

Fire suppression and ADB - Bespoke or pre-engineered?



At Plumis we are frequently asked how Automist fits with the sprinkler standard BS9251, and more recently the water-mist standard DD8458. The question is understandable because sprinklers are the only compensatory measure explicitly mentioned in Approved Document B . Volume 1 . Dwellings, and Automist can at first sight appear to be a sprinkler system.

Some Popular Misconceptions

Approved Document B states that if sprinklers are used for compensatory purposes, they “*should be designed and installed in compliance with BS9251:2005*”. This clear guidance is often interpreted too broadly, however. ADB does not state that sprinklers are the only permissible compensatory feature; indeed, a moment’s reflection tells us that many options such as fire curtains are in common use. Nor does it mandate that where alternatives to sprinklers are used, these should also comply with BS9251. Instead it says that “*0.18. There are many alternative or innovative fire suppression systems available. Where these are used it is necessary to ensure that such systems have been designed and tested for use in domestic buildings and are fit for their intended purpose.*” It is this clause that applies to innovative fire suppression systems like Automist.

For us to better understand why ADB is worded this way, and its consequences, it is necessary to understand what a sprinkler system is in essence and why standards compliance is required for sprinklers, but not for other solutions.

Sprinklers – a bespoke solution

A sprinkler is not an off-the-peg, what you see is what you get+product. It is a project-specific selection of components that will perform as intended only when selected and assembled correctly. Its modularity makes it very flexible, allowing it to scale, covering areas from 10m² to 100,000m² and addressing settings from small houses to huge warehouses using exactly the same components. However, the modularity has a consequence: complexity. With elements such as nozzle flow and spacing, pipe diameters, pump pressure and flow, tank size and many other details subject to variation, a strict protocol must be followed for the system to perform correctly. Standards are a way for us to codify the art of custom sprinkler system design and installation so that specifiers, regulators and users of the technology can be confident

that the intended performance will be achieved, however the technology is deployed. The term *designed* is apt: each sprinkler system is tailored; components are carefully selected and matched for each project. Like a LEGO kit, it begins life as a set of building blocks, but the similarity ends there. Even after well over 100 years of sprinkler use, sprinkler design remains a very technical endeavour, with lives depending critically on correct design, component selection and assembly.

This modularity and flexibility of course imposes a %cost of design+on every installation, but economies of scale render this cost less significant as project size increases. It should be no surprise that sprinklers are a cost effective solution for protecting shopping centres, large warehouses and hotels.

We've called sprinklers a bespoke solution . let's continue the tailoring metaphor. With a bespoke suit, an immense variety of styles and sizes can be achieved, but this freedom demands great skill of the designer, who must understand how to use a certain fabric and a certain cut to achieve a result that matches the style of the wearer and the purpose of the suit. The tailor has the training and experience to know what will work and what won't, what's in and what's out, and a great suit also depends on painstaking measurement and manufacture. The end result is an expensive product, but for some situations this cost is justifiable.

Back in 1881 when Grinnell invented the Automatic Sprinkler, clothing was expensive and largely made to measure. Yet the intervening years have seen an explosion of innovation, enabled by low-cost mass production of %off the peg+clothes.

Some similar themes arise when comparing Automist to conventional sprinklers. With a pre-engineered product like Automist, what you see *is* what you get. Instead of the design work being done *in situ* for the specific project, this is done upfront, by the manufacturer, and embedded within the product. There are no tanks, no selection of pumps and pipes, because these characteristics are frozen into the design of the finished product. The result is a ready-made solution which requires technical rigor in a greatly reduced domain and for a smaller and simpler set of tasks around specification and installation. Eliminating most of the design work provides an obvious cost benefit, but with a flipside: although Automist retains some modularity of mist heads, it is much less flexible and scalable than a sprinkler system. An Automist unit designed to protect 1-2 rooms with an area of 32m² would never be cost-effective if scaled up to serve an entire shopping mall or stadium. As with off-the-shelf clothing, customisation is sacrificed for the benefits of simplicity and convenience, and although it will not be the chosen solution for every occasion, Automist performs well for the simple needs of many customers.

A different approach

The buying experience for a bespoke suit is quite different to that for %off the peg+. In the bespoke case, an expert follows a complex measuring process, draws on deep experience and painstakingly produces the garments, creating something unique. An off-the-shelf suit lacks uniqueness . though some %modularity+remains, through mixing and matching of trousers and jackets. The buying experience is focused more on ensuring that we have found a suit that is going to work for the occasion.

A similar comparison applies to specifying sprinklers, versus pre-engineered solutions. A sprinkler is custom designed for an area: regardless of what the area looks like, it can be done. Pre-engineered solutions are really a compatibility exercise: does this readily available solution fulfil the need? For a domestic scenario we would need to ask: is the area that needs to be protected adequately covered by the proposed solution? Will it suppress a fire? Approved Document B actually reflects this idea: it states that if sprinklers are used, the design should follow a standard; if an alternative is used, it must simply be compatible with the application being proposed.

The same applies to fire performance. Since both conventional and water-mist sprinklers operate from the ceiling, the historically established relationship between suppression effectiveness and ceiling temperatures do not apply objectively to systems like Automist which have low spray heights. Since the measurement of temperature to evaluate survivability is in effect a subjective measurement (because the inference of survival depends on the constancy of these spray patterns), ceiling temperature measurements simply are not applicable for other types of system. This is why Automist was tested using the most objective method currently available: Fractional Effective Dosage of heat and asphyxiant gases. In the suit analogy, a subjective judgement can be compared to taste, and "in matters of taste, there can be no disputes".



Products in the pre-engineered suppression category will eventually have fire performance standards of their own. As with smoke control curtains and AOVs (Automatic Opening Vents), such standards emerge following long-term product maturation of the product category, once patents have expired and several competing products have become widespread.

A brighter future through smarter standards

A more flexible set of fire safety standards has recently arrived in the form of BS9991, PD7974, and even the most recent versions of Approved Document B. These standards in their very nature permit a wider range of innovative solutions like Automist, and serve to remind us that the best standards are outcome-focused rather than locked in to a particular design approach or product category.

Without innovation, we have stagnation. If the fire protection industry is to have a bright future in the UK, it will be through this smarter and more flexible approach, enabling a thriving market for innovative fire protection solutions. With this flexibility, appropriate combinations of a wide range of technologies – both simple and sophisticated – can be deployed to solve the problem at hand, providing better cost-effectiveness, wider compliance with the law, and improved fire safety.

For further information call Plumis on +44 (0) 20 7871 3899, visit www.plumis.co.uk or email info@plumis.co.uk.