

Water mist – the firefighting system and the organization behind it

Ragnar Wighus, IWMA president and chief scientist at SP Fire Research Norway, says: “Water mist firefighting systems are well established and have been in use for well over twenty years in their present stage of technology.” Funny enough, there are still a lot of engineers, architects but also fire officers around who do not know enough about this not so new technology.



Bettina McDowell

Many people still ask: how does water mist work? The answer is easy: A fire needs three elements to add up to a fire triangle: the combustible material, heat and oxygen. Water mist removes two of these items: heat and oxygen – traditional sprinkler systems only remove the heat. This means that water mist suffocates the fire. This also means that it interacts with the flames in a way that it can be used to fight fires where normally water would not be the right or best agent.

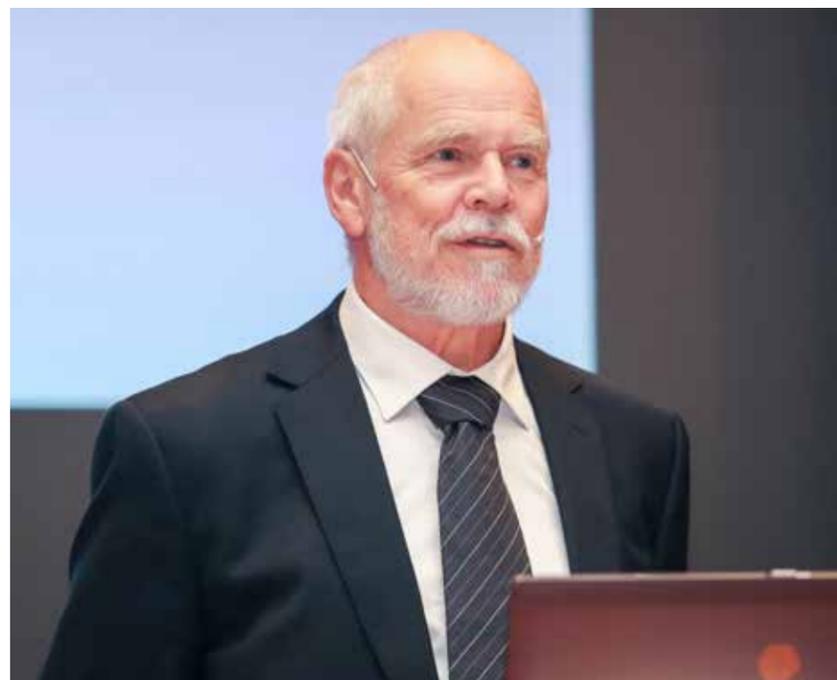
What happens is that the system sprays water at low, medium or high pressure through specially designed nozzles. As the system pressure increases the size of the droplets decreases. This results in droplets with an altogether larger surface and water turning into steam. Thus the system is able to reduce the temperature as well as the oxygen at

the flame front rapidly. This way energy is subtracted from the fire. On top of that the cooling effect prevents re-ignition.

Low pressure water mist systems remain under 12.5 bar (equals 175 psi). The span of medium pressure systems lies between 12.5 and 35 bar (equals 490 psi) and high pressure systems can reach a pressure of up to 120 bar (equals 1,680 psi). Each of these systems has its eligibility, high pressure being suited for different purposes than medium or low pressure and vice versa.

The next question usually is: Where can water mist be applied? The answer to this question is just as easy. However, it takes a little longer to answer it as the

▼ **IWMA president Ragnar Wighus (as he declares the Vienna conference in 2016 open).**



Bettina McDowell is the General Manager at the International Water Mist Association (IWMA).

list of applications is long. In fact some say that the only applications where water mist may not be the best solution, when it comes to fire suppression, are warehouses and storage areas. But what else is there? There are tunnels, offices, car parks, saunas, hospitals, care homes, atriums, churches, museums, archives and libraries, cable tunnels, power stations, machinery spaces, escalators, data centres and high-rise buildings. When it comes to the marine sector, the technology protects passenger ferries, container ships and oil rigs. Over the last years speakers at the International Water Mist Conference have talked about concert halls, main stations, the printing industry, historical buildings and industrial oil cookers. Water mist systems have been installed in the Hungarian Parliament, the Clock Tower at Mecca, the “Elbphilharmonie” in Hamburg and La Scala in Milan as well as St. Patrick’s Cathedral in New York and the Eurotunnel. They protect old wooden churches in Scandinavia and new buildings made from brick, glass and steel all over the world. Even NASA went for water mist. The International Space Station (ISS) is equipped with portable water mist extinguishers.

As less water is needed the technology is a good choice for regions like the Middle East where water is scarce and therefore precious. Less water also ensures that next to fire damages also damages caused by water are reduced. Just think of an old and valuable painting that is lost because of the large amount of water it has been soaked in.

Less water also makes water mist systems cost effective. Apart from that, water mist systems are reliable, environmental friendly, they cause no ozone depletion and do not contribute to global warming. On top of all this, they do not harm human lives. If a fire breaks out they can be activated immediately – unlike some gaseous systems. Ann Micheli, Managing Director at Ultra Fog, speaks about the “fear factor” in this context. She 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.”

Furthermore, water mist systems give architects the freedom to be creative. Rüdiger Kopp, general manager for fixed systems at Cologne-based Fogtec, explains: “Water mist solutions are



Image courtesy of S.L. Raesch

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.” And there are indeed a lot of extravagant and extraordinary buildings around the globe which have been equipped with water mist firefighting systems. There are for example the Credit Valley Hospital in Mississauga, Canada (a project by Marioff, Finland) or the Isala Clinics in Zwolle, Netherlands (a project by Danfoss Semco, Denmark) to name but just two. These are two examples of projects where high pressure water mist systems were installed and this naturally incorporates the development of special components. But, as already mentioned, there are also low pressure water mist

▲ **The clock tower in Mecca.**

systems. Alex Palle, CEO of VID Fire-Kill, explains: “With low pressure it is possible to use more conventional system components which can be sourced locally and which in the end reduces costs and saves time.” VID Fire-Kill’s webpage demonstrates what he says. Under references there is a list which includes amongst others: care homes, schools, hotels, car parks, machinery spaces and aircraft hangars.

Apart from fixed water mist systems there are also mobile systems such as water mist lances or nails and fire extinguishers like in case of the ISS. Here, one field of action is the marine sector. In fact IMO’s (International Maritime Organization) Sub-Committee on Fire Protection introduced new requirements



Image courtesy of VMD Fire-Kill

◀ **Water mist protects the outside of a wooden building.**

IWMA and to put water mist on the map of the firefighting market. The aim was also to show that the technology is not an auxiliary technology but a sufficient method to extinguish fires, being completely independent from traditional sprinkler systems.

At first water mist and consequently IWMA were met with skepticism, resentments and even open opposition. Many things have changed since then mainly due to learning processes and turning points. One of these turning points was a research project sponsored and organized by IWMA on “scaling of fire suppression characteristics in machinery spaces” carried out by SINTEF on behalf of IMO. The presentation of the outcomes at IMO in London in February 2009 was a key event for the association. Another important milestone was the opportunity to support the European Committee for Standardization, thus to contribute to the CEN-guidelines. Nowadays IWMA holds a liaison with CEN and also supports the European Commission (Expert Group on Marine Safety) and continues to support IMO with their work.

All this has happened and is happening over one hundred years after the idea about small droplets fighting fires first emerged. Back then, in 1880, the US-American company F.E. Myers manufactured a back pack system with a lance that produced water droplets and was used to fight small forest fires. About 30 years ago came the ban of halon and in 1990 a devastating fire on board the “Scandinavian Star” killed 158 people – these two incidents levelled the way for water mist. Who remains to be mentioned are two men – Krister Giselsson and Mats Rosander – who in 1978 wrote a lecture book called “Fundamentals of Fire”. They wrote: “In the future a liquid, e.g. water, atomized to drops smaller than powder grains will be the most important extinguishing agent against flames indoors, so-called fine mist.”

The 17th International Water Mist Conference will take place in Rome, Italy, on 25th and 26th October 2017.

➔ **For more information, go to www.iwma.net**

for fire protection on board of ships in January 2013. In fact, it became obligatory to carry water mist lances on board of new container ships that were constructed on or after 1st January 2016.

The forum which unites manufacturers, distributors, insurance companies, independent institutes etc. is the International Water Mist Association (IWMA). The organization was founded on 4th April 1998. The first two years were a phase of initiation during which the few members merely worked together on joint research projects and established a first working group which collected existing

guidelines for standardization worldwide. Dirk Sprakel, chief executive officer at Fogtec and current deputy chairman of IWMA board of directors, says: “The first two years were a time of casual exchange of thoughts and ideas, but as time went on our plans became more palpable.”

At the beginning of the century, things started moving and in April 2001 the first International Water Mist Conference (IWMC) was organized in cooperation with Factory Mutual Research from the USA, the Norwegian fire research laboratory SINTEF, the Swedish testing and research Institute SP and the Finish institute VTT.

Purpose of this conference, which took place in Vienna, Austria, was to introduce

▼ **A water mist nozzle.**



Image courtesy of Mareff

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