



Atomised futures

New IMO requirements for the use of water mist technology onboard container ships is just the latest chapter in the long history of water mist, writes Bettina McDowell, secretary of the International Water Mist Association.

Some people think that the water mist technology is still quite new and in some ways that may be true. However, water mist systems are well established and have been in use for well over 20 years in their present stage of technology and there is more to the history of water mist than meets the eye

The idea of using small water droplets to fight fires is by no means new. As early as 1880, the concept already existed. Back then the US company FE Myers had developed a backpack system to fight small forest fires. However, the idea needed to mature.

It wasn't until the late 1970s that two men – one might call them 'water mist pioneers' – re-introduced the initial idea, which was: put away the bucket and take a tumbler full of water to extinguish a fire. The two men were Krister Giselsson and Mats Rosander and in 1978 they wrote a book called *Fundamentals of Fire*. They believed that, "in the future a liquid, eg water, atomised to drops smaller than powder grains, will be the most important extinguishing agent against flames indoors, so-called fine mist"

However, more than a decade passed between the

publication of their book and the first big significant leap for water mist. It took two incidents to put the technology on the world fire fighting stage

The first one was the execution of the Montreal protocol on substances that deplete the ozone layer. The result was that halon, which up until then had been used as a fire extinguishing media, was banned

The second incident was a devastating fire on the ferry Scandinavian Star in the early hours of 7th April 1990. The fire killed 158 people – nearly half of all passengers on board. Due to the fact that there had been a good deal of development relating to high-pressure water mist in Sweden between 1975 and 1990, the first solutions were on the table on 20th June 1990 – two months after the disaster.

The ban of halon left a gap that water mist could fill. The fire on the Scandinavian Star led to an improvement of the International Maritime Organization's (IMO) fire safety requirements and installation guidelines. In addition, fire test procedures for alternative sprinkler systems were developed

But how does water mist work? And where can it be applied? The idea behind water mist is quite simple and it is based on the fire triangle of combustible material, heat and oxygen. If there is a fire, water mist fire fighting systems remove the heat and the oxygen – while traditional sprinkler systems only remove the heat. And it is the size of the droplets that makes the difference.

Water mist systems work at low, medium or high pressure, ie between just under 12.5 and up to 120 bar. They atomise water using nozzles especially designed for the purpose and the higher the system pressure the smaller the droplets. As the size of the droplets decrease the overall surfaces increases. The result is a steam that has the ability to reduce the heat and the oxygen. Consequently energy is subtracted from the fire and the additional cooling effect prevents re-ignition.

When it comes to applications water mist systems can be integrated into new but also existing buildings. The list of possible applications is impressive: tunnels, ferries and ships, oil rigs, data-centres, archives, escalators, atriums, nuclear plants and offices as well as cable tunnels – are only some of the items on that list. We can also add hospitals, saunas, stations, museums and heritage buildings, wooden churches as well as brick cathedrals, cooking areas, commercial fat fryers and so on. Indeed some say that the only applications where water mist systems are still lagging behind are storage areas and warehouses

One of the reasons for this vast range may be the flexibility that this kind of fire suppression system has to offer. Rudiger

Water mist systems can be installed in new and existing buildings.



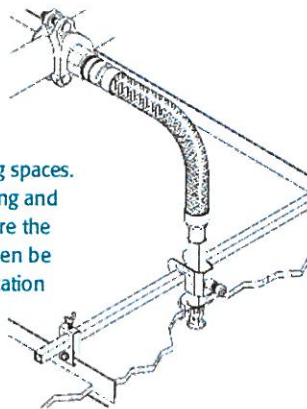


YOUR FLEXIBLE SPRINKLER FRIEND

Tyco Fire Protection Products has introduced the new Fastflex model FB – a flexible braided hose that is part of a unique sprinkler drop assembly for installation on wet-pipe pendent sprinkler systems in tight or false ceiling spaces. The VdS-approved hose allows for testing and charging of the system with water before the ceiling grid is installed. The hose can then be repositioned to fit the final sprinkler location without draining the system of water, saving installation time and costs. The Fastflex model's flexible design provides easier manoeuvrability around ducts and trays in congested spaces, offering additional positions to install the sprinkler. Its versatility also makes the hose ideal for tight and unusual ceiling types and curved plasterboard ceilings. Moreover, the product eliminates the need for measuring, cutting and threading pipes, as well as the use of elbows and fittings, contributing towards further reduced costs and project timeline.

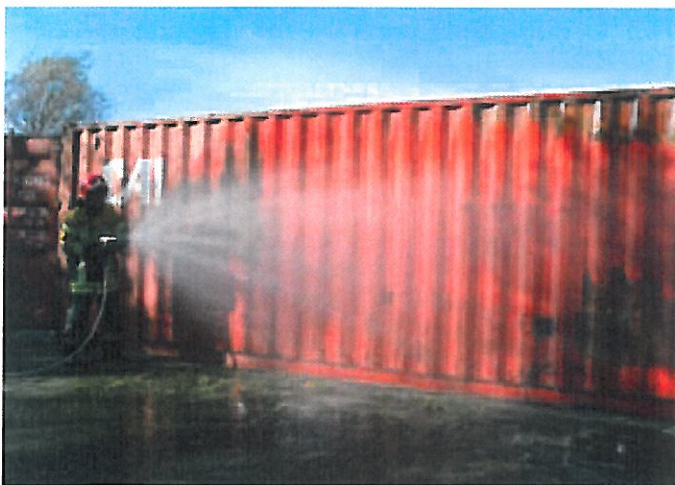
Comprising a stainless steel flexible hose, a swivel inlet nipple, a sprinkler reducer, and lightweight ceiling bracket components, the unit easily connects from the branch line to the sprinkler. Offering flexibility and simplicity benefits, the Tyco Fastflex Model FB is suited to a variety of applications including offices, schools, libraries, hospitals and retail complexes.

Tyco Fire Protection Products's Wouter Bossink commented: "Investing in approvals and focusing on overcoming user challenges enables us to develop effective solutions that offer customers design freedom, reliability and cost-effectiveness in challenging installation environments."



The IMO requires container ships built after 1st of January 2016 to carry water mist lances.

Kopp, general manager for fixed systems at Cologne-based Fogtec, explains: "There are many guidelines when it comes to water mist systems. But it is in fact these guidelines that give us so much freedom. Thus water mist solutions are often applied when it comes to special-purpose solutions and unusual hazards." He continues: "The core of water mist is the engineering approach. We do not set prescriptive standards. We find solutions via a performance-based approach for



completely new and out-of-the-ordinary projects." Looking at a picture of the new Elbphilharmonie concert hall in Hamburg, which is fitted with one of Fogtec's high pressure systems, this becomes quite clear.

One the other hand water mist systems can also be very much down to earth and indeed with low-pressure systems the customer may be just as happy. Alex Palle, CEO of VID Fire-Kill, remarks: "With low pressure it is possible to use more conventional system components that can be sourced locally and which in the end reduce cost and save time."

Marco Pesaola, Technical Manager at Eusebi Impianti, reports that in recent years there has been a growing interest in water mist systems from nuclear power plant operators. He explains: "Interestingly, some are retrofit projects in facilities that are between 20 and 30 years old."

In any case water mist fire fighting systems use less water than traditional sprinkler systems. This may be of importance in areas such as data centres or rooms where valuable artifacts are kept or exhibited. Here damage caused by water can be just as disastrous as damage caused by a fire. Also in regions like the Middle East where water is precious it makes sense to choose a system that uses less water.

Next to the fixed water mist systems there are also mobile water mist systems such as water mist lances or nails, extinguishers and other mobile units. One field of action here is the marine sector. The IMO has introduced new requirements for fire protection on board of ships and it becomes mandatory to carry water mist lances on board new container ships that are constructed on or after 1st January 2016.

The list of characteristics of water mist is impressive and, apart from being versatile and able to cope with small amounts of water, the technology is reliable, environmental friendly and – unlike some gaseous fire fighting systems – does not harm human beings. Ann Micheli, managing director at Ultra Fog, says: "In hospitals and residential buildings, the advantage of water mist is that you do not have to evacuate people before activating the fire system."

In summary there are situations where water mist is the better choice because of the way it interacts with fires (eg deep fat fryers), and in other cases because of its limited requirements for water (eg projects in the Middle East). For all applications, however, its use is based on full-scale fire test which ensures that the water mist produced by any particular system is able to deal with exactly the type of fire that may occur in specific buildings or industrial plants.

As far as standards are concerned water mist has become well established. The first body to work out a standard was the National Fire Protection Association with its NFPA 750 *Standard for water mist fire protection systems* (first published in 1996 and revised in 2015). In addition there is the CEN/TS 14972 – currently a technical specification – which is also available from the European Committee for Standardization as draft norm prEN 14972.

The International Water Mist Association represents manufacturers, insurance companies, independent consultants and institutes dealing with water mist. Founded in 1998 the IWMA today plays a part in promoting but also improving the technology. IWMA liaises with CEN and also supports the European Commission – as the Expert Group on Marine Safety – and the IMO in their work.

"Water mist technology has long been considered to be a black art", concludes Rüdiger Kopp. "But planners, consultants, surveyors, public authorities and also fire brigades are increasingly trusting the technology as they see guidelines becoming more and more transparent."