

Water Mist Fire Protection for the University Hospital in Amsterdam – A Challenging Project

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Ruediger Kopp completed his studies of Chemical Engineering and Safety Engineering at the University of Dortmund as Diploma-Engineer. Since 24 years he is involved in development, fire testing, approval and marketing of high pressure water mist systems.

Ruediger is Managing Director for fixed water mist systems at the company FOGTEC Fire Protection based in Cologne, Germany.

He is member of various international water mist guideline working groups (e.g. NFPA 750, CEN 14972) as well as co-founder of the International Water Mist Association (IWMA).

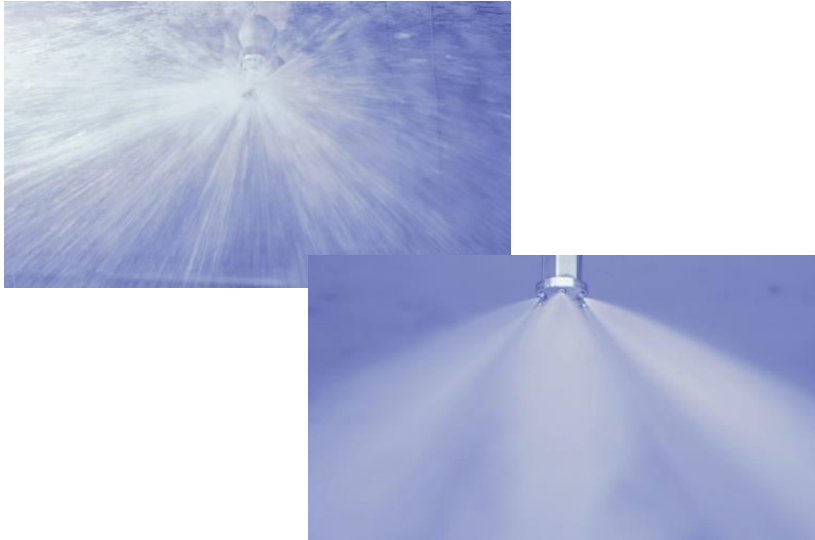
Motivation for Active Fire Protection in Hospitals



- Legislation requests for an automatic fire fighting system
- Missing compartmentation between parts of the buildings requires either structural measures or compensation by an automatic fire fighting system to prevent fire propagation
- Protection of exposed glass facades and steel structures to avoid structural fire protection measures
- Allowance for open building structures to fulfil architectural transparency
- Cost saving by compensation of structural measures, particularly for retrofit applications

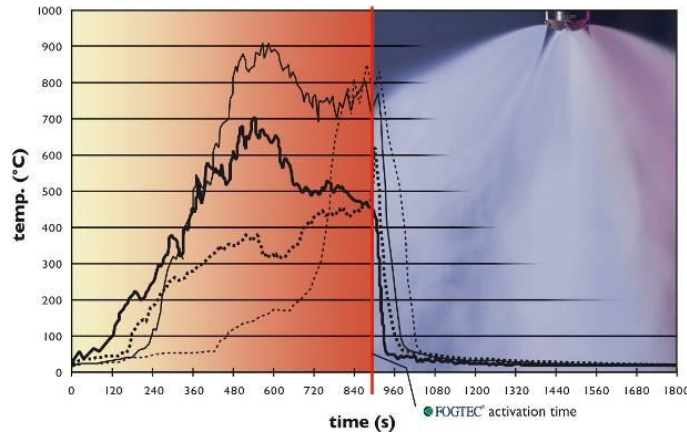


Water Mist as Alternative to Sprinklers



- Hospital operators afraid of large water usage of conventional sprinklers due to water damages to valuable electric equipment and to areas not directly affected by a potential fire
 - High pressure water mist systems require 70 to 80% less water
 - Minimal impact on electric components by water mist
- Substantial infrastructure requirements to accommodate large water storage tanks and water distribution pipes in false ceilings with conventional sprinkler systems
 - Water mist systems utilize small break tanks with < 5000 l volume
 - Pipe sizes range between 12 mm and 60 mm for main raisers

Water Mist Benefits



- High efficiency
 - Highest cooling effect / Optimal fire suppression / Improved evacuation
 - Immediate limitation of fire propagation / Protection of building structures (e.g. exposed glass facades)
- State of the art technology
 - 100% full scale fire tested and approved
 - Long life cycle due to stainless steel components (corrosion resistance)
 - Environmentally friendly and sustainable technology
- System flexibility
 - Modular system integration / Ideal for retrofit installations



Modular System Design



Automatic FOGTEC nozzle

- ▶ Automatic fire fighting
- ▶ Effective cooling
- ▶ Minimal water usage, thus potential damage
- ▶ Large area coverage up to 25m²



■ Public areas

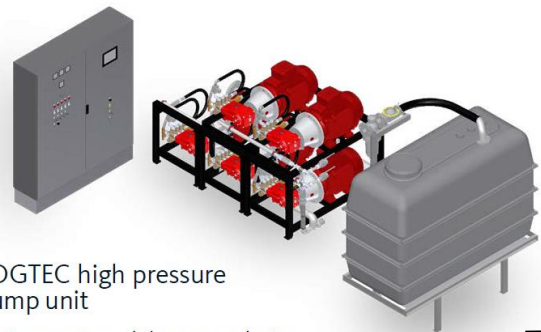
■ Nursing rooms

■ Food courts

■ Archival and storage rooms

■ Car parks

■ Technical rooms



FOGTEC high pressure pump unit

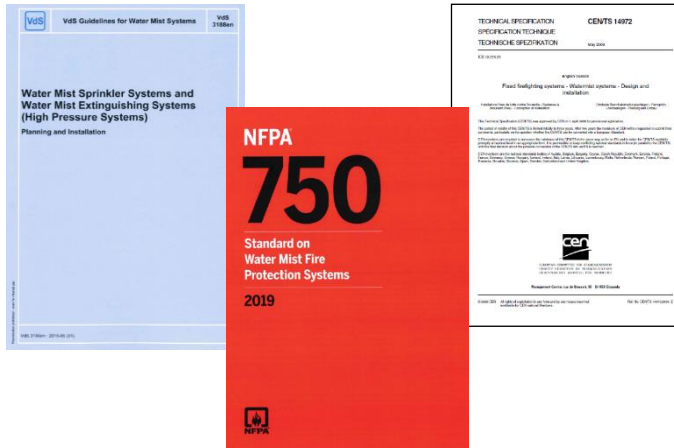
- ▶ Compact modular pump design
- ▶ Minimal water storage
- ▶ Advanced system monitoring



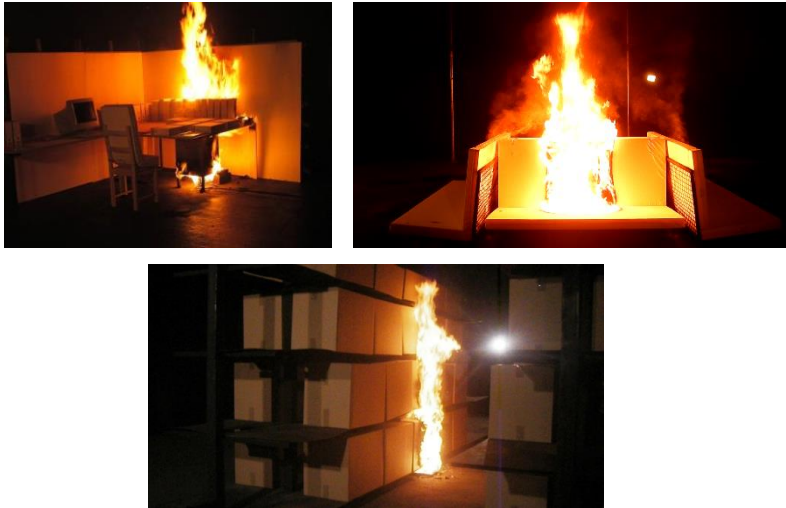
Section valve / Zone valve

- ▶ Alarm signal upon nozzle activation
- ▶ Test port for system operation inspection
- ▶ Shut-off device for section repair or extension

Fire Tests and Approvals



- System tested and certified based on international standards such as NFPA 750, prEN 14972 and VdS 3188
- Approvals include individual full scale fire tests for different applications and respective component tests
- Design, installation, operation and maintenance (DIOM) manuals are produced for each application
- Water mist is the only fire fighting technology being 100% fire tested

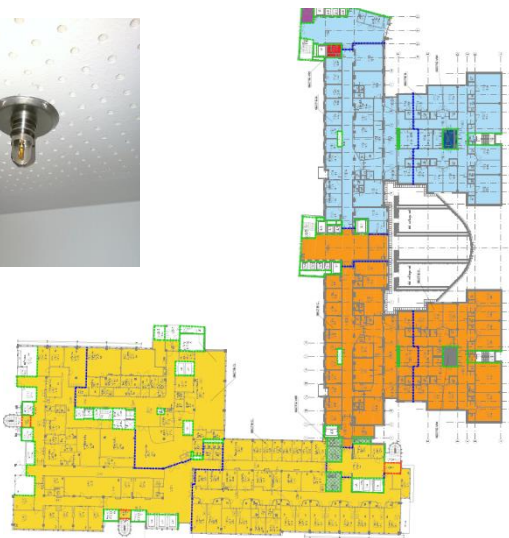
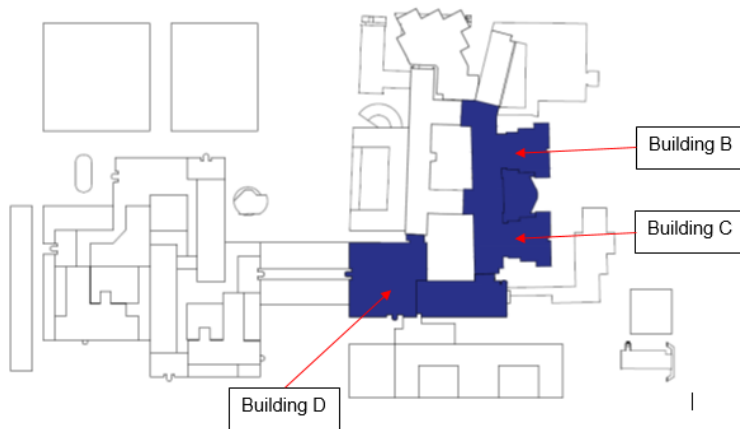


University Hospital in Amsterdam



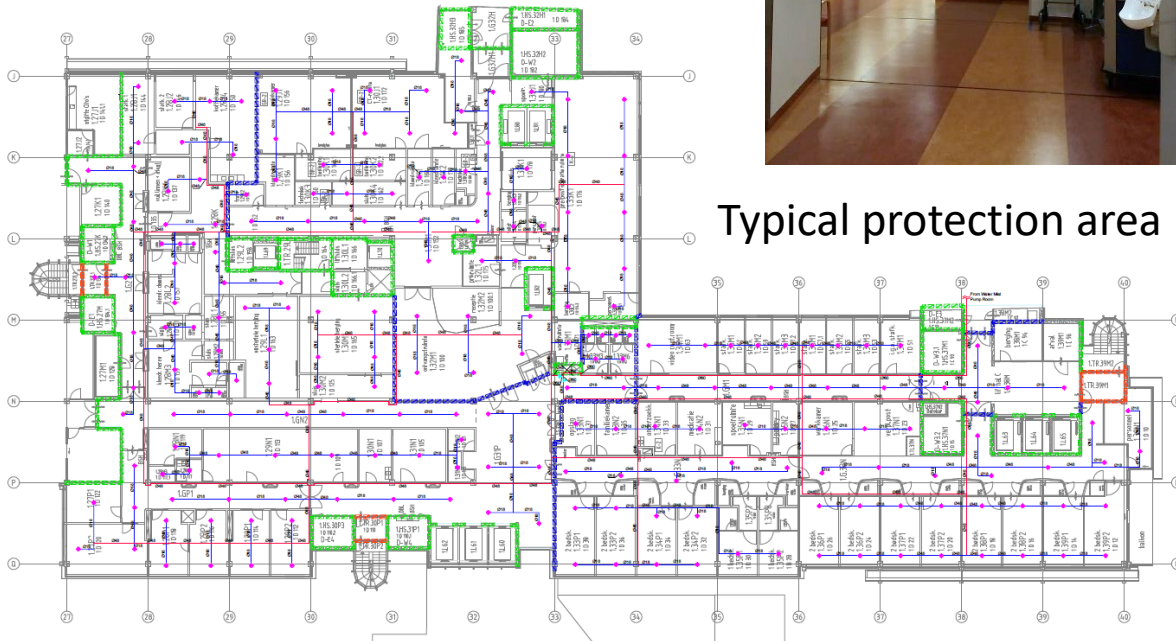
- Retrofit of an automatic fire fighting system to the university hospital as requirement by local authorities
- Hospital shall remain under full operation during system installation
- High pressure water mist selected as most flexible system with lowest interference with the daily operation and most compact system components, e.g. water storage, section valves and pipe sizes
- Retrofit of a high pressure water mist system into three buildings and the underground car parks
- Protection of 34 individual areas on 12 floors above ground and 2 underground floors with a total protection area of around 43.500 m²

University Hospital in Amsterdam



- Water mist system design verified by local authorities based on appropriate system approvals and the related DIOM manuals
- Automatic wet system with glass bulb activated nozzles
- Room protection of all nursing rooms, corridors, offices, public spaces and car parks in buildings B, C and D
- False ceiling protection in all escape areas, e.g. corridors and lift halls
- Maximum operational area for hydraulic dimensioning 140 m² based on specifications by local authorities
- Separate raisers for water supply for each building

Water Mist System Layout



Typical protection area

- Nozzle coverage area of up to 25 m²
- Distribution pipes of maximum 25 mm outer diameter
- Nozzle installation via flexible stainless steel hoses
- Minimal space requirement for pipe installation
- Centralised section valves in the raiser shafts



Challenging Project Execution



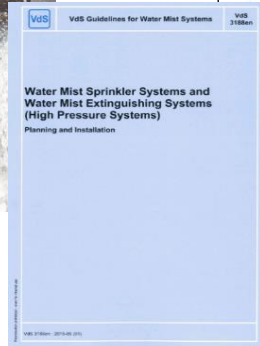
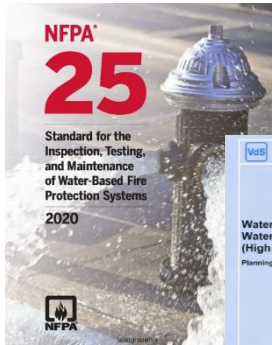
- Pipework and system installation under full operation of the hospital
 - High degree of pipe pre-fabrication
 - Local pipe routing adjustments by pipe bending
 - Press fittings for highest reliability and quiet installation
 - Continuous co-ordination with the client
 - Reduction of on site presence to a minimum level
 - No use of scaffolding or other construction equipment

Water Supply



- High pressure pump unit located in a centralized pump room in the basement of the hospital
- Pump unit with 5 x 120 l/min flow rate at 120 bar
- Fresh water supply from the hospital water main for minimum 60 minutes system operation time
- 3000 l water break tank in the pump room for biological separation of the water mist system from the water supply to the hospital
- Water supply ring main in the basement connecting the 3 risers
- Water supply ring main and water mist installation shafts also protected by water mist

System Maintenance



- Maintenance requirements for water mist systems are specified in standards such as NFPA 25, prEN 14972 or VdS 3188
- Maintenance is vital for operational availability of water mist systems as for any fire fighting system
- Maintenance requirements and intervals for water mist systems are comparable to those of conventional sprinkler systems
- Centralised test valves at each shaft in the basement of the hospital buildings allow for system test runs without interference of the operation of the hospital



Summary



- High pressure water mist offers a certified fire protection solution to hospitals and other health care applications
- Smallest water amounts ensure minimal harms to valuable equipment and the building infrastructure
- Enhanced cooling eases evacuation by providing safe escape routes and can compensate structural fire protection measures
- Compact system components eases its integration in retrofit projects as well as to new built hospitals
- One fire fighting technology covers all different risk areas in a hospital
- In case of fire, operational interruptions are reduced to a minimum resulting into a positive life cycle balance for water mist technology

Thank You for Your Attention



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