



One big step for water mist ...

It may be a European Standard, but it could well have a worldwide impact: EN 14972, the European standard for fixed land-based water mist systems. Based on the Vienna Agreement – which stipulates the exchange of information and increased transparency – standardisation bodies can adopt standards which have been created in other parts of the world which means that the European Standard could be used outside of Europe. Now **BETTINA MCDOWELL**, General Manager of the International Water Mist Association (IWMA), forecasts with the standard in place, a growing interest in and more buildings to be specified with, water mist in the very near future.

THE WORK ON EN 14972 started about two decades ago. On 23rd December 2020, EN 14972-1:2020 was finally published. The document enumerates requirements and lists recommendations for the design, installation, inspection and maintenance of all types of fixed land-based water mist systems. Those involved in fire protection now have a common standard they can refer to, not unlike the standard for traditional sprinkler systems. The big difference between these two kinds of systems is of course that water mist is performance based, not defining a minimum water density required as sprinkler systems do.

Henrik Bygbjerg, global director R&D, service, EHS&Q at Danfoss Fire Safety, supports Bettina's view "Having a recognised European standard for water mist is paramount and will help towards more buildings opting for a technology already proven and tested through extensive full-scale testing over the decades."

Markku Vuorisalo, director engineering at Marioff, adds: "The publication of EN 14972-1:2020 clearly is a landmark achievement for the industry and it is expected to change the way the whole industry is working. Harmonised test protocols are making it easier to compare the systems, third party approvals may not always be needed which would provide the market with flexibility."

EN 14972-1:2020 will benefit the water mist manufacturers who, in parallel with the standardisation work, have been undertaking fire tests within the scope of the document. Erling Mengshoel, chairman of the board of the Norwegian low-pressure water mist company Prevent Systems, has been representing Norway in the CEN expert group since 2013 comments: "Although water mist has steadily gained a substantial market share in recent years, the publication of the standard is a major milestone. In Norway, the most sprinklered country in the world per head,

water mist now represents ten per cent of the overall residential sprinkler market," adding "To secure the most effective, cost efficient, environmentally friendly and sustainable suppression system for a project, specifiers would be remiss if they did not include a reference to the new standard when asking for quotations. We have already experienced increased demand for information and training sessions from fire consulting firms, designers and major sprinkler installers."

Admittedly, the idea to use a relatively small amount of water to fight fires did not take off straight away. But since 1880, when F.E. Myers manufactured a backpack system with a lance that produced droplets to fight small forest fires, the technology has undergone a huge development and has come a long way. Today, there are many famous buildings and spaces that are protected with water mist systems like St. Patrick's Church in the centre of Manhattan, La Scala in Milan, the clock tower in Mecca, St. Marks's Basilica in Venice, the archive at the Bodleian Library at Oxford University and Windsor Castle. Also, the Eurotunnel between the United Kingdom and the continent is protected with water mist and even the International Space Station (ISS) carries portable water mist fire extinguishers.

And then there is also the "Gare de Lyon" in Paris. This railway station – one of the most important and beautiful railway stations in Europe – is now protected with a high-pressure water mist system provided by AQUASYS. The Austrian company had teamed up with its local and long-term partner, Uxello Risques Spéciaux to install the system which has now officially been approved.

Michael Bindreiter, AQUASYS' group sales manager, explains: "The installation of the system in the main hall of the station started back in 2016 and was carried out in several roll-out phases and partial commissioning. In order to prove the effectiveness of



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the high-pressure water mist, the concept is based on general fire tests according to the risk classification as well as an independent CFD simulation by an approved body”.

Due to the building remodelling and the opening of new shops in the station’s listed gallery, additional fire loads emerged that could endanger the historic supporting elements in the event of a fire. As it was not possible to install the water-carrying pipes required for firefighting on the existing walls of the hall, Uxello Risques Spéciaux and AQUASYS developed specially manufactured steel girders with built-in nozzles for firefighting. This would cool the hall structure in case of a fire. Naturally, they were adapted to the architectural setting of the railway station here.

The system is operated via pilot valves. This allows several water mist-generating nozzles to be supplied simultaneously when the activation nozzle equipped with a small glass bulb is triggered by rising fire heat. The simulations proved that the water mist generated by the side wall and the hanging nozzles in the event of a fire protects the hall structure well from heat radiation.

The project partners have paid special attention to the fixing of the nozzle pipes to the beautifully designed and historic wall elements and supports. The partially prefabricated piping system and the individually matched steel supports enable an innovative solution with as little aesthetic impact on the historic building as possible. The central pump unit installed in the station’s technical room is supplied via the public water supply and buffer storage. Compact and maintenance-free high-pressure pumps generate a nominal pressure of 100 bar in the system in an emergency.

A further project, where a water mist system has been installed with reference to EN 14972, is DNV-Gødstrup, a new 145,000 m² super hospital complex in Western Denmark. The building process began in September 2012. Supplier of the fire safety system was Danfoss Fire Safety, a company which – over the years – has also actively contributed to the development of the European standard.

The hospital consists of a 127,000 m² somatic department, a 13,000 m² psychiatric department and a 5,000m² research and education centre. The state-of-the-art hospital will provide more than 400 patient beds. The full focus will be on ensuring the best possible patient care and, at the same time, offering modern research and education facilities.



“The technology chosen to protect specific areas in the Regional Hospital Gødstrup is the SEM-SAFE® high-pressure water mist firefighting system. It comprises a high-pressure modular pump unit, section valves, piping and water mist nozzles. Apart from that we have supplied two SEM-SAFE® high-pressure water mist pump units, each with four pumps, 120 kilowatt working in a master-slave configuration and an integrated flow test system controlling 52 sections”, says Henrik Bygbjerg.

Approximately 10,000 of Danfoss Fire Safety’s SEM-SAFE® high-pressure water mist nozzles were delivered to protect public spaces, suspended ceilings, subfloor applications and further areas. The nozzles used had previously been proof fit for purpose through large-scale fire testing which has mainly been conducted in accordance with the EN 14972 standard, especially parts 2, 3, 5 and 8 as well as Annex A which was used to develop a representative fire test protocol for glass partition protection.

The system chosen for the DNV-Gødstrup project complies with the Danish rules issued by The Danish Institute of Fire and Security Technology (Dansk Brand- og Sikringsteknisk Institut) and is approved by the DBI Guidelines 254-1 and DBI 254-2 which both bear references to EN 14972.

Before EN 14972-1:2020 was published, manufacturers had used the technical specification TS 14972. And since the first systems were installed end customers have learned to appreciate a sustainable and eco-friendly technology in a world that needs protection.

Michael Bindreiter adds further key benefits: “Water mist is highly efficient, even if fires are concealed. It does not harm humans, poisonous gases are washed out and toxic smoke particles are suppressed. It is easy to retrofit in existing buildings and production areas. And in case of our AQUASYS high-pressure system up to 75 per cent less water is needed than for a traditional sprinkler system.”

And there are additional points in favour of the technology: Water mist is a suppressant agent that is applicable on a broad range of fire types. It reduces the heat and the oxygen within the fire triangle and the cooling effect prevents re-ignition. The systems are easy to install and extend and due to the size of the droplets water mist is well distributed, filling many nooks and crevices within seconds of activation. When it comes to smoke control, water mist will efficiently cool the smoke layer preventing the hot gas layer to contribute to further fire spread and it will also clean out some of the smoke particles.

These benefits have obviously existed all along, but now the publication of EN 14972-1:2020 will make them even more visible simply because more people will check out the technology.

Ann Micheli, managing director at Ultra Fog, adds: "EN 14972-1:2020 has been a long time in the making, and its publication is a noteworthy step in the right direction. It is so often the case that legislation and standards lag behind the advance of new technologies, and nowhere more so than in the water mist fire suppression industry. As a manufacturer of water mist fire suppression systems, our priority is to ensure that our customers are installing quality controlled, tested and certified systems. A harmonised European standard with clearly defined test protocols against which our systems can be tested and approved will help raise the profile of water mist solutions in Europe. EN 14972 has the potential to fill that gap."

Henrik Gustafson, operations manager – industrial applications, at Firefly AB, confirm the view of the water mist industry: "The standard sets a clear framework for the water mist industry on how to work with design, installation, inspection and maintenance for fixed land-based water mist systems. It will help the whole industry on a day-to-day basis and I expect we will see more and more water mist on the market in the following years."

Water mist systems are based on performance-based testing for the applications they protect. The standard lists criteria for using water mist in buildings and how the systems should be tested and documented. It consists of 17 parts, parts 2 to 17 being acknowledged test protocols water mist manufacturers have to test their systems against. Annex A in the standard provides a guideline for developing representative fire test protocols for how to undertake large scale fire testing to prove ability to control, suppress or extinguish fires.

Apart from committing the manufacturers to specify how systems should be designed, installed, operated and maintained in the DIOM (design, installation, operation, maintenance) manual, the standard also sets criteria for individual components used in the systems and states which component tests they need to be tested against, such as the corrosion test.

These procedures follow requirements of alternative technologies such as sprinkler and gas systems as are accepted worldwide, insuring the same reliability for water mist systems. Maintenance requirements for water mist systems are comparable to those for conventional sprinkler or gas extinguishing systems.

With the standard in place fire safety engineers, authorities having jurisdiction, architects and insurance companies – to name but a few – can now refer to a standard which the water mist manufacturer must follow ensuring the system specified meets the requirements. This is what many have been waiting for.



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