

# WATER MIST COMPLIANCE WITH RESIDENTIAL BUILDING REGULATIONS

The demand for residential fire suppression systems in the UK is increasing as building regulations continue to evolve, expanding the requirement for fire protection across different building classifications. For many years, fire sprinklers have been the standard method for safeguarding residential properties, as outlined in building regulations such as Approved Document B and BS 9991. However, alternative suppression systems designed specifically for residential applications are now available, offering distinct advantages over traditional sprinkler systems.

Water mist technology, for instance, provides fire suppression with equal or superior performance compared to sprinklers while using significantly less water. This reduction in water usage minimises the risk of water damage and allows for smaller pump and tank requirements, making it particularly well-suited for residential settings. Water mist systems achieve their enhanced performance by operating at higher pressures, producing finer droplets that disperse more dynamically and absorb heat more effectively due to the increased surface area exposed to the heat source.

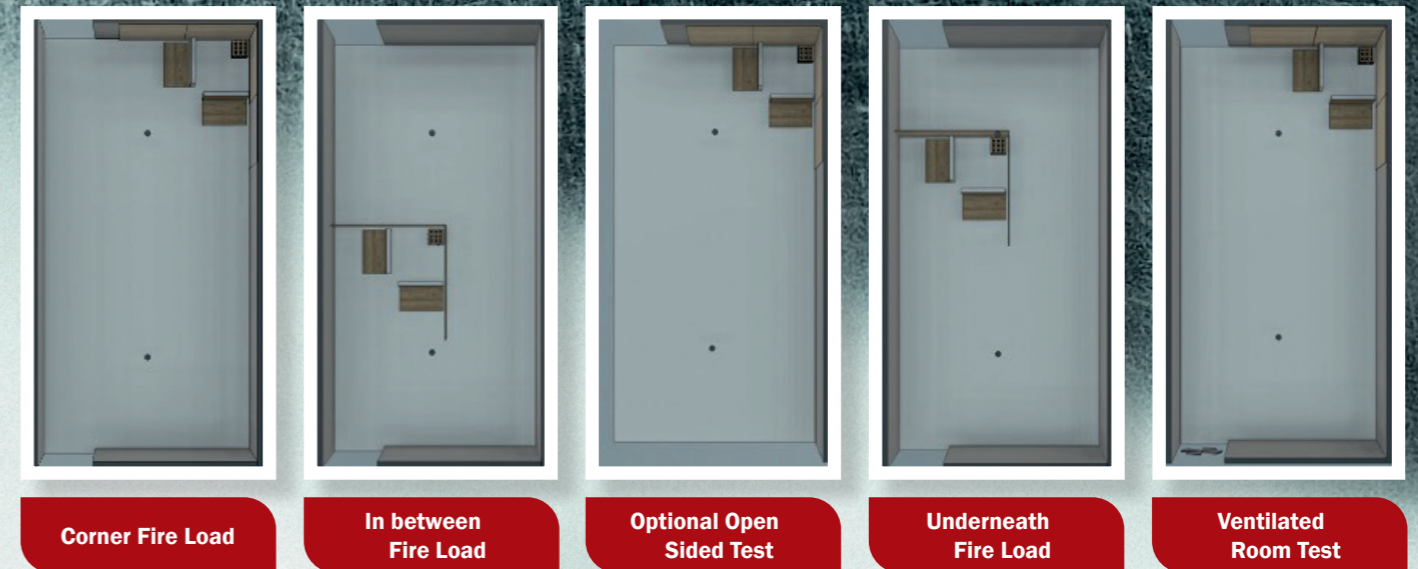
While building regulations often specify certain system types, such as sprinklers, they also acknowledge that alternative solutions may be used to meet regulatory requirements. The guidance advises that those opting for alternative systems should seek approval from the relevant building control authority

at an early stage. Regardless of the system chosen, responsibility falls on key stakeholders - including agents, designers, builders, installers, and building owners - to ensure that the chosen suppression method is fit for purpose.

A reliable way to validate the use of alternative suppression systems is to adhere to national standards applicable to the specific product and application. Compliance with such standards is widely recognised as a means of meeting building regulations and provides additional assurance to all parties involved in the project.

In the UK, BS 8458 : 2015 is the national standard for water mist systems in residential applications, covering design, installation, and fire testing requirements. This standard permits the use of water mist systems for buildings up to 45 metres in height. Additionally, BS 5306-0, which governs the selection of fixed firefighting systems, supports the use of water mist for residential applications. Furthermore, the forthcoming European standard, BS EN 14972 Parts 1 and 17, is largely based on the British BS 8458 standard, further reinforcing water mist's viability as a residential fire suppression solution.

For those seeking further assurance of water mist's effectiveness, a direct comparison can be made between residential water mist fire tests and equivalent sprinkler fire tests. BS EN 12259-14 outlines the fire test requirements for residential sprinklers. Both mist and



Corner Fire Load

In between Fire Load

Optional Open Sided Test

Underneath Fire Load

Ventilated Room Test

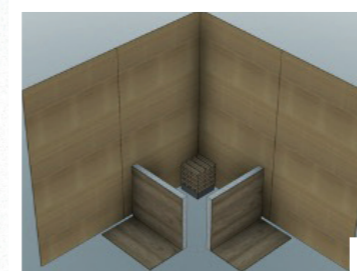
sprinkler systems are tested in similar rectangular rooms, with two nozzles or sprinklers positioned along the centre line and a ceiling height of approximately 2.5 metres. The pass/fail temperature criteria for both systems are also comparable: 316°C (sprinklers) and 320°C (water mist) at 75 mm below the ceiling, and 54°C (sprinklers) and 55°C (water mist) at 1.6 metres above floor level.

However, a key distinction lies in the fire load used for testing. The fire load in the water mist test is twice as high as that in the sprinkler test. The wood crib in the mist test is stacked eight levels high compared to four levels in the sprinkler test. Additionally, the mist test includes twice the number of plywood panels on the walls and positions foam panels closer to the ignition source, significantly increasing the challenge of the fire test.

Further differences include the number of fire

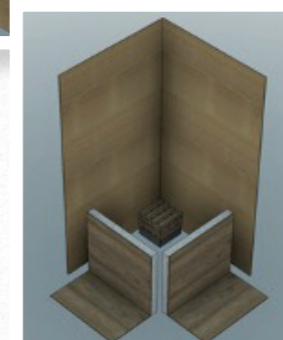
scenarios tested. Sprinklers undergo a single fire test with the fire load positioned in the corner of the room. In contrast, water mist systems must pass multiple tests with the fire load placed in various positions, including the corner, directly beneath the nozzle, and between two nozzles. The worst-performing test is then repeated in a highly ventilated environment. Finally, an optional test removes two sides of the room to evaluate the mist's ability to contain the fire in an open space.

Given the more rigorous fire testing required for water mist systems compared to sprinklers, it is evident that water mist technology is not only a viable alternative but, in many cases, a superior option for residential fire suppression. Provided that a water mist system is tested and installed in accordance with the relevant British or European standards, it can serve as an effective substitute for traditional sprinkler systems, offering enhanced performance while minimising water usage and potential property damage.



Water mist fire test fire load

Equivalent sprinkler fire test load with half the ply on the wall, half the size wood crib and foam spaced twice as far from the wall



For those who would like to know more about the water mist technology, the 24th International Water Mist Conference – organised by IWMA (the International Water Mist Association) – will take place in Manchester on 24 and 25 September. The call for abstracts has been published. Last date to hand in abstracts is 15 April. [www.iwma.net](http://www.iwma.net)



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