Protection of Cultural Heritage Applications with Low Pressure Water Mist Systems

By Alex Palle, VID Fire-Kill
IWMA Conference 2012
I am here to talk about TAPAS...
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

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

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 long concealed spaces

For horizontal long throw

Without wetting walls
4) Approval/Testing of System.

Standard watermist system
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.

Special watermist system:
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 "strengh" of approval.
- Cost and time requiring to do.
4) Approval/Testing of System.

Special watermist system
Example of test method
CEN/TS14972
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 chosen: 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 chosen: STANDARD WATERMIST SYSTEM.
5) Project Examples.

Wooden Church: System: MODEL APS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length (L)</td>
<td>unlimited</td>
</tr>
<tr>
<td>Height (H)</td>
<td>unlimited</td>
</tr>
<tr>
<td>Width (2xD) Type A</td>
<td>max. 16m</td>
</tr>
<tr>
<td>Type B</td>
<td>max. 20m</td>
</tr>
<tr>
<td>Type C</td>
<td>max. 26m</td>
</tr>
<tr>
<td>Nozzle wall height (B)</td>
<td>3.5m – 7m</td>
</tr>
</tbody>
</table>
5) Project Examples.

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

Museum:
System: MODEL OH-OS
5) Project Examples.
5) Project Examples.
Thank you for your attention.