

EN 14972-1:2020 – A EUROPEAN STANDARD ON WATER MIST FIRE PROTECTION WITH GLOBAL PERCEPTION

- Ms. Bettina McDowell, Mr. Alex Palle, Mr. Henrik Bygbjerg

Introduction

The long-awaited European water mist standard EN (European Norms) 14972-1 was published on 23rd December 2020. Fire consultants, designers and installers of water mist systems now have a common standard they can refer to, not unlike the standard for traditional sprinkler systems. The big difference is that water mist is performance based, not stipulating a minimum water density required as sprinkler systems do. “With a European standard covering land-based applications in place, we expect a growing interest for the technology for building protection. In fact, I expect more buildings to be specified with water mist in the very near future”, says Bettina McDowell, general manager of the International Water Mist Association (IWMA).

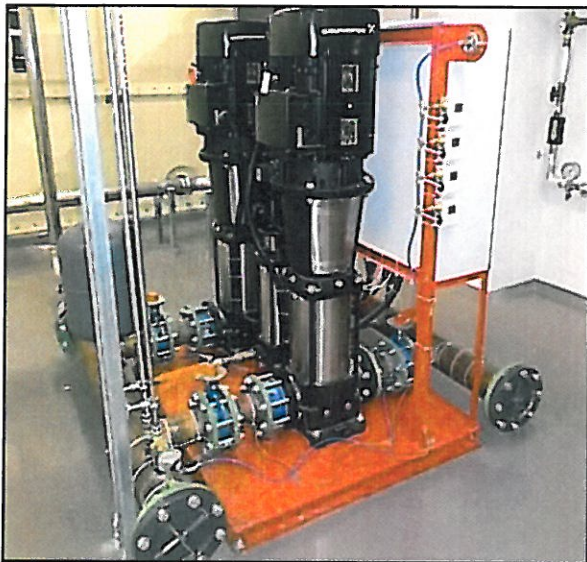
Henrik Bygbjerg, global director R&D, service, EHS&Q at Danfoss Fire Safety, supports this view and adds: “Having a recognized European standard

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.” And Markku Vuorisalo, director engineering at Marioff, assumes: “The publication of EN 14972 clearly is a landmark achievement for the industry and it is expected to change the way the whole industry is working. Harmonized test protocols are making it easier to compare the systems. Third party approvals also may not always be needed which would provide the market with flexibility.”

More than 20 years have passed since a group of people first started gathering to work on a European standard for water mist. This pertains to Topic Groups (TG3 positioned under Working group (WG5) within Technical Committee (TC 191). The translation of this reads like this: TC 191 is a technical body responsible for fixed firefighting systems within the European Committee for Standardization (CEN).

WG5 is the working group for sprinkler systems and the people who wanted to tell the world that less is more congregated within TG3.

In 2008, the first technical specification was published followed by a second one in 2011. In 2016, TG3 was promoted to WG10, the working group for water mist systems. And now the first part of the European Standard EN 14972-1:2020 has been 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. CEN members have until 30th June 2021 to implement the document as a national standard, either by publication of an identical text or by endorsement, and withdraw any conflicting national standards by December 2021.



SEM-SAFE high-pressure pump unit in Godstrup Hospital

EN 14972-1:2020 will give benefit to the water mist manufacturers who, in parallel with the standardization 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. He says: "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."

Erling adds: "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."

Right from the beginning, IWMA representatives have been involved in ensuring neutrality with regard to the interests of different parties. "Within TG3 and later on WG10 all contributors were and of course still are considered equal", says Bettina McDowell. She adds: "WG10, as was before TG3, is an amalgamation of stakeholders with a variety of backgrounds. Here, the low-pressure perspective meets the high-pressure approach and what adds value is the extra input from consultants and fire research laboratories as well as test laboratories."

The unfailing and sustained efforts behind the scenes have helped to catapult the technology into the real world. 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 center 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.

Case study No.1. Another more recent example of a building that is protected with a compliant water mist system is the Queens University in Belfast, Northern Ireland.

During an expansion of the university site, it was decided that the new 10,000 square meter annex should have a fixed firefighting system installed.

The institution houses a cancer research center containing highly valuable electrical equipment, and with a water mist system the risk of water damage is reduced to a minimum. This also helps in accomplishing shorter interruptions in the aftermath of a fire.

Almost as important to the site procurement and design team as an efficient protection system, was the requirement of a fire protection system that would uphold the aesthetic appearance of the newly built annex.

Alex Palle, CEO at VID Fire-Kill explains: "As the semi-concealed design of the FIREKILL low-pressure water mist nozzles allows a perfect blending with the surroundings of the modern architectural building, our water mist system was found to meet the

aesthetical design requirements, the fire protection requirements as well as the requirement for the reduction of water distributed from the nozzles and was therefore chosen for the project.”

With reference to EN 14972, VID Fire-Kill supplied a system compliant with EN 14972 part 1 including the use of automatic nozzles compliant with EN 14972 parts 2, 4 and 5, and an atrium system compliant with EN 14972 part 10.

Case study 2: A further project, where a water mist system has been installed with reference to EN 14972, is DNV-Gødstrup, is a super hospital complex in Western Denmark covering a 145,000 square meters landscape. The building process began in September 2012 and the opening is scheduled for May 2021. 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 houses a somatic department covering 127,000 square meters, one psychiatric department (13,000 square meters) and a research cum education center (5,000 square meters). 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 Kilo Watt 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 - or Sikringsteknisk Institute) and is approved

by the DBI Guidelines 254-1 and DBI 254-2 which both bear references to EN 14972.

Bettina McDowell says: “The list of famous and not so famous buildings and projects that are protected with water mist has continuously been getting longer over the years. One of the reasons is that manufacturers have been using the technical specification TS 14972 as a basis for their work for years. Another reason is that end customers have learnt to appreciate a sustainable and eco-friendly technology in a world that needs protection.”



Control Panel Unit

An additional reason is most probably the list of benefits: Water mist is a suppressant agent that is applicable on a broad range of fire types. It does not harm humans, reduces the heat and the oxygen within the fire triangle and the cooling effect prevents re-ignition. Water mist systems are easy to install, retrofit and extend. The components are relatively small as only a relatively small amount of water is needed. Due to the application of small size droplets, water mist is well distributed, fills many nooks and crevices within seconds of activation. The droplets can be carried around with the air flow and are therefore not depending on hitting the fire directly. They are therefore able to control or extinguish even concealed fires. 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 water mist will also cleanout some of the smoke particles.

Bettina McDowell says: “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, states: “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.”

Alex Palle, who also has been one of the experts at the WG10 table, adds: “With the water mist standard, EN14972 part 1 released in Europe, it is now possible to protect most areas of a complete building with a compliant water mist system.”

Erling Mengshoel closes: “ I agree with Bettina McDowell when she says that the interest will grow with EN 14972-1:2020 in place and that the very near future will see many more buildings being specified with water mist.”

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 on how to undertake large scale fire testing and prove its 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 and 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.



DNV-Godstrup, a new super hospital complex in Western Denmark



Bettina McDowell, General Manger - International Water Mist Association (IWMA)

Bettina has been working for IWMA since 2012 and determines – together with the IWMA board of directors – the overall strategy of the organization. Many of her articles on water mist have been published in journals worldwide. Bettina also gives presentations to educate interested parties about the advantages of the water mist technology.



Alex Palle, CEO at VID Fire-Kill



Henrik Bygbjerg, global director R&D, service, EHS&Q at Danfoss Fire Safety