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Heal the world *by design*

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Water mist is eco-friendly and sustainable. The organization that is dedicated to the technology is the International Water Mist Association (IWMA). It was founded in 1998 and supports the continuous development and extension of the technology. IWMA general manager Bettina McDowell speaks about why water mist fits into a world that is facing many challenges when it comes to the protection of the environment.

Sustainability and eco-friendliness are en vogue. Everybody talks about the climate change. People who have tried to avoid this topic in the past have to or actually want to face it now as the need to countersteer is manifest. Humankind has an impact on nature and all too often it is a negative one. Some people argue that the living conditions and the climate have always changed and that, of course, is absolutely true. However, earth overshoot day is coming earlier every year. So, would less actually be more?

In the 1980s the world acted to save the ozone layer. The news that chemicals found in many personal hygiene products had caused a hole which was getting bigger and bigger was dramatic and spurred the signing of the Montreal Protocol. One of the substances that was then banned was halon – a chemical used, amongst others, as a fire suppression agent that had done a good job, was effective, efficient, cheap and easy to install, but which had also caused ozone depletion. Regarding fire protection, the phasing-out of halon left a gap which was filled by the water mist technology.



What makes a water mist system a sustainable and eco-friendly system?

The first two points here are – obviously – that a water mist system uses water and indeed less of it. We all know that water is pure and natural. And water is precious. Not only in the Middle East. “There, using less water means less water has to be drawn from drinking water resources”, says Henrik Bygbjerg, Global Director R&D, Service, EHS&Q at Danfoss Fire Safety. Water-based fire extinguishing systems make up by far the largest share of the extinguishing technology sector.

Water mist systems use up to 85 % less water than traditional sprinkler systems and are either connected to the mains or a tank. If they are connected to a tank, this tank obviously does not need a lot of expensive square meterage. The other option – using the mains and thus the existing infrastructure – makes water mist systems so attractive for home and building owners. If they choose water mist, they get a system which not only protects the building itself but also increases the level of life safety, by attacking the fire without the usage of harmful substances, and uses less water which reduces the possible water damage.

Water mist systems and traditional sprinkler systems can only be compared to a certain degree. However, the end customer, looking for a water-based fire protection system, should be made aware of the fact that traditional sprinkler systems are fed from a huge water tank which has an enormous amount of water sitting there for sometimes years on end, not being used.

So, with a smaller tank or a connection to the mains we are talking space savings, obviously also material savings and consequently cost savings. The same applies to other vital components such as pipes, valves and pumps.



Another point in favour of water mist is the fact that it is quick to install and easy to retrofit. Water mist systems are often integrated into existing buildings as customers prefer not to or simply cannot give up the space for a tank. Especially in historic buildings the integration of a fire protection system can be intricate and the possibility to have no tank and to use pipes which are smaller in diameter makes water mist system so eligible. And should the need arise to extend an existing system with additional areas having to be included into the overall fire protection concept, the minimum required nozzle pressure can easily be reached.

When it comes to the longevity of systems Henrik Bygbjerg recommends: "Use stainless steel in all components that will come into contact with water!" The use of stainless-steel components is not mandatory, but it prevents corrosion which is not only beneficial for the conservation of the system but also lowers the risk of contamination. Henrik Bygbjerg adds: "Using stainless steel also helps moving towards circular construction and buildings as it is easier to re-use than for example galvanized or plastic pipes. Michael Bindreiter, Head of Global Sales, Aquasys, states: "The use of high-quality corrosion-resistant stainless steel prevents contamination, supports a high hygiene standard and the longevity of the system."

Talking of "contamination" and "hygiene"

Talking of 'contamination' and 'hygiene' brings us straight to the next point: the challenge to dispose of the residue after fire incidents in hazardous areas like the nuclear industry, pharmaceutical and electronic manufacturing. When a fire breaks out in such areas this can result in the release of many different toxins and chemicals from the fuel of the fire and / or the gases. The firewater gathers these substances. Luciano Nigro, president at Jensen Hughes Con. Europe - Milan, says: "In hazardous areas the extinguishing water has to be picked up and disposed of after a fire which is a difficult job that becomes the easier the less water there is. The water discharged by a water mist system is much less in quantity and therefore easier to contain and much less expensive to dispose of."

Besides this, the overall damage is reduced due to less water being discharged. An important point here is: the less water there is the quicker it evaporates. This again means cost savings because there is less downtime for businesses and looking at it from the environmental perspective we are talking about less waste and thus the possibility to salvage resources as less infrastructure, furniture, equipment has to be replaced.

Another point is the room-filling effect: due to the size of the droplets water mist is well distributed, fills many nooks and crevices within seconds of activation, something that the languorous sprinkler droplets cannot accomplish. Water mist is permanently discharged and thus the area is continuously fed with new fine droplets. Most of them can directly interact with the source of the fire. All this leads to a massive cooling effect that prevents re-ignition and a good shielding of heat radiation and in consequence insulation of the fire.

Based on all these facts, more and more end customers choose water mist systems. One reason is of course that the technology is eco-friendly in itself. The other reason is that more and more buildings are designed with the environment in mind and refraining from selecting an eco-friendly fire protection system would not make sense.



The Green Pea project – Turin - Italy

One of these buildings is the Green Pea, a four-storey multi-purpose-center in Turin, Italy, with a focus on eco-friendly retail and dining. It is being built based on the principles of sustainable architecture with minimal impact on the environment. VID Fire-Kill together with their Italian distributor Bettati Antincendio will partake in the re-development of the building. "Here, environmental-friendly firefighting meets the principles of sustainable architecture as the aim is to impact the environment as little as possible", say Alex Palle, CEO at VID Fire-Kill.

The Green Pea has been devised as a living structure with wood being the ever-recurring theme. The entire building is covered with wood panels, vegetation being part of the composition. With the use of natural materials, the project requires a unique and effective fire protection strategy that will blend into the surroundings. And since the aim was to have a low impact on the environment, the customer was on the look-out for a matching fire protection system. Alex Palle explains: "The end customer knew that our low-pressure water mist system with its low water and power consumption plus the concealed design was the perfect match for the mentioned requirements."

The Alsik Hotel opened in Sønderborg

In early 2019, the Alsik Hotel opened in Sønderborg, a beautiful harbour city in southern Denmark. Right from the concept stage, the high-rise building played a special role in a city that has made a commitment to becoming one of the most environmentally friendly places in Denmark. Known as 'Project Zero', the hotel has fully embraced the goal of the local community: sustainable growth and a carbon free future.

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When planning and erecting the building, the aim was to optimize the supply and use of energy, water and materials and to ensure that running the hotel is as environmentally friendly as possible. To comply with the sustainability vision of the building and the city, all suppliers were carefully selected and only the most energy-efficient ones were considered and Danfoss Fire Safety had been given the task to implement the fire safety system.

Henrik Bygbjerg says: "We are extremely proud to have been chosen as the supplier of the fire protection system and to be part of a construction project that makes a real statement in terms of expertise in clean-tech solutions." He continues: "In line with the sustainability vision, high-pressure water mist technology for fire safety in the Alsik Hotel was the best choice, as water is a 100% environmentally friendly firefighting media."

This 'green' hotel has a surface area of nearly 25,000 square metres and the 2,500 nozzles that have been installed cover OH1, OH3 and OH4 applications such as offices, 190 hotel rooms, two restaurants, nine meeting rooms, a spa, fitness studios, the atrium and storage areas.

One thing is to be in harmony with the environment, the other is to protect it. An important aspect here is the protection of sensitive areas and high-tech equipment under sensitive environmental conditions while at the same time reducing the risk of contamination. This is a constant challenge for operators of laboratories, data centres, hospitals or semiconductor production facilities. In these surroundings the combination of the technological advantages of water mist and the use of high-quality stainless steel,

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especially for pipes but also for all other components that come into contact with water, are the main benefits of the system.

Michael Bindreiter says: "The prevention of corrosion in the piping, the option to use demineralised water together with high-grade stainless steel and in consequence being able to lower the risk of contamination ensures that even the highest cleanliness requirements can be met."

The State Laboratory Berlin Brandenburg

The State Laboratory Berlin Brandenburg opened more than ten years ago and has been the first transnational state research institution in Germany to deal with a wide range of topics in consumer protection, radiation protection, animal disease control and disaster control. In the four-storey building, 249 square metres of laboratories with security level 3 are protected with a modern high-pressure water mist system by Aquasys.

In order to meet the special requirements of laboratory operations, the fire protection concept was implemented in close consultation with planners, authorities and the client. During commissioning and approval of the system at the end of 2018, the functional capability in interaction with the fire alarm technology was successfully tested and handed over to the customer for whom the disposal of contaminated water in case of an emergency was one of the key factors why they preferred a high-pressure water mist system to a traditional sprinkler system.



“No wonder the high-pressure water mist technology has come into the focus of such applications over the last few years”, says Michael Bindreiter.

Carmignano di Brenta

And what about other industrial sectors that have set out to protect the environment just like the water mist manufacturers only in different fields? In 2016, the water mist manufacturer Marioff provided the fire protection system for a machinery space within a renewable-energy power plant in Carmignano di Brenta, a small town in the province of Padua, in the Veneto region in Italy. The co-generation plant, which is operated by Onenergy srl, is run on animal fats (liquid biomass) producing 1000 kilowatts of electricity and 500 kilowatts per hour of thermal energy.

The aim was to install a system which is compliant with the idea of sustainability and provides the kind of fire safety which does not harm humans when in operation.

The water mist system is Marioff’s pre-engineered twin fluid water mist system HI-FOG MAU (machinery-space accumulator unit) which uses water and nitrogen and is FM approved for the protection of machinery in enclosures with volumes $\leq 9175 \text{ ft}^3$ (260 cubic metres). A detection system is used to actuate the HI-FOG system.

Massimo Ferretti, Marioff’s area sales manager, explains: “The customer was very keen to have a water mist system because it does not harm humans, because the impact on the production plant in case of an emergency would be minimal, because it has no impact on the environment and because there are no disposal costs for the extinguishing agent thus the system as a whole protects staff, plant and environment.”

Global climate change has been identified as one of the most important – if not the most important – environmental challenge to be faced by humanity in the 21st century. In 2019, Earth Overshoot day was on 29th July. In 2020 it was on 22nd August. COVID-19 has caused humanity’s ecological footprint to shrink. However, real sustainability can only ever be achieved by design, not disaster.



IWMA in few words



The International Water Mist Association is the first association of its kind dedicated exclusively to water mist firefighting and related technologies. The IWMA was founded on 4th April 1998 and began maintaining a permanent office at the beginning of 2000. From the IWMA's international headquarters in Hamburg, Germany, it supports the continued development, research and applications engineering of generic water mist systems.

Manufacturers, distributors, insurance companies, scientific institutes, approval bodies, fire departments as well as private persons are members of the IWMA.