



# SLOVENSKI STANDARD

## SIST EN 16925:2019

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### Vgrajeni gasilni sistemi - Avtomatski sprinklerski sistemi za bivalne površine - Načrtovanje, vgradnja in vzdrževanje

Fixed firefighting systems - Automatic residential sprinkler systems - Design, installation and maintenance

Ortsfeste Brandbekämpfungsanlagen - Automatische Sprinkleranlagen für Wohnbereiche - Planung, Installation und Instandhaltung

Installations fixes de lutte contre l'incendie - Systèmes d'extinction automatiques du type sprinkleur résidentiel - Conception, installation et maintenance

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Ta slovenski standard je istoveten z: **EN 16925:2018**

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#### **ICS:**

13.220.20      Požarna zaščita      Fire protection

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EUROPEAN STANDARD

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English Version

## Fixed firefighting systems - Automatic residential sprinkler systems - Design, installation and maintenance

Installations fixes de lutte contre l'incendie - Systèmes  
d'extinction automatiques du type sprinkleur  
résidentiel - Conception, installation et maintenance

Ortsfeste Brandbekämpfungsanlagen - Automatische  
Sprinkleranlagen für Wohnbereiche - Planung,  
Installation und Instandhaltung

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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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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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 (EN 16925:2018) 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of an identical text or by endorsement, at the latest by June 2019, and conflicting national standards shall be withdrawn at the latest by September 2020.

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.

Annexes A to E are normative. Annexes F to J are informative.

This standard is part of a series of standards which includes the following:

- EN 12259 (all parts), *Fixed firefighting systems – Components for sprinkler and water spray systems*;
- EN 12845, *Fixed firefighting systems – Automatic sprinkler systems*;
- prEN 14972 (all parts), *Fixed firefighting systems – Water mist systems*;
- EN 12094 (all parts), *Fixed firefighting systems – Components for gas extinguishing systems*;
- EN 15004 (all parts), *Fixed firefighting systems – Gas extinguishing systems*;
- EN 12416 (all parts), *Fixed firefighting systems – Powder systems*;
- ISO 6184 (all parts), *Fixed firefighting systems – Explosion protection systems*;
- EN 13565 (all parts), *Fixed firefighting systems – Foam systems*;
- EN 671 (all parts), *Fixed firefighting systems – Hose systems*;
- EN 12101 (all parts), *Smoke and heat control systems*.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## Introduction

Sprinkler systems have demonstrated their value in protecting life and property in industrial and commercial applications for over 100 years. The recognition that the largest number of deaths from fire occur in the home has led to the introduction of sprinkler systems specifically designed for residential occupancies.

A correctly designed and installed residential sprinkler system can detect and control a fire at an early stage of development and activate a fire alarm. Operation of the system rapidly reduces the rate of production of heat and smoke, allowing more time for occupants to escape to safety or be rescued.

Sprinklers operate at predetermined temperatures to discharge water over the area below. Only the sprinklers near the fire, which are individually heated above their operating temperature, will operate. The flow of water initiates a fire alarm signal to draw attention to the operation of the system. The operating temperature is generally selected to suit ambient temperature conditions.

It is essential that residential sprinkler systems are properly maintained and regularly tested to ensure correct operation in case of fire.

It should not be assumed that the provision of a residential sprinkler system eliminates the need for other means of detecting and fighting fires and it is important to consider the fire precautions in the occupancy as a whole. Structural fire resistance, escape routes, smoke alarms, fire alarm systems, provision of portable extinguishers, training and information all need consideration.

It is assumed that the building design and construction will be in accordance with local building codes and national requirements. If the residential sprinkler system is to be used to compensate for other fire protection measures, such as walls or doors, building authorities may require the installation of a system with additional measures to enhance performance and/or reliability.

Only a competent person should undertake the design, installation, inspection, testing and maintenance of residential sprinkler systems. This standard does not necessarily cover all local or national legislative requirements, which may take precedence over this standard.



## 1 Scope

This document specifies requirements and gives recommendations for the design, installation, water supplies and backflow prevention, commissioning, maintenance and testing of fixed residential fire sprinkler systems in buildings for residential occupancies.

This document is intended for use by those concerned with purchasing, designing, installing, testing, inspecting, approving, operating and maintaining automatic residential sprinkler systems, in order that such equipment will function as intended throughout its life.

This document identifies construction details of buildings which are the minimum necessary for satisfactory performance of residential sprinkler systems complying with this standard.

This document applies to any addition, extension, repair or other modification to the residential sprinkler system.

This document does not cover situations such as arson where fires of a malicious intent may be started in multiple locations simultaneously.

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

EN 1057, *Copper and copper alloys — Seamless, round copper tubes for water and gas in sanitary and heating applications*

EN 10205, *Cold reduced tinmill products — Blackplate*

EN 10216-1, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 1: Non-alloy steel tubes with specified room temperature properties*

EN 10217-1, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 1: Non-alloy steel tubes with specified room temperature properties*

EN 10255, *Non-Alloy steel tubes suitable for welding and threading — Technical delivery conditions*

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

EN 12259-5, *Fixed firefighting systems — Components for sprinkler and water spray systems — Part 5: Water flow detectors*

prEN 12259-14, *Fixed firefighting systems — Components for sprinkler and water spray systems — Part 14: Sprinklers for residential applications*

EN 12845, *Fixed firefighting systems — Automatic sprinkler systems — Design, installation and maintenance*

EN 1717, *Protection against pollution of potable water in water installations and general requirements of devices to prevent pollution by backflow*

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

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EN 60730-1, *Automatic electrical controls for household and similar use — Part 1: General requirements (IEC 60730-1)*

EN 60898-1, *Electrical accessories — Circuit breakers for overcurrent protection for household and similar installations — Part 1: Circuit-breakers for a.c. operation (IEC 60898-1)*

EN 806-2:2005, *Specification for installations inside buildings conveying water for human consumption — Part 2: Design*

EN 806-5, *Specifications for installations inside buildings conveying water for human consumption — Part 5: Operation and maintenance*

IEC 60331-1, *Tests for electric cables under fire conditions — Circuit integrity — Part 1: Test method for fire with shock at a temperature of at least 830°C for cables of rated voltage up to and including 0,6/1 kV and with an overall diameter exceeding 20 mm*

**3 Terms and definitions**

For the purposes of this document, the terms and definitions given in EN 12845 and the following apply.

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

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

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**3.1****A alarm**

system flow alarm that indicates a possible fire

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**3.2****alarm receiving unit**

control panel capable of initiating an alarm

**3.3****area of operation**

maximum area over which it is assumed, for design purposes, that sprinklers will operate in a fire

**3.4****authority**

organization or individual responsible for approving sprinkler systems, equipment and procedures

**EXAMPLE** Examples include the fire and building control authorities, the fire insurers, the local water authority and other appropriate public authorities.

**3.5****sprinkler (automatic)**

nozzle with a thermally sensitive sealing device which opens to discharge water for fire-fighting

**3.6****B alarm**

indication of a technical fault or an abnormal condition

### 3.7

#### **bed and breakfast**

accommodation with up to four lettable rooms and up to three storeys, where the owner lives on the premises and no meal other than breakfast is provided

### 3.8

#### **competent person**

person, suitably trained and qualified by knowledge, understanding and practical experience, and provided with the necessary instructions, to enable the required task(s) to be carried out correctly

### 3.9

#### **design area of coverage**

floor area protected by a sprinkler

### 3.10

#### **design density**

discharge flow from each sprinkler, divided by the area covered

Note 1 to entry: Expressed in mm/min.

### 3.11

#### **design sprinklers**

individual sprinklers or groups of sprinklers within the same residential compartment located at the most hydraulically favourable and unfavourable locations, and which are used to determine the hydraulic design demand of the sprinkler system

### 3.12

#### **dwelling**

building that contains units intended to be used for habitation purposes

Note 1 to entry: The dwelling may be owned, rented, leased, let or hired out.

### 3.13

#### **effective capacity**

volume of stored water available, taking into account the air gap at the top and the unusable water at the base of the tank

Note 1 to entry: the effective capacity is affected by a vortex letting air into the pump suction

### 3.14

#### **flexible sprinkler hose**

flexible device assembly and its supporting components used solely for connecting a single fire sprinkler to a range pipe

### 3.15

#### **horizontal ceiling**

ceiling with a slope not exceeding 9,5°

### 3.16

#### **K-factor**

constant which characterises the hydraulic performance of a sprinkler and is used to calculate the water flow through the sprinkler from the square root of the water pressure

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## 3.17

**manufacturer's specification**

document published by a manufacturer which is intended to supplement this standard with additional technical information with regards to design, installation and maintenance

## 3.18

**maximum flow demand** $Q_{\max}$ 

flow at the point of intersection of the pressure-flow demand characteristic of the most favourable area of operation of the sprinkler system and the water supply pressure-flow characteristic with the suction source at its normal level

## 3.19

**most favourable area**

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

## 3.20

**most unfavourable area**

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

## 3.21

**normal water level**

water level at the water supply needed to give the required effective capacity in relation to the low water level, including any necessary margins

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## 3.22

**premix anti-freeze solution**

combination of an anti-freeze and water that is mixed, packaged and labelled by a manufacturer using a quality controlled process that ensures product homogeneity and concentration as specified in order to ensure localised concentrations do not arise in the pipe network

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## 3.23

**residential pump**

pump dedicated to supply the sprinkler system only

## 3.24

**sprinkler, quick response spray**

sprinkler that gives a downward paraboloid pattern of water discharge and which has an RTI of 50 (m-s)<sup>1/2</sup> or less according to EN 12259-1, either upright, pendent or sidewall type

## 3.25

**remote test valve**

test facility incorporating a test valve with any associated fittings and pipework, delivering a flow equivalent to the discharge from a single sprinkler with the smallest K-factor in the system, connected at the hydraulically most remote location on a distribution pipe

## 3.26

**residential compartment**

space completely enclosed by walls and a ceiling, where

- a) the total width of openings in a single wall to an adjacent room is not more than 2 500 mm and all openings have a lintel depth of not less than 200 mm; or

- b) there is a single opening without a lintel in a wall to an adjacent room of not more than 900 mm in width and there are no other openings

### 3.27

#### **residential occupancies**

part of a building only containing dwellings

Note 1 to entry: This includes common areas such as separate small storage rooms up to 9 m<sup>2</sup> used only by the residents, the entrance area and boiler rooms.

### 3.28

#### **residential sprinkler**

type of sprinkler in accordance with prEN 12259-14

### 3.29

#### **shadow area**

small area which is not wetted by the residential sprinkler due to an obstruction such as a wall or partition

### 3.30

#### **sloped ceiling**

ceiling with a slope exceeding 9,5°

### 3.31

#### **small hotel**

hotel or guest house with up to 14 lettable rooms and an occupied floor at a height of up to four storeys or 18 m above the lowest fire brigade access level, without a licence to sell alcohol

## 4 Contract planning and documentation

### 4.1 General

The information specified in this clause shall be provided to the user or owner as appropriate. All drawings and information documents shall carry the following information:

- a) the name of the user and the owner, where known;
- b) the address and location of premises;
- c) the type of occupancies found in each part of the building;
- d) the name of the designer;
- e) the name of the person responsible for reviewing the design, who shall not be the designer and may be a third party;
- f) date and number of issue.

### 4.2 Preliminary stage

The following information shall be provided:

- a) a block plan of the premises showing:
  - 1) the type of application (see Table 1);
  - 2) the extent of the system with details of any unprotected areas;

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- 3) location of control valve set(s);
  - 4) location of zone stop valves (if applicable);
  - 5) a cross-section of the full height of the building(s) showing the height of the highest sprinkler above a stated datum level;
- b) general information about the water demand, water main pressure and flow data if a water main connection is to be used, and a plan of the test site;
- c) description of any deviations from the requirements of this standard and the reasons why.

Table 1 — System types and applications

System Type	Application
1	One or two-family dwelling / house Pre-fabricated house Bed and breakfast
2	Apartment building <sup>a</sup> House with multiple households sharing facilities <sup>a, b</sup> Care home <sup>a, c</sup> Child or adult day-care centre <sup>a, c</sup> Student accommodation <sup>a</sup>
3	Care home <sup>a</sup> Small hotels or hostels <sup>a</sup>
<sup>a</sup> Limited to four storeys or 18 m height. <sup>b</sup> Shared facilities are bathrooms and/or kitchens and living rooms. <sup>c</sup> 10 or fewer residents.	

NOTE Some countries may have a national annex with guidance on the maximum height and any additional requirements for apartment buildings higher than 18 m to be protected with a residential sprinkler system.

See Annex F for guidance on special circumstances for the applications in Table 1.

### 4.3 Consultation

Where a residential sprinkler system or an extension or alteration to a residential sprinkler system is being considered for new or existing buildings, the following should be consulted where known and, where necessary, their approval sought at an early stage:

- a) the water undertaker (provider);
- b) the fire authority;
- c) the building control body;
- d) the insurer(s), where insurance is in place, of the dwelling and dwelling contents.

NOTE This list is not exhaustive and national regulations may require consultation with additional bodies.

## 4.4 Design stage

### 4.4.1 General

The information provided shall include a summary schedule (see 4.4.2), complete installation layout drawings of the residential sprinkler installation(s) (see 4.4.3) and details of the water supplies (see 4.4.4).

### 4.4.2 Summary schedule

The summary schedule shall give the following information:

- a) the name of project;
- b) all drawings or document reference numbers;
- c) the type(s) of installation(s) and the nominal diameter(s) of each control valve set;
- d) the number or references of each control valve set in the system;
- e) the number of sprinklers on each control valve set;
- f) the pipework volume in the case of dry installations.

### 4.4.3 Installation layout drawings

#### 4.4.3.1 General

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Layout drawings shall include the following information:

- a) the system type (see Table 1);
- b) plan and cross sections showing construction details of floors, ceilings, roofs, exterior walls and walls separating sprinklered and non-sprinklered areas;
- c) the following information for each type of sprinkler:
  - 1) nominal operating temperature;
  - 2) K-factor;
  - 3) response type;
  - 4) orientation;
 and for each type of residential sprinkler the maximum area of coverage;
- d) the location of access to and the type of control valve sets;
- e) the location and details of any water flow, and air or water pressure alarm switches;
- f) the location and size of any subsidiary valves, subsidiary stop valves and drain valves;
- g) the location of all test valves;
- h) the location and details of any alarm receiving unit;
- i) the location of all concealed pipework;