no added heat.

No mess, no damage, no fuss, no hassle.



A Few Facts

Sprinklers can be fitted to parts of a property, rather than all of the property as a compensatory measure (Regs part B 0.17).

The new regulations state that dwellings with more than 1 floor 4.5 metres above ground level can have a full sprinkler system as an alternative means of escape (Regs part B 2.7b). This avoids the requirement for a second separate staircase.

Escape travel distances can be doubled where a full sprinkler system is installed (ADB table 12 doubles compartmentation and escape distances).

Where a loft conversion means that a staircase leads to an open plan arrangement at ground floor level, “sprinkler protection to the open plan area” (Regs part B 2.20b) may be used.

A full sprinkler system can be used instead of partitioning off a stairway at first or higher level (Regs part B 2.7b).

A full sprinkler system can be used instead of “separating the third floor by fire resisting construction” (Regs part B 2.7b).

Fire resisting construction in storerooms can be reduced by 30 minutes if sprinkler protected (Regs 5.58 part b vol2).

Subdivision can be reduced with sprinkler protection (Regs 8.2 part b vol2)
Table 12 Regs part b vol2 allows doubling of compartmentation and in some cases removes all limits.

Regs part B 2.20b asks for “cooking facilities to be separated from the open plan area”, yet building regulators approve thousands of apartments throughout the UK where the kitchen area is open plan to the dining and living areas and all the bedrooms are off this open plan area, often the kitchen area is a route of escape through the area! Moreover, the kitchen door asked for will invariably be ajar or open anyway thus eliminating any benefit whereas sprinklers in the kitchen will firefight regardless.

We recommend that where cooking facilities are by the nature of the dwelling required to be open to the open plan area then the positioning of the hob and oven at a distance of 2.0m or more from the direct route of travel from the foot of the staircase to exit will reduce any heat radiation effects to an acceptable level permitting safe passage.



Advantages

Regs part B1-VII states “protected horizontal escape routes do not offer indefinite protection” – Nationwide Fire Sprinklers do.

Regs part B1-VIII states “protected stairways are virtually fire sterile” – but this is only if the room off the staircase, which is on fire, has its door closed. A full sprinkler system will fight the fire wherever it is.

Escape routes from galleries can be doubled (Regs part B 2.12b and c).

Here to Help with Your Technical Difficulties

Individual projects often have features, such as an atrium or unusual aspect like stained glass windows, which offer no means of escape. We assist in the process of securing a specification of alternative means of achieving a safe and satisfactory means of life safety and escape.

We are here to assist and give the necessary guidance to empower the BCO’s and AI’s to make an informed judgment.

We can give you solutions to fire protection issues that might otherwise be insurmountable.

We operate throughout the UK and offer a professional service to all of our customers.

Costs

A typical one off partial system, where some of the ground floor is protected with sprinklers, starts at around £1200*

A typical one off full system starts at around £2300*

Costs are then dependent upon location, complexity, number of heads and available water supply.

Multi-installations, such as apartment blocks, give us the opportunity to offer greatly reduced costs as we can install several in one site visit. A typical apartment cost would be £750*



On older properties the incoming water supply is often inadequate to run the sprinkler system. Where the supply is less than 28mm and/or dynamic pressure is lower than 1.8 bar the system will probably have to have a booster pump, and sometimes reservoir tankage.

In loft conversions we tend to use our unique triangular tanks located in the eaves section of the conversion, where the space is unused anyway.

*Approximate

Concealed Fires

Some LABC's have made reference to the effectiveness of fire sprinklers in a concealed fire. The BRE did a series of tests in 2003 (reference report 05 BD 03354/a) and the conclusion of the report was that sprinklers were not cost effective in some dwellings unless tradeoffs could be used. More significantly the report established that sprinklers would not put out a concealed fire until such time as it broke out beyond its constraints.

One test was a basket fire under a coffee table which continued to burn until its fuel was exhausted. Importantly the report stated that "closing the door to the room of fire origin was found to be effective in keeping tenable conditions in connecting spaces".

The recent live fire testing with concealed fires done with Derbyshire Fire and Rescue now supersede this outdated thinking.

Some local authorities have in the past cited these findings as a reason to refuse sprinklers as an alternative solution to compartmentation. However, the goal posts have moved somewhat. The more recent testing by the NHBC, BRE and OVE ARUP overrides and supersedes those findings and the clear and unequivocal evidence of the smoke reducing capabilities of sprinklers outweighs any concerns about a concealed fire producing smoke and toxic particles in an uncontrolled manner.

Consider this then - accept that there will be a concealed fire - accept that the door may be left ajar - the smoke alarm, if fitted, will still activate when it senses smoke but without sprinklers the fire will continue to grow and may break out into the entire room.

Now if sprinklers were installed in this same scenario the heat would activate the sprinklers (after an extended timescale as the heat may take longer to build as with any small fire) which would both contain the fire and, most important of all, will pull down airborne toxic particles, making a significant reduction in the amount of toxic gasses escaping from the room on fire into the connecting spaces.

So given the choice of allowing compartmentation over sprinklers, where it is likely that the door may be left open and the compartmentation is rendered useless, which is the better option in the real world? Accepting that a concealed fire will emit toxic gasses, which is better - a sprinkler pulling down particles or nothing?



The BRE monitored fire testing in Cleckheaton in 1998. At that time the considerations for escape from fires in property concentrated only on persons not in the room of origin. The BRE established for the first time that there was “potential for survival in the room of origin with fire sprinklers” this single observation was the catalyst for a move from care of persons only beyond the room of origin.

So do sprinklers work in concealed fires?

The following report is from August 2007 in a real fire situation

Strathclyde Fire & Rescue Service reports that on 11th August they were called to a fire in a residential care home for the elderly. They found that a dishwasher had caught fire. The sprinkler system operated to control the fire so that firefighters were able to complete extinguishment with a portable extinguisher. Damage was limited to scorching of a small area of one wall of the kitchen

FAQ's

Q – If a fire starts do all the sprinklers set off?

A – No, only the sprinkler or sprinklers near to the heat source will activate, so in a normal sized bedroom if, for example, the computer caught fire (a common occurrence nowadays) the sprinkler in that room would activate but nowhere else.

Q – Does my smoke alarm set the sprinklers off as we are always setting them off when cooking?

A - Our fire sprinklers are activated by heat only and no amount of smoke will set them off. Typically temperatures of over 70 degree centigrade are needed to activate sprinkler heads so unless you apply extreme heat directly up at a sprinkler they will not go off accidentally

Q – How disruptive is the installation of sprinklers in my home going to be?

A – Typically the installation process is just like fitting a central heating system. We need to lift floor boards at first floor level to run pipe work in the floor void to protect the ground floor below. We also need to get into the loft space and any upper floors to carry out this process. Installation can be done in as little as one day; obviously larger projects can take longer

Contact Us

For more information visit our web site: www.nationwidefiresprinklers.co.uk

Alternatively email your project drawings (CAD/PDF) or sketch with your details to sales@nationwide-fire.co.uk

Or call our National Sales Line on 0800 028 9911.



We look forward to hearing from you.

**ALWAYS ASK FOR
THIRD PARTY ACCREDITATION**

LOOK FOR THIS LOGO



ACCEPT NOTHING LESS THAN THIS STANDARD

**Remember this if nothing else:
No one has died in a dwelling fire where fire sprinklers were operational.**