

Unanswered calls for fire sprinkler innovation



1882

Today

At Plumis we are spearheading the creation of [electronically controlled suppression](#) in response to unanswered calls from the fire industry for innovation:

2002

'The research showed that a more sensitive sprinkler was needed to respond faster to both smouldering and fast-developing residential fires for two reasons. First, fires had to be controlled quickly in order to prevent the development of lethal conditions in small residential compartments. Second, fires had to be attacked while still small if they were to be controlled with the water supplies typically available in residences, i.e., 20 to 30 gpm (76 to 114 L/min).'

[Review of Residential Sprinkler Systems: Research and Standards](#) by Madrzykowski and Fleming

2004

'The house fires used in these tests were all of a slow-growing type that produced a lot of smoke but limited heat. Because sprinklers depend on heat to activate these fires posed a severe challenge to the sprinklers...'

'the temperature setting of sprinklers used needs to be reassessed to give quicker operation in slow, smoky fires, and 57°C is probably the best choice of available sprinkler temperature rating for most situations in the UK. The development of sprinkler with a temperature rating of say 50°C would be beneficial.'

[An appraisal of the ODPM - BRE Report](#) by the Fire Sprinkler Association

2005

'Sprinkler protection was not found to be a complete panacea, slow-growing and shield fires can be a problem'

'In order to be cost-effective in a broader range of dwellings, installation and maintenance cost must be minimal, and/or trade-offs may be provided to reduce costs by indirect means.'

[Review of Residential Sprinkler Systems: Research and Standards](#) by BRE

2006

'Where a fire has occurred involving either the nightwear or bed clothes of an occupant of a bed, the fire experiments have indicated that sprinklers alone are unlikely to operate soon enough to prevent the occupant of a bed being fatally injured or suffering very serious injuries from flames and/or heat.'

'The reason that sprinklers are likely to be less effective in care homes for the elderly than elsewhere lies in the nature of the fatal fires. Many are caused by careless smokers, who set light to their clothes or bedding. We have assumed that it would not be likely for sprinklers to save lives in these cases. By the time the first sprinkler activated, the heat release rate of the fire would be approximately 500kW. In addition to the heat, the victim will be in the immediate vicinity of the undiluted toxic fire products.'

[Sprinkler Effectiveness in Care Homes](#) by BRE

2010

'As an extreme example, a "100% effective" sprinkler system would not equate to a 100% reduction in loss, because a fire must be present and reach sufficient size to activate the sprinkler system as designed and thus there will always be a measure of loss in a sprinklered fire.'

[A review of sprinkler system effectiveness studies](#) by K Frank

2017

'We have an aging population with increased vulnerabilities...People will therefore need to be protected in increasingly more sophisticated ways than have been used to date for able-bodied people capable of responding to alarms – and acting appropriately to save their own lives...More needs to be done in terms of reliable early detection and suitable intervention, to either delay the development of the fire or to notify people – using technology – so they can take suitable action at the early stages of the fire.'

[The causes of fire fatalities and serious fire injuries in Scotland](#) by BRE

2018

'These obstacles to water supply for AFSS must be overcome. Water companies in London need to be more consistent in their approach to installation and more innovative in encouraging new technologies to make installing AFSS more feasible.'

[Never again: Sprinklers as the next step towards safer homes](#) by the London Assembly

'Neither room protection system tested (water sprinkler and mist) could provide suppression without producing some hazard to occupants. This is partly due to the slower activation times of the room protection systems, which resulted in a larger fire prior to activation. The sprinkler system was able to delay the tenability limit in one test. In the second test, tenability became an issue after sprinkler activation.'

[Investigation of Residential Cooking Fire Suppression Technologies](#) by NIST

2019

'A study of these fatal dwelling fires, where sprinklers were present, found that the circumstances of the fire fell outside the life-saving operating parameters of the system's design. Typically, the casualty was directly involved in the fire with either their clothing or bedding ignited - often by smoking materials. Typically, they were also unable to move away from the fire or remove clothing due to mobility issues. Often, they were medically more likely to succumb to burns or smoke inhalation due to age or infirmity. More work is needed to design systems that are specifically required and installed to protect those who are both vulnerable and at greater risk than the general population.'

[Incidence of Deaths and Injuries in Sprinklered Buildings](#) by NFSN and NFCC

Our concept is not new



Watch Prof David Purser CBE talking about the rationale for [electronically controlled active fire suppression](#)

How does Automist help address these problems?

[Automist activates electronically](#) overcoming the constraints of existing sprinkler systems by operating earlier and tackling fires before the temperature required to burst the glass bulb of a sprinkler is reached, helping to reduce smoke and maintain survivable conditions.



Watch [Automist vs Sprinklers for a fridge fire](#)

For a number of scenarios, the measured activation times of a concealed sprinkler head are 2.0 to 13.7 times greater than those using an electronic nozzle system. A combination of an effective Response Time Index (RTI) of $20 \text{ m}^{1/2}\text{s}^{1/2}$ and an effective conduction factor (C factor) of $0.25 \text{ m}^{1/2}\text{s}^{-1/2}$ has been shown to reasonably predict activation times for an electronic nozzle system when simulated in a B-RISK zone model. This study is in pre-draft (subject to peer review) and will be published later this year.

As it is a low flow system, using less water than a power shower, it can be connected to the existing water main. This avoids the works required for an upgraded water main, or the space and cost of a sprinkler tank. This makes [Automist a cost-effective solution in homes](#) where otherwise it would be impractical because of the existing plumbing infrastructure.