
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 - Wassernebelsysteme - 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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13.220.10 Gašenje požara Fire-fighting

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EUROPEAN STANDARD

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This European Standard was approved by CEN on 13 March 2022.

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European foreword

This document (EN 14972-10:2022) 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of an identical text or by endorsement, at the latest by October 2022, and conflicting national standards shall be withdrawn at the latest by October 2022.

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.

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.cencenelec.eu.

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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 organisations 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, Turkey and the United Kingdom.

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1 Scope

This document specifies the evaluation of the fire performance of water mist systems for fire protection of interior atriums, with low or medium fire load where the fire load or any obstructions do not extend above 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.

EN 14972-1:2020, *Fixed firefighting systems - Water mist systems - Part 1: Design, installation, inspection and maintenance*

ISO 5660-1, *Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 1: Heat release rate (cone calorimeter method) and smoke production rate (dynamic measurement)*

3 Terms, definitions and abbreviations

3.1 Terms and definition

For the purposes of this document, the terms and definitions given in EN 14972-1 and the following apply. ISO and IEC maintain terminological databases for use in standardization at the following addresses:

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

3.1.1

atrium

open space inside buildings or inside of a building complex with high ceiling exceeding the height of one story where the fire load is located at the floor level only

3.1.2

low fire load

non-storage, non-manufacturing occupancy where the quantity and combustibility of the content are low (less than 150 MJ/m²)

3.1.3

medium fire load

non-storage, non-manufacturing occupancy where the quantity and combustibility of the content are medium (between 150 MJ/m² and 500 MJ/m²)

3.2 Abbreviations

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

<i>CL</i>	coverage length
<i>H</i>	maximum installation height

EN 14972-10:2022 (E)**4 General requirements**

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

NOTE Keeping samples of the tested nozzles is common practice. These are usually kept by the laboratories or the certification bodies.

4.2 The water mist system, after manual activation, shall successfully complete all described performance fire tests.

4.3 The fire load shall be taken from the conditioning area and arranged into the test area just before conducting the test.

4.4 The water flow shall be shut-off 15 min after the activation of the system in the fire test. Any remaining fire shall be manually extinguished and the fire damage shall be recorded.

4.5 All fire tests shall be conducted using the manufacturer instructions in regard to nozzle placement, spray flux, and operating pressure. Sprays shall not be intermittent.

NOTE Intermittent systems are defined in EN 14972-1.

4.6 Prior to the testing, a layout of the water mist system to be tested shall be submitted for test preparation purposes. This layout shall include any components required for the testing as well as the full dimensioning (e.g. length of pipes).

4.7 System components, component locations and operating conditions shall remain unaltered throughout all of the fire tests.

4.8 The test protocol is only applicable to wall mounted open nozzles.

4.9 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.

4.10 Unless otherwise stated, all measurements shall be with a tolerance of $\pm 5\%$.

5 Fuel packages

5.1 General

The fuel package consists of the following elements:

- walls;
- sofas (mattresses and metal frames);
- ignition source.

Figure 1 shows the complete fuel package consisting of three sofas (a centre sofa and a side sofa on each end of the centre sofa) in front of combustible walls. The sofas made of two mattresses on steel frames are positioned in line with 0,1 m between the seat mattresses of the sofas, with the top of the backrest positioned 0,02 m from the vertical back wall.

The fuel package elements shall be conditioned by storage indoor at (20 ± 5) °C for at least two weeks prior to the test.

In case of storing fire loads in conditioned environment at a temperature of (23 ± 2) °C and a relative humidity of (50 ± 5) % conditioning time may be reduced to minimum of 48 h.

The storing conditions shall be the same for all fire loads used during all tests.

5.2 Walls

The walls are made of vertical back plates of minimum 10 mm thick plasterboard 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.

5.3 Sofas

Three metal frames in accordance with Figure 2 shall be provided.

The steel frames for the sofas shall consist of rectangular bottom and backrest frames constructed of (25 ± 2) mm square iron of normally 2 mm thickness. The dimensions of the bottom frame shall be 2 000 mm × 700 mm and the dimensions of the backrest frame shall be 2 000 mm × 725 mm.

The seat and backrest mattresses shall be supported on each frame by three vertical and one horizontal steel bars, constructed from similar steel stick. The vertical steel bars shall be spaced every 500 mm and welded to the inner long sides of the frame. The horizontal steel bar shall be welded to the inner short sides of the frame.

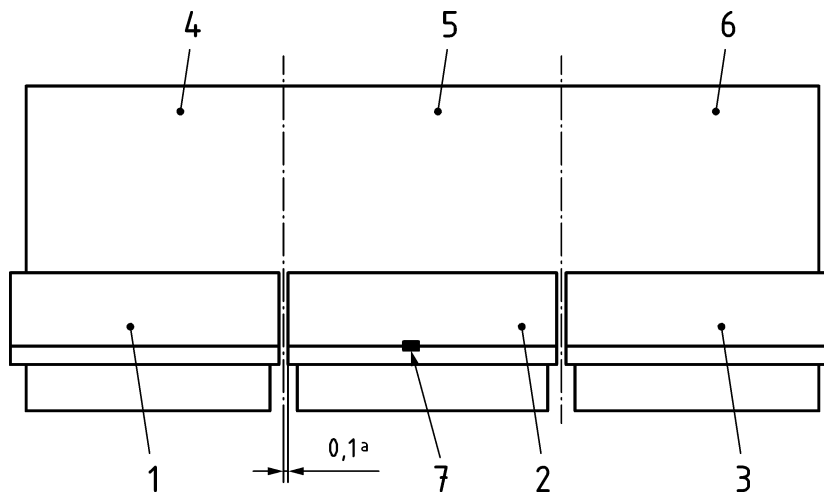
Both steel frames shall be fitted with a 150 mm by 150 mm steel plate, with a thickness of 2 mm. The steel plate shall be positioned directly under and behind the intended position of the igniter, in order to prevent it from falling to the floor during a test.

Each sofa should have a rectangular armrest on each end. The armrest shall be constructed of similar steel stick and shall have a length of 600 mm in length and height of 300 mm. The front section of the armrest shall be attached to the bottom frame 70 mm away from the backrest frame.

The assembled frames shall be supported by four legs constructed of similar steel stick. The two rear legs shall be 205 mm in height and the front legs shall be 270 mm in height.

When installed, the mattress forming the seat shall be installed first, with its long side edge close up against the backrest frame. The mattress forming the backrest shall be installed thereafter. This mattress shall be kept in upright position by four hooks, two on the short sides and two on the long sides of the backrest frame. The hooks shall be constructed from nominally 50 mm flat iron bars, of nominally 2 mm thickness.

Dimensions in metres

**Key**

- | | | | |
|---|---|---|---|
| 1 | left side sofa | 5 | centre panelling 2,0 m × 2,4 m ($L \times H$) |
| 2 | centre sofa | 6 | right panelling 2,0 m × 2,4 m ($L \times H$) |
| 3 | right side sofa | 7 | ignition source |
| 4 | left panelling 2,0 m × 2,4 m ($L \times H$) | a | gap |

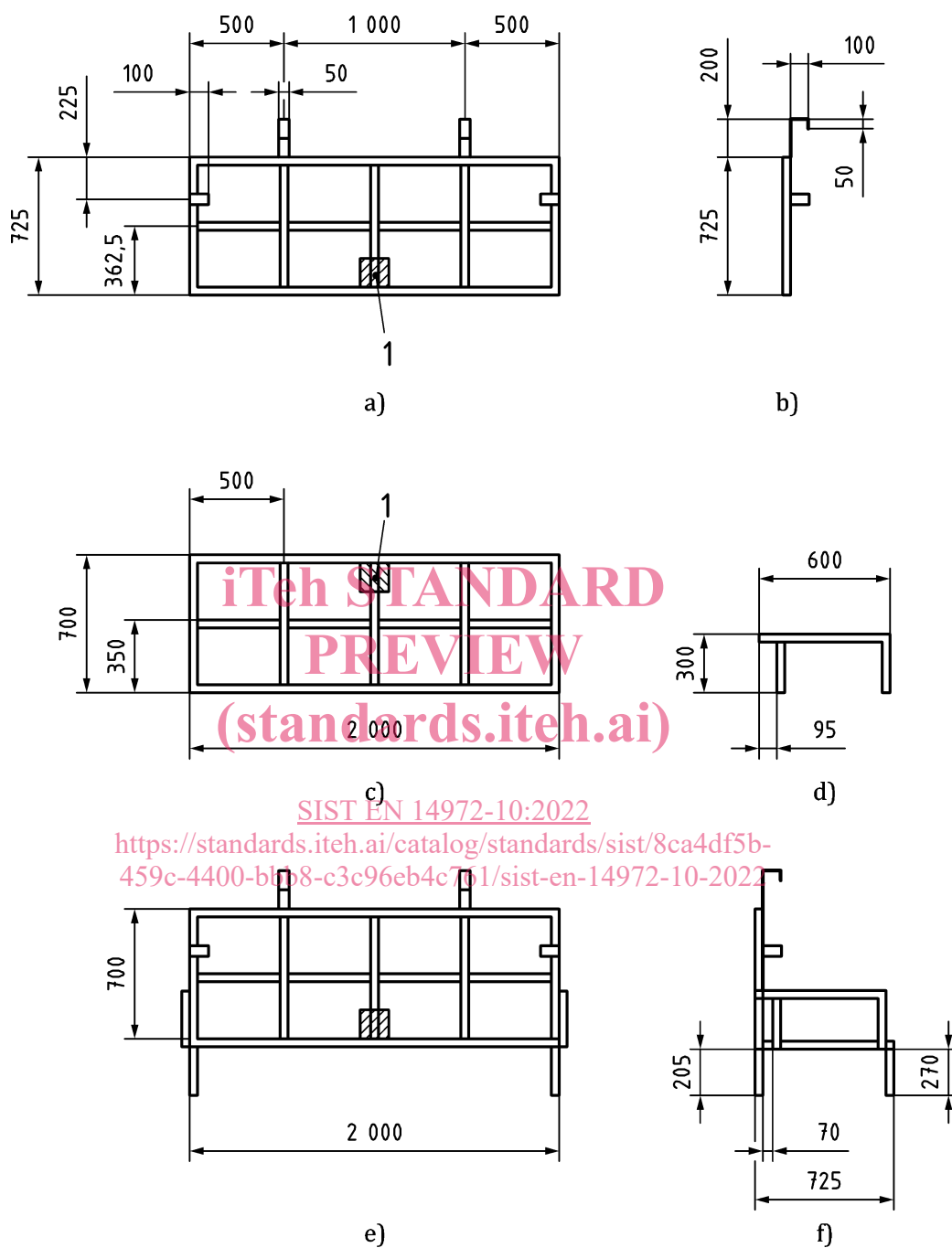
Figure 1 — Front view of the standard fuel package design

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Dimensions in millimetres

**Key**

- | | | | |
|----|-----------------------------|----|----------------------------|
| 1 | 150 mm × 150 mm steel plate | b) | back support (side view) |
| a) | back support | d) | armrest (two pieces) |
| c) | bottom frame | f) | assembled sofa (side view) |
| e) | assembled sofa (front view) | | |

Figure 2 — Assembly of metal frames for the sofas