

How to find a good watermist system manufacturer

As with anything you acquire you want to make sure you have a good product. And especially when it comes to fire protection – something that in an emergency shall protect nothing less than lives, properties and / or jobs – you want to make extra sure that you buy and integrate a system that does the job it is supposed to do. That is why it is beneficial to have some relevant questions (that are and indeed should be frequently asked) at hand to come to the right decision. Bettina McDowell, general manager at IWMA, the International Water Mist Association, has compiled these questions and Lewis Oxley, Regional Sales Manager – Europe at Danfoss Fire Safety, and David Sherrington, Project Engineer, Danfoss Fire Safety, have answered them.



IWMA members Lewis Oxley and David Sherrington (copyright: Jasmina Rahmanovic and Jan Kulke)

How do I find the right system for a specific application and how do I know that water mist is a good or even the best choice for this application?

The suitability of any type of active fire protection system must be evaluated with respect to the fire hazard, its associated risks, the agreed scope of the system as well as the practical, technical, and budgetary constraints of the application.

These details should be defined within a fire strategy prepared by a suitably qualified fire engineer, and the strategy may also recommend suitable types of suppression system. At Danfoss Fire Safety, we provide full design and guidance to provide the best solution possible, aligned with the fire strategy.

In addition to the performance objectives, the cost of the system may also affect the suitability. With this in mind, it is crucial to consider the Total Cost of Ownership (TCO).

For example, while it is permissible to use carbon steel or plastic pipe for sprinkler systems, most water mist systems utilise high quality, corrosion-resistant stainless steel pipes and fittings, to ensure longer service life. However, for certain hazard types, water mist systems may achieve an equivalent (or higher) level of performance as sprinkler systems, using 60-80% *less* water than sprinklers. Owing to this lower flow rate, water mist systems tend to use much smaller pipes. *Diameters in the range of 10 – 38mm (3/8 – 1.5”) are common.* Also, owing to mist systems' higher operating pressures, it is possible to supply the entire system from one water mist pump unit, even on the largest or tallest buildings without the need for additional booster pumps. Consequently, this increases the ease and speed of system installation, requires fewer fittings, and applies less load onto the building's ceilings, all of which serve to reduce the installation and maintenance costs.

What must a manufacturer / installer deliver?

From the outset, the deliverable is a complete system designed as a complete solution approved and built to valid and applicable standards in accordance with the manufacturer's Design, Installation, Operation and Maintenance (DIOM) manual. The manufacturer and installer must always select and install products which have been tested in real fires, representative of the application.

The hand-over of the system to the customer is just the beginning. Depending on the application, the design life of a water mist system can span many years – for example, Danfoss Fire Safety continues to provide spares and service support for several of their SEM-SAFE® water mist systems which are more than 30 years old. Akin to all other types of active fire safety system, water mist systems must be routinely inspected and maintained. Consequently, the manufacturer must be equipped to deliver technical support and spare parts throughout the life of the system.

How do I choose a “good” water mist system?

I believe the key driver is to work with a supplier who can guide and advise to create an attractive TCO and the best possible fire safety solution in accordance with application's *life safety and property protection* requirements.

The quality of the system as a whole is dependent upon a combination of factors, including the quality of its components, the quality of the design, quality of the installation, and the quality (and ease) of maintenance.

A good starting point is to choose a system from a reputable manufacturer, which will be designed and installed by an authorised partner of the equipment manufacturer.

Where do standards come in? And what standards are there?

Water mist systems were introduced in the 1940s for specific applications such as passenger ferries. Consequently, the International Maritime Organisation's Marine Safety Committee (IMO MSC) developed many of the first international water mist standards, most of which also contain water mist fire test protocols. The IMO standards are extensive, with fire test protocols for applications ranging from low-hazard public spaces, high-hazard storage spaces, engine rooms, machinery spaces, vehicle decks and the protection of external balconies.

In the mid-1990s, interest in water mist systems for land-based applications went up, becoming increasingly popular as a green alternative to halon, particularly when CFC production was phased-out under the Montreal Protocol in 1987. In 1996, the NFPA 750 *Standard on Water Mist Fire Protection Systems* was first published. This provided standardised design, installation, maintenance, and testing requirements for water mist fire suppression systems in the US. It remains one of the most recognised water mist standards and is regularly reviewed and updated, typically every four years.

In Europe, standard EN 14972 was approved in 2020. It also covers the design, installation, inspection and maintenance of water mist systems, and contains fire test protocols for a wide range of residential, commercial, and industrial applications.

In addition to the US and European standards, other national water mist standards exist. For example, BS 8458 and BS 8489 are the British standards for domestic & residential, and commercial & industrial applications.

Is there a standard that covers everything or are there situations when standards should be / can be combined?

NFPA 750 and EN 14972 both cover a wide range of hazards, and where a fire test protocol for a particular hazard does not exist, EN 14972 also provides guidelines for developing representative fire test protocols, which may include reference tests using a sprinkler system to establish the required performance of the mist system.

Subject to approval by the Authority Having Jurisdiction (AHJ), it may be acceptable to combine standards. For example, both NFPA 750 and NFPA 502 are applicable to Danfoss SEM-SAFE® Vehicle Tunnel systems.

What type of approvals are there? Which are the approvals to look out for? What are the approval bodies active in the water mist market?

Broadly, there are product approvals and system approvals.

Product approval is normally performed by 3rd party approval bodies including FM Approvals®, UL Solutions, and VdS. The focus is typically the fire testing and component testing of water mist components. Components' *Type Approval Certificates* can be accessed on several approval bodies' websites or by contacting the manufacturer.

System approval is normally performed by the relevant AHJs, with reference to the applicable standards, for example EN 14972, NFPA750, etc.

What is the significance or 3rd party inspection? Should I insist upon one?

3rd party inspection of a system design or installation can provide an additional, independent, and impartial means of quality assurance. In many cases, 3rd party inspection is mandated by the AHJs. These can include the local fire authority, building control, and the insurer – all of whom may be involved in the inspection and approval of the installation. It is good practice to consult the AHJs at an early stage in the design of the system.

Are there any applications where water mist is not the right choice?

Water mist can be the optimal technology when it comes to protecting people, buildings and assets, particularly with respect to the fact that it is suitable for almost all fire classes, including ordinary combustibles, flammable liquids, flammable gases, electrical fires and cooking oils and fats.

As with all fire protection systems, there are limits to its application. Water-based systems including sprinkler and mist systems must not be used for direct application to combustible metals (Class D fires), such as lithium, sodium, potassium.

It is worth noting that this does not preclude the use of water mist for the containment and cooling of lithium-ion battery fires. In fact, this is an application where water mist's low flow rates and high cooling capacity has potential to provide tangible benefits.

The conclusion that can and must be drawn from these answers is: The end customer should put any provider of water mist (as well as other fire suppression and extinguishing) systems to the test. The core message is: Do not just grab any system from the bargain bin. At the end of the day, many may lose out if decision makers saved at the wrong end. It would simply be false

economy to have everything neat but the fire protection system. Knocking on more than one door to compare prices is okay, knocking on more than one door to compare competency is even better.

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