



BSI Standards Publication

Fixed firefighting systems — Water mist systems

Part 1: Design, installation, inspection and maintenance

National foreword

This British Standard is the UK implementation of EN 14972-1:2020+A1:2025. It supersedes BS EN 14972-1:2020, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by A1 A1.

The UK participation in its preparation was entrusted to Technical Committee FSH/18/5, Watermist systems.

A list of organizations represented on this committee can be obtained on request to its committee manager.

The UK committee initially voted against the approval of the original version of EN 14972-1:2020, citing several critical concerns regarding its content and applicability. However, the UK committee believes that the amendment to the standard has addressed some of the previously identified issues, offering enhanced clarity and incorporating additional details regarding fire test protocols and associated design considerations.

Users of this standard are advised to exercise due diligence when reviewing any DIOM manual submitted as part of a system design validation process. The system's specific requirements ought to be fully understood and adhered to for effective performance and compliance.

For applications within the UK, the committee reminds users of the existence of the BS 8489 series, which provides guidance on water mist systems applications. At the time of writing, BS 8458, *Fixed fire protection systems — Residential and domestic watermist systems — Code of practice for design and installation*, while subject to a proposed withdrawal, is also still available.

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English Version

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Installations fixes de lutte contre l'incendie - Systèmes
à brouillard d'eau - Partie 1 : Conception, installation,
inspection et maintenance

Ortsfeste Brandbekämpfungsanlagen -
Wassernebelsysteme - Teil 1: Planung, Einbau,
Inspektion und Wartung

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European foreword

This document (EN 14972-1:2020+A1:2025) has been prepared by Technical Committee CEN/TC 191 “Fixed firefighting systems”, the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2025, and conflicting national standards shall be withdrawn at the latest by November 2025.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document includes Amendment 1, approved by CEN on 7 April 2025.

This document supersedes  EN 14972-1:2020 .

The start and finish of text introduced or altered by amendment is indicated in the text by tags  .

The former CEN/TS 14972:2011 was reviewed and replaced with this new European Standard.

EN 14972, *Fixed firefighting systems — Water mist systems*, consists of the following parts:

- *Part 1: Design, installation, inspection and maintenance;*
- *Part 2: Test protocol for shopping areas for automatic nozzle systems;*
- *Part 3: Test protocol for office, school class rooms and hotel for automatic nozzle systems;*
- *Part 4: Test protocol for non-storage occupancies for automatic nozzle systems;*
- *Part 5: Test protocol for car garages for automatic nozzle systems;*
- *Part 6: Test protocol for false floors and false ceilings for automatic nozzle systems;*
- *Part 7: Test protocol for commercial low hazard occupancies for automatic nozzle systems;*
- *Part 8: Test protocol for machinery in enclosures exceeding 260 m³ for open nozzle systems;*
- *Part 9: Test protocol for machinery in enclosures not exceeding 260 m³ for open nozzle systems;*
- *Part 10: Test protocol for atrium protection with sidewall nozzles for open nozzle systems;*
- *Part 11: Test protocol for cable tunnels for open nozzle systems;*
- *Part 12: Test protocol for commercial deep fat cooking fryers for open nozzle systems;*
- *Part 13: Test protocol for wet benches and other similar processing equipment for open nozzle systems;*
- *Part 14: Test protocol for combustion turbines in enclosures exceeding 260 m³ for open nozzle systems;*

- *Part 15: Test protocol for combustion turbines in enclosures not exceeding 260 m³ for open nozzle systems;*
- *Part 16: Test protocol for industrial oil cookers for open nozzle systems;*
- *Part 17: Test protocol for residential occupancies for automatic nozzle systems.*

NOTE This list includes standards that are in preparation and other standards may be added. For current status of published standards, refer to www.cen.eu.

This document converts CEN/TS 14972:2011 into a full EN standard. It is a full revision of the Technical Specification, and incorporates the following principal changes:

- guidance on areas of operation;
- guidance on effective capacity of tanks;
- extension of scope of application to cover more areas in buildings when supported by test standards produced by other organizations.

Any user claiming compliance with this document is expected to be able to justify any course of action that deviates from its recommendations.

This document is intended for use by manufacturers, designers and installers of water mist systems, and for authorities having jurisdiction.

It has been assumed in the preparation of this document that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

Water mist systems

Fixed water mist systems for the fire protection of industrial, commercial and residential hazards comprise specially designed nozzles mounted in pipework, and connected via control valves to a dedicated water supply.

Specific areas within buildings can be protected by water mist where relevant fire test protocols exist.

Water mist systems deliver a mist of small droplets which control, suppress or extinguish fire by:

- absorbing heat from the fire and its surroundings;
- smothering the flames by localized oxygen depletion through evaporation to steam;
- blocking some of the radiant heat transfer to adjacent combustible materials;
- wetting and cooling of the fuel surface.

Fires such as those involving flammable liquids (class B fires) can be extinguished using water mist. Fires such as those involving ordinary combustible materials (class A fires) can be controlled and suppressed using water mist and may also be extinguished. Water mist can also prevent flash-over.

With the high surface area of the droplets produced, water mist is able to absorb relatively large amounts of heat and thus provide efficient cooling.

Currently, the majority of applications for water mist relate to property and asset protection. However, under certain circumstances, water mist can improve conditions within the protected space and thus increase the chances of survival for personnel inside the protected areas. It can also enhance personnel protection in more general applications by protecting facilities thereby enhancing the safety of individuals.

Water mist is a specific application solution which needs to be proven for each individual application and/or occupancy.

1 Scope

This document specifies requirements and gives recommendations for the design, installation, inspection and maintenance of all types of fixed land based water mist systems.

This document is intended to apply to water mist automatic nozzle systems and water mist deluge systems supplied by stand alone or pumped systems.

The document covers only applications and occupancies which are covered by the fire test protocols of the EN 14972 series.

Aspects of water mist associated with explosion protection and/or use within vehicles are not covered by this document.

This document does not cover all legislative requirements. In certain countries specific national regulations apply and take precedence over this document. Users of this document are advised to inform themselves of the applicability or non-applicability for this document by their national responsible authorities.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 3-7:2004+A1:2007, *Portable fire extinguishers — Part 7: Characteristics, performance requirements and test methods*

EN 54 (all parts), *Fire detection and fire alarm systems*

CEN/TS 54-14, *Fire detection and fire alarm systems — Part 14: Guidelines for planning, design, installation, commissioning, use and maintenance*

EN 12094-1, *Fixed firefighting systems — Components for gas extinguishing systems — Part 1: Requirements and test methods for electrical automatic control and delay devices*

EN 12094-2, *Fixed firefighting systems — Components for gas extinguishing systems — Part 2: Requirements and test methods for non-electrical automatic control and delay devices*

EN 12094-4, *Fixed firefighting systems — Components for gas extinguishing systems — Part 4: Requirements and test methods for container valve assemblies and their actuators*

EN 12094-8, *Fixed firefighting systems — Components for gas extinguishing systems — Part 8: Requirements and test methods for connectors*

EN 12094-10, *Fixed firefighting systems — Components for gas extinguishing systems — Part 10: Requirements and test methods for pressure gauges and pressure switches*

EN 12259-1, *Fixed firefighting systems — Components for sprinkler and water spray systems — Part 1: Sprinklers*

EN 12259-2, *Fixed firefighting systems — Components for sprinkler and water spray systems — Part 2: Wet alarm valve assemblies*

EN 12259-3, *Fixed firefighting systems — Components for automatic sprinkler and water spray systems — Part 3: Dry alarm valve assemblies*

EN 12259-12 ^{A1}, *Fixed firefighting systems — Components for sprinkler and water spray systems — Part 12: Pumps*

EN 12845:2015+A1:2019, *Fixed firefighting systems — Automatic sprinkler systems — Design, installation and maintenance*

EN 14972 (all parts) ^{A1}, *Fixed firefighting systems — Water mist systems*

EN 15004-1:2019, *Fixed firefighting systems — Gas extinguishing systems — Part 1: Design, installation and maintenance (ISO 14520-1:2015, modified)*

EN 17450-1 ^{A1}, *Fixed firefighting systems — Water mist components — Part 1: Product characteristics and test methods for strainer and filter components*

EN 17451 ^{A1}, *Fixed firefighting systems — Automatic sprinkler systems — Design, assembly, installation and commissioning of pump sets*

EN 50342 (all parts), *Lead-acid starter batteries*

EN 60529, *Degrees of protection provided by enclosures (IP Code)*

EN 60623, *Secondary cells and batteries containing alkaline or other non-acid electrolytes - Vented nickel-cadmium prismatic rechargeable single cells (IEC 60623)*

ISO 3046-1, *Reciprocating internal combustion engines — Performance — Part 1: Declarations of power, fuel and lubricating oil consumptions, and test methods — Additional requirements for engines for general use*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <http://www.iso.org/obp/>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1.1

additive

chemical or mixture of chemicals, intentionally injected to the water mist system or pre-mixed with the water in the water supply and/or system piping

Note 1 to entry: The additive can have one or more of the following purposes:

- compliance with fire protection requirements;
- corrosion protection;
- frost protection;
- preventing micro-biological growth.

3.1.2

area of operation

<automatic nozzles> maximum area over which it is assumed, for design purposes, that automatic water mist nozzles will operate in a fire

<open nozzles> all nozzles included in one section

Note 1 to entry: The total area of operation can consist of more than one section.

3.1.3

atomizing gas

compressed air or other gas used to produce water mist by mixing with the water

3.1.4

authorities

organizations responsible for approving water mist systems, equipment and procedures, e.g. the fire and building control authorities, the fire insurers, the local water authority or other appropriate public authorities

3.1.5

automatic nozzle water mist system

water mist system with activation based on an individual automatic water mist nozzle that operates when its thermal release element is heated to its thermal rating or above, allowing water mist to discharge over specified area or volume

Note 1 to entry: Automatic nozzle water mist systems are referred to as water mist sprinkler systems in other publications.

Note 2 to entry: According to the type of the pipework the automatic nozzle water mist systems are differentiated in:

- wet pipe systems;
- dry pipe systems; and
- pre-action systems.



3.1.6

automatic water mist nozzle

component with one or more orifices, which is designed to produce and discharge water mist automatically, where the nozzles operate independently of other nozzles by means of a detection/activation device built into the nozzle

3.1.7

competent person

organization

individual or organization that has the requisite training and experience, access to the requisite tools, equipment and information, and is capable of carrying out a defined task

3.1.8

control valve

valve intended to open automatically to control the flow of the extinguishing medium of a water mist system or sections of it and trigger an alarm

Note 1 to entry: A control valve may be:

- a deluge valve for a deluge system;
- a wet valve for an automatic wet pipe system;
- a dry valve for an automatic dry pipe system;
- a pre-action valve for an automatic pre-action system.

3.1.9

deluge water mist system

water mist system with activation based on the simultaneous discharge from all the predetermined nozzles included in one system section that operates when a fire detection and fire alarm system actuates the control valve controlling the flow to that system section or by manual means

Note 1 to entry: According to the application characteristics the deluge water mist systems are differentiated in:

- local application systems;
- volume protection systems; and
- zoned protection systems (sectioned systems).

3.1.10

discharge operating time

time interval from the start until the end of the discharge of water mist from the system nozzle(s)

Note 1 to entry: The discharge time is expressed in minutes.

3.1.11

dry pipe system

water mist system using automatic nozzles in which the pipework is always charged with air or inert gas under pressure

Note 1 to entry: The water flows into the piping system and out through any activated nozzles.

3.1.12

enhanced availability water mist system

water mist system with additional measures for enhanced availability of the system

Note 1 to entry: For example, for life safety or insurance purposes.

3.1.13

fire control

to limit the size of the fire by distribution of water to reduce the heat release rate and pre-wet adjacent combustibles, while controlling the gas temperatures at the ceiling and limiting the radiation to prevent damage to structures during the discharge operating time

3.1.14

fire extinguishment

complete elimination of any flaming or smouldering fire and the prevention of re-ignition

3.1.15

fire suppression

reduction in the heat release rate and prevention of re-growth of the fire during the discharge operating time

3.1.16

flash-over prevention

reducing the average temperature inside the protected volume to whereby combustion products in the smoke layer do not ignite

3.1.17

flash-over

rapid transition to a state of total surface involvement in a fire of combustible material within an enclosure

3.1.18

free-burn test

fire test without activation of the water mist system

3.1.19

hydraulically most favourable area

area of operation for which the water flow is at its maximum for a specified pressure, measured at the control valve or pump set

3.1.20

hydraulically most unfavourable area

area of operation for which the system pressure, when measured at the control valve or pump set, is required to be at its maximum to achieve the specified flow rate

3.1.21

inspection

<water mist systems> examination of an installation or their design and determination of its conformity with specific requirements or, on the basis of professional judgment, with general requirements at required intervals undertaken by a competent person

3.1.22

installer / installation company

organization or part of an organization delivering one or more services related to the planning, design, installation or maintenance of a water mist system to a client, trained and authorised by the water mist component manufacturer

Note 1 to entry: EN 16763 use the term service provider.

3.1.23

intermittent system

deluge water mist system which may cycle on and off the supply of water to the nozzles, according to the fire test protocol(s)

3.1.24

local application system

system designed to protect a particular object or hazard and within the containment or confinement area around the hazard

EXAMPLE For the protection of individual generators within a larger enclosure.

3.1.25**maintenance**

combination of all technical, administrative actions, including monitoring actions, intended to retain an item in, or restore it to, a state in which it can perform a required function undertaken by a competent person

[SOURCE: EN 13306:2017, definition 2.1, modified]

Note 1 to entry: Maintenance can include inspection and repair.

3.1.26**manufacturer's design, installation, operation and maintenance manual (DIOM)**

document describing the design process and giving details on the installation, operation and maintenance

Note 1 to entry: It is issued by the water mist system manufacturer for specific application, based on the results of successful fire tests. The contents of the DIOM manual will form part of the assessment of the overall system compliance.

3.1.27**means of escape**

whereby a safe route or routes in the event of fire is or are provided for persons to travel from any point in a building to a place of ultimate safety

3.1.28**maximum pressure**

at a nozzle inlet with water flowing

3.1.29**minimum pressure**

minimum pressure at a nozzle inlet with water flowing

Note 1 to entry: Specific to the fire test protocol to which the nozzle is applied, as specified by the manufacturer.

Note 2 to entry: Often referred to as design pressure in manufacturer literature.

Note 3 to entry: During discharge the operating pressure may be constant or time-dependent, contingent to the fire test protocol.

3.1.30**maximum standby pressure**

maximum pressure to which the installed nozzle is exposed due to the effects of the pressure maintenance device and head of water, as specified by the manufacturer

3.1.31**minimum standby pressure**

minimum pressure to which the installed nozzle is exposed due to the effects of the pressure maintenance device and head of water, as specified by the manufacturer

Note 1 to entry: This can be lower or higher than the operating pressure.

Note 2 to entry: This may be static pressure or flowing pressure.

3.1.32

maximum rated pressure

maximum allowable pressure that a pressure bearing component may be exposed to

Note 1 to entry: This pressure is maximum pressure to which the component is listed, which will normally be much higher than likely to be in the applied system design.

3.1.33

open water mist nozzle

component, with one or more orifices, which is designed to discharge water mist

3.1.34

operating pressure

range of pressures between minimum and maximum operating pressures

3.1.35

pre-action water mist system

dry pipe water mist system, in which an independent fire detection and fire alarm system in the protected area allows the water to flow into the pipework prior to the independent operation and subsequent operation of any automatic nozzle

Note 1 to entry: There are two types of pre-action system:

Type A pre-action system - otherwise normal dry pipe system in which:

- the air/inert gas pressure in the installation is monitored at all times;
- the control valve set is activated by an automatic fire detection system but not by the operation of the automatic nozzles;
- at least one quick opening manually operated valve is installed in an appropriate position to enable the pre-action valve to be activated in an emergency.

Type B pre-action system - otherwise normal dry pipe system in which:

- the control valve set is activated either by an automatic fire detection system or by the operation of the automatic nozzles;
- independently of the response of the detectors, a pressure drop in the pipework causes the opening of the system control valve.

3.1.36

pre-burn time

time from ignition of the fire source till the operating pressure or design flow is available at the hydraulically most remote nozzle

3.1.37

propellant gas

compressed gas used as a prime mover to push water out of storage vessels or containers, through pipe network or through water mist nozzles

3.1.38

pump set

<water mist systems> pumping unit made of one or more pumps, one or more motors or engines and one or more control panels (controllers) governing the operation

3.1.39**room or volume protection**

complete closed room or a structurally separated volume is protected by a water mist system; normally the water mist extinguishing system is activated for the entire protected area (total flooding system)

3.1.40**self-contained system**

comprises a set of cylinders or a skid mounted pressure tank, connected to a source of gaseous stored pressure (e.g. pressurized air or inert gas cylinders)

3.1.41**standby pressure**

pressure held in system pipework prior to system activation

3.1.42**total flooding system**

system designed to protect all the hazards in an enclosure

3.1.43**user**

person(s) responsible for or having effective control over the water mist systems adopted in or appropriate to the premises or the building

3.1.44**water mist**

water spray for which the $D_{v0,90}$ is less than 1 mm measured in a plane 1 m from the nozzle at its minimum operating pressure

Note 1 to entry: $D_{v0,90}$ is the drop diameter such that the cumulative volume, from zero diameter to the respective diameter, is nine tenths of the corresponding sum of the total distribution.

3.1.45**water mist system**

distribution system of a firefighting system connected to a water supply equipped with one or more water mist nozzles capable of delivering water mist intended to control, suppress or extinguish fire

Note 1 to entry: Water mist systems can discharge plain water mist or a mixture of water mist and some other agent or agents like gases or additives.

3.1.46**water mist system operating time**

total time for which the supply of water mist is designed to last at operating pressure

Note 1 to entry: The time is given in minutes.

Note 2 to entry: For systems with intermittent discharge it is the sum of the times of discharge and the times without discharge.

Note 3 to entry: The discharge operating time may be longer than the water mist operating time.

3.1.47**water mist system with additives**

water mist system containing substances other than those normally present in fresh water

3.1.48

wet pipe water mist system

water mist system using automatic or automatic/pneumatic nozzles attached to a piping system containing water and connected to a water supply so that water discharges immediately from nozzles operated by the heat from a fire

3.1.49

zone protection systems

water mist system designed to protect multiple hazards in a predetermined portion of an area

3.2 Abbreviations

For the purposes of this document, the following abbreviations apply.

AO	areas of operation for typical automatic nozzle water mist systems
DIOM manual	design, installation, operation and maintenance manual
NPSH	net positive suction head

4 Design

4.1 Design principal

4.1.1 General

Water mist systems shall be designed for specific hazards or occupancies covered by the EN 14972 series fire test protocols and in accordance with information and limitations obtained from these fire test protocols and the manufacturers DIOM manual.

[A1] If no other tolerance is specified in the relevant part of the EN 14972 series, the general tolerances in Annex S shall be applied. **[A1]**

4.1.2 General requirement

Companies installing and/or designing and/or maintaining water mist systems from a water mist system manufacturer shall be trained in those tasks by that water mist system manufacturer.

4.1.3 Full scale fire testing procedures

4.1.3.1 General

[A1] The safe use of a water mist system is limited to applications it has been tested for. Water mist systems shall be tested in accordance with the fire test protocols of the EN 14972 series. The testing should be done following a quality system in accordance with EN ISO/IEC 17025.

Annex A gives guidelines on how to develop new fire test protocols to be added under the EN 14972 series according to CEN regulations.

The applicability of the fire test protocols are described in Annex C through Annex R. For the given application, the relevant annex shall be applied. **[A1]**

4.1.3.2 Test protocols

One of the greatest challenges to engineering of water mist fire suppression systems lies in determining whether the conditions of a particular and recognized test protocol are representative of the actual conditions in a given application based on an understanding of the dynamics of the interaction of water mist with fire. The following application parameters shall to be considered as a minimum.

- a) Determine that the fire hazard is similar to the fire hazard simulated in the test protocol (liquid or solid fuel, flash point, combustibility, quantity, arrangement).
- b) Determine that the compartment volume is within the maximum and minimum volumes of the test room.
- c) Determine that the compartment height is within the maximum and minimum heights in the test protocol.
- d) Determine that the compartment ventilation conditions are similar to those in the test protocol (presence of fans, forced ventilation, etc., area of openings, position of openings).
- e) Determine whether any obstructions to the distribution of mist are simulated in the test protocol.
- f) Determine that the operating time of protection provided by the listed system is appropriate for the actual level of protection needed.

Parameters used during such tests define the limits of a water mist systems application, unless scaling of the results is part of the testing and the method and limits by which scaling may take place is explicitly specified by the applicable EN 14972 test protocol.

For systems using gas as a propellant the extinguishment/suppression shall be demonstrated by running and passing the fire test with air instead of the relevant gas.

NOTE With this test it is demonstrated that the fire fighting mechanism is based on water mist.

4.2 Design, installation, operation and maintenance manual

4.2.1 General

There shall be a design, installation, operation and maintenance manual (DIOM manual) for each water mist system based on the fire test protocol(s). This may be combined in a single document.

The DIOM manual shall be dated and shall be identifiable with a reference number or a date, and revision status to clarify the current version.

The DIOM manual shall be available for the purposes of verification of design, installation and audit of the water mist system.

4.2.2 Content of the DIOM manual

For each application the manufacturer shall prepare a detailed manual to provide a specification of the system information.

Design information shall include at least the following where applicable:

- a) system type and identification;
- b) applicable occupancies with any restrictions;
- c) description of hazards  and storage .
- d) limits of ventilation and ambient conditions;
- e) area and room limitations;
- f) requirements on fire resisting separation;

- g) design parameters:
 - 1) nozzle type and unique model identification;
 - 2) number of operating nozzles or area of operation;
 - 3) additives (if used);
 - 4) minimum operating pressure;
 - 5) specific pressure for the automatic start of the first pump set when the pressure in the water mist system falls;
 - 6) minimum nozzle flow rate and maximum nozzle pressure;
 - 7) minimum and maximum ceiling height;
 - 8) minimum and maximum volume or area;
 - 9) minimum and maximum nozzle spacing;
 - 10) nozzle orientation, installation and positioning parameters;
 - 11) requirements concerning obstructions (e.g. min. distance to beams, spray obstructions);
 - 12) type of fire detection system (if used in the fire test);
 - 13) minimum/maximum distance of thermal release element from below the ceiling;
- h) list of critical components compatible with the water mist system (e.g. nozzles, triggering, signalling and valves);
- i) minimum requirement for water and/or atomizing gas quality;
- j) hydraulic calculations or other dimensioning methods (e.g. pre-engineered systems, accumulator systems);
- k) additives (if applicable);
 - 14) specific type;
 - 15) specific concentration;
 - 16) method of mixing the additive with water;
 - 17) method of handling the mixture of additive and water during the lifetime;
 - 18) material safety data sheet of additives;
 - 19) explanation of the effects of additives;
- l) any constraints critical to the operation of the water mist system (e.g. information about nozzle cover plates, guards and ancillaries such as escutcheon plates);
- m) for each application list the associated fire test protocol and the test report reference.

The operational information shall include at least the following:

- n) full functional system description;
- o) full installation and commissioning instructions;
- p) full operation instructions;
- q) full maintenance and service lifetime intervals and instructions;
- r) distance from the hazard (if applicable).

4.3 Water mist systems using gas for their operation

Water mist systems discharging into the protected volume a gas, different from air, shall also comply with the requirements of EN 15004-1:2019, Clause 5.

4.4 Use of additives

Where water mist systems involving additives are used in normally occupied areas, consideration shall be given to safety aspects related to the nature of the additives.

4.5 Design parameters

The design of the water mist system shall be in accordance with the DIOM manual. ^{A1} It shall be based on successful fire tests in accordance with the EN 14972 series for the specific hazard and type of systems (dry or wet). ^{A1}

4.6 Water and gas supply

4.6.1 Pumped systems requirements

Water supplies with pumps shall be installed to provide the required continuous system flow rates at the required pressures for the required operating time, based upon the hydraulic calculations.

4.6.2 Self-contained systems requirements

A self-contained system typically comprises a set of cylinders or a skid mounted pressure tank, connected to a source of gaseous stored pressure (e.g. pressurized air or inert gas cylinders). The stock of water and propellant required for the total operating time shall be stored.

They shall not:

- a) have a connection to an external water or gas source except for filling purposes;
- b) require any external power source to operate, except for actuation.

4.7 Compartment protection

4.7.1 General

Systems designed for compartment protection shall be characterized by compartment parameters and fire hazard.

4.7.2 Compartment

Compartment parameters shall include at least the compartment geometry, which includes room height, layout, floor area, openings (if applicable) and ventilation (natural or forced). Special

consideration shall be given to the degree of obstruction and the potential shielding of the fire location that can be encountered.

4.7.3 Fire hazard

The fire hazard in the compartment to be protected shall be evaluated taking into account the combustible loading, the fuel type(s) and the geometric presentation of the fuel(s).

The present hazard shall be compared to the scope of the test protocols to ensure that the test protocol is representative of the actual occupancy fire hazard being protected.

Water mist is a specific application solution which shall be proven for each individual application and/or occupancy.

4.7.4 Design requirements

The system shall be designed to match the area, compartment, object and fire hazard characteristics with the successfully passed fire tests of the proposed water mist system. All relevant information can be found in the DIOM manual.

4.8 Requirements for different types of water mist deluge systems

4.8.1 Local application systems

Without any risk assessment the local application fire extinguishing systems shall be designed and installed for the object being protected, together with its associated hazards, in accordance with the design parameters established through representative fire tests.

4.8.2 Local application systems with multiple hazards

Without a specific risk assessment the local application systems for the protection of multiple hazards shall be designed to supply an area with a radius of 7 m around the most unfavourable position of a fire hazard simultaneously with the minimum design parameters specified in the DIOM manual. Where a risk assessment shows that the spread of fire could involve two or more hazards the water mist system shall be designed for the combined hazard and based on the most onerous risk.

4.8.3 Volume protection water mist systems

Volume protection water mist systems shall be designed to be operated in the whole compartment with the minimum design parameters specified in the DIOM manual.

4.8.4 Zoned protection systems

Zoned protection systems, where the protected area is divided in zones shall be designed for all hazards expected to be present in each zone.

4.8.5 Activation and control

4.8.5.1 Activation

Deluge water mist systems shall be automatically activated and be equipped with a manual activation device. For zoned systems the manual activation device shall be on each zone. The manual device shall be located outside the protected space or adjacent to the main exit from the space.

4.8.5.2 Fire detection and fire alarm system and activation system

Water mist deluge systems require a fire detection and fire alarm system as well as an activation system to operate (in accordance with 4.11).

When a specific fire detection is defined in the DIOM manual, based on the results of the fire tests, it shall be used to actuate the water mist system in actual installations.

4.8.5.3 Intermittent systems

Details of specific intermittent misting operations of systems and the associated modes of controls re-setting shall be as defined in the DIOM manual.

4.9 Design of water mist automatic nozzle systems

4.9.1 Extent of protection

For a building, or a specific compartment to be considered fully protected by a water mist system, coverage shall extend to all areas in that building or compartment – with the exception of those areas, rooms or places where water discharge might present a hazard and according to 4.9.2 and 4.9.3.

Crawl spaces and voids shall be protected unless the risk assessment of fire load and fire separation shows it to be unnecessary.

4.9.2 Permitted exceptions within a building

Water mist protection shall be considered in the following cases, but may be omitted after due consideration of the fire load in each individual case:

- a) washrooms and toilets constructed of non-combustible material and which are not used to store combustible materials or made ready for electrical appliances like washers and dryers;
- b) enclosed staircases and enclosed vertical shafts (e.g. lifts or service shafts) containing no combustible material and constructed as a fire resistant separation;
- c) rooms protected by other automatic firefighting systems, (e.g. sprinkler system, gas, powder and water spray);
- d) wet processes (e.g. wet end of paper making machines);
- e) small cupboards (i.e. less than 2 m²).

4.9.3 Material reaction

Water mist systems shall not be used in those cases where the application of water can cause additional hazards.

Liquefied gases: Water mist systems should not be used for direct application to liquefied gases at cryogenic temperatures (such as liquefied natural gas), which boil violently when heated by water.

NOTE Materials which react with water include: reactive metals, such as lithium, sodium, potassium, magnesium, titanium, zirconium, uranium and plutonium; metal alkoxides, such as sodium methoxide; metal amides, such as sodium amide; carbides, such as calcium carbide; halides, such as benzoyl chloride and aluminium chloride; hydrides, such as lithium aluminium hydride; oxyhalides, such as phosphorus oxybromide; silanes, such as trichloromethylsilane; sulfides, such as phosphorus pentasulfide, cyanates, such as methylisocyanate.

4.9.4 System design

4.9.4.1 General

Where a risk assessment shows that the spread of fire could involve two or more hazards, the water mist system shall be designed for the combined hazard and based on the most onerous hazard.

4.9.4.2 Hydraulic calculations

The designer shall provide hydraulic calculations (see 4.12) which show that the minimum and maximum pressure and flow requirements (for water and atomizing media as applicable) as defined in the DIOM manual are met for the most unfavourable and most favourable area of operation (see 4.9.4.3).

This hydraulic calculation shall be made with the installed water supply and for the low water level/ minimum pressure for main connection.

Where hazards having different hazard classifications are protected by the same system, the maximum and minimum pressures per each different nozzle shall be met, with the maximum and minimum operating pressure being based on the most onerous requirements with regard to nozzle operating pressure.

The designer shall provide a calculation that the water supply is able to supply the most favourable area of operation for the specified operating time (see 4.13.5).

4.9.4.3 Area of operation

The area of operation to be hydraulically calculated shall be based on the “minimum design area” or the “minimum nozzle quantity”, as defined in Table 1, whichever is greater.

A1

Table 1 — Design criteria

Occupancy ^c	Minimum design area ^{a, e}	Minimum nozzle quantity ^{a, d}	Fire test protocol
Sales areas, storage areas adjacent to sales areas, archives, libraries, technical areas/mechanical floors or similar.	216 m ²	—	EN 14972-2
Cellular offices and open plan offices, areas with counters, restaurants and kitchens, public areas in buildings with non-storage, escape routes or other corridors, churches, museums, hotel rooms, rooms in hospitals, nursing homes, senior citizens residences, apartments, training classrooms, recreation areas or similar.	72 m ²	6	EN 14972-3
Apartments, churches, concealed spaces (greater 800 mm in height), gymnasiums, hospitals and hospital laboratories, hotel rooms, libraries, museums, offices, meeting rooms, restaurant seating areas, kitchens, schools and university class rooms, unused attics, institutions or similar.	140 m ²	9	EN 14972-4

Occupancy ^c	Minimum design area ^{a, e}	Minimum nozzle quantity ^{a, d}	Fire test protocol
Non-stacking garages, fully enclosed garages and underground garages for horizontal, solid, flat ceilings with heights of 2 m and above.	144 m ² (wet system) 180 m ² (dry system)	—	EN 14972-5
Horizontal false ceilings and false floors between 300 mm and 800 mm.	72 m ²	6	EN 14972-6
Apartments, churches, concealed spaces, gymnasiums, hospitals, hotel rooms, libraries, museums, offices, restaurant seating areas, schools and university class rooms and unused attics or similar.	72 m ²	6	EN 14972-7
Dwelling house, apartment, maisonette, transportable home, house of multiple occupation, bed and breakfast accommodation, boarding houses and blocks of apartments or similar of 18 m or less in height and with a maximum total floor area of 2 400 m ² .	For rooms greater than 64 m ² : 64 m ²	All nozzles in the largest compartment up to maximum 2.	EN 14972-17
Apartment blocks greater than 18 m up to 45 m in height, sheltered and extra care housing, residential care premises, residential rehabilitation accommodation, dormitories and hostels or similar up to 45 m in height ^b .	For rooms greater than 64 m ² : 64 m ²	4	EN 14972-17
<p>^a Values are applicable for wet pipe water mist systems unless indicated.</p> <p>^b Some countries may have a national annex with guidance on the maximum height and any additional requirements for apartment buildings higher than 18 m.</p> <p>^c The overlap in occupancies described in the table is due to more than one fire test protocol in the EN 14972 series, covering the same occupancy. Refer to Annex C through Annex R, and the DIOM manual, for the minimum design criteria for the respective fire test protocol for the water mist system.</p> <p>^d If no value is given, the minimum number of nozzles is calculated based on the number of nozzles within the area of operation.</p> <p>^e For buildings with more than 45 m in height, the design area shall be increased to at least 216 m².</p>			

A1

4.9.4.4 Requirements for different types of automatic nozzle water mist systems

4.9.4.4.1 Wet pipe water mist systems

Wet pipe water mist systems shall be used in areas not subject to freezing and shall be used where the room temperature cannot drop below a minimum value of 4 °C. They allow the faster discharge of water

mist into the hazards because there is no delay between the opening of the automatic nozzle and the actual discharge of water mist.

Wet pipe water mist systems in these areas may be allowed if the piping is protected against freezing with appropriate measures, e.g. trace heating.

4.9.4.4.2 Dry pipe systems

Dry pipe systems can be used where the room temperature can drop below 4 °C.

The maximum acceptable discharge-delay of a dry pipe system shall be in accordance with the DIOM manual (as demonstrated in the fire test) and validated for the installation.

In case of protecting more than one floor with a dry pipe system each floor shall have its own control valve. This shall also apply to mezzanines but not balconies.

4.9.4.4.3 Pre-action water mist systems

Pre-action water mist systems shall be used where the threat for water damage is considered an important issue.

Pre-action water mist systems require a separate fire detection and fire alarm system to operate the device controlling the water mist system to allow water to enter the system only after the fire detection and fire alarm system has detected a fire condition.

The maximum acceptable discharge-delay of a pre-action system shall be in accordance with the DIOM manual, as demonstrated in the fire test.

4.9.4.4.4 Area limitation

Unless differently addressed, the protected area, served by a single wet pipe/pre-action control valve, shall not exceed 10 000 m².

4.9.4.4.5 Determination of material factor

The category shall be determined by the following procedure.

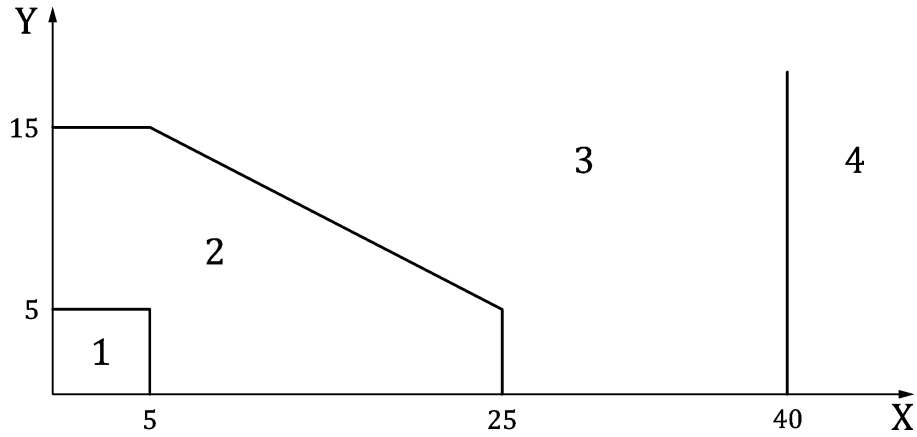
Material factor 1: Non-combustible products in combustible packaging and low or medium combustibility products in combustible/non-combustible packaging. Products having little plastic content as defined below:

- unexpanded plastics content less than 5 % by mass (including the pallet);
- expanded plastics content less than 5 % by volume.

Material factor 2: Goods having higher energy content than material factor 1 goods, for instance those containing plastics in greater quantities as defined in Figure 1.

Material factor 3: Materials which are predominantly unexpanded plastic (see Figure 1) or materials of a similar energy content.

Material factor 4: Materials which are predominantly expanded plastic (more than 40 % by volume) or materials of a similar energy content (see Figure 1).



- Key**
- 1 Material factor 1
 - 2 Material factor 2
 - 3 Material factor 3
 - 4 Material factor 4
 - x % by volume of expanded plastic
 - y % by mass of unexpanded plastic

Figure 1 — Material factor

4.9.4.4.6 Effect of storage configuration

After determining the material factor, the storage configuration shown in Table 2 shall be referred to determine the most appropriate categorization.

Table 2 — Categories as a function of storage configuration

Storage configuration	Material factor 1	Material factor 2	Material factor 3	Material factor 4
Exposed plastic container with non-combustible contents	Category I, II, III	Category I, II, III	Category I, II, III	Category IV
Exposed plastic surface – unexpanded	Category III	Category III	Category III	Category IV
Exposed plastic surface – expanded	Category IV	Category IV	Category IV	Category IV
Open structure	Category II	Category II	Category III	Category IV
Solid block materials	Category I	Category I	Category II	Category IV
Granular or powdered material	Category I	Category II	Category II	Category IV
No special configuration	Category I	Category II	Category III	Category IV

4.9.5 Nozzle selection and positioning

4.9.5.1 Nominal operating temperature for automatic nozzles

Selected nominal operating temperature shall be the closest available to, but not less than 30 °C higher than, the maximum expected ambient temperature in the protected area unless special consideration about the temperature rating selection is given in DIOM manual.

4.9.5.2 Nozzle selection

Nozzles shall be in accordance with the appropriate fire test protocol(s). Nozzles shall be selected in accordance with the DIOM manual for the specified application.

4.9.5.3 Nozzle positioning

Nozzles shall be spaced and installed in accordance with the DIOM manual (see 5.2.3.2).

4.9.6 Alarm device

An alarm device shall be installed on each water mist automatic nozzle system or control valve where used to detect the flow of even a single nozzle with the lowest flow rate operating in the system. The alarm shall be activated and remain permanent operating while there is a flow of water through the system, and shall be connected to a permanently staffed location or in accordance with the fire strategy of the building.

The alarm device shall initiate a fire alarm signal that is audible throughout the protected space.

4.9.7 Test connection

An alarm test connection shall be provided per each water mist automatic nozzle system or control valve where used, terminating in a device giving a flow equal to or less than the flow of a single nozzle with the lowest flow rate installed in the system or section.

4.9.8 Air velocity and openings

Maximum air velocity in the protected space and openings (size and position) shall be taken into account as applicable and shall be in accordance with the DIOM manual.

4.10 Design of water mist deluge system

4.10.1 Nozzle selection and positioning

4.10.1.1 Nozzle selection

Nozzles shall be selected in accordance with the DIOM manual for the specified application.

4.10.1.2 Nozzle positioning

Nozzles shall be spaced and installed in accordance with the requirements of the DIOM manual.

4.10.2 Air velocity and openings

Maximum air velocity in the protected space and openings (size and position) shall be taken into account as applicable and shall be in accordance with the DIOM manual.

4.10.3 Automatic shut-down

4.10.3.1 Ventilation in the protected area

Wherever possible, the ventilation system shall be shut down before the system operates. In those cases where this is not possible or desirable, the air velocity or total leakage area or both shall be within the limits specified by the DIOM manual.

4.10.3.2 Fuel and other combustibles used in the protected area

During a fire incident provision shall be made to stop any supply of additional combustible substances as part of the shut-down emergency procedures (product and raw materials feed), with the exception of the minimum supply for emergency running systems. This point shall also be taken into consideration when specifying the operating period.

4.10.3.3 Power supply to equipment in the protected area

Normally, high voltage power supplies to the equipment in the affected area shall be switched off upon activation of the water mist system or detection of a fire. Minimum supplies for emergency running systems are an exception. Where this is not possible, provisions shall be in accordance with the DIOM manual.

4.11 Fire detection and fire alarm systems activating the water mist system

4.11.1 General requirements

Where a fire detection and fire alarm systems is used to activate a water mist system, the fire detection and fire alarm systems shall fulfil the following requirements, as applicable:

- a) the fire detection and alarm systems shall be in accordance with EN 54 series and national installation regulations;
- b) the fire detection and fire alarm systems shall be installed in all zones or rooms protected by the water mist system;
- c) the fire detection and fire alarm and control lines shall be continuously monitored for faults.

4.11.2 Fire detection and fire alarm systems continuity

The detection system shall be adapted to the risk to be protected. In case the design of the water mist system requires special provisions on the detection system it shall be described in the DIOM manual.

4.11.3 Avoiding false alarms by water mist discharge

The fire detection and fire alarm systems shall be selected and arranged so that the possibility of an alarm being produced in an adjacent zone by the water mist discharge is minimized.

4.11.4 Manual activation

Water mist systems activated by fire detection and fire alarm systems shall be equipped with a manual triggering device.

The manual triggering device shall be located outside the protected area and shall be installed at $(1,4 \pm 0,15)$ m above the floor height, at visible locations.

4.11.5 Electrical detection and activation

4.11.5.1 General

The fire detection and fire alarm systems shall be in accordance with the EN 54 series with the additions in 4.11.5.2 to 4.11.5.3.

4.11.5.2 Electrical equipment

Special attention shall be paid to the use of equipment in hazardous classified areas and the appropriate ingress protection grade.

4.11.5.3 Fire detection and fire alarm systems control panel

The fire detection and fire alarm system control panel shall comply with EN 12094-1.

4.11.5.4 Fire detection and fire alarm systems power supply

4.11.5.4.1 Electric power supply

The electric power supply to the fire detection and fire alarm system shall be in accordance with EN 54-4 and independent of the supply for the protected area.

4.11.5.4.2 Electrical power supply dimensioning

The emergency power supply of the fire detection and fire alarm system shall be capable of keeping the system in operation for at least 24 h from first loss of power. After 24 hours stand by operation the emergency power supply shall still be capable of actuating the water mist system and the related alarm and signalling devices for a minimum of 30 min.

4.11.5.5 Fire detection and fire alarm system power supply isolating switch

The electrical supply isolating switch for the fire detection and fire alarm system shall be clearly marked as "DO NOT SWITCH OFF – AUTOMATIC FIREFIGHTING SYSTEM".

4.11.5.6 Alarm and fault indications

4.11.5.6.1 General

Alarms or fault indicators or both shall be used to indicate the operation of the system or failure of any supervised device. The type (audible, visual), number and location of the devices shall be in accordance with CEN/TS 54-14.

4.11.5.6.2 Alarm and fault signals

Audible alarms and, where appropriate, visible warning signs shall be provided for the followings:

- a) fire alarm signal upon the first alarm from one element of the fire detection and fire alarm system;

- b) system operational status, any conditions that can affect the function of the fire detection and fire alarm system as well as the control and monitoring system shall cause an indication. Such conditions shall include but not be limited to the following:
- 1) failure in the fire detection and fire alarm systems;
 - 2) fault in the activation circuit;
 - 3) status “manual” in case of a device is installed for selection of either automatic or manual operation;
 - 4) failure in power supply.

Alarms and fault indications shall be connected to a permanently staffed location.

4.11.6 Non-electrical detection

4.11.6.1 General

Non-electrical detection devices shall comply with EN 12094-2. Where pneumatic, hydraulic or mechanic detection equipment is used, the lines shall be arranged in such a way that crimping and other possible damages are avoided. Where installations could be exposed to adverse conditions that could affect the integrity of the installation (electrical cable, pipework, key parts, etc.), appropriate precautions shall be taken to counteract such occurrence.

4.11.6.2 Pneumatic fire detection and fire alarm systems

When air or inert gas is used in a pneumatic detection system, the working pressure in the pneumatic detection system shall not exceed 3,5 bar.

4.11.6.3 Pneumatic or hydraulic system supervision

Pneumatic or hydraulic detection systems shall be supervised for low pressure, at a value such that it is possible to prevent inappropriate water mist system activation.

4.12 Hydraulic and pneumatic calculations

The pipe work of each water mist system shall be hydraulically calculated to demonstrate the capability of the water supply to meet the water mist system discharge characteristics. Where an atomizing gas is used, the hydraulic calculation shall include it. Hydraulic and pneumatic calculations shall be carried out using validated calculations (e.g. “Darcy-Weisbach” formula) or dimensioning procedures. Both shall be in accordance with the DIOM manual. Pre-engineered systems shall in accordance with the DIOM manual.

4.13 Water, propellant and atomizing gas supply design

4.13.1 General

Water mist systems shall have at least one automatic supply of water, propellant or atomizing media, where required, to operate the water mist system at the correct pressure, flow and operating time (see 4.13.5).

Water mist systems using gas as propellant or atomizing media shall make provision for minimum operating temperature and cylinder leakage.

4.13.2 Connection to public or town mains

Connection of water mist systems with town mains may be covered by national or local rules.

4.13.3 Flow requirement

4.13.3.1 Flow requirement for water mist automatic nozzle systems

The flow required for water mist automatic nozzle systems shall be based on the flow rate of the nozzles in the hydraulically most favourable area of operation, or on the number of nozzles specified to operate simultaneously, whichever is higher. The amount of atomizing gas, where required, shall be sufficient for the above mentioned total flow.

4.13.3.2 Flow requirement for deluge water mist systems

The flow required for deluge water mist systems shall be based on the supply of the largest single protected area or group of simultaneously protected areas at the maximum operating pressure. The amount of atomizing gas, where required, shall be sufficient for the total flow.

4.13.4 Maximum and minimum water pressure

The maximum and minimum pressure of the water supply and of the atomizing gas, where required, shall be within the approved limits of operating pressure for the nozzles specified by the DIOM manual taking into account both the hydrostatic pressure difference and the pipe hydraulic pressure loss.

4.13.5 Discharge operating time

The relevant discharge operating times which are to be used are given in Table 3 and Table 4. It should be noted that these minimum operation times should be assessed for each application and if necessary increased.

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Table 3 — Minimum discharge operating time

Fire extinguishing systems	Discharge operating time
Wet benches	Twice the extinguishment time. Minimum operation time is 2 min. Time delay limited to 30 s, unless otherwise proven in the tests.
Commercial deep fat cooking fryers	Twice the total time it takes to extinguish the fire and to cool the oil below the auto-ignition temperature in accordance with the fire test protocol. Minimum operation time is 10 min.
Industrial oil cookers	Twice the total time it takes to extinguish the fire and to cool the oil below the flash point in accordance with the fire test protocol. Minimum operation time is 10 min.
Other fire extinguishing systems	Whichever is greater: — twice the longest extinguishment time in the relevant fire tests; — the time to shut down the process equipment; or — 10 min.

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Table 4 — Minimum time of operation

Occupancy ^a	Minimum Operation Time min	Fire test protocol
Sales areas, storage areas adjacent to sales areas, archives, libraries, technical areas or similar.	60	EN 14972-2
Cellular offices and open plan offices, areas with counters, restaurants and kitchens, public areas in buildings with non-storage, escape routes or other corridors, churches, museums, hotel rooms, rooms in hospitals, nursing homes, senior citizens residences, apartments, training classrooms, recreation areas or similar.	60	EN 14972-3
Apartments, churches, concealed spaces (greater 800 mm in height), gymnasiums, hospitals and hospital laboratories, hotel rooms, libraries, museums, offices, meeting rooms, restaurant seating areas, kitchens, schools and university class rooms, unused attics, institutions or similar.	60	EN 14972-4
Non-stacking garages, fully enclosed garages and underground garages for horizontal, solid, flat ceilings with heights of 2 m and above.	60	EN 14972-5
Horizontal false ceilings and false floors between 300 mm and 800 mm.	60	EN 14972-6
Apartments, churches, concealed spaces, gymnasiums, hospitals, hotel rooms, libraries, museums, offices, restaurant seating areas, schools and university class rooms and unused attics or similar.	60	EN 14972-7
Atriums with low or medium fire load, where the fire load is maximum 1,5 m high.	60	EN 14972-10
Cable tunnels with maximum 1 m/s longitudinal ventilation.	30	EN 14972-11
Dwelling house, apartment, maisonette, transportable home or similar.	10	EN 14972-17
House of multiple occupation, bed and breakfast accommodation, boarding houses and apartment blocks or similar of 18 m or less in height and with a maximum total floor area of 2 400 m ² .	30	EN 14972-17
Apartment blocks up to 18 m in height, sheltered and extra care housing, residential care premises, residential rehabilitation accommodation, dormitories and hostels or similar.	30	EN 14972-17

Occupancy ^a	Minimum Operation Time min	Fire test protocol
Apartment blocks greater than 18 m up to 45 m in height, sheltered and extra care housing, residential care premises, residential rehabilitation accommodation, dormitories and hostels or similar from 18 m to 45 m in height ^b .	60	EN 14972-17
^a The overlap in occupancies described in the table is due to more than one fire test protocol in the EN 14972 series, covering the same occupancy. Refer to Annex C through Annex R, and the DIOM manual, for the minimum design criteria for the respective fire test protocol for the water mist system. ^b Some countries may have a national annex with guidance on the maximum height and any additional requirements for apartment buildings higher than 18 m.		

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Intermittent systems shall repeat the discharge sequence throughout the required discharge operating time.

4.13.6 Type of water supply

4.13.6.1 Acceptable sources of water supply

Water mist system water supply shall be at least one of the following:

- a) a connection to the public water main;
- b) a pressurized tank or cylinder system;
- c) a gravity tank;
- d) a combination of water reservoir(s) and automatic fire pump(s).

4.13.6.2 Acceptable propellant/atomizing gas supply systems

Water mist system atomizing gas supply, where required, shall be one of the followings:

- a) a reservoir of pressurized gas in tank(s) or cylinder(s) for the exclusive use in the water mist system;
- b) a combination of automatic compressor(s).

4.13.7 Availability

4.13.7.1 General

The water supply shall be capable of supplying the maximum demand of both the hydraulically most unfavourable and the hydraulically most favourable area of operation.

The water shall be free from fibrous or other matter in suspension liable to cause accumulations in the system piping. Salt or brackish water shall not be retained in water mist systems.

The water quality shall be specified in the DIOM manual.

Where the fire strategy requires additional measures to improve system reliability and availability, the following needs to be fulfilled:

- a) a town main fed from both ends, fulfilling the following conditions:
 - 1) each end shall be capable of satisfying the flow demands of the water mist system;
 - 2) it shall be fed from two or more water sources;
 - 3) it shall be independent at any point on a single, common trunk main;
 - 4) if only one end gives the required pressure, a single booster pump shall be installed. If both ends cannot give the required pressure, two or more booster pumps shall be installed;
- b) a gravity tank with no booster pump, or storage tank with two or more pumps, where the tank fulfils the following conditions:
 - 5) the tank shall be full capacity;
 - 6) there shall be no entry for light or foreign matter;
 - 7) clean water shall be used;
 - 8) the tank (including break tank) shall be corrosion resistant or coated or given other corrosion protection which reduces the need for emptying the tank for maintenance to periods of no less than 10 years.
- c) an inexhaustible source with two or more pumps.

4.13.7.2 Reduced capacity water reservoir

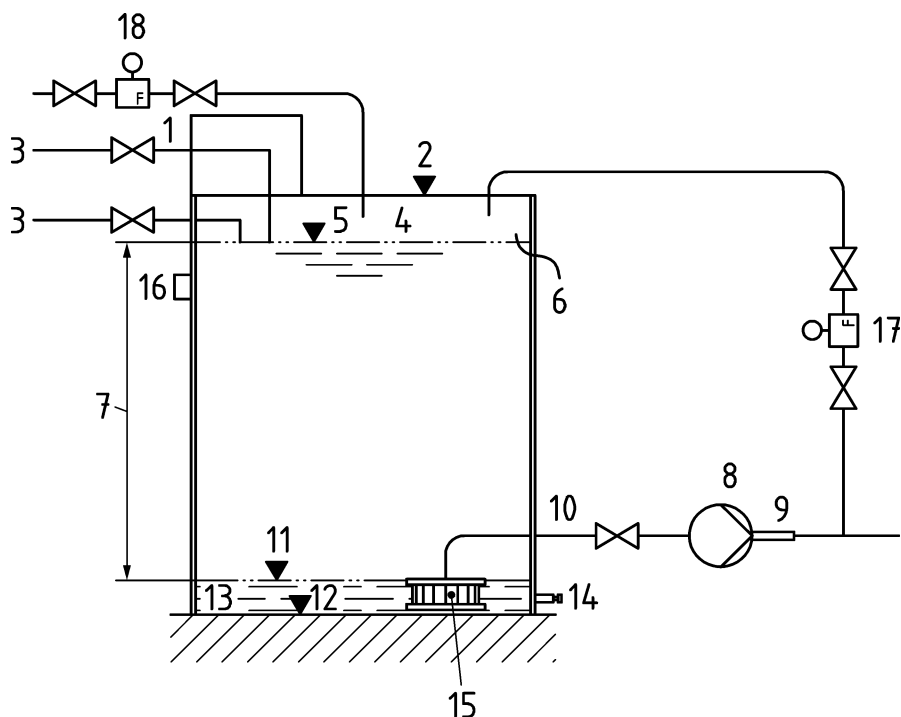
The refill rate for reduced capacity tanks shall be sufficient to ensure the operating time according Table 3 and Table 4, even if one of the refill devices is out of order. Electrically powered refill devices shall have adequate emergency power supplies and shall be monitored and duplicated.

For fire suppression and control systems using reduced capacity tanks the effective capacity shall be not less than 30 % of full capacity and the infill rate shall be sufficient to ensure discharge operating times in accordance with 4.13.5.

Figure 2 and Figure 3 show examples of the arrangements of a water supply with refill tanks.

For fire extinguishing systems using reduced capacity tanks, tanks shall have an effective capacity which is at least equal to

- 5 min operation time of the pump system if the minimum system duration is not more than 30 min; and
- 10 min operation time of the pump system if minimum system duration is more than 30 min.



Key

- | | | | |
|---|--|----|---|
| 1 | shut-off valve | 10 | pump suction pipe |
| 2 | tank lid | 11 | low water level (min. 100 mm above key number 15) |
| 3 | alternative water supply in-fill locations | 12 | base |
| 4 | freeboard ¹ | 13 | dead water |
| 5 | normal water level | 14 | drain |
| 6 | overflow | 15 | vortex inhibitor |
| 7 | effective capacity | 16 | water level alarm sensor |
| 8 | pump set | 17 | pump flow test meter |
| 9 | pump delivery to nozzles | 18 | town main flow test meter (alternative) |

Figure 2 — Effective capacity of tank with a vortex inhibitor (example)

¹ space between the normal water level and the top of the tank to avoid splashing