



SLOVENSKI STANDARD
oSIST prEN 12259-14:2018
01-december-2018

Vgrajene naprave za gašenje - Sestavni deli sprinklerskih sistemov in sistemov s pršečo vodo - 14. del: Sprinklerji za uporabo v stanovanjih

Fixed firefighting systems - Components for sprinkler and water spray systems - Part 14: Sprinklers for residential applications

Ortsfeste Löschanlagen - Bauteile für Sprinkler- und Sprühwasseranlagen - Teil 14: Sprinkler für die Anwendung im Wohnbereich

Installations fixes de lutte contre l'incendie - Composants des systèmes d'extinction du type sprinkleur et à pulvérisation d'eau - Partie 14: Sprinkleurs pour applications résidentielles

Ta slovenski standard je istoveten z: prEN 12259-14

<https://standards.iteh.ai/catalog/standards/sist/337e0457-c332-42ba-8249-a2e90f0ceab2/sist-en-12259-14-2020>

ICS:

13.220.20 Požarna zaščita Fire protection

oSIST prEN 12259-14:2018 **en,fr,de**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 12259-14

October 2018

ICS 13.220.20

English Version

Fixed firefighting systems - Components for sprinkler and water spray systems - Part 14: Sprinklers for residential applications

Installations fixes de lutte contre l'incendie -
Composants des systèmes d'extinction du type
sprinkleur et à pulvérisation d'eau - Partie 14:
Sprinkleurs pour applications résidentielles

Ortsfeste Löschanlagen - Bauteile für Sprinkler- und
Sprühwasseranlagen - Teil 14: Sprinkler für die
Anwendung im Wohnbereich

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.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.

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.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

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

Contents	Page
European foreword.....	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	7
4 Construction and performance	10
4.1 General	10
4.2 Dimensions and pressure rating	10
4.2.1 Dimensions	10
4.2.2 Pressure ratings	10
4.3 Nominal operating temperature	10
4.4 Operating temperatures	11
4.5 Water flow and distribution	11
4.5.1 K-factor	11
4.5.2 Water distribution	11
4.5.3 Water Impingement Test	12
4.6 Function	12
4.7 Fire Test	12
4.8 Strength of sprinkler body and deflector	13
4.8.1 Strength of frame	13
4.8.2 Flow endurance	13
4.8.3 Strength of deflector	13
4.9 Strength of release element	13
4.9.1 Glass bulb sprinklers	13
4.9.2 Fusible link sprinklers	14
4.10 Leak resistance and hydrostatic strength	14
4.11 Heat exposure	14
4.11.1 General	14
4.11.2 Additional heat exposure of glass bulb sprinklers	15
4.11.3 Additional heat exposure of sprinklers using o-rings	15
4.11.4 Thermal shock	15
4.12 Corrosion	15
4.12.1 Stress corrosion	15
4.12.2 Sulphur dioxide corrosion	15
4.12.3 Salt mist corrosion	15
4.12.4 Moist air	15
4.13 Water hammer	16
4.14 Thermal response	16
4.14.1 Oven test	16
4.14.2 Room response test	16
4.15 Resistance to vibration	16
4.16 Resistance to impact	16
4.17 Resistance to low temperature	16
4.18 Resistance to heat	16
4.19 Test conditions	16
5 Marking	16

5.1	General	16
5.2	Identification number	16
5.3	Nominal operating temperature and year of manufacture	17
5.4	Manufacturing location	17
5.5	Heat sensitive element supplier	17
5.6	Protective covers	17
5.7	Sidewall sprinklers	17
5.7.1	General	17
5.7.2	Horizontal sidewall sprinklers	17
5.8	Concealed sprinklers	18
5.9	Removable recessed housing	18
6	Instruction charts	18
6.1	General	18
6.2	Installation Instructions	18
Annex A (normative) Conditions for tests		20
Annex B (normative) Water flow test		21
Annex C (normative) Water distribution test		23
C.1	Water distribution test – Horizontal surface	23
C.1.1	General	23
C.1.2	Upright, pendant, flush, recessed and concealed sprinklers	23
C.1.3	Sidewall Sprinklers	24
C.2	Water distribution test – vertical surface	26
C.2.1	Test method	26
C.3	Water impingement test	28
Annex D (normative) Fire test		29
D.1	Extent of testing	29
D.2	Test arrangement	33
D.2.1	Test room	33
D.2.2	Fire source	35
D.2.3	Sprinkler installation	36
D.3	Test method	37
D.4	Supplementary test	37
Annex E (normative) Function test		38
E.1	Function test	38
E.2	Verification function test	38
Annex F (normative) Strength of sprinkler body and deflector		40
F.1	Strength of sprinkler body	40
F.2	Flow endurance test	41
F.3	Deflector strength test	41
Annex G (normative) Strength of release elements test		42

prEN 12259-14:2018 (E)

G.1	Glass bulbs	42
G.2	Fusible links	44
Annex H (normative) Leak resistance tests		45
H.1	Leak Test	45
H.2	Hydrostatic Strength Test	45
Annex I (normative) Heat exposure		46
I.1	High temperature test	46
I.2	Additional testing of glass bulb sprinklers	46
I.3	Additional testing of residential sprinklers using o-rings	46
Annex J (normative) Glass bulb sprinkler thermal shock test		47
Annex K (normative) Exposure and corrosion tests		48
K.1	Stress corrosion	48
K.1.1	Sample preparation	48
K.1.2	Apparatus	48
K.1.3	Procedure	48
K.2	Sulphur dioxide corrosion	48
K.2.1	Reagents for apparatus of 5 l volume	48
K.2.2	Apparatus	49
K.2.3	Procedure	49
K.3	Salt mist corrosion	51
K.3.1	Reagents	51
K.3.2	Apparatus	51
K.3.3	Procedure	51
K.4	Moist Air	51
K.4.1	Performance criteria	51
K.4.2	Procedure	51
Annex L (normative) Water hammer test		52
Annex M (normative) Thermal response test		53
M.1	Oven heat test	53
M.2	Room heat test	54
M.2.1	Flush, recessed or concealed sprinklers	54
M.2.2	Sprinkler location and orientation	54
M.2.3	Room dimensions and water supply	54
M.2.4	Fire source and distance to sprinkler	55
Annex N (normative) Vibration test		58
N.1	Sample preparation and performance criteria	58

N.2 Procedure	58
Annex O (normative) Impact test	59
Annex P (normative) Resistance to low temperature test	60
Annex Q (normative) Resistance to high temperature test	61
Bibliography	62

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[SIST EN 12259-14:2020](https://standards.iteh.ai/catalog/standards/sist/337e0434-c332-42ba-8249-a2e90f0ceab2/sist-en-12259-14-2020)

<https://standards.iteh.ai/catalog/standards/sist/337e0434-c332-42ba-8249-a2e90f0ceab2/sist-en-12259-14-2020>

prEN 12259-14:2018 (E)**European foreword**

This document (prEN 12259-14:2018) 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.

It is included in a series of European Standards planned to cover:

- automatic sprinkler systems (EN 12259 and EN 12845);
- gas extinguishing systems (EN 12094);
- powder systems (EN 12416);
- explosion protection systems (EN 26184);
- foam systems (EN 13565);
- hydrant and hose reel systems (EN 671);
- smoke and heat control systems (EN 12101).

ITEH Standards
(<https://standards.iteh.ai>)
Document Preview

[SIST EN 12259-14:2020](https://standards.iteh.ai/catalog/standards/sist/337e0434-c332-42ba-8249-a2e90f0ceab2/sist-en-12259-14-2020)

<https://standards.iteh.ai/catalog/standards/sist/337e0434-c332-42ba-8249-a2e90f0ceab2/sist-en-12259-14-2020>

1 Scope

This document specifies requirements for the construction and performance of residential sprinklers as well as test methods for their type approval, which are operated by a change of state of an element or bursting of a glass bulb under the influence of heat, for use only in automatic sprinkler systems for domestic and residential applications as defined in EN 16925:⁻¹.

This standard does not cover representative fire and other tests for special sprinklers that are intended to provide for specific fire hazards, nor does it cover fire and other tests for sprinklers for commercial and industrial sprinkler systems as in EN 12845. Those test requirements are covered by EN 12259-1.

NOTE 1 All pressure data in this European Standard are given as gauge pressures in bar.

NOTE 2 Sprinklers according to EN12259-1 can also be used in residential and domestic applications if the system is designed according to EN 12845.

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 12259-1:1999+A1:2001, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

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

EN16925:⁻¹, *Fixed firefighting systems — Automatic residential sprinkler systems — Design, installation and maintenance*

ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation*

ISO 49, *Malleable cast iron fittings threaded to ISO 7-1*

ISO 65, *Carbon steel tubes suitable for screwing in accordance with ISO 7-1*

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)*

UL 723, *Standard for test for surface burning characteristics of building materials*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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>

¹ Under preparation. Stage at the time of publication: FprEN 16925:2018

prEN 12259-14:2018 (E)

**3.1
concealed sprinkler**
unit (pre-assembled or assembled on site) consisting of a sprinkler, a housing and a cover plate, that ensures that the sprinkler will be installed with all or part of the thermally sensitive element behind the plane of the ceiling

**3.2
recessed sprinkler**
unit (pre-assembled or assembled on site) consisting of a sprinkler and a housing, that ensures that the sprinkler will be installed with all or part of the thermally sensitive element above the plane of the ceiling

**3.3
discharge coefficient “K”**
known as K-factor

coefficient of discharge in the formula,

$$Q = K \sqrt{p} \quad (1)$$

where

Q is the flow in litres per minute, and

p is the pressure in bar

**3.4
dry-type sprinkler**
sprinkler secured in an extension nipple that has a seal at the inlet end to prevent water from entering the nipple until the sprinkler operates

**3.5
flush sprinkler**
unit consisting of a sprinkler and housing, that ensures that the sprinkler will be installed partly behind, but with the temperature sensitive element before, the finished plane of the ceiling or wall

**3.6
heat responsive element**
that portion of a sprinkler that breaks, melts, or otherwise functions to initiate the automatic operation of the sprinkler when exposed to sufficient heat

**3.7
heptane**
commercial grade heptane having the following characteristics:

- a) minimum Initial Boiling Point of 88 °C;
- b) maximum Dry Point of 100 °C; and
- c) specific Gravity (15,6 °C/15,6 °C) of 0,68 - 0,73

**3.8
orifice**
opening that controls the amount of water discharged from a sprinkler at a given pressure

3.9**pendent sprinkler**

sprinkler intended to be installed so that its deflector is located below the orifice and the water flows downward through the orifice

3.10**residential sprinkler**

sprinkler intended to be installed only in residential occupancies as defined in EN16925:–¹

3.11**sidewall sprinkler**

sprinkler intended for installation on or near the wall

3.12**upright sprinkler**

sprinkler intended to be installed so that its deflector is located above the orifice

3.13**response time index****RTI**

measure of the thermal sensitivity of the sprinkler expressed in (meters.seconds)^{1/2} (m×s)^{1/2}

Note 1 to entry: Unlike in EN12259-1, the RTI value is calculated without considering the conductivity factor

3.14**design lower tolerance limit****DLTL**

glass bulb supplier's specified and assured lowest lower tolerance limit (LTL)

3.15**design upper tolerance limit****DUTL**

sprinkler supplier's specified and assured highest upper tolerance limit (UTL)

3.16**fusible link sprinkler**

sprinkler which opens when an element provided for that purpose melts

3.17**glass bulb sprinkler**

sprinkler which opens when a liquid-filled glass bulb bursts

3.18**mean design service load**

sprinkler supplier's specified and assured highest mean service load for any batch of 10 or more sprinklers

3.19**mean design strength**

glass bulb supplier's specified and assured lowest mean bulb strength for any batch of 55 or more bulbs

prEN 12259-14:2018 (E)**3.20****horizontal sprinkler**

sprinkler in which the nozzle directs the water horizontally

3.21**lower tolerance limit**

LTL

glass bulb lowest strength determined by test and statistical analysis of a batch of 55 or more bulbs

3.22**supplier**

company responsible for the design, manufacture and quality assurance of a product

3.23**upper tolerance limit**

UTL

highest service load determined by test and statistical analysis of a batch of 20 or more sprinklers

3.24**frame arms**

part of a sprinkler that maintains the thermally sensitive element in load bearing contact with the sprinkler head valve

4 Construction and performance**4.1 General**

Sprinklers shall only be assembled in such a way that adjustment or dismantling will result in destruction of an element of construction.

It shall be possible to remove the cover of a concealed sprinkler without having to use special tools, e.g. for visual inspections.

4.2 Dimensions and pressure rating**4.2.1 Dimensions**

Nominal thread sizes shall be suitable for fittings threaded in accordance with ISO 7-1.

It shall be possible for a sphere of (5,0 +0,01/-0) mm diameter to pass through the orifice of the sprinkler

4.2.2 Pressure ratings

A residential sprinkler shall have a maximum operating pressure of at least 12 bar

4.3 Nominal operating temperature

When tested in accordance with “Test to determine operating temperatures of fusible link sprinklers and glass bulb sprinklers” of EN 12259-1, sprinklers shall operate at a temperature within the range:

$$T_{\text{test}} = [t \pm (0,035 t + 0,62)] \text{ } ^\circ \text{C}$$

where t is the nominal operating temperature.

When cover plates are tested in accordance with the “Test to determine operating temperatures of fusible link sprinklers and glass bulb sprinklers” of EN 12259-1, cover plates shall operate at a temperature within the range:

$$T_{\text{test}} = [t_{\text{cover}} \pm (0,035 t + 0,62)] \text{ } ^\circ \text{C}$$

where t_{cover} is the nominal operating temperature of the cover.

This temperature t_{cover} shall be 8 °C to 20 °C lower than the nominal operating temperature of its sprinkler head.

4.4 Operating temperatures

The temperature classification, temperature rating, and colour coding of a residential sprinkler shall be as specified in Table 1.

Table 1 — Nominal operating temperatures and colour codes

Glass bulb sprinklers		Fusible link sprinklers	
Nominal operating temperature °C	Liquid colour code	Nominal operating temperature within range °C	Frame arms colour code
57	Orange	57 to 77	uncoloured white
68	Red	80 to 107	
79	Yellow		
93	Green		
100	Green		

4.5 Water flow and distribution

4.5.1 K-factor

The nominal K-factor shall be specified by the supplier. The K-factor of the sprinklers shall be within the nominal value $\pm 5\%$ for other than dry sprinklers and $\pm 8\%$ for dry sprinklers, when determined in accordance with Annex B.

4.5.2 Water distribution

4.5.2.1 Water distribution test – Horizontal surface

When installed in accordance with the installation instructions and tested as described in C.1 a residential sprinkler shall distribute water over a horizontal surface so that the discharge density for any pan within the design area (the maximum area the sprinkler is intended to protect) shall be at least 0,8 mm/min except that:

- No more than two pans (0,5m x 0,5m) or not more than 4 pans (0,3m x 0,3m) for each quadrant shall be allowed to be at least 0,6 mm/min for upright and pendant sprinklers; and
- No more than eight pans (0,3m x 0,3m) or three pans (0,5m x 0,5m) shall be allowed to be at least 0,6 mm/min for each half (split along the sprinkler centreline) of the maximum area a sidewall sprinkler is intended to protect

4.5.2.2 Water distribution test – Vertical surface

When installed in accordance with the installation instructions and tested as described in C.2, a residential sprinkler shall distribute water in a uniform manner over vertical surfaces as follows:

prEN 12259-14:2018 (E)

- a) Walls within the coverage area shall be completely wetted to at least within 660 mm of the ceiling with one sprinkler discharging water at the specified design flow rate.
- b) For square coverage areas, each wall within the coverage area shall be wetted with at least 5 percent of the sprinkler flow; for rectangular coverage areas, each wall within the coverage area shall be wetted with a proportional water amount based on 20 % of the total sprinkler discharge in accordance with the following formula:

$$WW - 20 \% (D / P) \quad (2)$$

where

- WW* is required amount of water collected on a wall, percent;
D is wall length, metres;
P is total perimeter of coverage area, metres.

4.5.3 Water Impingement Test

When tested in accordance with C and while discharging water at a service pressure of 0,5 bar less than the maximum operating pressure, a residential sprinkler shall not prevent the operation of an adjacent residential sprinkler.

4.6 Function

When tested in accordance with Annex E each of the residential sprinklers shall operate at service pressures of 0,5 bar to the maximum operating pressure. The sprinkler shall open and within 5 s of release of the thermally sensitive element shall operate satisfactorily. Any lodgement of released parts shall be cleared within 60 s of the release of the thermally sensitive element. After testing in accordance with Annex E the sprinkler shall conform to the requirements of 4.5.2.

NOTE In most instances visual examination of the equipment will be sufficient to establish conformity with the requirements of 4.5.2.

4.7 Fire Test

When fire tested as described in Annex D a residential sprinkler shall limit temperatures as specified below when tested at each spacing referenced in the installation instructions. Additionally, a maximum of two residential sprinklers shall operate. The sprinklers shall limit temperatures as follows:

- a) The maximum temperature 76 mm below the ceiling at locations 4 and 5 as illustrated in Figure D.1, Figure D.2 and Figure D.3 shall not exceed 316 °C.
- b) The maximum temperature 1,6 m above the floor at location 4 shall not exceed 93 °C.
- c) The temperature at the location described in (b) shall not exceed 54 °C for more than any continuous 2 minute period.
- d) The maximum ceiling material temperature 6 mm behind the finished ceiling surface shall not exceed 260 °C.

NOTE The thermocouple 76 mm below the ceiling, located above the fire source, is for reference purposes only.

See Figure D.1, (pendant, upright, flush, recessed pendant, and concealed sprinklers) or Figure D.2 and Figure D.3 (sidewall sprinklers) for temperature measuring locations.