

# PRACTICAL WATER MIST APPLICATIONS

The International Water Mist Association looks at the growing use of water mist suppression across various industries

It all started with marine and offshore applications. However, for many years water mist systems have been installed in buildings on land. When it comes to the different classes of fires, water mist ticks more boxes than any other kind of fire suppression system. This is due to the smaller droplets that interact with the fire in a different way than the larger droplets from traditional sprinkler systems. Water mist systems deal with heat and oxygen, whereas sprinkler systems only deal with heat. This is reflected in the list of applications that – over the years – has grown to considerable length.

## Healthcare

One typical area is the health sector. Hospitals, health centre, care homes. Derek Killaspy, managing director of Fireworks Fire Protection and IWMA (International Water Mist Association) member, explains: "While fire sprinklers have been the traditionally chosen

solution in the past, we saw the beginnings of the transition to water mist fire protection around a decade ago. Private clinics were amongst the first to benefit from the superior life-saving properties

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offered by water mist." One hospital which is equipped with a water mist system is the VUmc University Medical Centre in Amsterdam, one of the largest high-pressure water mist projects in the Netherlands. Provider of the

system is the German company Fogtec (also an IWMA member). Rüdiger Kopp, Fogtec's managing director fixed systems, says: "We believe that high-pressure water mist offers the best fire protection for the hospital environment. Two points in favour of this technology are the high cooling effect and the minimal water usage. The result is an easy evacuation in case of a fire and limited fire and water damage to the valuable equipment and the building."

Particularly in retrofit situations to existing hospitals, the small pipe diameters and reduced water storage requirements render a flexible and space saving installation of the system possible.

In 2020, the installation process started. The system was selected as an integral part of the buildings' engineering scheme to lift the hospital complex' fire safety concept to the highest level. It was installed while the medical centre was in full operation, which means

that installation works were carried out while patients were taken care of and doctors, nurses and students were on duty.

Special installation concepts had been developed by Fogtec to ensure as little interference as possible to the daily routine in the hospital. The use of flexible high-pressure stainless-steel hoses in conjunction with high-pressure press fittings reduces the site presence to a minimum and guarantees a quiet and clean system integration.

## Data centres

Two further, nowadays typical and common applications are the protection of data centres and archives. Regarding the protection of data centres, IWMA member Marioff can report about two projects in the Dutch cities Groningen and Eindhoven.

The facility at Groningen is a multi-tenant data centre with customers across industries. One significant



client is Overheids Datacenter (ODC) Noord, one of the four government data centres in the Netherlands, underscoring the need for uninterrupted operation.

Business continuity at NorthC Groningen, as for all data centres, is paramount. Fire suppression in the facility is particularly challenging because of the need for the high airflow and high-power density. NorthC Groningen ultimately chose Marioff HI-FOG as the fire suppression solution to protect their critical infrastructure through Marioff's partner FireX with a complete suppression and detection system.

The facility at Eindhoven is the first carbon-negative data centre in the world that also holds a Tier 4 certification, the highest guarantee of reliability possible, which means failure of their digital systems must be avoided at all costs. All systems and installations at the 1,200 square-metre facility must be redundant and separate.

This meant thinking through the fire protection plan from the ground up, while simultaneously meeting the fire suppression challenges of high airflow and power density presented by data centres. Finally, Eindhoven's commitment to cradle-to-cradle sustainability principles meant accounting for water usage.

The fire safety concept for the facility was developed in collaboration with RHDHV and FireX. For Eindhoven, detection was made highly sensitive, with automatic and localized discharge to protect the



data centre's business continuity – a tailor-made fire protection solution for protecting the most critical data.

HI-FOG discharges high-pressure water mist that effectively suppresses, controls and cools fires. It uses less water than traditional sprinkler systems, minimising water damage in the event of fire and reduces the possibility of a false discharge when compared to gas suppression.

### Public buildings

One famous archive which is protected with water mist is the Bodleian Library at Oxford University. Another example: the Hubei Provincial Archives. They maintain the province's collection of nearly one million extremely valuable books, paintings, calligraphies, and other historical documents – many dating back to the Ming Dynasty.

“When the government built the new 60,000 square-metre building to house these very flammable treasures, the responsible engineers selected amongst others Danfoss PAH (Pump Axial-Piston High-Pressure) pumps to power our advanced high-pressure water mist fire suppression system,” says Amin Hadian, application manager at Danfoss High-Pressure Pumps.

The focus lay on providing a compact, reliable, simple to maintain high-pressure water mist system that would protect these historical treasures. Because the collection is largely paper-based, engineers from fire-suppression specialist HeFei KDLian proposed installing a water mist system, which reduces water damage significantly better than traditional sprinklers.

Hadian explains: “For this project, high-pressure pumps by Danfoss were definitely part of the solution.” Based on project requirements and positive past experience with Danfoss products, the HeFei KDLian engineers specified 85 PAH 80 pumps to provide misting pressure. They also selected Danfoss solenoid, check, and pressure relief valves.”

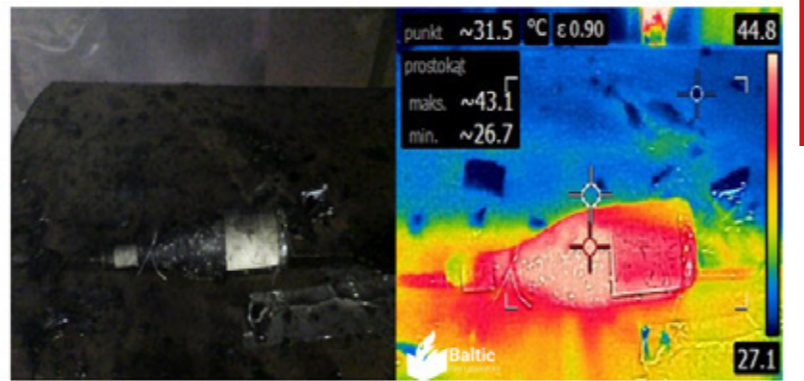


Photo 31. Wine bottle located on target box front, on 4,2m height, photo after test.

### Protecting businesses

Of course, in most cases, what is protected are lives, properties, and jobs. In other cases, it is seemingly small things like labels on wine bottles. “But if that is your business, it is also your livelihood”, says Bettina McDowell, IWMA general manager.



**THE DATA AND CONCLUSION THAT COULD BE DRAWN FROM THIS TEST UNDERLINED THE COOLING EFFECT AND RADIATION SHIELDING WATER MIST PROVIDES. ”**

Valuable bottles of wine lose their value if the label is flawed by – for example – activated sprinkler systems that can impair or even wash labels off wine bottles. IWMA member BFL Baltic Fire Laboratory was contracted by Ultra Fog – also a member of IWMA – to check nozzle capacity against storage racks with a very high fire load.

To validate the damage on goods, the Baltic Fire Laboratory suggested making the test more realistic by placing a bottle of wine in the rack next to the burning one to make sure it did not explode due to heat exposure (which it did not) but also to make sure the water would not

wash the label off the bottle (which also it did not happen).

The aim was to design a protection for a medium-sized storage with a height of 5.25 metres. The Baltic Fire Laboratory (where the test was performed in August 2022) used – as a base – FM 5560 HC-2 with the difference that the storage height was slightly changed to three instead of two racks.

The data and conclusion that could be drawn from this test underlined the cooling effect and radiation shielding water mist provides.

### Other applications

Over the years, speakers at the International Water Mist Conference have introduced their projects: The Spanish Congress Palace in Madrid, the Hungarian Parliament in Budapest, St. Mark's Basilica in Venice and St. Patrick's Church in New York. They talked about safeguarding escape routes in high-rise buildings, about the protection of industrial oil cookers, saunas and wooden churches and sensitive roof structures.

“It will be interesting to see what topics will be submitted for the 22nd International Water Mist Conference”, adds Bettina McDowell. This event will take place in Copenhagen, Denmark, on 11th and 12th October 2023. The conference hotel will be the Copenhagen Marriott. The call for papers will be released on 1st February, the deadline by which abstract should be submitted and the date from which onwards delegates can purchase their tickets is 15th May. ■