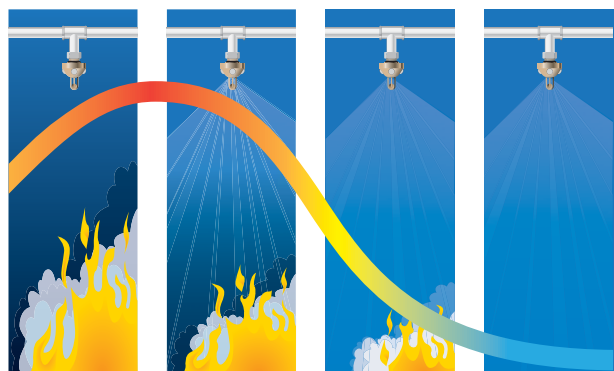


Introduction

This folder about water mist enters into force 1st July 2009, and will replace the previously released newsletter 01/2006.

This folder is thought to aid authorities and insurance companies, consultants, system owners/ users and installers during installation, approval and maintenance of Water mist systems.

In a transitional period of 6 months from the effective date, the principles for the newsletter may still be used. New systems and extensions, where construction petitions have been filed before the expiry of the transitional period can be completed after the principles in the newsletter.



Water mist in buildings

Water mist systems are constructed to detect a fire and with water mist, either extinguish or control it., until other fire fighting is initiated by fire authorities.

Water mist is for protection of objects and for the protection of all parts of the building or parts of a building.

What is a Water Mist system?

A water mist system is a permanently installed water-based extinguishing system, where water droplets are small, typically with water droplets with a diameter less than 1.0 mm. Water mist systems are often used on ships as firefighting systems.

The primary extinguishing form is cooling of flammable gases, where the water droplets evaporate and absorb energy. In closed sites oxygen depletion with water vapor can enhance the extinction performance.

The water mist system is divided in 3 classes:

- Low pressure- water mist less than 16 bar
- Medium pressure- Water mist system between 16bar and 60 bar
- High pressure- water mist system above 60 bar

How is it secured in it that particular safety and reliability is not degraded compared to a sprinkler?

A water mist system, like a sprinkler system shall meet specified requirements for energy and water supply. Water mist systems must comply with similar requirements for operation and maintenance as a sprinkler system.

Classification test

Water mist systems are classified based on their ability to extinguish or control a fire, and there are following classification tests for water mist systems:

CEN/TS 14972

“Technical specification –fixed fire fighting systems- Water mist systems –Design and installation”

IMO Resolution A.800 (19)

“Revised guidelines for approval for sprinkler systems equivalent to that referred to on SOLAS regulation II.2/112”

IMO MSC 265 (85)

“Amendments to the revised guideline for approval of sprinkler systems equivalent to that referred to in SOLAS regulation II-2/12 (Resolution A.800(19)).”

What are test results used for?

Classification tests are used to demonstrate that the water mist system can control or extinguish a fire in a given application or space.

How to handle a large scale test?

A large scale test shall always be performed in an accredited test lab and carried out in accordance with accepted testing standards. Refer to the methodology of full-scale test described in CEN / TS 14972.

Risk Classes

Water mist systems can be utilized in the following risk classifications- based on documentation of extinguishing capability, component testing and system testing and possible large-scale test.

CEN/S 14972 indicate specific classification test that can be used for documentation of extinguishing ability in normal risk class group 1 and group 2 (OH1 and OH2).

CEN/S 14972 specifies further methodological development of representative classification tests for other Risk classes.

Classification of risk classes in a building

Risk classification in a building is determined by the sprinkler system, see eg. DBI guideline 251/4001 “Sprinkler-design, installation and maintenance”.



Components

The following main components of a water mist system must at least be approved:

- Nozzles
- pump unit with control and steering systems
- alarm-/section valves

Which component tests are used?

Presently, there are no European standards for type testing of components for water mist systems. Presently, components will be approved following up to date IMO test nozzles system approvals (conducted by marine classification societies), and section valves pump units or a relevant European Standard contains performance requirements that can be achieved by component, for example: DS / EN 122-2, wet alarm valves.

The following standards or technical specifications contain requirements for type testing of components which may be relevant to a water mist system:

- DS/EN 54 (all parts)
“Fire detection and fire alarm systems”
- DS/EN 12094 (all parts)
“Fixed firefighting systems- Components for gas extinguishing systems”
- DS/EN 12259 (all parts)
“Fixed firefighting systems- components for sprinkler and water spray systems”
- CEN/TS 14972
“Fixed fire fighting systems- Water mist systems- Design and installation”

Some of the standards are harmonized under the CPD. When a harmonized standard is used, the component must be certified under the Buildings Directive, the other components must be certified under applicable law.

It is the manufacturer's responsibility to ensure that components are certified according to directives, including the Machinery Directive and existing legislation.

What component approvals are used?

Alarm valves in the wet system with a fixed pressure not exceeding 12.5 bar must be certified in accordance with EN 12259-2, noting that the alarm valve must function properly during water flow, which applies when only one water mist nozzle is activated.

Pumps should at least be equipped with a 3.1.B certificate.

Systems

In the European Technical Specification CEN / TS 14972 “Fixed Fire Fighting System-Water mist System-Design and Installation”, in annex A and B methods for type testing and acceptance criteria for the practical performing tests of the system.

Annex A contains:

- flammable liquids
- cable tunnels
- Office space equivalent to risk class OH 1.

Annex B provides guidelines for development as representative fire test procedures for water mist systems.

Furthermore the IMO Resolution A 800 (19) with amendments MSC 265(84) “Revised guidelines for approval of sprinkler systems equivalent to that referred to in SOLAS regulation II/12 - Appendix 2 Fire test procedure for the equivalent sprinkler systems in accommodation, public space and service areas on pass passenger ships ”can be used. IMO is an abbreviation for International Maritime Organization.

What system approvals can be used?

System approvals may be issued in accordance with the system performed as described above. The following system approvals are accepted in Denmark:

- VDS,
- DBI Danish Fire and Security Technology,
- FM Global,
- UL approvals.
- Systems approved by a classification society to IMO specifications.
- Accredited certification bodies.

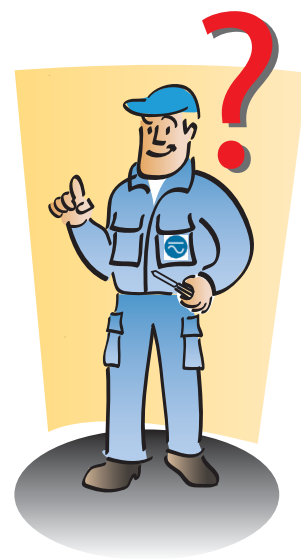
It should be clearly stated in the system accreditation, which/what area(s) the system covers.

Installers

Until special provisions for water mist systems are developed such systems must be installed by a company approved as installers of sprinkler systems for design, installation, service and maintenance. In addition, it is required that the installer must have received appropriate training in the extinguishing system's function, components and system design from producers. Alternatively, the installation is done in proven cooperation with the manufacturer of the water mist system.

The installer should at least have received appropriate education and training on proper installation, service and maintenance, jr. DBI Guideline 001 "Automatic fire protection-Approval of firms for design, installation, service and maintenance of automatic fire protection systems".

See DBI Guideline 002 "Automatic fire protection systems - Certification of persons for design, installation, service and maintenance of automatic fire protection systems"



Data sheet / design manual

The producer of a water mist system shall for each installation develop a data sheet or a design manual which shall contain all information necessary for installation of a system. It must ensure that the plant will be installed in accordance with the performed tests where it is documented that the system satisfies the established criteria for approval.

The datasheet/ design manual should minimum contain the following information:

- Nozzle type
- Minimum water consumption at least nozzle pressure, minimum and maximal nozzle spacing and water density.
- Nozzle placement
- Area of coverage
- Maximal System pressure
- Method for calculation sufficient water consumption, liter per minute(l/min) and pressure loss calculations
- Room height/maximal volume
- Pressure testing procedure
- Procedure for pipe flushing and draining
- Procedure for assembly of piping and components
- Minimum requirements for quality of piping and components
- Quality procedures for installation and commissioning
- Procedure for handling of materials
- User Manual
- Service and maintenance manual
- Minimum water quality requirements for proper system functionality.

If the system contains additives, the data sheet or design manual should also contain:

- Specific type
- Specific concentration
- method for blending the additive with water
- durability / replacement interval
- necessary preventive measures to ensure the health and lives of individuals who might be exposed
- necessary preventive measures to address environmental impacts
- necessary measures to prevent corrosion in plant and / or protected parts.

If the system works with a mixture of water and gases, the data sheet or design manual should also contain:

- Requirements to the supply of the gas and the assembly of water-and air component
- Mixing ratio
- Necessary preventive measures to ensure the life and health of persons who might be expose
- Preventive measures to avoid pressure damages.



Inspection

A water mist system can be considered as equivalent to a traditional sprinkler system and therefore should also be inspected.

Authorities, insurance agents and construction owners / users will usually require that a sprinkler system shall be inspected by an accredited inspection company as proof that the system meets the specified requirements. Therefore it is important that a water mist system is inspected.

How is a Water mist system inspected?

Inspection companies accredited for first time inspection and annual inspections, applicable for sprinkler or extinguishing systems with relevant procedures, shall be valid for the water mist systems as well.

See DBI Guideline 004 "Automatic fire protection installations – System completion, inspection and approval."

Operation and maintenance

It is of utmost importance that water mist systems are maintained properly. The Aim is to:

- Secure facility daily functioning so that harm to people and assets completely or partially are avoided.
- Prevent unnecessary strain on the emergency departments through proper use of the building relative to the installed water mist system, thus avoid unwanted alarms.

In order to achieve these objectives it is necessary that:

- installer, system supplier or manufacturer shall provide an adequate instruction for service and maintenance when the system is transferred to the owner / user
- elements for sprinkler and extinguishing systems given in DBI Guideline 005 "Automatic fire protection installations - Operation and maintenance", as the water mist system structure must be implemented
- If the systems supplier, the manufacturer or installer still have further requirements these must also be implemented.



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Water Mist Systems in buildings

