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INTERNATIONAL FIRE PROTECTION

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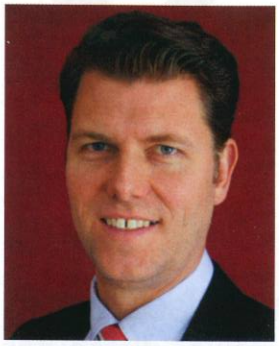
Water Mist System East Recognition

The new Carpet Museum in Mashhad, Iran



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Water mist firefighting systems have been around in the Middle East for the past 15 to 20 years. However, it is only recently that water mist technology has achieved broad recognition in most Middle East countries, leading to it being specified in numerous prominent projects.

Due to the nature of water mist and the variety of different technologies to generate water mist, there are no prescriptive standards as there are for conventional fire fighting systems such as water sprinklers or gaseous extinguishing systems. All published water mist standards have a performance based approach and require independent full scale fire tests as the design basis.

For most applications, no common fire test protocols have existed until a few years ago, which made it difficult for authorities having jurisdiction, mostly being the civil defence departments in Middle East counties, to decide whether water mist is suitable to be applied for protection of a certain fire risk.

This situation has changed in recent years and water mist standards such as CEN TS 14972 and FM 5560 today clearly specify full scale fire test scenarios to be passed for system acceptance and approval for a number of industrial and ordinary hazard risks.

For applications where no detailed fire test scenarios are defined in the existing standards, the CEN TS 14972 standard provides a clear procedure to develop representative fire test scenario for the respective fire risk. This approach is today followed by all renowned fire research bodies and approval bodies certifying water mist technology.

Civil defence departments in the Middle East counties have, as a common practice, defined and published listings of internationally accredited fire test laboratories and certification bodies that they accept and approve for all kind of fire protection systems. The number of listed institutions for water mist is still limited, but constantly increasing due to the growing knowledge and awareness of water mist systems by these departments. This has

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The Sultan Qaboos University Library in Oman

made the Middle East water mist market more transparent and generally prevents doubtable protection concepts, and doubtable water mist systems specifications and installations in the Middle East region.

So, it must be stressed that independent full scale fire tests for each individual application and system equipment are essential for reliable and safe use of water mist technology.

Water Mist Market Development in the Middle East

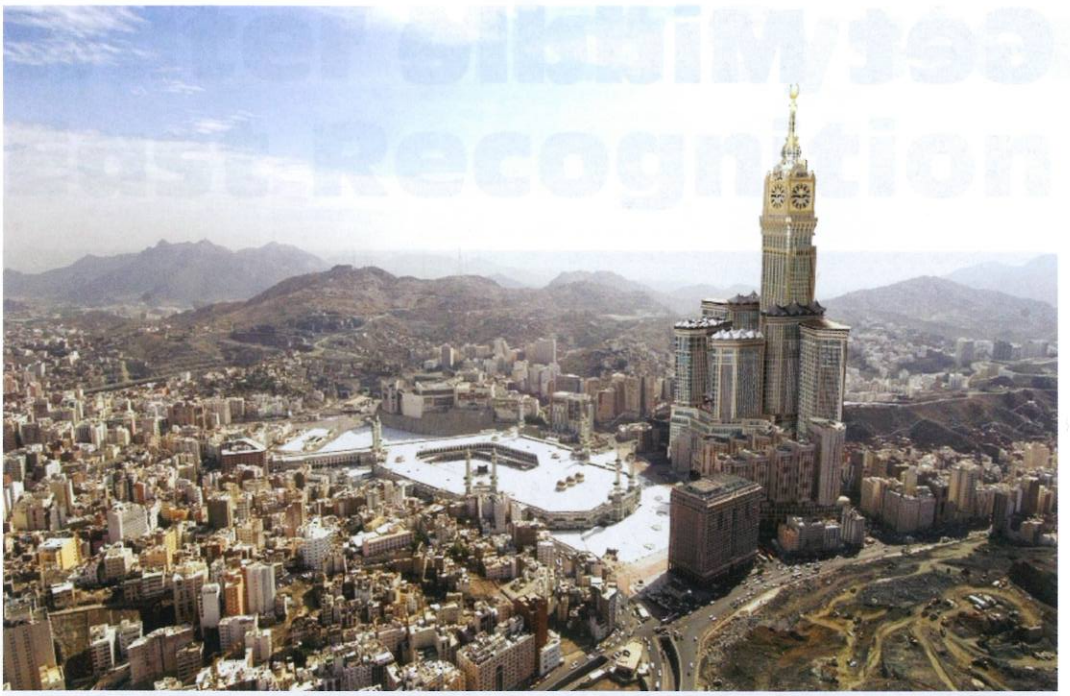
Where initially in the 1990s in the Middle East region water mist technology was seen as a Halon alternative firefighting agent for various industrial and machinery fire risks, today the majority of projects where water mist is specified fall into areas traditionally being protected by conventional sprinkler systems. Due to the broad recognition of the technical benefits of water mist systems for ordinary hazard risks in Europe, these have been introduced in numerous high profile projects throughout the Middle East region.

System advantages of water mist systems include substantially less water consumption, combined with higher cooling effect when compared to conventional sprinkler systems. Upon system activation, less consequential water damages will occur compared to a sprinkler activation, which has a strong impact on clean-up costs, business and operational interruptions, particularly in hotels, libraries and museums. In some cases the high cooling effect of water mist systems allow for a reduction of certain fire protection measures, for example, fire resistant glass facades or exposed steel structures.

The space saving pipe installation due to small pipe sizes of 12mm to a maximum of 60mm for main risers is providing architects with greater flexibility when designing modern buildings. In a number of projects, the stainless steel pipework of water mist systems with exposed pipes at concrete ceilings has become an integral part of the architectural aesthetics of the building. Also a smaller space requirement for water storage and pumping equipment is a strong argument in favour of water mist technology. The space saved can be utilised for commercial activities, which is a common factor when considering life-cycle costs and comparing water mist systems with alternative technology solutions.

Operators of buildings containing valuable items and documents, such as in libraries and museums, have been the first to employ water mist technology in the Middle East region. This includes the Sultan Qaboos University library in Oman and the library in the University of Balamand in Lebanon, as well as the new carpet museum in Mashhad in Iran.

Even if the focus today is on ordinary hazard risks, fire protection challenges found in large industrial projects also make use of water mist technology, including in the power generation and power distribution industries and in infrastructure developments such as metro stations. Typical applications can be found in cable tunnels,



Mecca Royal Clock Tower in Saudi Arabia

transformers, generators and control rooms.

The almost three dimensional spread of water mist, along with its high cooling effect and hydraulic flexibility when designing extended pipe systems in widely spread installations have motivated fire consultants to specify water mist for these applications in prestigious development projects in various Middle East countries. Among these is the protection of large underground cable tunnels that provide power supply to the impressive real estate developments in Dubai, the protection of technical areas along the metro

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line in Mecca in Saudi Arabia, and switchboard areas at Telecom Egypt in Cairo.

Middle East Case Study

Located adjacent to the holy mosque Masjid al Haram with the Kaaba, the Mecca Royal Clock Tower is the second tallest building in the world with 120 floors and an overall height of 601 metres. The building was completed in 2012 and is part of the King Abdul Aziz Endowment Project and houses a luxury hotel, the 46 metre diameter Royal Clock, which is visible for 25 kilometres. From there daily prayers are offered to the Muslim world.

Initially being to have a height of 485 metres, the building was extended during its construction to the final height of 601 metres. Due to this extension, the lower 400 metres of the building are built in reinforced concrete structure and the upper 200 metres in steel. The upper part of the building, containing the royal clock and large displays, is covered by lightweight claddings and is equipped with more than two million LEDs and 21,000 flashlights.

Weight restrictions and the elevated fire risk within the upper 200 metres of the tower represented a challenge to the fire protection concept and necessitated special fire protection measures. Whereas the lower 400 metres of the building housing the luxury hotel is protected by a conventional sprinkler system, the sprinkler system could not be extended to protect the Lunar Observation Centre, the Islamic Museum and the clock itself, all of which occupy the upper 200 metres of the building.

Due to the high cooling ability and low water consumption of high pressure water mist technology, it was chosen by the architect and the fire consultants to be the best possible solution to protect the challenging steel construction part of this outstanding and prestigious building. Beside ordinary hazard fire tests for OH1 and OH3 fire risks, additional special full scale fire tests were independently conducted to verify the efficiency on the water mist system in protecting the exhibition and museum spaces that have up to 12-metre ceiling heights.

All public spaces of the Lunar Observation Centre and Islamic Museum and even the semi-public areas up to and including the top of the tower have been protected with a wet system using 2250 glass-bulb-activated nozzles. The machinery areas and cable areas are equipped with a total of 740 nozzles forming a deluge system. The system has been zoned into individual activation areas by means of 156 section valves. This particularly relates to the machinery spaces behind the clock, the LED screens along the perimeter of the tower below the clock, and to the illuminated half-moon at the top of the building.

For manual fire fighting intervention, 83 high pressure water mist wall cabinets have been positioned around the upper 200 metres of the tower. The water mist fire fighting guns provide effective extinguishing equipment with the lowest possible water consumption.

This is a typical example of the challenges for which water mist technology offers significant advantages over other conventional fire protection systems.

Outlook

At this year's Intersec exhibition in Dubai in January – the largest fire protection venue for the Middle East region – the increasing interest and acceptance of water mist technology was apparent by the positive feedback of water mist system exhibitors as well as feedback from the IWMA (International Water Mist Association) educational seminar, which was held at the convention centre during Intersec.

So, water mist has its firm place in the Middle East fire protection market, particularly for water sensitive areas and buildings that have so far been protected only by fire detection systems. These applications represent the most rapid developing application field for water mist technology thanks to the numerous installation and safety benefits. Beside libraries and museums, applications such as high rise buildings, hospitals, laboratories and executive-style hotels are identified as being particularly appropriate water mist applications. IFP

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For further information, go to www.fogtec.com