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Vgrajeni gasilni sistemi - Sistemi s pršečo vodo - 2. del: Zahteve in preskusne metode za šobe

Fixed firefighting systems - Water mist systems - Part 2: Product characteristics and test methods for nozzles

Ortsfeste Brandbekämpfungsanlagen - Wassernebelsysteme - Teil 2: Anforderungen und Prüfverfahren für Düsen

Installations fixes de lutte contre l'incendie - Systèmes à brouillard d'eau - Partie 2 : Caractéristiques de produit et méthodes d'essai pour les diffuseurs

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Fixed firefighting systems - Water mist systems - Part 2: Product characteristics and test methods for nozzles

Ortsfeste Brandbekämpfungsanlagen - Wassernebelsysteme - Teil 2: Anforderungen und Prüfverfahren für Düsen

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (prEN 17450-2:2023) has been prepared by Technical Committee CEN/TC 191 “Fixed firefighting systems”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

EN 17450, *Fixed firefighting systems — Water mist systems*, consists of the following parts:

— Part 1: *Product characteristics and test methods for strainer and filter components*

— Part 2: *Product characteristics and test methods for nozzles*

— Part 3: *Product characteristics and test methods for check valves*[1]

— Part 4: *Product characteristics and test methods for control deluge valves and actuators*

— Part 5: *Product characteristics and test methods for pressure switches*[1]

[1] Document planned.

1 Scope

This document specifies product characteristics and test methods of open nozzles and automatic nozzles for use in water mist systems.

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

EN 60751, *Industrial platinum resistance thermometers and platinum temperature sensors (IEC 60751)*

EN 14972 (all parts), *Fixed firefighting systems — Water mist systems*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14972-1 and the following apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
nozzle filter element
element that collects the particles

EXAMPLE A mesh.

3.2
nominal cross section (size)
calculated cross section on basis of the nominal diameter

3.3
pressure loss
differential pressure between inlet and outlet of the filter

3.4
operating pressure
constant or time-dependent pressure at a nozzle during discharge

3.5
stand-by pressure
pressure in the pipework at a closed automatic nozzle, prior to the activation of the nozzle

Note 1 to entry: This can be static pressure or flowing pressure.

Note 2 to entry: This can be higher or lower than the operating pressure.

3.6
maximum stand-by pressure
highest pressure to which the installed nozzle is exposed, due to the effects of the pressure maintenance device and head of water

Note 1 to entry: Specified by the manufacturer.

3.7
minimum stand-by pressure
lowest pressure to which the installed nozzle is exposed, due to the effects of the pressure maintenance device and head of water

Note 1 to entry: Specified by the manufacturer.

3.8
fire protocol test pressure
lowest pressure used in the fire test measured on the hydraulically most unfavourable nozzle

Note 1 to entry: Specified by the manufacturer.

3.9
maximum operating pressure
highest pressure at the nozzle inlet while operating

Note 1 to entry: Specified by the manufacturer.

3.10
minimum operating pressure
lowest pressure at the nozzle inlet while operating

Note 1 to entry: Specified by the manufacturer.

3.11
release element
part of a nozzle which activates the discharge of the nozzle after thermal or other activation method

4 Product characteristics

4.1 General

The nozzles used in water mist fire protection systems shall be representative of production nozzles and shall pass all of the applicable requirements specified in this document.

All nozzles with orifice diameters less than 2,5 mm shall be equipped with a nozzle filter. The size of the nozzle filter element shall be at least 1,5 times the nominal cross section area of the sum of the orifices behind the filter itself. The filter shall not have a bigger mesh size, i.e. grade of filtration, than 80 % of the smallest nozzle orifice diameter behind the filter itself.

Nozzle types tested in accordance with this document shall be the same as those that have successfully passed the fire tests according to the relevant part of the EN 14972 series.

The nozzles shall be compared according to 5.2.1.

As an optional test the water distribution can be tested according to Annex B.

4.2 Nominal operating temperature for automatic nozzles

The nominal operating temperatures of automatic nozzles are given in Table 1. Automatic nozzles shall be colour coded according to Table 1.

The nominal operating temperature shall be according to 5.2.2.

Table 1 — Nominal operating temperatures and colour codes

Glass bulbs		Fusible links	
Nominal operating temperature °C	Liquid colour code	Nominal operating temperature within range °C	Yoke arms colour code
57	orange	57 to 77	uncoloured
68	red	80 to 107	white
79	yellow	121 to 149	blue
93	green	163 to 191	red
100	green	204 to 246	green
121	blue	260 to 302	orange
141	blue	320 to 343	black
163	mauve	–	–
182	mauve	–	–
204	black	–	–
227	black	–	–
260	black	–	–
286	black	–	–
343	black	–	–

4.3 Thermal response of automatic nozzles

The RTI value shall be verified with tests according to 5.3. In the most unfavourable orientation the average RTI values shall not exceed 250 % of the average RTI values in the standard orientation.

4.4 K-factor

All K-factors shall vary less than ±5 % from manufacturer specifications when tested in accordance with 5.4.

4.5 Function of nozzles

4.5.1 Automatic nozzles

For automatic nozzles, when tested in accordance with 5.5.1, the water mist nozzle shall open and within 5 s of release of the release element shall operate as intended. Any lodgement of released parts shall be cleared within 60 s of the release of the release element.

For nozzles with deflectors or separate/moving parts for the development of a spray, when tested in accordance with 5.5.1, the deflector and its supporting parts shall operate as intended.

4.5.2 Open nozzles

For open nozzles with blow-off caps, when tested in accordance with 5.5.2, the cap shall fully release within 5 s and not impede the discharge at any time.

4.6 Strength of nozzle body and deflector

4.6.1 Mechanical strength test

When tested in accordance with 5.6.1, the water mist nozzle body shall not show permanent elongation of more than 0,2 % in relation to the distance between the load bearing parts at the end of the test.

If the testing of this requirement is not applicable due to the design of the nozzle, the nozzle shall be pressure tested according to 4.6.2.

4.6.2 Hydrostatic strength test

When tested in accordance with 5.6.2, the water mist nozzle body shall not show leakage or permanent elongation of more than 0,2 % in relation to the distance between the load bearing parts at the end of the test.

4.6.3 Strength of nozzle deflector and its supporting or moving parts

For nozzles with deflectors (or other protruding parts which impinge upon the water discharge and alter the spray pattern, or moving parts regardless of their position), when tested in accordance with 5.6.3, the water mist nozzle deflector and its supporting or moving parts shall not be damaged or deformed and shall remain intact.

4.7 Strength of release element of automatic nozzles

4.7.1 General

The testing of release elements shall be done as described in 4.7.2 and 4.7.3.

4.7.2 Automatic nozzles using glass-bulbs

The design lower tolerance limit of bulb strength according to EN 12259-1 (0,99 confidence for 99 % of samples) shall be greater than twice the design upper tolerance limit of the bulb/nozzle assembly load including the highest calculated water pressure on nozzle. Nozzles shall be tested and comply with the requirements described in 5.7.2.

4.7.3 Automatic nozzles using fusible links

For each design, fusible heat-responsive elements in the lowest temperature rating shall demonstrate their ability to sustain the design load when tested in accordance with 5.7.3.

4.8 Leak resistance

When tested in accordance with 5.8, nozzles shall show no sign of leakage. In addition nozzles shall function as intended when tested in accordance with 5.5.3.

4.9 Heat exposure for automatic nozzles

There shall be no damage to the glass bulb when automatic nozzles are tested in accordance with 5.9.

4.10 Resistance against thermal shock for automatic nozzles

For automatic glass bulb water mist nozzles, when tested in accordance with 5.10, the glass bulbs shall remain intact after being cooled in the water bath. The nozzles shall meet the requirements of 4.5 after being cooled in the water bath.

4.11 Resistance against corrosion

4.11.1 Stress corrosion for nozzles with brass parts

Nozzles shall be tested in accordance with 5.11.1.1.

After exposure the nozzles shall show no evidence of cracks, delamination or failure of an operating part.

In the case that any nozzles show evidence of cracking, delamination or failure of an operating part:

— Automatic nozzles shall show no visible evidence of leakage when subjected to the leak resistance test described in 5.8. The nozzles shall operate in such a way that the waterway is cleared; any lodgements shall be ignored, when subjected to a function test in accordance with 5.5.3. The nozzles shall show no evidence of separation of permanently attached parts, when subjected to a flowing pressure test in accordance with C.2.

— Open nozzles shall show no evidence of separation of permanently attached parts, when subjected to a flowing pressure test in accordance with C.2.

4.11.2 Sulphur dioxide corrosion

Nozzles shall be subjected to a sulphur dioxide corrosion test in accordance with 5.11.2.

After exposure, when subjected to a function test in accordance with 5.5.3 the automatic nozzle shall operate such that the waterway is cleared; any lodgements shall be disregarded.

Those nozzles which show evidence of corrosive attack or failure of a non-operating part shall show no visible evidence of separation of permanently attached parts when subjected to the flowing test described in 5.4 and the K-factor shall vary less than ±5 % to the results from 4.4.

4.11.3 Salt mist corrosion

Nozzles shall be subjected to a salt mist corrosion test in accordance with 5.11.3.

After exposure, when subjected to a function test in accordance with 5.5.3 the automatic nozzle shall operate such that the waterway is cleared; lodgements shall be disregarded.

Those nozzles which show evidence of corrosive attack or failure of a non-operating part shall show no visible evidence of separation of permanently attached parts when subjected to the flowing test described in 5.4 and the K-factor shall vary less than ±5 %.

4.11.4 Moist air exposure

Nozzles shall be subjected to moist air exposure in accordance with 5.11.4.

After exposure, when automatic nozzles subjected to a function test in accordance with 5.5.3 the automatic nozzle shall operate such that the waterway is cleared; lodgements shall be disregarded.

Those nozzles which show evidence of corrosive attack or failure of a non-operating part shall show no visible evidence of separation of permanently attached parts when subjected to the flowing test described in 5.4 and the K-factor shall vary less than ±5 %.

4.12 Aging test (by heat exposure) for automatic nozzles (optional)

As an optional test, water mist nozzles can be tested according to 5.12.

When tested in accordance with 5.12 the water mist nozzles shall not operate during the exposure period.

When subjected to the additional tests specified in 5.12, the water mist nozzles shall meet the following requirements:

a) when tested in accordance with 5.5.3, the water mist nozzles shall operate such that the waterway is cleared; any lodgements shall be disregarded;

b) when tested in accordance with Annex F, the water mist nozzles shall conform to the requirements specified in 5.2.2;

c) when tested in accordance with 5.8, the water mist nozzles shall conform to the requirements specified in 4.8.

4.13 Resistance against water hammer for automatic nozzles

When tested in accordance with 5.13 the automatic nozzles shall show no visible evidence of damage.

4.14 Resistance to heat

When tested in accordance with 5.14, the water mist nozzle body, deflector and its supporting parts shall show no significant deformation or breakage.

NOTE For automatic nozzles, this test is executed without release elements.

4.15 Resistance to low temperature for automatic nozzles (optional)

When tested in accordance with 5.15, the water mist nozzle shall not operate and shall show no signs of damage.

Following examination, when subjected to a function test in accordance 5.5.3, the water mist nozzle shall operate in such a way that the waterway is cleared; any lodgements shall be disregarded.

4.16 Resistance to vibration

When tested in accordance with 5.16, the water mist nozzles shall be able to withstand the effects of vibration without deterioration of their performance characteristics.

4.17 Resistance to impact

When tested in accordance with 5.17, the water mist nozzles shall show no signs of damage.

5 Testing, assessment and sampling methods

5.1 General

The tests are conducted at a temperature of (20 ± 10) °C unless otherwise specified.

The tolerance of all test parameters is ±5 % unless specified otherwise.

Water mist nozzles shall be checked for obvious defects before testing.