

CASE STUDY:

Education Research Facility seeks customised fire suppression system for its heritage of libraries and archives



Customer:
University of Oxford

Region:
United Kingdom

Project Name:
Weston Library

Product Solutions:
AquaMist

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Dr Tim Nichols EMEA Sales
Director Water Mist and
Special Hazards

Profile

The Weston Library (formerly known as the New Bodleian Library), a key research facility at the University of Oxford, recently underwent a £80 million refurbishment to create high-quality storage for the Library’s valuable collections and to expand public access.

The project also involved an upgrade to security measures, including the library’s fire protection system that shelters a collection of around eight million books, including two Shakespearian first folios and 10,000 medieval manuscripts and many other rare books, archives, music and maps.

“Working closely alongside fire protection consultant, Frontline Fire International, we were called upon to identify a fire protection solution for the Weston Library,” comments Dr Tim Nichols, Sales Director for Water Mist at Tyco. “Together with our expertise in protecting specialist buildings, we were able to effectively consult and advise the client on the best fire protection solution to match their spatial and environmental requirements. After conducting extensive design and testing work to verify our recommendations, the client selected Tyco AquaMist technology to safeguard a variety of fire risk, including paper, books, micro-film and CD cases,” Nichols adds.

The AquaMist range comprises three technologies, each one tailored to protect particular settings and environments. These technologies include the AquaMist Ultra Low Flow (ULF), AquaMist FOG and AquaMist SONIC. For this project, the AquaMist High Pressure FOG system was selected to reduce pipe diameters, optimising space while providing a fast and efficient fire protection solution for class A fires. Through minimising water distribution, the system is ideally suited for applications where infrastructure needs specialist attention and excessive water use could damage valuable assets and equipment, such as older buildings, libraries and archives.

Picture credit: John Cairns © Bodleian Libraries, University of Oxford.

Identifying the Solution



Water Mist Nozzle

Benefits at a Glance

- Fine discharge of water droplets to minimise water damage
- Low maintenance and installation costs
- Compact solution for limited space and facilities
- Project management and on-going consultation

The design and construction of the Weston Library presented several challenges when selecting a fire protection method. The objective was to protect the entire building, where the risk of deep-seated fires and complex layouts pose a greater challenge. The arrangement consisted of materials packed tightly together with natural flue spaces to promote fire spread, yet inhibit water delivery. With low ceilings, limited drainage facilities and large areas above and below ground with difficult access and egress, the University of Oxford required low quantities of water to fight, control and suppress the fire. The client, therefore, needed a system that adhered to its specialist requirements, while offering low maintenance and installation costs.

Water Mist technology was selected due to its ability to control class A fires. In comparison to more traditional sprinkler systems, water damage can be alleviated by vaporising and reducing the size in water droplets. Water Mist technology also features smaller pipes, making the system easier to install in environments with limited space and facilities.

Despite a lack of recognised protocol or design for the storage risk and rack configuration inherent to the Weston Library's structure, the team at Tyco Fire Protection Products were able to develop a design from first principle and test the arrangement to determine AquaMist's effectiveness in a specialist building.

The Test Rig

As the selected fire protection provider, Tyco assumed the responsibility of developing a design from first to full scale arrangement. The test rig was constructed to replicate the exact geometry of the risk involved, in this case the archive within the library, while assessing the most challenging configuration and material types to allow for a viable and accurate evaluation. As such, the design comprised fixed and mobile racks, while encompassing sharper angle, lower volume nozzles that were placed in access zones and higher volume nozzles that were integrated above the racks.



Protecting heritage assets, buildings and people for posterity



Third Parted Tested

Constructed at Vinci Technology Centre in Bedfordshire, the test was adjudicated by all relevant authorities, including Third Party Certification House, Exova Warrington Fire. The objectives of the test included quickly controlling the fire within the prescribed area, regulating temperature levels, inhibiting flame spread and minimising collateral damage through effective water drainage.

The test ran for a duration of 30 minutes. At 2:06 minutes, the first nozzle was set into operation with the peak temperature recorded at 2:09 minutes, and control eventually achieved by nine operating nozzles. The test was considered a resounding success by all parties and sufficiently achieved control and suppression of the fire.

Protecting the Weston for Years to Come

The test results were used to develop the design strategy for the Weston Library's fire protection system. Work on site is now nearing completion and commissioning is fully underway. Through close collaboration during the design and testing phases, Oxford University has a good understanding of the system's constraints and a disaster recovery plan is being fine-tuned to best suit the individual specifications and abilities of the Tyco AquaMist High Pressure FOG system.

"At Tyco, we strongly believe in tailoring the solution to meet our customer's individual needs," says Nichols. "A 'one size fits all' approach is an ineffective way of providing and installing an effective fire protection method. It is vital to assess the environment and fire risks inherent to the building before determining the type of system to be integrated. In this case, the Tyco AquaMist High Pressure FOG technology proved most appropriate, meaning we were able to find a customisable solution to match the fire risk.

"Our involvement in the project further demonstrates our capacity to identify and supply compliant, innovative products to the market. We continue to perform extensive testing work for the effective protection of high value, challenging applications to ensure the design performs as specified and supply our customers with products they can trust," Nichols concludes.



University of Oxford, All Souls College

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