



SLOVENSKI STANDARD

oSIST prEN 14972-7:2022

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Vgrajeni gasilni sistemi - Sistemi s pršečo vodo - 7. del: Protokol preskušanja sistemov s samodejnimi šobami za komercialne prostore z nizko stopnjo nevarnosti

Fixed firefighting systems - Water mist systems - Part 7: Test protocol for commercial low hazard occupancies for automatic nozzle systems

Ortsfeste Brandbekämpfungsanlagen - Wassernebelsysteme - Teil 7: Prüfprotokoll für kommerzielle Belegung geringer Gefährdung für automatische Düsensysteme

Installations fixes de lutte contre l'incendie - Systèmes à brouillard d'eau - Partie 7 : Protocole d'essai des systèmes à buses automatiques pour locaux commerciaux à risque faible

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ICS:

13.220.10	Gašenje požara	Fire-fighting
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English Version

**Fixed firefighting systems - Water mist systems - Part 7:
Test protocol for commercial low hazard occupancies for
automatic nozzle systems**

Installations fixes de lutte contre l'incendie - Systèmes
à brouillard d'eau - Partie 7 : Protocole d'essai des
systèmes à buses automatiques pour locaux
commerciaux à risque faible

Ortsfeste Brandbekämpfungsanlagen -
Wassernebelsysteme - Teil 7: Prüfprotokoll für
kommerzielle Belegung geringer Gefährdung für
automatische Düsensysteme

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 191.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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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 14972-7:2022) 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*
- *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 might be added. For current status of published standards refer to www.cencenelec.eu.

1 Scope

This document specifies fire testing requirements for water mist systems used for fire protection of commercial low hazard occupancies up to 5 m ceiling height.

EXAMPLE Examples for commercial low hazard occupancies are apartments, churches, concealed spaces, gymnasiums, hospitals, hotels, libraries, museums, offices, restaurant seating areas, schools and university class rooms, unused attics.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 520, *Gypsum plasterboards — Definitions, requirements and test methods*

EN 636, *Plywood — Specifications*

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

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

EN 13501-1:2018, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

ISO 5660-1:2015, *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 and definitions

For the purposes of this document, the terms and definitions given in EN 14972-1:2020 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

low hazard occupancy

non-storage, non-manufacturing occupancy where the quantity and combustibility of the content is low with maximum fuel loads

Note 1 to entry: Fuel loads are specified in 5.1 to 5.4.

4 General requirements

4.1 General

The low hazard occupancy tests comprise small, large and open compartments, plus open plan office simulations. The water mist system needs to pass all the tests for the categories for which it is to be used.

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

4.2 Categories

4.2.1 Category I system

This system covers rooms up to 37 m² containing low hazard fire loads ≤ 150 MJ/m² up to 2,4 m ceiling height.

4.2.2 Category II system

This system covers unlimited rooms containing low hazard fire loads, ≤ 150 MJ/m² up to 5 m ceiling height.

4.2.3 Category III system

This system covers unlimited rooms containing low hazard fire loads, ≤ 500 MJ/m² up to 5 m ceiling height.

5 Fuel packages

5.1 Fuel package 1 (bunk beds)

The bunk bed shall consist of two units designated as the upper and lower bunks.

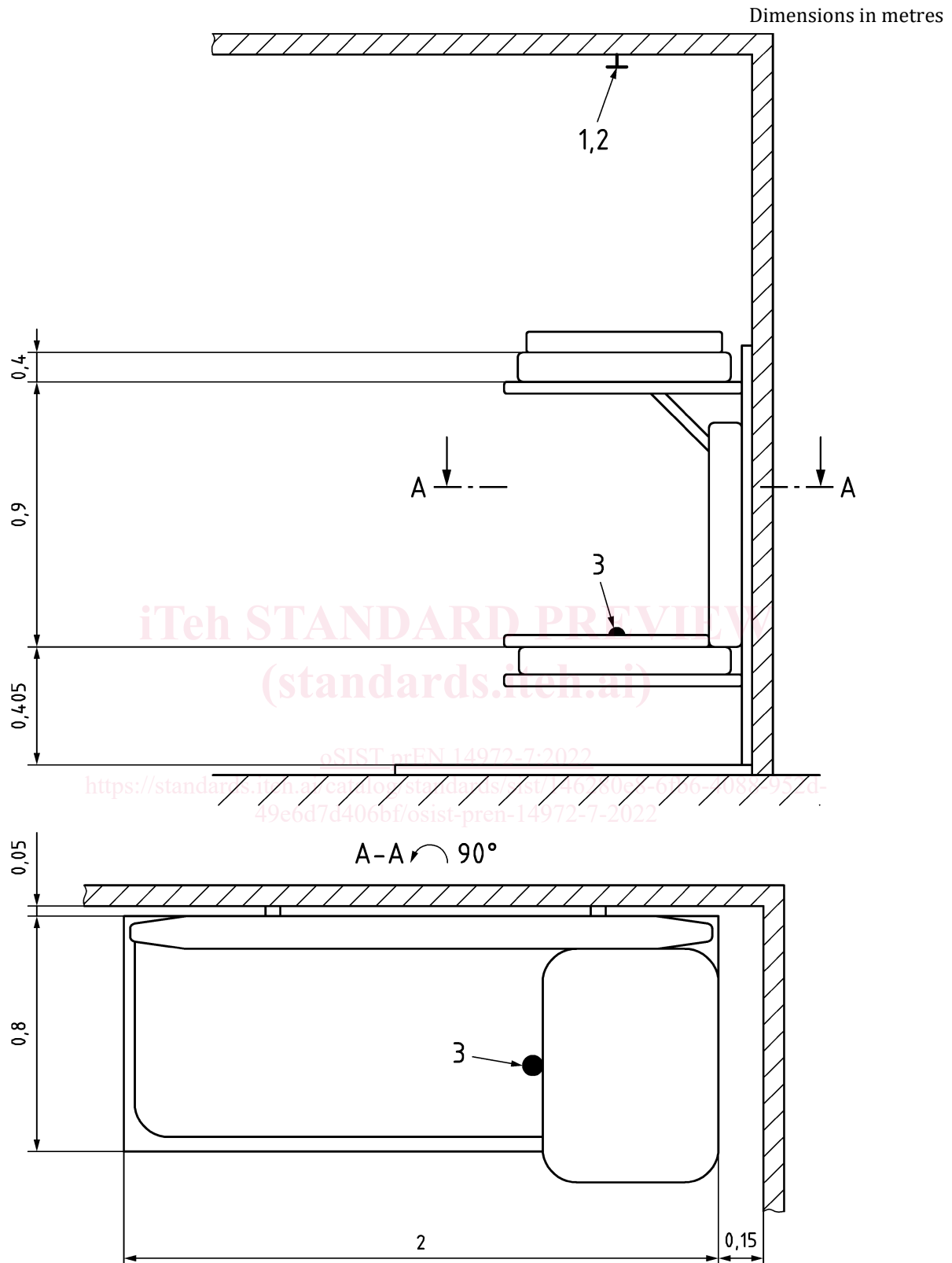
Each bunk shall consist of three components: a steel frame, a mattress, and a pillow.

The steel frame for the bunk beds shall be constructed of rectangular steel, 2 mm thick, steel.

The primary supporting structure shall be constructed to support the two mattress frames and bunk beds (see Figure 1).

The top and bottom mattress frames shall be constructed of similar steel stock, with dimensions of 2,0 m \times 0,8 m. 3 mm sheet steel, with dimensions of 2,0 m \times 0,8 m, shall be welded to the top and bottom mattress frames. These two assemblies shall be attached to the primary bunk bed support structure in an appropriate manner that allow the mattresses to be placed flat and square, and without deformation.

NOTE Additional brackets can be provided on the primary frame to provide support for the vertical mattress.

**Key**

- | | |
|--|------------------|
| 1 embedded ceiling surface thermocouple | 3 ignition point |
| 2 gas temperature thermocouple (75 mm below ceiling surface) | |

Figure 1 — Fuel package 1 (bunk bed)

The bottom mattress frame assembly shall be located such that the top of the frame is 300 mm above the floor. The top mattress frame assembly shall be located 1 m above the bottom mattress frame assembly.

Each mattress shall consist of a 2 m × 0,8 m × 0,1 m piece of polyether foam with a cotton fabric cover. Each pillow shall consist of a 0,5 m × 0,8 m × 0,1 m piece of polyether foam with a cotton fabric cover cut from the end of a mattress. The cotton fabric covers shall not be fire-retardant-treated and shall have an area weight of 140 g/m² to 180 g/m².

The covers shall be one-ply and shall contain a thread count of approximately 0,186 threads per mm². The cut end of the pillow shall be positioned such that it faces the doorway of the test room.

The lower bunk shall have an additional mattress with a cotton fabric cover positioned as a back rest (see Figure 1). Two bunk beds shall be used, one on each side of the test room.

The mattress and pillow material shall be made of non-fire-retardant polyether foam and shall have a density of approximately 33 kg/m³.

When tested in accordance with ISO 5660-1:2015 at 35 kW/m² in the horizontal position, the mean values shall be as specified in Table 1.

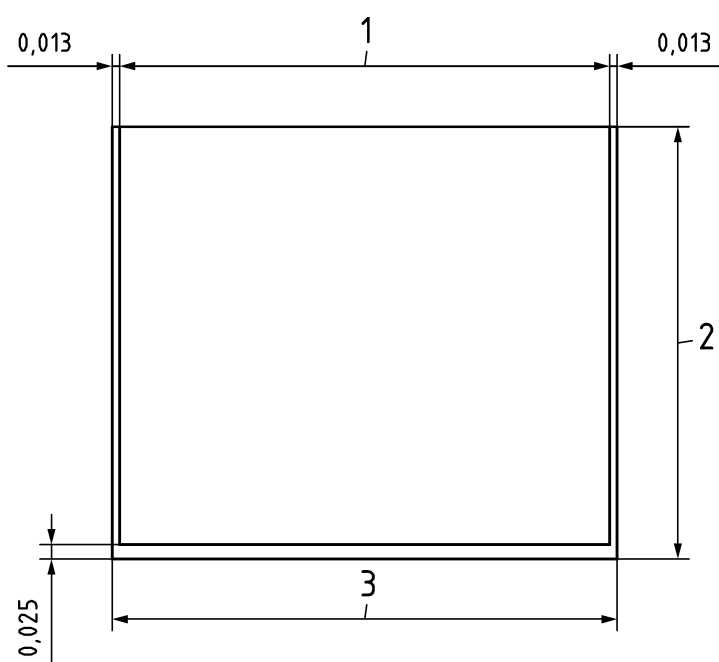
Table 1 — Burning characteristics of foam mattress material

Property	Requirement
Time to ignition	2 s to 6 s
3 min average heat release rate	(270 ± 50) kW/m ²
Minimum heat of combustion	(28 ± 3) MJ/kg
Total heat release	(50 ± 12) MJ/m ²

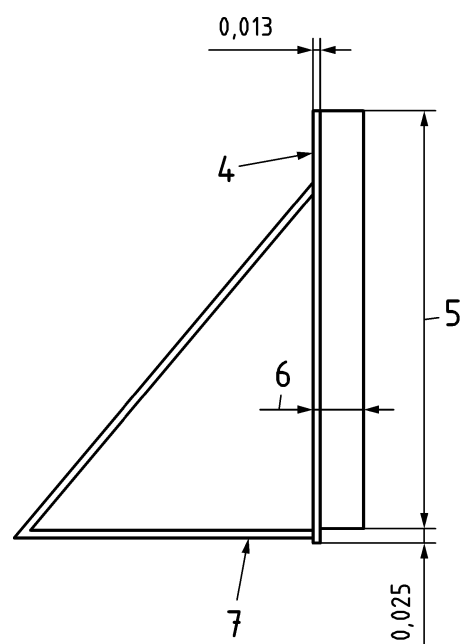
5.2 Fuel package 2 (corner crib and simulated furniture)

The large compartment corner fuel package shall consist of a wood crib and simulated furniture (see Figure 2).

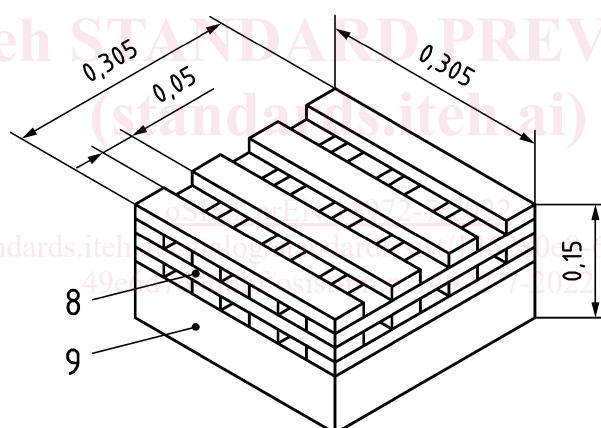
Dimensions in metres



a) Simulated furnace (front)



b) Simulated furnace (side)



c) Wood crib

Key

- | | | | |
|---|------------------------------|---|-------------------------------------|
| 1 | foam, 864 mm wide | 6 | foam, 76 mm thick |
| 2 | plywood, 787 mm high | 7 | metal angle frame, 3 mm thick |
| 3 | plywood, 890 mm wide | 8 | timber, 38 mm × 38 mm nominal size |
| 4 | plywood backing, 13 mm thick | 9 | steel pan, 605 mm × 305 mm × 104 mm |
| 5 | foam, 762 mm high | | |

Figure 2 — Fuel package 2 (corner crib and simulated furniture)

The wood crib shall be 300 mm × 300 mm × 150 mm high and shall consist of four layers of lumber. Each layer shall consist of four 300 mm long pieces of 38 mm × 38 mm kiln-dried spruce or fir lumber. The lumber in each layer shall be placed at right angles to the adjacent layers.

Individual wood members in each layer shall be evenly spaced along the 300 mm length and stapled to adjacent layers. The mass of the crib shall be 2,5 kg to 3,2 kg.

After assembly, the wood crib shall be conditioned at a temperature of $(20 \pm 5) ^\circ\text{C}$ for 24 h to 72 h.

After conditioning, the wood crib shall be placed on top of a nominal 300 mm × 300 mm × 100 mm high, 2,5 mm thick steel pan (see Figure 2), which shall contain 0,47 L water and 0,24 L heptane and shall be located on the floor in a corner of the test enclosure. The wood crib shall be centred on the pan and positioned 55 mm from each wall (see Figure 6 and Figure 7).

The simulated furniture shall consist of foam cushions attached to a plywood backing and supported by a steel frame. The cushions shall consist of two pieces of uncovered pure polypropylene oxide polyol, polyether foam having a density of (30 ± 5) kg/m³ and measuring 860 mm × 760 mm × 76 mm. When tested in accordance with ISO 5660-1 at 35 kW/m² in the horizontal position, the mean values shall be as specified in Table 1.

Each foam cushion shall be fixed to a 890 mm × 790 mm, nominal 12 mm thick, plywood backing using an aerosol urethane foam adhesive.

The location of the foam on the plywood shall give a 13 mm gap between the sides of the cushion and the sides of the backing, and a 25 mm gap between the bottom of the cushion and the bottom of the backing, as shown in Figure 2.

The foam cushion and plywood backing assembly shall be conditioned at $(21,1 \pm 2,8)$ °C and (50 ± 10) % relative humidity for at least 24 h prior to testing, and shall then be placed in a steel support frame that holds the assembly in the vertical position.

The simulated furniture, wood crib, and steel pan shall be placed as illustrated in Figure 6 and Figure 7 on a piece of cement board sheathing or equivalent non-combustible sheathing material measuring 1,2 m × 1,2 m × 6 mm.

Two 150 mm × 50 mm × 30 mm bricks shall be placed on the cement board sheathing against the foam cushions, with their ends flush with the edge of the foam. Two cotton wicks, 150 mm long with a 6 mm diameter, shall be soaked in heptane and placed on bricks, with their ends flush with the edge of the bricks and foam (see Figure 6 and Figure 7).

5.3 Fuel packages 3 (sofas) oSIST prEN 14972-7:2022

There shall be four sofas, each consisting of three components: two mattresses and a steel frame. Each mattress shall consist of a 2 m × 0,8 m × 0,1 m piece of polyether foam with a cotton fabric cover.

The test configuration shall be as shown in Figure 3.