International Watermist standards.
1. Why do watermist standards exist?

**Question:** Which came first?

- **Watermist Standards are produced for the industry.**
- **The industry requires watermist standards.**
As watermist primarily fight fires by cooling chemical processes and inerting the ambient of the oxidation processes....

**Water mist is most effective in locations with:**
- Large fires => large steam production
- High heat => Large steam production & little steam condensation
- Enclosures => Reduced oxygen supply => fast oxygen depletion
- Little ventilation => increased oxygen depletion effect.

**So the safe thing to say is that watermist fits perfect into applications where one wants to reduce water and where:**
- Large fires are expected to occur in enclosures.
- The main fire risk consist of small or medium fire loads.
- Ventilation rates are non-existing or small.

**For this reason watermist fits perfect into applications such as:**
- Industrial applications: Machine rooms, generator rooms, turbines, etc.
- Commercial applications: Schools, hotels, offices, accommodation areas, etc.

2. What do todays standards cover?
2. What do today’s standards cover?

And for the same reason most available WM standards also cover these applications. See below:

**MARINE STANDARDS**
- IMO1165 (Total flooding machine room protection)
- IMO 1387 (local protection machine room protection)
- IMO 1272 (car and truck decks)
- IMO MSC 265 (Accommodation areas)
- ISO 15371 (Fat fryers)
- Etc.

**LAND STANDARDS**
- CEN/TS 14972: Offices, special Object protection
- UL2167: NFPA Residential areas, LH, OH1
- VDS : Car parks, cable tunnels, Hotels, Offices, false ceilings.
- UK: LPS1283 Domestic & residential areas, LH & OH1
- INSTA 900: Domestic & residential areas
- CNPP: Turbines
- Etc.
3. Overview of different type standards.

STANDARDS can be divided into three groups:

**Fire test standards (protocols):**
- Being used to find limitations for installation (e.g. installation height, vent., obstructions)
- Being used to find system specifics (e.g. K-factor, pressure, spacing, obstruction)

**Component test standards (protocols):**
- Being used to determine if design and construction will be able to withstand 30 years lifetime.
- Being used to verify production quality and uniformity.

**Overall Design, Installation and Maintenance standards (codes):**
- Being used to specify common and overall requirements for all type watermist systems.
- Being used to describe risk classification, system operation area*, system duration time*.

* Sometimes these parameters are found from the fire test standards.

* Sometimes in same document (Notifying Body, FM, VDS, LPCB)
4. Available standards

Test standards examples:
- **FM5560**: US light Hazard (EU OH1), machinery, turbines, special hazards, more
- **UL2167**: US LH, OH1, OH2.
- **VDS3188**: Car parks, cable tunnels, OH1, Offices, more
- **DD8458+ 8489**: Domestic & residential areas, EU LH & OH1
- **INSTA 900**: Domestic & residential areas
- **CEN/TS14972**: Offices, Fat fryers, special hazards
- **CNPP**: Turbine
- **IMO**: All applications found on ships.

Design standard examples:
- USA, Middle East, Far East: **NFPA 750**
- Europe: **CEN/TS14972**
- Denmark: **RETN. 254-1/2**
- Scandinavia: **INSTA 900**: Domestic & residential areas
- Marine: **SOLAS**
- FM/VDS insured buildings: **FM5560 / VDS 3188**
5. Understanding the standards and the differences between them.
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Components (pumps)</td>
<td>NFPA 20</td>
<td>Low: EN12845 &amp; EN12259-12 (centrifugal)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High: EN 14847 (positive displacement pumps).</td>
</tr>
<tr>
<td>Components (tanks,</td>
<td>Listed + minor requirements mentioned in NFPA 750</td>
<td>Reference to CEN/TS 14972 part 2-? + minor requirements mentioned in CEN/TS14972 part 1.+</td>
</tr>
<tr>
<td>Valves, hangers, pipes,</td>
<td>+ Reference to ASTM standards (see part 3 for</td>
<td></td>
</tr>
<tr>
<td>nozzles, strainers, pump</td>
<td>nozzles).</td>
<td>Reference to EN standards for sprinkler and gas components. (see part 3 for</td>
</tr>
<tr>
<td>controllers)</td>
<td></td>
<td>nozzles).</td>
</tr>
<tr>
<td>Component Materials</td>
<td>Copper, Stainless steel or other listed materials</td>
<td>Stainless steel or equivalent (copper, zinc coated steel (galv) and synthetic</td>
</tr>
<tr>
<td></td>
<td>with same corrosion resistance</td>
<td>materials may be used if found not to create clogging).</td>
</tr>
<tr>
<td>Fire test accepted</td>
<td>See part 2</td>
<td></td>
</tr>
<tr>
<td>Design (Classification,</td>
<td>Occupancy (minimum 30min). Specific (accordingly</td>
<td>Application Specific. Water supply for pumped systems to be calculated as EN</td>
</tr>
<tr>
<td>water supply)</td>
<td>to listing, always ext. time x2). Design area</td>
<td>12845 or listed, whatever is greater.</td>
</tr>
<tr>
<td></td>
<td>accordingly to listing.</td>
<td>Pre-eng.: 10min or ext. time x2, whatever is greater.</td>
</tr>
<tr>
<td>Other design and Installation</td>
<td>DIOM</td>
<td>DIOM</td>
</tr>
<tr>
<td>requirement.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance requirement</td>
<td>NFPA 25 &amp; DIOM</td>
<td>EN 12845 / EN15004-1 where relevant + DIOM</td>
</tr>
<tr>
<td>Final Acceptance</td>
<td>AHJ</td>
<td>AHJ</td>
</tr>
</tbody>
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### Notifying Body Design standards (part 1B)

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Components (pumps)</td>
<td>NFPA 20</td>
<td>FM approved. FM loss prevention datasheets, NFPA 20 and NFPA 750</td>
</tr>
<tr>
<td>Components (tanks, Valves, hangers, pipes, nozzles, strainers, pump controllers)</td>
<td>Listed + minor requirements mentioned in NFPA 750 + Reference to ASTM standards (see part 3 for nozzles).</td>
<td>FM Approved FM loss prevention datasheets, NFPA 20 and NFPA 750 (see part 3 for nozzles).</td>
</tr>
<tr>
<td>Component Materials</td>
<td>Copper, Stainless steel or other listed materials with same corrosion resistance</td>
<td>Copper or Stainless steel only.</td>
</tr>
<tr>
<td>Fire test accepted</td>
<td>See part 2</td>
<td></td>
</tr>
<tr>
<td>Design (Classification, water supply)</td>
<td>Occupancy (minimum 30min). Specific (accordingly to listing, always ext. time x2). Design area accordingly to listing.</td>
<td>Occupancy: (FM DataSheet 3-26) Pre-eng.: 10min or ext. time x2, whatever is greater.</td>
</tr>
<tr>
<td>Other design and Installation requirement</td>
<td>DIOM</td>
<td>DIOM</td>
</tr>
<tr>
<td>Maintenance requirement</td>
<td>NFPA 25 &amp; DIOM</td>
<td>FM Inspection + DIOM</td>
</tr>
<tr>
<td>Final Acceptance</td>
<td>AHJ</td>
<td>FM Inspection (APPROVAL)</td>
</tr>
</tbody>
</table>
# Accepted test protocols (part 2)

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Fire test protocols where a listing can be obtained. The protocol shall be fit to the application and be accepted by the AHJ.</td>
<td>Fire test protocols are included in CEN/TS 14972 and written in part X-Y. Most protocols are copies from known, used and accepted protocols such as:</td>
<td>Fire test protocols are included in FM5560</td>
</tr>
<tr>
<td>Recognized in NFPA750: IMO 668 (1165) and IMO A800 (MSC 265) FM5560, UL2167, CEN/TS 14972, (VDS?)</td>
<td>Existing!: flammable liquids, cable tunnels, office, certain storage areas (all are copies of VDS protocols with minor changes), commercial deep fat fryer (copy of ISO15371).</td>
<td>FM: machinery spaces, turbine enclosure, HC1 (application specific), Wet benches, industrial oil cookers, local application, Data centers, wood board presses, Chemical fume hoods,</td>
</tr>
</tbody>
</table>
| **Definition from chapter 3.2.3**

Equipment, materials, or services included in a list **published by an organization** that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose. | FM (new): machinery spaces, turbine enclosure, HC1 (application specific), Wet benches, industrial oil cookers. |
| | VDS(new): car parks, false floor/ceiling, hotel |
| | LPCB(new): residential & domestic, low hazard (application specific). |
| | DFL(new): Atrium |
Component test methods (Part 3)

Covers:
- Corrosion (materials)
- Nozzle design (strength)
- Glassbulb QC
- Fast release (RTI)
- Discharge patterns (even distribution)
- K-factor (Flow and pressure)
- Verification of fire test nozzles.
- Protection caps (packaging test)

Note: no droplet size tests (not needed).
6. If the industry requires a standard.

Watermist Standards are produced for the industry.

The industry requires watermist standards.
If no standard is available for the application

CEN/TS 14972:2011, Annex B.

In accordance with this guideline it is possible to:

- Develop a test method for a specific application to any system type.
- Authorities involved in the project, accepts the protocol
- Conduct the fire tests described in the developed standard.
- Get the test results evaluated and documented in a test report.
- An ISO17025 accredited fire test laboratory shall conduct the fire test.
- Often the AHJ is involved throughout the entire test project.

Note: Further requirements are set to component tests and production QC level in the main CEN/TS14972 document.
How to follow CEN/TS14972 appendix B

Figure B.1 — Process of developing a fire test procedure
Examples of fuels that could be used.
Evaluation of the compartment conditions.
Evaluation of pass/fail.

Control, suppression or comparison?
The results

Test Method

Test report

AHJ witness letter
7. Summary

NFPA 750 (2015)

FM5560:2012 (Notifying body)

CEN/TS 14972:2014

The New TS14972: Main Part

14972-1
- Design
- Installation
- Maintenance

14972-2 to 10
- Component test protocols

14972-11>
- Fire Test Protocols

Appendix B
(Other applications)
Summary

The chicken or the egg?

- Notifying Bodies makes the first standards to cover the most common (where watermist works best) watermist applications so that they get most customers!
- Second generation watermist standards cover new exiting applications where watermist manufacturers have found it possible also to sell
- Don't worry - you are retired!
- Third generation watermist standards.... Perhaps more general standards with less(other) test requirements as more knowledge exist!