SLOVENSKI STANDARD
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Vgrajeni gasilni sistemi - Sistemi s pršečo vodo - 10. del: Protokol preskušanja sistemov z odprtimi šobami za zaščito atrija s šobami na stranskih zidovih

Fixed firefighting systems - Water mist systems - Part 10: Test protocol for atrium protection with sidewall nozzles for open nozzle systems

Ortsfeste Brandbekämpfungsanlagen - Feinsprüh-Löschanlagen - Teil 10: Brandversuchsprotokoll für Atriumschutz mit Seitenwanddüsen für offene Düsensysteme

Installations fixes de lutte contre l'incendie - Systèmes à brouillard d'eau - Partie 10 : Protocole d'essai des systèmes à buses ouvertes pour protection d'atrium avec buses murales

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Fixed firefighting systems - Water mist systems - Part 10: Test protocol for atrium protection with sidewall nozzles for open nozzle systems

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

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European foreword

This document (prEN 14972-10:2019) 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 14972, *Fixed firefighting systems — Water mist systems*, consists of the following parts:

— Part 1: *Design, installation, inspection and maintenance*[1)]

— Part 2: *Test protocol for shopping areas* for automatic nozzle systems[1)]

— Part 3: *Test protocol for office, school class rooms and hotel for automatic nozzle systems*[1)]

— Part 4: *Test protocol for non-storage occupancies for automatic nozzle systems*[1)]

— Part 5: *Test protocol for car garages for automatic nozzle systems*[1)]

— Part 6: *Test protocol for false floors and false ceilings for automatic nozzle systems*[1)]

— Part 7: *Test protocol for commercial low hazard occupancies for automatic nozzle systems*[1)]

— Part 8: *Test protocol for machinery in enclosures exceeding 260 m³ for open nozzle systems*[1)]

— Part 9: *Test protocol for machinery in enclosures not exceeding 260 m³ for open nozzle systems*[1)]

— Part 10: *Test protocol for atrium protection with sidewall nozzles for open nozzle systems*[1)]

— Part 11: *Test protocol for cable tunnels for open nozzle systems*[1)]

— Part 12: *Test protocol for commercial deep fat cooking fryers for open nozzle systems*[1)]

— Part 13: *Test protocol for wet benches and other similar processing equipment for open nozzle systems*[1)]

— Part 14: *Test protocol for combustion turbines in enclosures exceeding 260 m³ for open nozzle systems*[1)]

— Part 15: *Test protocol for combustion turbines in enclosures not exceeding 260 m³ for open nozzle systems*[1)]

— Part 16: *Test protocol for industrial oil cookers for open nozzle systems*[1)]

— Part 17: *Test protocol for residential occupancies for automatic nozzle systems*[1)]

1) Under development.

1 Scope

This document specifies the evaluation of the fire performance of water mist systems for fire protection of atriums, with low or medium fire load where the fire load is no greater than 1,5 m height.

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.

prEN 14972-1,[2]: Fixed firefighting systems — Water mist systems — Design, installation, inspection and maintenance

3 Terms, definitions and abbreviations

3.1 Terms and definition

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

ISO and IEC maintain terminological 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
atrium
considered as in this procedure is an open space between or inside buildings with high ceiling exceeding the height of one story where the fire load is located at the floor level only

3.2 Abbreviations

For the purposes of this document, the following abbreviation applies.

CL coverage length

4 General requirements

4.1 Up to a maximum of 5 nozzles used in the fire tests shall be kept for later verification.

4.2 The water mist systems shall be installed in accordance with the manufacturer's specifications which shall include the reference of the test protocol.

4.3 No changes or adjustments to the water mist system shall be performed during the test scenario, with the exceptions of cleaning of nozzles and filters.

[2]) Under preparation. Stage at the time of publication prEN 14972-1:2017.

4.4 Fire tests shall be conducted at minimum and maximum operating pressure prescribed by the manufacturer.

4.5 Operating pressures shall be measured at the hydraulically most remote nozzle.

4.6 Water flow rate shall be measured at a position between the water supply and the inlet to the system to be tested. As an alternative for single fluid systems the water flow rate can be determined by the K-factor and the pressure at the nozzles with an additional pressure measurement.

4.7 The time delay from system activation to water discharge at the most remote nozzle shall not exceed 30 s.

4.8 Unless otherwise stated, the following tolerances shall apply:

— length ± 2 % of value;

— volume ± 5 % of value;

— pressure ± 3 % of value;

— temperature ± 5 % of value.

5 Test equipment requirements

5.1 Test hall

The test hall shall have a floor area of minimum 12 m × 12 m and shall have a minimum height of 12 m.

The test hall shall be generally free of air flow.

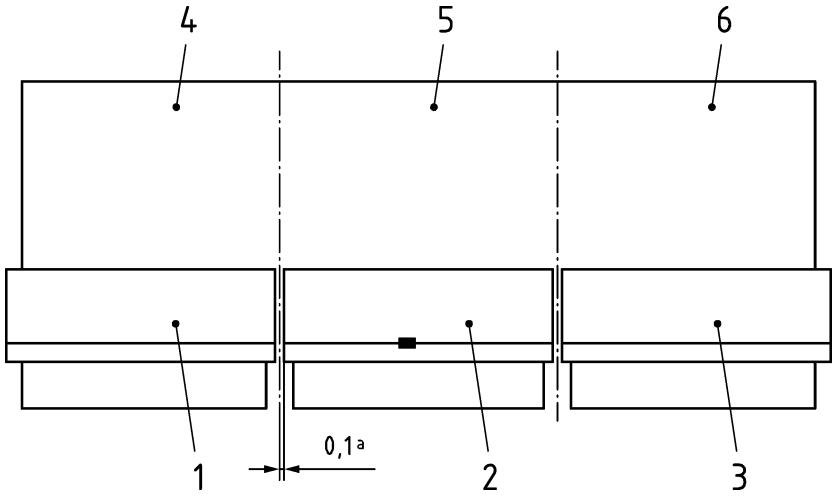
5.2 Fuel package

The standard fuel package design consists of three sofas, a centre sofa and a side sofa on each end of the centre sofa. Each sofa having two polyether mattresses (2 m × 0,8 m × 0,1 m) with cotton fabric covers.

The steel frames for the sofas shall consist of rectangular bottom and backrest frames constructed of steel angles, channels or rectangular stock of at least 3 mm thickness. The frame dimensions shall be 2,0 m × 0,65 m. The seat and backrest cushions shall be supported on each frame by three steel bars 20 mm to 30 mm wide × 0,65 m long spaced every 0,5 m and welded to the frames. Steel plates shall not be used to support the cushions. The assembled frames shall be supported by four legs constructed of similar steel stock. The two rear legs shall be 500 mm in height and the front legs shall be 580 mm in height. Each sofa shall have a rectangular armrest on each end. The armrest shall be constructed of similar steel stock and shall be 0,2 m in height and 0,5 m in length. The rear section of the armrest shall be attached to the bottom frame 50 mm from the backrest.

The sofas are positioned on line with 0,1 m between the seat cushions of the sofas, with the top of the backrest positioned 0,02 m from a vertical back plate made of minimum 10 mm thick plasterboard plates covered with 3 mm to 5 mm thick plywood panelling on the surface facing the sofa arrangement. The wood panelling shall cover the full length of the sofa arrangement and be 2,4 m high. See Figure 1.

Dimensions in metres



Key

1 left side sofa
2 centre sofa
3 right side sofa
4 left panelling 2,4 m × 2 m
5 centre panelling 2,4 m × 2 m
6 centre panelling 2,4 m × 2 m
a gab

Figure 1 — Front view of the standard fuel package design

The mattresses shall be made of non-fire-retarding polyether and they shall have a density of 33 kg/m³ ± 2 kg/m³. The cotton fabric shall not be fire-retardant treated and it shall have an area weight of 0,16 kg/m² ± 0,02 kg/m².

When tested in accordance with ISO 5660-1, the polyether foam shall give the values in Table 1.

Table 1 — ISO 5660-1, cone calorimeter test

Test Conditions	Results	
Irradiance 35 kW/m²	Time to ignition	2-6 (s)
Horizontal position	3 min average HRR, q_{180}	270 ± 50(kW/m²)
Sample thickness 50 mm	Effective heat of combustion	28 ± 3 (MJ/kg)
No frame retainer shall be used	Total heat release	50 ± 12(MJ/m²)

The fuel package elements shall have a normal humidity content prior to the test, as obtained by storage indoor at (20 ± 5) °C for two weeks.

5.3 Ignition source

An igniter is exemplarily shown in Figure 2.

The ignition source shall fulfil the following requirements:

— material: fibreboard;

— dimensions: 60 mm × 60 mm × 75 mm;

— quantity of heptane: 120 ml;

— plastic bag in appropriate size.

After filling in the heptane the plastic bag shall be closed immediately.

Figure 2 — Ignition source (exemplarily)

6 Fire test set-up requirements

6.1 Simulated atrium set-up

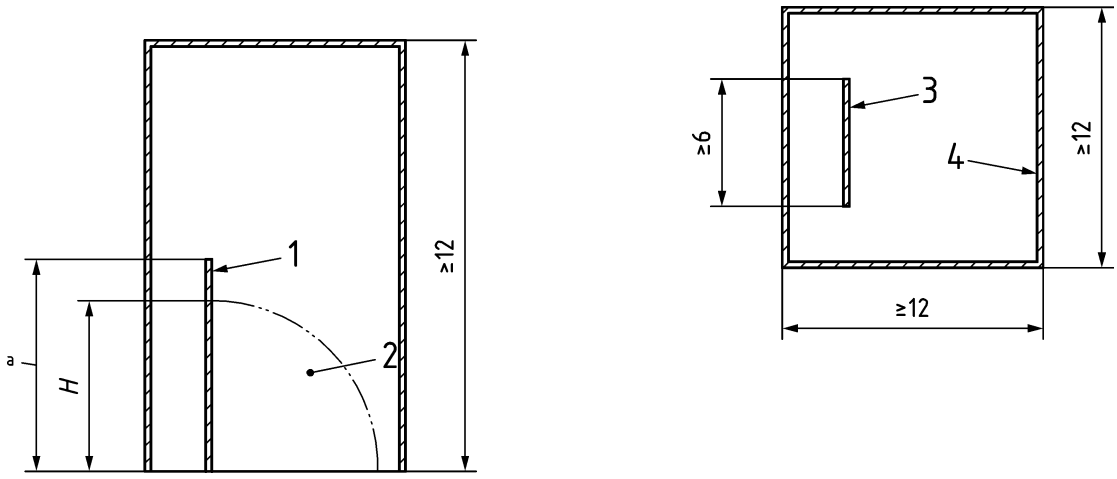
The set-up consists of an atrium wall with the minimum length of 6 m and a minimum height of the maximum installation height (H) of the nozzle plus 1 m at least, see Figure 3.

6.2 Fire test set-up 1: Fuel package up against the atrium wall

The 2,4 m × 6 m wood panelling is positioned on the atrium wall. The sofa group is positioned up against the wood panelling with a 0,02 m gap between the backrest mattress and the wood panelling, and 0,1 m between the sofa mattresses. The thermocouple is positioned 3 m above the ignition point on the centre sofa. See Figures 4 a) and 5.

6.3 Fire test set-up 2: Fuel package positioned at half coverage spacing

Dimensions in metres



Key

	a) Side view		b) Top view
1	atrium wall	3	atrium wall
2	system spray	4	testhall wall
H	coverage length (CL)		
a	maximum installation height (H) of the nozzle + min. 1 m		

Figure 3 — Simulated atrium arrangement

The wood panelling covered 2,4 m × 6 m plaster wall shall be positioned with the wood panelling facing the atrium wall in a distance of 0,5 times coverage length (CL) of the suppression system to be tested.

The sofa group shall be positioned with the backrests 0,02 m from the wood panelling, and 0,1 m between the sofa mattresses. The thermocouple is positioned 3 m above the ignition point on the centre sofa. See Figure 4 b).

6.4 Fire test set-up 3: Fuel package positioned at full system coverage distance

The wood panelling covered plaster wall shall be positioned with the wood panelling facing the atrium wall in a distance of the manufacturer defined coverage length (CL) of the suppression system to be tested.

The sofa group shall be positioned with the backrests 0,02 m from the wood panelling, and 0,1 m between the sofa mattresses. The thermocouple is positioned 3 m above the ignition point on the centre sofa. See Figure 4 c).

6.5 Obstruction fire test set-up 4

If the height of an obstruction exceeds 1,5 m the following additional test shall be carried out (see Figure 4 d). The sofa group shall be positioned as described in 6.3 and 6.4.

The obstruction shall be positioned between the fire load and the sidewall nozzle and shall have a length of 6 m and a thickness as specified by the manufacturer.

The height of the wooden obstruction wall with the length of 6 m shall be 2,4 m which reflects the maximum allowed height of an obstruction.