Water Mist Available Fire Test Protocols and the current status of the European Water Mist System Standard 14972-1

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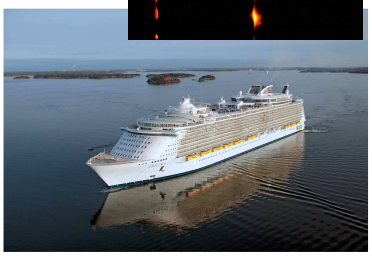
A little bit of history

In the mid and early nineties water mist is introduced as an ”environmentally friendly” system able to:

- Extinguish Total Compartment fires,
- Replace gaseous systems that had a negative impact on the environment.

In the same period, in response to marine customers that were building many large cruise ships, the water mist industry and the ship owner organizations developed the concept of sprinkler equivalent systems to protect the large cruise ships with a much lighter and less impacting water based system

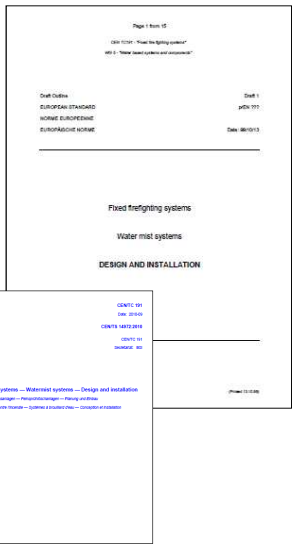


Simultaneous Standards process start - up

- The problem of developing suitable design and installation standards was immediately considered important by all involved
- The Marine world started developing the IMO rules with several circulars published in the 90's to cover all the possible applications on board of ships, for both Total flooding and Sprinkler equivalent applications.
- NFPA, the National Fire Protection Association in the US started the development of NFPA 750 – Standard on water mist fire protection systems – in 1993 with the first publication in 1996

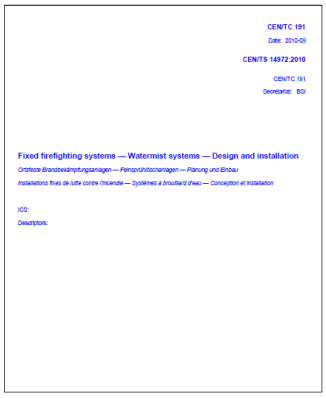
Something starts in Europe also

- Already in 1998 a working group was active within the TC191/WG5 of CEN; it is known as Task Group 3 (TG3) and its main task is the development of a complete standard on water mist systems.
- The working group is working actively: it published the first standard, the CEN-TS 14972 in 2007. It is the first European standard on "fixed firefighting systems - water mist systems – design and installation".
- It is a TS and it was published again in 2010.



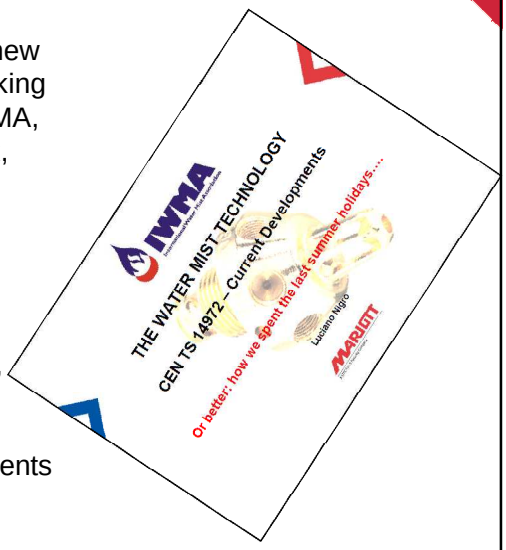
The current edition of TS 14972

- The current edition of the TS14972 is a complete standard on design, installation and maintenance of water mist systems.
- It also include an appendix for water mist nozzle specification and testing
- And it includes a series of fire test protocols developed by the working group during the over than 10 years activity.
- The TS 14972 has been adopted in some European Countries. The UK, however, is developing its own national standard on design, installation and test procedures.


CEN/TC 191
Date: 2010-09
CEN/TS 14972:2010
CEN/TC 191
Secretariat: BSI
Fixed firefighting systems — Watermist systems — Design and installation
Ortsfeste Brandbekämpfungsanlagen — Feinsprühlöschanlagen — Planung und Einbau
Installations fixes de lutte contre l'incendie — Systèmes à brouillard d'eau — Conception et installation
ICS:
Descriptors:

The new draft of TS 14972

- You already know that a completely new draft has been developed by the working group, mainly with the support of IWMA, that provided the actual drafting work, during 2011.
- The new draft is progressing and a completion is expected within the next year.
- It will be a more extensive document, divided in several parts, with a first section concerning design and installation, then followed by components and protocols



The new draft of TS 14972

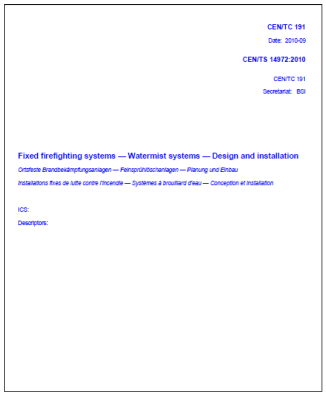
14971-1
Design & installation

Components:
14972-2: Water Mist Nozzles
14972-3: Water control valves
14972-4: Pressure switches
14972-5: Filters and strainers
14972-6: Water flow detectors
14972-7: ?

Fire test protocols:
14972-11: test protocol abc…
14972-12: test protocol xyz…
…
…
14972-xx: test protocol wyz...

The 14972-1 Design and Installation

- The new draft for 14972-1 is planned to be published as an EN.
- It includes the design, installation and maintenance of the systems, with a strong link to the Design, Installation and Operation Manual to be delivered by the manufacturer of the water mist system, and to be approved by the third party certification organization.
- The new draft differentiates between open nozzle deluge actuated systems and closed automatic nozzle or sprinkler like nozzle systems where the thermal mechanism in the nozzle activates the system.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The component standards

- The main components of water mist systems are covered by specific component standards.
- In general the low pressure systems will make reference to the EN-12259 series for sprinkler and deluge system components
- The gaseous part of the system will make reference to the EN 12094 series for gas systems
- The other components will have specific standards that will include the construction characteristics and the test requirements per each one.
- They will be published as EN standards, but they will not be “harmonized” for the time being, which means that no CE marking will apply.
- They are mostly ready for the approval process.

The fire test protocols

- It is the “qualifying” part of the European Standard developed by TG3
- It also is the most critical issue in water mist system standardization

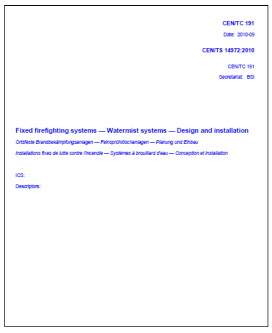
The ”Cologne” criteria

- In the Cologne, the criteria for adoption of a fire test protocol within the scope of the 14972 standard were defined.
  - The protocols will be selected “per application”
  - It has been agreed that there will be one only protocol per application
    - This is still a discussion topic as it may not make sense for applications, like OH (LH) or Machinery Spaces where there are more than one well established protocol.
  - The protocols shall indicate clearly, in their scope, the applications to which they are applicable and the limitations.
  - The protocols for “closed automatic nozzle or sprinkler like systems” shall indicated the “minimum number of operating nozzles” to be considered.

The ”Cologne” criteria

- In Cologne, the “fast track” process was established to immediately incorporate some protocols into the standard.

  Fast Track Process criteria for protocols:
  - It shall be used in more than one European country
  - There shall be more than one approval based on such test procedure by different manufacturers
  - It shall be time-proven (period of at least 2 years since first approval)
  - There shall be no proven concerns about failure
  - It shall not contradict the main body of EN 14972.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The ”Cologne” criteria

- In Cologne , the other criteria for accepting a protocol within the scope of the 14972 standard were defined.

any protocol proposed to the working group:

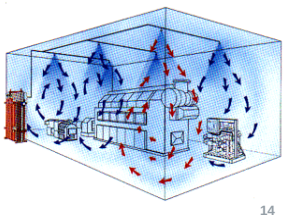
- The test protocol shall be discussed and checked by TG 3 experts in detail for decision about the acceptance and publication.

In all cases:

- The test protocols shall be published as separate documents e.g.: 14972-11, 12, 13….
- Test protocols shall be included as full text and not be just referenced.
  - In addition to the text of the protocol, the standard should reference “or the latest edition of the standard” if updated before the next revision of EN14972
    - Test protocols do get updated and the standard should not codify a superseded protocol
- The decision on the form of publication (EN, CEN/TS or TR) depends on different aspects (consolidate usage, acceptance by end users etc.) and shall be decided case by case (new or established procedure).

The main protocols already adopted

- CEN prEN 14972-(11) **Fire Tests for Water Mist Systems for the Protection of Special Hazard Machinery Spaces with Volumes not Exceeding 9175 ft3 (260 m3) light diesel type**
- Fire Hazards that are addressed by the protocol include the followings: rooms with machinery such as oil pumps, oil tanks, fuel filters, generators, transformer vaults, gear boxes, drive shafts, lubrication skids, diesel engine driven generators, and other similar machinery using fuel and/or lubrication fluids with volatilities less than or equal to light diesel. All hazards included under the scope of this total flooding application shall be protected for a minimum of twice the longest time to extinguish the test fires, the time to shut down process equipment, or 10 minutes, whichever is greater.



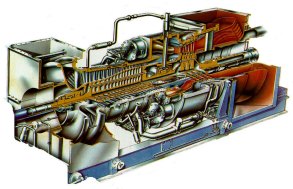
The main protocols already adopted

- CEN prEN 14972-(12) **Fire Tests for Water Mist Systems for the Protection of Special Hazard Machinery Spaces with Volumes not Exceeding 9175 ft3 (260 m3) Heptane grade**
- Fire Hazards that are addressed by the protocol include the followings: rooms with machinery such as internal combustion engines or other equipment using fuel and/or lubrication fluids with volatilities less than or equal to heptane, and incidental use or storage of limited quantities of flammable liquids of not more than two 55 gal (208 L) drums. All hazards included under the scope of this total flooding application shall be protected for a minimum of twice the longest time to extinguish the test fires, the time to shut down process equipment, or 10 minutes, whichever is greater.

The main protocols already adopted

- CEN prEN 14972-(13) **Fire Tests for Water Mist Systems for the Protection of Combustion Turbines with Volumes not Exceeding 9175 ft3 (260 m3)**
- Fire Hazards that are addressed by the protocol include the followings: combustion turbines in enclosures with volumes not exceeding 9175 ft3 (260 m3). Combustion turbines included under the scope of this total flooding application shall be protected for a minimum of twice the longest time to extinguish the test fires, turbine rundown
- time (including the time that the turbine surfaces are above the autoignition temperature of the lubricating fluid), the time to shut down process equipment, or 10 minutes, whichever is greater.

MS7001



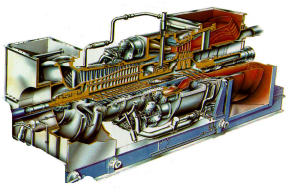
The main protocols already adopted

- CEN prEN 14972-(14) **Fire Tests for Water Mist Systems for the Protection of Machinery Spaces and Special Hazard Machinery Spaces with Volumes Exceeding 9175 ft3 (260 m3)**
- Fire Hazards that are addressed by the protocol include the followings: rooms with machinery such as oil pumps, oil tanks, fuel filters, generators, transformer vaults, gear boxes, drive shafts, lubrication skids, diesel engine driven generators, and other similar machinery using fuel and/or lubrication fluids with volatilities less than or equal to light diesel. The special hazard machinery space application includes rooms with machinery such as internal combustion engines or other equipment using fuel and/or lubrication fluids with volatilities less than or equal to heptane, and incidental use or storage of limited quantities of flammable liquids of not more than two 55 gal (208 L) drums. All hazards included under the scope of this total flooding application shall be protected for a minimum of twice the longest time to extinguish the test fires, the time to shut down process equipment, or 10 minutes, whichever is greater.

The main protocols already adopted

- CEN prEN 14972-(15)**Fire Tests for Water Mist Systems for the Protection of Combustion Turbines with Volumes Exceeding 9175 ft3 (260 m3)**
- Fire Hazards that are addressed by the protocol include the followings: Combustion turbines included under the scope of this total flooding application shall be protected for a minimum of twice the longest time to extinguish the test fires, the turbine rundown time (including the time that the turbine surfaces are above the auto-ignition temperature of the lubricating fluid), the time to shut down process equipment, or 10 minutes, whichever is greater.

MS7001



The main protocols already adopted

- CEN prEN 14972-NN **Fire test protocol for water mist systems for the protection of cable tunnels (control and suppression systems)**
- This test protocol is only applicable to mainly horizontal (max. 10) cable tunnels. It does not include testing of the function of the cables.
- NOTE Horizontal cable tunnels relate to the orientation of the tunnel, not to the cable orientation.

The main protocols already adopted

- CEN prEN 14972-MM **Fire test protocol for car park garages (pertaining to OH2 classification under the 12845 standard)**
- These tests are carried out to evaluate the extinguishing effectiveness of fine water spray systems for the application to car park garages classified as OH2 according to EN 12845. In the tests specified in this concept the fine water spray system to be approved shall have at least equal extinguishing effectiveness as a sprinkler system. These tests can only be applied for the evaluation of the extinguishing effectiveness of fine water spray systems for the application to car park garages. It is not possible to apply them to other OH2 risks or higher room heights. In case of a positive result of the tests the fine water spray system to be approved can be approved for the protection against the following OH2 risks: Protection of non-automatic, fully enclosed garages and underground garages.

The main protocols already adopted

- CEN prEN 14972-PP **Fire test protocol for water mist systems for the protection of industrial oil cookers**.
- Application of the water mist system is limited to the protection of the industrial oil cookers only, and does not include the protection of other equipment such as exhaust ducts, heaters, heat exchangers, and food processing areas, unless tested for these applications. Consideration of the application and use of nozzle protection caps to prevent or reduce the amount of nozzle contamination should be given and the use of such caps should be included in the fire test and nozzle performance test requirement programs.

The main protocols already adopted

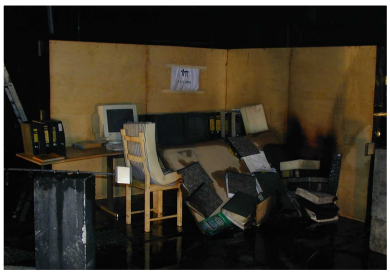
- CEN prEN 14972-XX **Fire test protocol for water mist systems for the protection of wet benches and other similar processing equipment**
- This application includes tools which consist of ventilated and unventilated compartments, spin rinse dryers, alcohol vapor dryers, chemical mechanical polishing tools and step and repeat exposure systems. All hazards included under the scope of this local application protocol shall be protected for a minimum of 10 minutes or double the time needed to extinguish the worst case fire scenario, whichever is greater.

The main protocols already adopted

- CEN prEN 14972-NN **Fire test protocol for water mist systems for the protection of False Floors and False ceilings**
- TG 3 agreed to accept the test protocol for false floors and false ceilings as stand-alone.
- They were developed by VdS and have been adopted as such.

The protocols still under discussion

- CEN TS 14972 already includes a fire test protocol for offices pertaining to OH1 hazard categories as mentioned in EN 12845.
- There is also a fire test procedure currently used by VdS for the “Hotel Occupancy hazards”
- There is another fire test procedure established by Factory Mutual for the so called “Light Hazards occupancies or Hazard Category I” that overlaps the previous two.
- **As a result: No one has been adopted yet**



The protocols still to be discussed

- There are also several protocols still to be taken into consideration to decide whether to accept them in the standard 14972 or not and to which extent different protocols may overlap each others.
- Examples include:
  - All the marine protocols developed during the '90 and currently used by several manufacturers.
  - The protocols issued by UL Underwriter's Laboratories, that are of particular interest because based on Hazard categories
  - The big un-explored area of residential water mist systems

Great! We have a lot still to do in the next years

THANK YOU

IWMA
International Water Mist Association