

# Fire Protection of high-rise Buildings with Water Mist

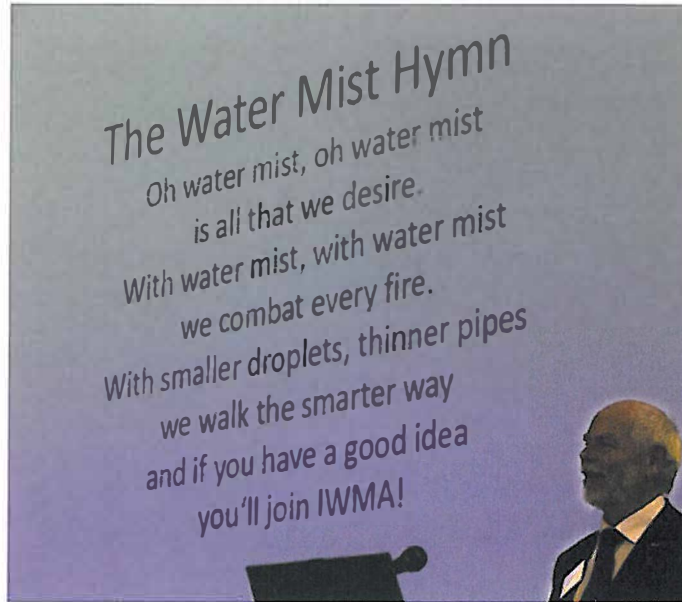
**I**WMA President Ragnar Wighus says: "Water mist fire-fighting systems are well established and have been in use for well over twenty years in their present stage of technology." But how does water mist work?

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 - and thus suffocates the fire.

The systems spray water through specially designed nozzles. As the pressure increases, the size of the droplets decreases. This results in droplets with an altogether larger surface and water turning into steam. The temperature and the oxygen at the flame front are rapidly reduced and energy is subtracted from the fire. Plus: the cooling effect prevents re-ignition.

The list of applications is long: tunnels, offices, car parks, saunas, hospitals, care homes, atriums, churches and cathedrals, museums, archives and libraries, cable tunnels, power stations, machinery spaces, industrial oil cookers, escalators, data centres and high-rise buildings. In the marine sector, the technology protects passenger ferries, container ships and oil rigs. Water mist systems have been installed in the Clock Tower at Mecca, the "Elbphilharmonie" in Hamburg and St. Patrick's Cathedral in New York as well as the Eurotunnel. They protect old wooden churches in Scandinavia and new buildings made from brick, glass and steel all over the world. Particularly in the public eye: High-rise buildings.

Fires in high-rise buildings are problematic. For one: "A high-rise building is typically a multi-purpose building with several hazard categories", explains Ryan Conaghan, Sales Director for Marioff UK. Secondly, the average fire ladder extends to 30 metres only, whereas a high-rise building is, by definition, 45 metres or higher. Plus: "Fire risks may be increasing with the use of



combustible modern construction material and methods", Gary Howe, Senior Fire Protection Engineer with Zurich Risk Engineering says.

Apparently, only three per cent of the UK council buildings are protected by conventional sprinklers or water mist systems. Yusuf Muhammad, Chief Design Officer of Plumis and co-inventor of Automist, explains: "Legislation has focused on new builds where the costs can be diluted." He continues: "Only buildings constructed since 2007 which are taller than 30 metres are required to have sprinklers fitted." The requirement was not applied retroactively. The Grenfell Tower was built in 1974.

In early March, the International Water Mist Association (IWMA) held a seminar in the UK. The topic: "Fire Protection of high-rise Buildings with Water Mist". This will not be the specific topic of the 18th International Water Mist Conference which will take place in London, UK, on 19th and 20th September. However, with the Grenfell Tower Fire still vivid in people's mind the discussion will continue.

There are already a number of high-rise buildings in the UK

and around the globe fitted with water mist systems. Two projects by Marioff in London: Vantage Point in London is a 1960s office to residential retrofit. The protected areas are: apartments, plant rooms, generator set and communal areas. And: Creekside Wharf is a 70 metre high new build, modular construction. Block 1 is 22 storeys high, block 2 is 11 storeys high. The protected areas are: apartments, plant rooms, generator set, communal areas, car park, bin store. Sounds very much like complete building protection.

Plumis have adopted a different approach: partial protection. Automist is a low pressure mid-wall mounted stand-alone system. The idea is to prevent the fire from spreading from the room of origin where sparks from a faulty electrical appliance may cause a catastrophe. Surrey Towers have been retrofitted with the system following the Shirley Towers blaze in April 2010. Automist was selected, because it is easier to retrofit than other active fire suppression systems.

Also Dean Reeve, UK and Ireland Agent for VID Fire-Kill, stresses: "Yes, water mist is acceptable for

high-rise buildings." He adds: "There are published British Standards and the scope of these standards gives guidance and recommendation on the design, installation, water supplies, commissioning and maintenance of water mist standards."

Insurance people like Gary Howe naturally always ask questions like: is it installed as designed? Is it installed correctly? And: Will it work?" But as Dean Reeve puts it: "If a project is going to use any suppression technology, it is not acceptable for it to be designed and installed by a company that does not have the proven training and skills in that exact technology." Indeed Gary Howe admits that if he finds fault, all kinds of fire protection systems are affected. The discussion should therefore remain within the framework of advantages versus disadvantages and challenges versus solutions.

A major advantage of water mist is the amount of water that needs to be stored and pumped up to the higher floors. David Sherrington works for Ultra Fog. His focus lies on the design and development of systems for residential, commercial, and industrial applications within the UK. He points out that water mist systems have a consumption of 80 to 90 per cent less water than conventional sprinkler systems. This means: reduced demands on the water supply, smaller diameter pipework and reduced water damage. The smaller droplets have a larger overall surface which means: rapid cooling, reduced transmission of radiant heat and greater interaction with smoke particles.

Bettina McDowel, IWMA General Manager, says: "With all these points in mind, the future looks bright for the technology, which is well developed and ready to use. And with the European Standard on the horizon the sector will get an extra boost."

For more information go to [www.iwma.net](http://www.iwma.net) or write to [info@iwma.net](mailto:info@iwma.net).