Protection of Cultural Heritage Applications with Low Pressure Water Mist Systems

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IWMA Conference 2012

I am here to talk about TAPAS...

Agenda

1) What solution shall one provide when working with a project?

2) Cultural heritage applications.

3) System to be provided.

4) Approval/testing of system.

5) Project examples.

1) What Solution Shall One Provide when Working with a Project?

One have to define:

- The application – the challenge.
- System type specification – to fit the application best.
- Approval/documentation which can be accepted.

2) Cultural Heritage Applications.

What is Cultural heritage applications?

- Tangible buildings which shall be preserved for the future.

What type areas are often found in such?

- Large open volumes, concealed spaces, rooms.

Fuel types?

- Class A fuels.

Environment?

- Open well ventilated areas, Cold areas, enclosed areas.

Other things to encounter?

- Artifacts, wall/ceiling paintings, water damage.

3) System to be Provided.

Decision matrix

	Sprinkler	Internal Gas Systems	Watermist standard products	Watermist special products
Large Volume size	GOOD	BAD	BAD	GOOD
High height	GOOD	BAD	BAD	GOOD
Fuel protection	GOOD	GOOD	GOOD	GOOD
Fire spread risk to other rooms	GOOD	BAD	GOOD	GOOD
Limitations due to artifacts/water damage	BAD	GOOD	GOOD	GOOD
Water limitation	BAD	GOOD	GOOD	GOOD
System space requirements/Visability	BAD	BAD	GOOD	GOOD
Project time limitations	GOOD	GOOD	GOOD	BAD
Approval needed	GOOD	GOOD	GOOD	BAD

The ”best” solution

3) System to be Provided.

Standard watermist system:

- Existing system.
- Common knowledge on usage and performance.
- Approved.

Is best when:

- Limitations in approval fits application.
- Limitations to technical performance fits application.
- Project time is scarce.

Special watermist system:

- Not available yet – to be developed.
- To be tested/approved.

Is best when:

- Something special is needed because of application.
- When there is time to do R&D, testing etc.

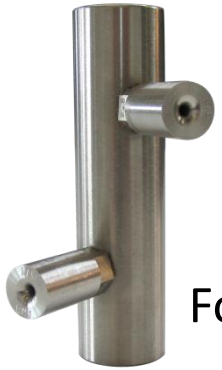
3) System to be provided.

Standard watermist system:

Special watermist system:

For horizontal long throw

For horizontal long throw
Without wetting walls



For long concealed spaces

4) Approval/Testing of System.

<u>Standard watermist system</u>

Example of available approvals for cultural heritage:

- FM5560: US light Hazard (EU OH1)
- UL2167: Residential areas, LH, OH1.
- VDS: Hotels, Offices.
- LPS1283: Hotel, offices.
- CEN/TS14972 annex A: Offices

Advantages:

- Has been tested and approved to work in fires.
- Easy accepted.

Disadvantages:

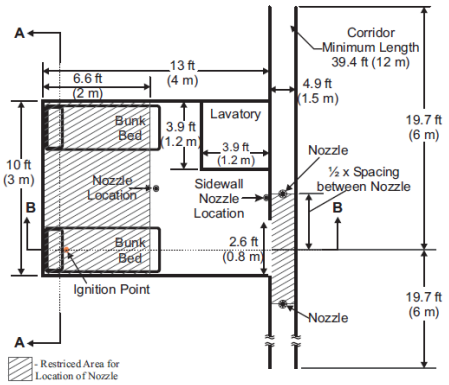
- Limitations to dimensions.
- Limitations to application type.
- Limitation to technical performance.
- Limitation to water spray damage.

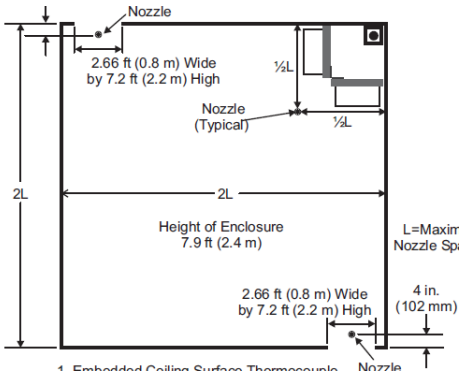
4) Approval/Testing of System.

Standard watermist system

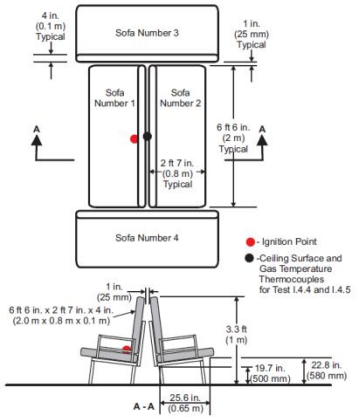
Example of test method FM5560 Light Hazard:

- Apartments
- Atriums
- Churches
- Concealed spaces
- Gymnasiums
- Hospitals and hospital laboratories
- Hotel rooms
- Institutions
- Kitchens
- Libraries
- Meeting rooms in convention centers and hotels
- Metalworking shops with nonhydraulic cutting operations
- Mineral processing such as: glass, cement, ore treating, gypsum processing, etc.
- Museums
- Nursing or convalescent homes
- Offices
- Restaurant seating areas
- Schools and universities classrooms
- Unused attics





LIMITS:
-5m ceiling height.
-Pendent automatic nozzle
-Sidewall only for small compartments.



4) Approval/Testing of System.

<u>Special watermist system:</u>

Available approval for cultural heritage:

- CEN/TS 14972 Appendix B.
- Fire test demonstrations.

Advantages:

- Can test special products.
- Can provide specific required data for the exact project.

Disadvantages:

- Limitations to ”strenght” of approval.
- Cost and time requiring to do.

4) Approval/Testing of System.

<u>Special watermist system</u>

Example of test method
CEN/TS14972

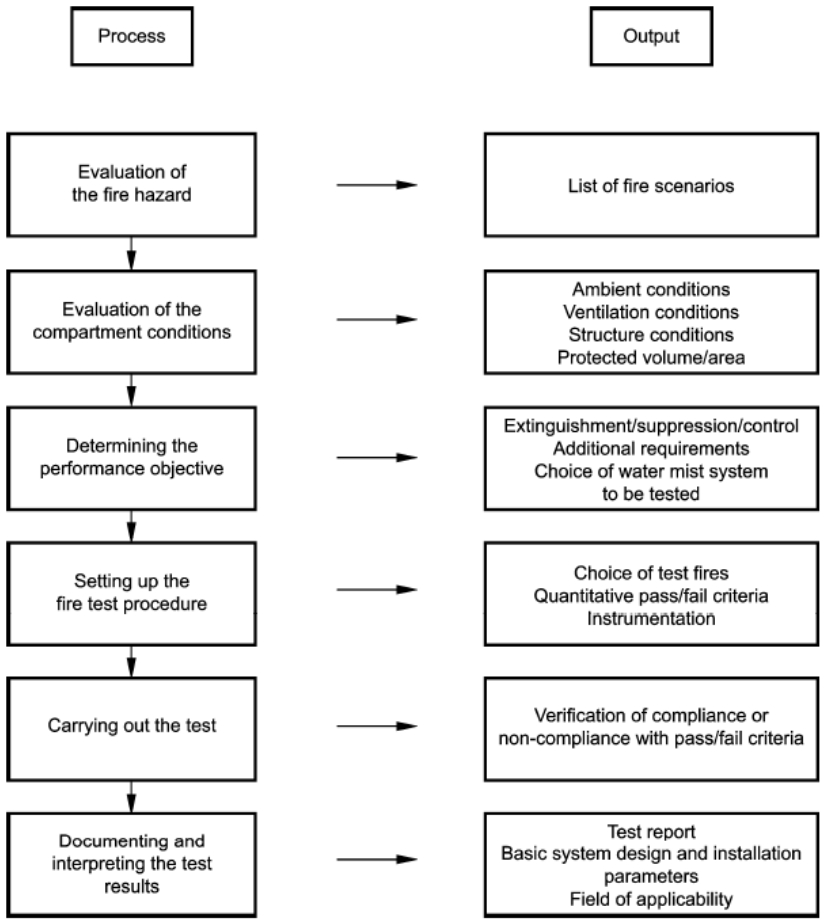


Figure B.1 — Process of developing a fire test procedure

5) Project Examples.

Wooden Church:

- Large and high open space with low fuel loads (sofas, benches) placed at floor. Fire spread risk high due to all wood.
- Heated and unheated areas with natural ventilation.
- Ceiling painting not to be destroyed by installation or water spray
- Authority was fire brigade.

System choosen: SPECIAL WATERMIST SYSTEM.

Museum:

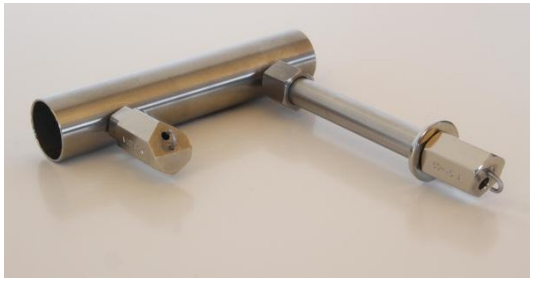
- Ceiling heights up to 3m with relative low fuel loads (furniture) placed at floor. Fire spread high due to low ceiling heights.
- Heated areas with natural ventilation.
- Artifacts in rooms not to be destroyed by water except in the vicinity of a fire.

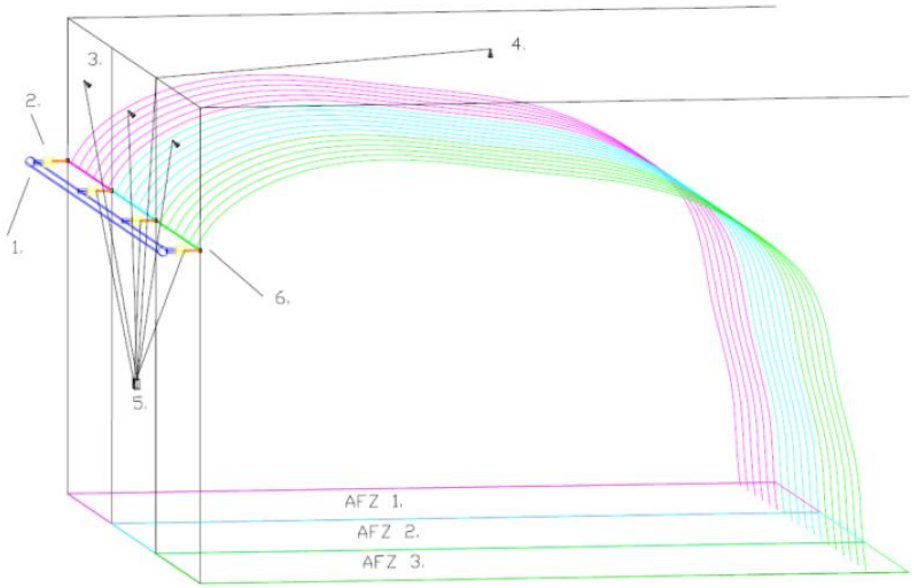
System choosen: STANDARD WATERMIST SYSTEM.

5) Project Examples.

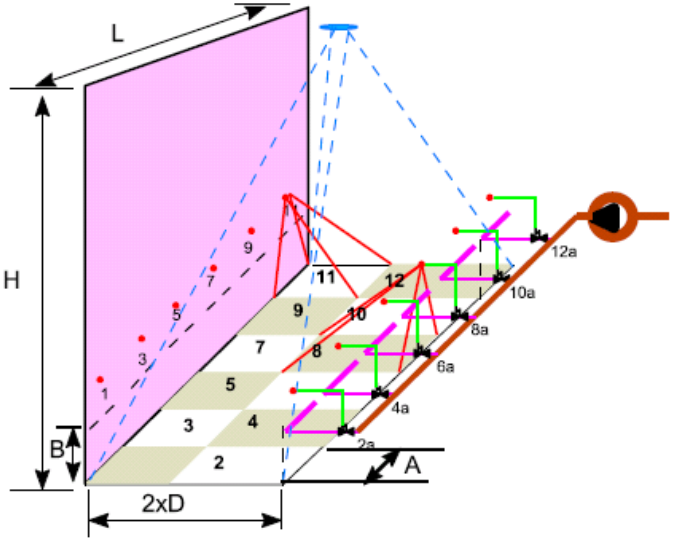
Wooden Church:

System: MODEL APS



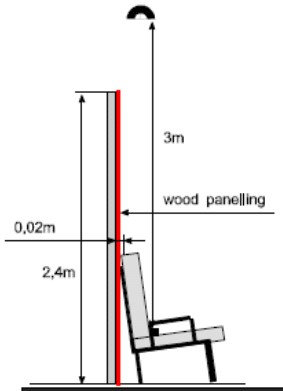


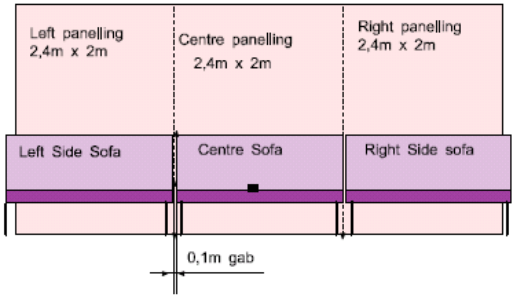
Length (L):	unlimited
Height (H):	unlimited
Width (2xD) Type A	max. 16m
Type B	max. 20m
Type C	max. 26m
Nozzle wall height (B):	3,5m – 7m

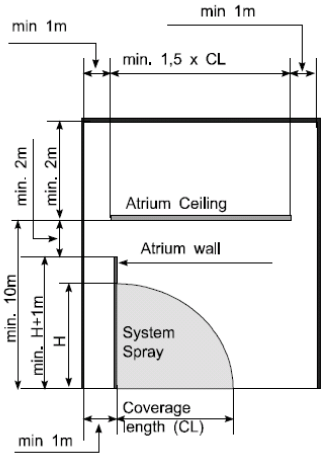


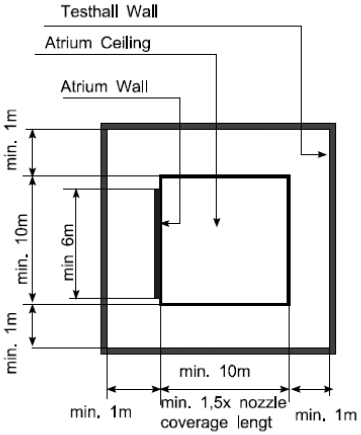
5) Project Examples.

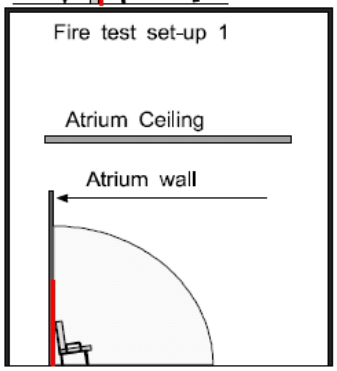
Test scenarios from test method designed in accordance to CEN/TS 14972 Annex B.

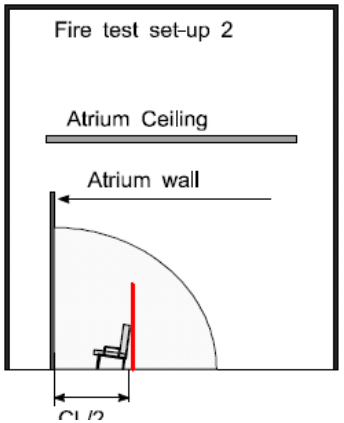


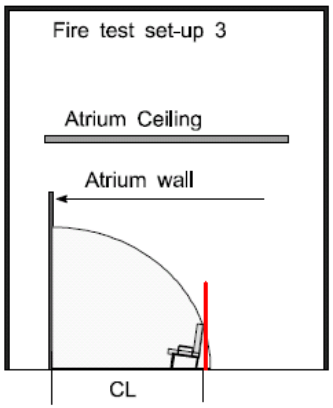












Videos link

5) Project Examples.

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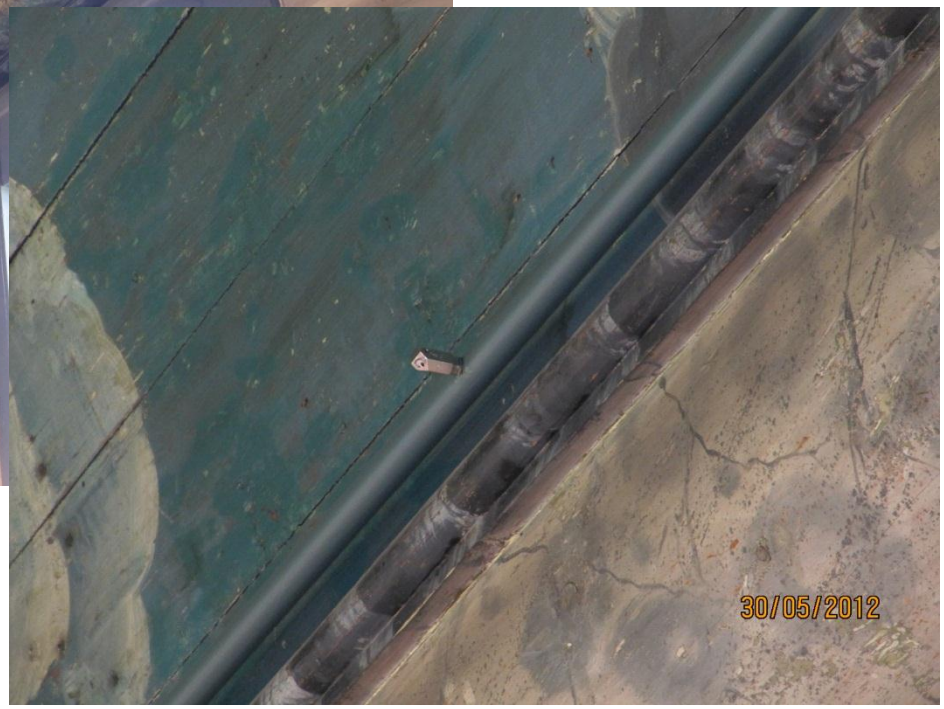

5) Project Examples.

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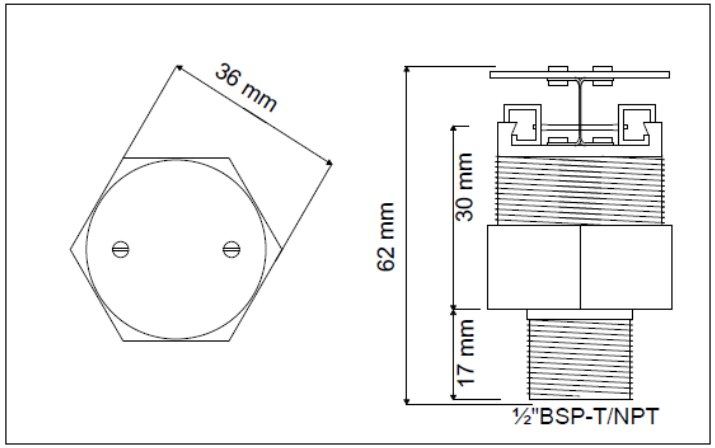
Museum:

System: MODEL OH-OS



General Stats	
Minimum water pressure	10 bar
Maximum working pressure	16 bar
K-factor (metric)	16.5 (l/t/√bar)
FM approved nominal release temperature	57°C
Other nominal release temperatures	68°C, 79°C, 93°C
Time Response Index (metric)	RTI < 50 Fast Response Class
Drop size	DV_{90} < 300 µm
Application	
Spacing (max)	13 m^2 (3.6m x 3.6m)
Distance to wall (max)	1.8 m
Height (max)	5 m

FM APPROVED

Certificate of Compliance

This certificate is issued for the following:

System Designation:	Model OH-OS Fine Water Spray System
System Type:	Water Mist System for the Protection of Light Hazard Occupancies
Design, Installation, Operation, and Maintenance Manual:	Design, Installation and Service Manual For Factory Mutual Approved VID Fire-Kill OH-OS Systems, Doc. No. 120815-01-02, 23-Aug-2012

Prepared for:

VID FIRE-KILL
SVALBARDVEJ 13
DK-5700 SVENDBORG
DENMARK

Manufactured at:

VID FIRE-KILL
SVALBARDVEJ 13
DK-5700 SVENDBORG
DENMARK

FM Approvals Class: 5560

Approval Identification: 3041497 Approval Granted: October 1, 2012

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and strict conformity to the constructions as shown in the Approval Guide, an online resource of FM Approvals.

For more than 160 years FM Approvals has partnered with business and industry to reduce property losses.

Richard B. Dunne
Group Manager – Fire Protection
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Videos link

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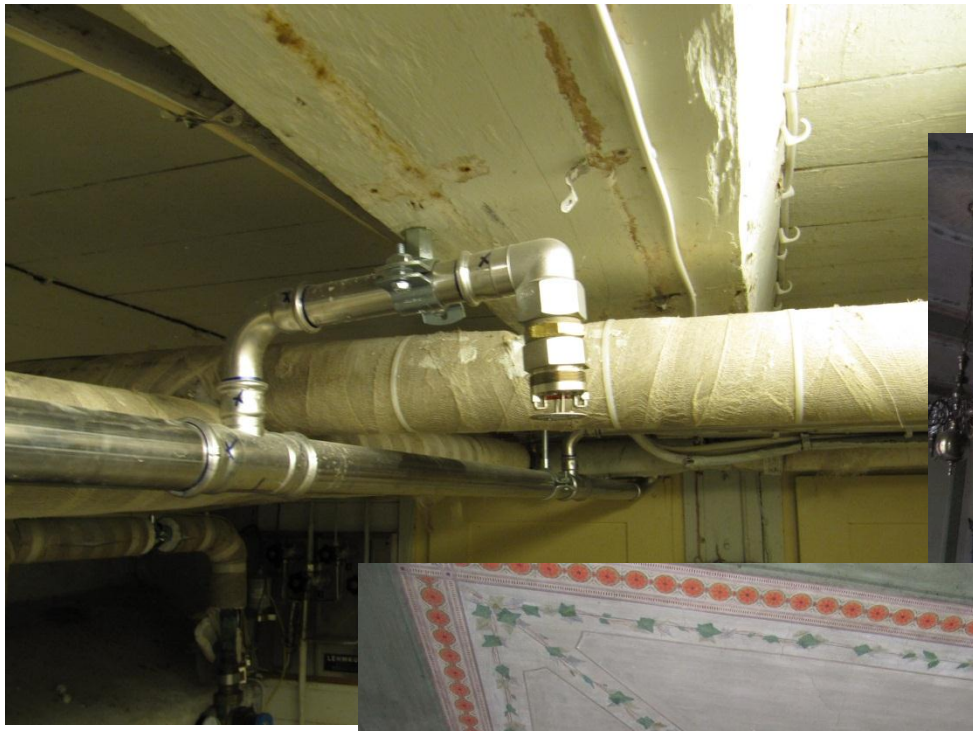

Thank you for your attention.