



**SLOVENSKI STANDARD**  
**oSIST prEN 12845-1:2022**

**01-februar-2022**

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**Vgrajene naprave za gašenje - Avtomatski sprinklerski sistemi - 1. del:  
Projektiranje, vgradnja in vzdrževanje**

Fixed firefighting systems - Automatic sprinkler systems - Part 1: Design, installation and maintenance

Ortsfeste Brandbekämpfungsanlagen - Automatische Sprinkleranlagen - Planung, Installation und Instandhaltung

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

**Ta slovenski standard je istoveten z: [oSIST prEN 12845-1:2022](http://standards.itc.gov.si/catalog/standards/sist/b5a47e8e-394c-46c7-8813-84d82b3557be/osist-pren-12845-1-2022)  
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**ICS:**

13.220.10      Gašenje požara      Fire-fighting

**oSIST prEN 12845-1:2022**      **en,fr,de**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 12845-1**

December 2021

ICS 13.220.20

Will supersede EN 12845:2015+A1:2019

English Version

## Fixed firefighting systems - Automatic sprinkler systems - Part 1: Design, installation and maintenance

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

Ortsfeste Brandbekämpfungsanlagen - Automatische  
Sprinkleranlagen - Planung, Installation und  
Instandhaltung

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

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**prEN 12845-1:2021 (E)****European foreword**

This document (prEN 12845-1:2021) 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.

This document will supersede EN 12845:2015.

This document is included in a series of European standards:

CEN/TS 14816, *Fixed firefighting systems - Water spray systems - Design, installation and maintenance*;

CEN/TS 17551, *Fixed firefighting systems — Automatic sprinkler systems — Guidance for earthquake bracing*

EN 671 (all parts), *Fixed firefighting systems - Hose systems*;

EN 12094 (all parts), *Fixed firefighting systems - Components for gas extinguishing systems*;

EN 12101 (all parts), *Smoke and heat control systems*;

EN 12259 (all parts), *Fixed firefighting systems - Components for sprinkler and water spray systems*;

EN 12416 (all parts), *Fixed firefighting systems - Powder systems*;

EN 13565 (all parts), *Fixed firefighting systems - Foam systems*;

EN 14972 (all parts), *Fixed firefighting systems - Water mist systems*;

EN 17451, *Fixed firefighting systems - Automatic sprinkler systems - Design, assembly, installation and commissioning of pump sets*.

The built environment continuously evolves. So do the fire protection challenges faced. This edition of EN 12845 is a substantial revision. The objectives of the revision were to:

- provide the European market and users of EN 12845 with the most up to date and state of the art sprinkler technologies; and
- preserve the excellent levels of performance (availability, reliability, and maintainability) of automatic fire sprinkler systems.

The expert group responsible for drafting EN 12845 draw their expertise and knowledge from global fire protection practices. Research and emerging best practice from around the world have been utilised in this update.

The bibliography of this document identifies some of the sources of knowledge and research drawn upon in the preparation of this document, and other sources of useful information in the sector. This list is not intended to be exhaustive.

In comparison with the previous edition, the following technical modifications have been made:

- the sequence of clauses has been revised to reflect the flow of work in the design and installation of a sprinkler system;
- a new approach to hazard classification has been introduced to reduce the number of classifications, give more guidance for common hazards and to assist designers to determine the correct hazard classification;
- hazard classification has been separated from hydraulic design criteria to allow for more than one design approach for each hazard classification and to incorporate additional solutions;
- new names have been introduced for the hazard classifications;



- additional design options have been added for many hazard classifications to offer more flexibility and to introduce new technology;
- the design criteria for storage protection have been updated;
- new design criteria for sprinkler systems under high ceilings have been added;
- new design criteria to take account of the effect of combustible construction on sprinkler system performance have been added;
- some previous annexes have been incorporated in the body of the standard;
- ESFR and CMSA solutions were separated into a second part;
- pre-calculated systems were consolidated into an annex;
- furthermore, considering the changes in fire risk profiles introduced by the extensive use of plastics in many industrial manufacturing processes, in the building construction components as well as in the packaging of goods, this revision has introduced special considerations to reflect these challenges in the sprinkler protection design.

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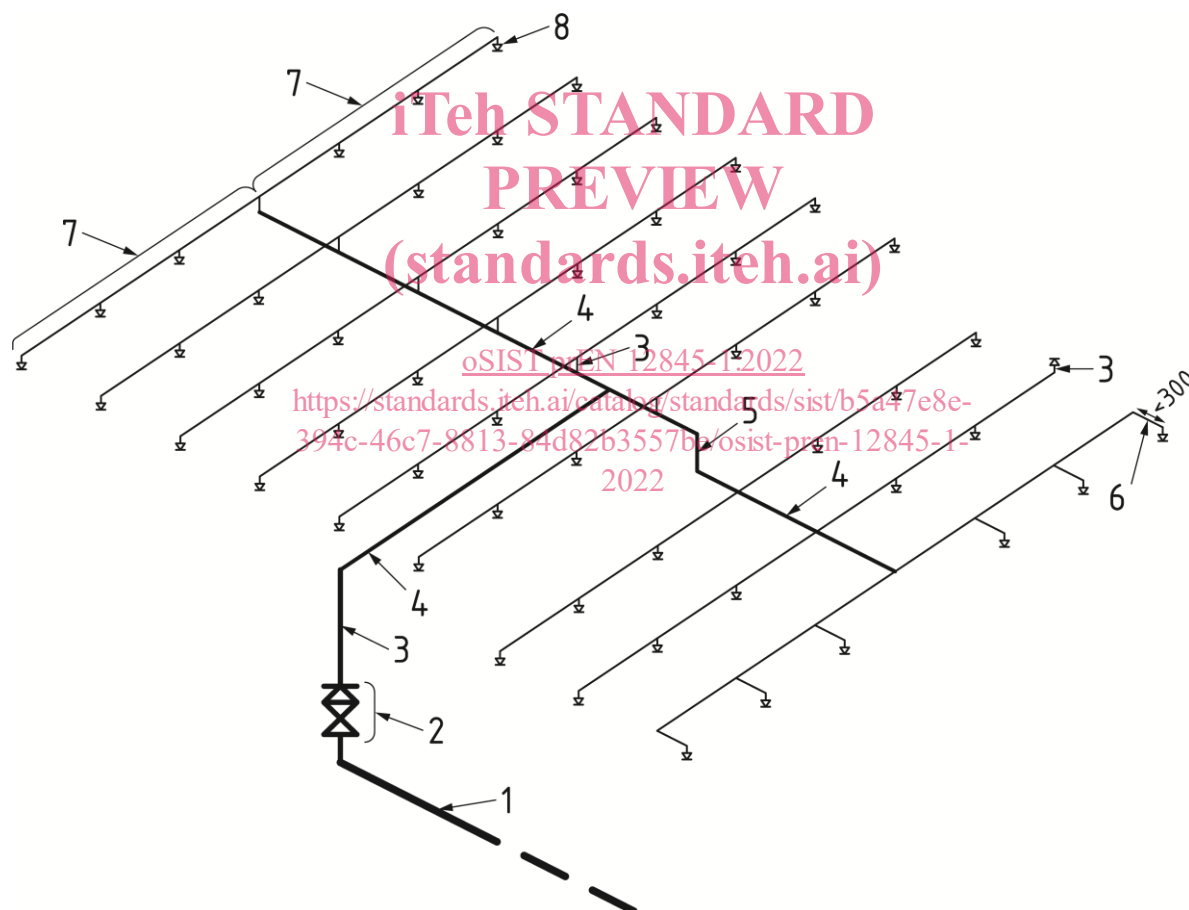
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## Introduction

This document covers the classification of hazards, provision of water supplies, components to be used, installation and testing of the system, maintenance, and the extension of existing systems, and identifies construction details of buildings which are the minimum necessary for satisfactory performance of automatic sprinkler systems. CMDA design approaches are covered in this document, while design approaches for ESFR and CMSA designs are in EN 12845-2, which is to be used in conjunction with EN 12845-1.

Sprinkler systems according to this document provide protection of life and property, and mitigate business interruption.

An automatic sprinkler system is designed to detect a fire and extinguish it with water in its early stages or hold the fire in check so that extinguishment can be completed by other means. An automatic sprinkler system consists of a water supply (or supplies) and one or more sprinkler installations; each installation consists of a set of installation main alarm valves and a pipe array fitted with sprinkler heads. The sprinkler heads are fitted at specified locations at the roof or ceiling, and where necessary between racks, below shelves, and in ovens or stoves. The main elements of a typical installation are shown in Figure 1.



### Key

- |   |                              |   |                                |
|---|------------------------------|---|--------------------------------|
| 1 | trunk main (see 3.127)       | 5 | drop (see 3.34)                |
| 2 | alarm valve set (see 3.28)   | 6 | arm pipe (see 3.17)            |
| 3 | riser (see 3.83)             | 7 | range pipe (see 3.82)          |
| 4 | distribution pipe (see 3.31) | 8 | automatic sprinkler (see 3.84) |

**Figure 1 — Main elements of a sprinkler installation**

The sprinklers operate at predetermined temperatures to discharge water over the affected part of the area below. The flow of water through the alarm valve initiates a fire alarm. The sprinkler operating temperature is generally selected to suit ambient temperature conditions.

Only sprinklers in the vicinity of the fire, i.e. those which become sufficiently heated, operate. The sprinkler system is intended to extend throughout the premises with only limited exceptions.

In some applications additional measures to improve automatic sprinkler system reliability and availability may be specified, such as where the automatic sprinkler system is part of the measures designed to maintain safe conditions during evacuation.

It should not be assumed that the provision of an automatic sprinkler system eliminates the need for other means of fighting fires and it is important to consider the fire precautions in the premises as a whole.

Structural fire resistance, escape routes, fire detection and fire alarm systems, particular hazards needing other fire protection methods, provision of hose reels and fire hydrants and portable fire extinguishers, etc., safe working and goods handling methods, management supervision and good housekeeping all need consideration.

Automatic sprinkler systems should be properly maintained to ensure they operate when required. This routine is liable to be overlooked or given insufficient attention by supervisors. It is, however, neglected at peril to the lives of occupants of the premises and at the risk of crippling financial loss. The importance of proper maintenance cannot be too highly emphasised.

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

It is a basic assumption that this standard is for the use of companies employing personnel competent in the field of application with which it deals. Only trained and experienced personnel should undertake the design, installation and maintenance of sprinkler systems (see 3.152). Similarly, competent technicians should be used in the installation and testing of the equipment.

Research periodically leads to the introduction of new sprinkler concepts. Authorities may accept these new sprinkler systems if they are satisfied that there is sufficient evidence that they offer equivalent or better performance and reliability to the technology in this standard.

**prEN 12845-1:2021 (E)****1 Scope**

This document specifies requirements for the design, installation and maintenance of new automatic sprinkler systems as well as any addition, extension, repair or other modification of existing automatic sprinkler systems.

This document does not cover all legislative requirements. In certain countries specific national regulations apply and take precedence over this document. Users of this document are advised to inform themselves of the applicability or non-applicability for this document by their national responsible authorities.

**2 Normative references**

The following documents are referenced 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.

CEN/TS 54-14, *Guidelines for planning, design, installation, commissioning, use and maintenance*

CEN/TS 14816:2008, *Fixed firefighting systems — Water spray systems — Design, installation and maintenance*

EAD 330232-00-0601, *Mechanical fasteners for use in concrete*

EN 54-2, *Fire detection and fire alarm systems — Part 2: Control and indicating equipment*

EN 54-4, *Fire detection and fire alarm systems — Part 4: Power supply equipment*

EN 54-21, *Fire detection and fire alarm systems — Part 21: Alarm transmission and fault warning routing equipment*

EN 837-1:1998, *Pressure gauges — Part 1: Bourdon tube pressure gauges — Dimensions, metrology, requirements and testing*

EN 837-2, *Pressure gauges — Part 2: Selection and installation recommendations for pressure gauges*

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

EN 1092-1 (all parts), *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated*

EN 1254 (all parts), *Copper and copper alloys*

EN 1568 (all parts), *Fire extinguishing media — Foam concentrates*

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: Electric welded and submerged arc welded non-alloy steel tubes with specified room temperature properties*

EN 10224, *Non-alloy steel tubes and fittings for the conveyance of water and other aqueous liquids — Technical delivery conditions*

- EN 10225 (all parts), *Weldable structural steels for fixed offshore structures — Technical delivery conditions*
- EN 10242, *Threaded pipe fittings in malleable cast iron*
- EN 10255, *Non-alloy steel tubes suitable for welding and threading — Technical delivery conditions*
- EN 10305-3, *Steel tubes for precision applications — Technical delivery conditions — Welded cold sized tubes*
- EN 10312, *Welded stainless steel tubes for the conveyance of aqueous liquids including water for human consumption — Technical delivery conditions*
- EN 12259-1:1999,<sup>1</sup> *Fixed firefighting systems — Components for sprinkler and water spray systems — Part 1: Sprinklers*
- EN 12259-2, *Fixed firefighting systems — Components for sprinkler and water spray systems — Part 2: Wet alarm valve assemblies*
- EN 12259-3, *Fixed firefighting systems — Components for sprinkler and water spray systems — Part 3: Dry alarm valve assemblies*
- EN 12259-4, *Fixed firefighting systems — Components for sprinkler and water spray systems — Part 4: Water motor alarms*
- EN 12259-5, *Fixed firefighting systems — Components for sprinkler and water spray systems — Part 5: Water flow detectors*
- EN 12259-9, *Fixed firefighting systems — Components for sprinkler and water spray systems — Part 9: Deluge alarm valves*
- EN 12259-14, *Fixed firefighting systems — Components for sprinkler and water spray systems — Part 14: Sprinklers for residential applications*
- EN 12845-2, *Fixed firefighting systems — Automatic sprinkler systems — Part 2:*
- EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*
- EN 13501-2, *Fire classification of construction products and building elements — Part 2: Classification using data from fire resistance tests, excluding ventilation services*
- EN 13501-3,<sup>2</sup> *Fire classification of construction products and building elements — Part 3: Classification using data from fire resistance tests on products and elements used in building service installations: fire resisting ducts and fire dampers*
- EN 13565-1:2019, *Fixed firefighting systems — Foam systems — Part 1: Requirements and test methods for components*
- EN 13565-2:2018,<sup>3</sup> *Fixed firefighting systems — Foam systems — Part 2: Design, construction and maintenance*

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<sup>1</sup> Impacted by EN 12259-1:1999/A1:2001, EN 12259-1:1999/A2:2004 and EN 12259-1:1999/A3:2006

<sup>2</sup> Impacted by EN 13501-3:2005+A1:2009

<sup>3</sup> Impacted by EN 13565-2:2018/AC:2019.

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EN 17451, *Fixed firefighting systems — Automatic sprinkler systems — Design, assembly, installation and commissioning of pump sets*

EN 60332-1-2:2004/A12:2020, *Tests on electric and optical fibre cables under fire conditions - Part 1-2: Test for vertical flame propagation for a single insulated wire or cable - Procedure for 1 kW pre-mixed flame*

EN 60332-2-2:2004, *Tests on electric and optical fibre cables under fire conditions - Part 2-2: Test for vertical flame propagation for a single small insulated wire or cable - Procedure for diffusion flame*

EN IEC 60332-3-23:2018, *Tests on electric and optical fibre cables under fire conditions - Part 3-23: Test for vertical flame spread of vertically-mounted bunched wires or cables - Category B*

EN IEC 60332-3-24:2018, *Tests on electric and optical fibre cables under fire conditions - Part 3-24: Test for vertical flame spread of vertically-mounted bunched wires or cables - Category C*

EN 60529:1992+A2:2013, *Degrees of protection provided by enclosures (IP Code)*

EN ISO 1127, *Stainless steel tubes — Dimensions, tolerances and conventional masses per unit length*

EN ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles — Specifications and test methods systems*

EN ISO 17672:2016, *Brazing — Filler metals (ISO 17672:2016)*

EN ISO 5817:2014, *Welding — Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) — Quality levels for imperfections*

EN ISO 9606-1, *Qualification testing of welders — Fusion welding — Steels*

FM 1630:2021, *Steel Pipe for Sprinkler Systems* [oSIST prEN 12845-1:2022  
https://standards.iteh.ai/catalog/standards/sist/b5a47e8e-295c-467-8813-84d82b3557be/osist-pren-12845-1-2022](https://standards.iteh.ai/catalog/standards/sist/b5a47e8e-295c-467-8813-84d82b3557be/osist-pren-12845-1-2022)

FM 5130, *Foam Extinguishing Systems*

ISO 8528-4:2005, *Reciprocating internal combustion engine driven alternating current generating sets — Part 4: Controlgear and switchgear*

prEN 12259-12:2017, *Fixed firefighting systems — Components for sprinkler and water spray systems — Part 12: Pumps*

UL 162, *Standard for Foam Equipment and Liquid Concentrates*

### 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>

#### 3.1 Terms and definition

##### 3.1

##### **100 % flow point**

##### **$Q_{100}$**

flow at the point of intersection of the pressure-flow demand characteristic of the most unfavourable area of operation of the automatic sprinkler system (the one corresponding to the maximum product of design density X area of operation) and the water supply pressure-flow characteristic with the tank at its lowest water level or the town main at its most unfavourable conditions

##### 3.2

##### **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 automatic sprinkler system and the water supply pressure-flow characteristic with the suction source at its normal level

##### 3.3

##### **pressure gauge**

##### **gauge**

device that measures and indicates pressure

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<https://standards.iteh.ai/catalog/standards/sist/b5a47e8e-394c-46c7-8813-84d82b3557be/osist-pren-12845-1-2022>

##### 3.3.1

##### **'A' gauge**

pressure gauge connected to a town main connection, between the supply pipe stop valve and the non-return valve

##### 3.3.2

##### **'B' gauge**

pressure gauge connected to and on the same level as an alarm valve, indicating the pressure on the upstream side of the valve

##### 3.3.3

##### **'C' gauge**

pressure gauge connected to and on the same level as an alarm valve, indicating the pressure on the downstream side of the valve

##### 3.4

##### **accelerator**

device that reduces the delay in operation of a dry alarm valve, activated by early detection of the drop in air or inert gas pressure upon sprinkler operation