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Stationære brandslukningsanlæg – Automatiske sprinkleranlæg – Projektering, installation og vedligeholdelse

Fixed firefighting systems – Automatic sprinkler systems – Design, installation and maintenance

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Fixed firefighting systems - Automatic sprinkler systems - 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

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 12845:2015+A2:2026) 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of an identical text or by endorsement, at the latest by October 2026, and conflicting national standards shall be withdrawn at the latest by October 2026.

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.

This document includes Corrigendum 1 issued by CEN on 20 January 2016, Amendment 1 approved by CEN on 2 October 2016 and Amendment 2 approved by CEN on 19 January 2026.

The start and finish of text introduced or altered by the amendments is indicated in the text by ⟨A1⟩ ⟨A1⟩ and ⟨A2⟩ ⟨A2⟩.

The start and finish of text introduced or altered by the corrigendum is indicated in the text by tags ⟨AC⟩ ⟨AC⟩.

This document supersedes ⟨A2⟩ EN 12845:2015+A1:2019 and EN 12845:2015/AC:2016 ⟨A2⟩.

⟨A2⟩ In comparison with EN 12845:2015+A1:2019, technical modifications have been made to integrate references and usage of EN 17451, EN 12845-2 and EN 12845-3 into this document. ⟨A2⟩

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

— automatic sprinkler systems (EN 12259);

— gas extinguishing systems (EN 12094);

— powder systems (EN 12416);

— explosion protection systems (ISO 6184);

— foam systems (EN 13565);

— gas systems (EN 12094);

— hydrant and hose reel systems (EN 671);

— smoke and heat control systems (EN 12101).

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.

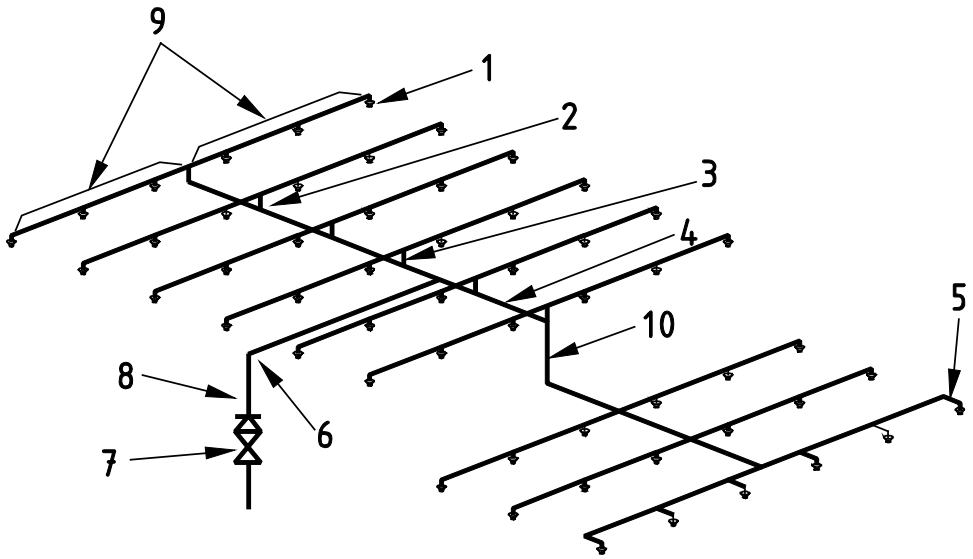
According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of

North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

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.

A sprinkler system consists of a water supply (or supplies) and one or more sprinkler installations; each installation consists of a set of installation main control 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	sprinkler head	6	main distribution pipe
2	riser	7	control valve set
3	design point	8	riser
4	distribution pipe spur	9	range pipes
5	arm pipe	10	drop

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 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.

It should not be assumed that the provision of a sprinkler system entirely obviates 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 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.

It is essential that sprinkler systems should be properly maintained to ensure operation 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 emphasized.

When sprinkler systems are out of service extra attention should be paid to fire precautions and the appropriate authorities informed.

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. Similarly, competent technicians should be used in the installation and testing of the equipment (see Annex M).

1 Scope

This European Standard specifies requirements and gives recommendations for the design, installation and maintenance of fixed fire sprinkler systems in buildings and industrial plants, and particular requirements for sprinkler systems that are integral to measures for the protection of life.

This European Standard covers only the types of sprinkler specified in EN 12259-1 (see Annex L).

The requirements and recommendations of this European Standard are also applicable to any addition, extension, repair or other modification to a sprinkler system. They are not applicable to water spray or deluge systems.

It 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 sprinkler systems complying with this European Standard.

This European Standard does not cover water supplies to systems other than sprinklers. Its requirements can be used as guidance for other fixed firefighting extinguishing systems, provided that any specific requirements for other firefighting extinguishing supplies are taken into account.

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

This European Standard is intended only for fixed fire sprinkler systems in buildings and other premises on land. Although the general principles might well apply to other uses (e.g. maritime use). For these other uses additional considerations should be taken into account.

The requirements are not valid for automatic sprinkler systems on ships, in aircraft, on vehicles and mobile fire appliances or for below ground systems in the mining industry.

Sprinkler system design deviations might be allowed when such deviations have been shown to provide a level of protection at least equivalent to this European Standard, for example by means of full-scale fire testing where appropriate, and where the design criteria have been fully documented.

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 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 1254 (all parts), *Copper and copper alloys — Plumbing fittings*

EN 12259-1, *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 automatic 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 50342-1, *Lead-acid starter batteries — Part 1: General requirements and methods of test*

EN 50342-2, *Lead-acid starter batteries — Part 2: Dimensions of batteries and marking of terminals*

EN 60332 (all parts), *Tests on electric and optical fibre cables under fire conditions (IEC 60332)*

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

EN 60623, *Secondary cells and batteries containing alkaline or other non-acid electrolytes — Vented nickel-cadmium prismatic rechargeable single cells (IEC 60623)*

EN 60947-1, *Low-voltage switchgear and controlgear — Part 1: General rules (IEC 60947-1)*

EN 60947-4, *Low-voltage switchgear and control gear — Part 4: Contactors and motor-starters — Electromechanical contactors and motor-starters (IEC 60947-4)*

EN ISO 3677, *Filler metal for soft soldering, brazing and braze welding — Designation (ISO 3677)*

EN ISO 9606-1, *Qualification testing of welders — Fusion welding — Part 1: Steels (ISO 9606-1)*

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

ISO 3046 (all parts), *Reciprocating internal combustion engines — Performance*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
'A' gauge
pressure gauge connected to a town main connection, between the supply pipe stop valve and the non-return valve

3.2
accelerator
device that reduces the delay in operation of a dry alarm valve, or composite alarm valve in dry mode, by early detection of the drop in air or inert gas pressure on sprinkler operation

3.3
alarm test valve
valve through which water might be drawn to test the operation of the water motor fire alarm and/or of any associated electric fire alarm

3.4
alarm valve
non-return valve, of the wet, dry or composite type that also initiates the water motor fire alarm when the sprinkler installation operates

3.5
alarm valve, alternate
alarm valve suitable for a wet, dry or alternate installation

3.6
alarm valve, dry
alarm valve suitable for a dry installation; and/or in association with a wet alarm valve for an alternate installation

3.7
alarm valve, pre-action
alarm valve suitable for a pre-action installation

3.8
alarm valve, wet
alarm valve suitable for a wet installation

3.9
area of operation
maximum area, over which it is assumed, for design purposes, that sprinklers will operate in a fire

3.10
area of operation, hydraulically most favourable
location in a sprinkler array of an area of operation of specified shape at which the water flow is the maximum for a specific pressure measured at the control valve set

3.11
area of operation, hydraulically most unfavourable
location in a sprinkler array of an area of operation of specified shape at which the water supply pressure measured at the control valve set is the maximum needed to give the specified design density

3.12
arm pipe
pipe less than 0,3 m long, other than the last section of a range pipe, feeding a single sprinkler

3.13
authorities
organizations responsible for approving sprinkler systems, equipment and procedures, e.g. the fire and building control authorities, the fire insurers, the local water authority or other appropriate public authorities

3.14
'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

3.15
booster pump set
automatic pump supplying water to a sprinkler system from a gravity tank or town main

3.16
'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

3.17
control valve set
assembly comprising an alarm valve, a stop valve and all the associated valves and accessories for the control of one sprinkler installation

3.18
cut-off sprinkler
sprinkler protecting a door or window between two areas only one of which is protected by sprinklers

3.19
design density
minimum density of discharge, in millimetres per minute of water, for which a sprinkler installation is designed, determined from the discharge of a specified group of sprinklers, in litres per minute, divided by the area covered, in square metres

3.20
design point
point on a distribution pipe of a pre-calculated installation, downstream of which pipework is sized from tables and upstream of which pipework is sized by hydraulic calculation

3.21
distribution pipe
pipe feeding either a range pipe directly or a single sprinkler on a non-terminal range pipe more than 300 mm long

3.22
distribution pipe spur
distribution pipe from a main distribution pipe, to a terminal branched pipe array

3.23
drencher
sprayer used to distribute water over a surface to provide protection against fire exposure

3.24
drop
vertical distribution pipe feeding a distribution or range pipe below

3.25
end-centre array
pipe array with range pipes on both sides of a distribution pipe

3.26
end-side array
pipe array with range pipes on one side only of a distribution pipe

3.27
exhauster
device to exhaust the air or inert gas from a dry or alternate installation to atmosphere on sprinkler operation to give more rapid operation of the alarm valve

3.28
fire resistant compartment
enclosed volume capable of maintaining its fire integrity for a minimum specified time

3.29
fully calculated
term applied to an installation in which all the pipework is sized by hydraulic calculation

3.30
gridded configuration
pipe array in which water flows to each sprinkler by more than one route

3.31
hanger
assembly for suspending pipework from elements of building structure

3.32
high rise system
sprinkler system in which the highest sprinkler is more than 45 m above the lowest sprinkler or above the sprinkler pumps, whichever is the lower

3.33
inexhaustible sources
natural and artificial water sources such as rivers, canals and lakes which are virtually inexhaustible for reasons of capacity and climate, etc.

3.34
installation (sprinkler installation)
part of sprinkler system comprising a control valve set, the associated downstream pipes and sprinklers

3.35
installation, alternate
installation in which the pipework is selectively charged with either water or air/inert gas according to ambient temperature conditions

3.36
installation, dry (pipe)
installation in which the pipework is charged with air or inert gas under pressure

3.37
installation, pre-action
one of two types of dry, or alternate in dry mode, installation in which the alarm valve can be opened by an independent fire detection system in the protected area

3.38
installation, wet (pipe)
installation in which the pipework is always charged with water

3.39
discharge coefficient "K"
coefficient of discharge in the formula $Q = K\sqrt{p}$

where:

Q is the flow in litres per minute, and p is the pressure in bar

3.40
looped configuration
pipe array in which there is more than one distribution pipe route along which water might flow to a range pipe

3.41
main distribution pipe
pipe feeding a distribution pipe

3.42
maximum flow demand (Qmax)
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

3.43
mechanical pipe joint
pipe fitting other than threaded tubulars, screwed fittings, spigots and socket and flanged joint, used to connect pipes and components

3.44
multi-storey building
building comprising two or more storeys, above or below ground

3.45
node
point in pipework at which pressure and flow(s) are calculated; each node is a datum point for the purpose of hydraulic calculations in the installation

3.46
normal water level
water level at the water supply needed to give the required effect capacity in relation to the low water level, including any necessary margins

EXAMPLE For ice.

3.47
pipe array
pipes feeding a group of sprinklers

EXAMPLE Pipe arrays can be looped, gridded or branched.

3.48
pre-calculated
installation in which the pipes downstream of the design point(s) have been previously sized by hydraulic calculation

Note 1 to entry: Tables of diameters are given.

3.49
pressure maintenance pump (jockey pump)
small automatic pump set used to replenish minor water loss and maintain system pressure

3.50
pressure tank
tank containing water under air pressure sufficient to ensure that all the water can be discharged at the necessary pressure

3.51
range pipe
pipe feeding sprinklers either directly or via arm pipes

3.52
riser
vertical distribution pipe feeding a distribution or range pipe above

3.53
sprayer
water spray nozzle that gives a downward conical pattern discharge

3.54
sprinkler (automatic)
nozzle with a thermally sensitive sealing device which opens to discharge water for fire fighting

3.55
sprinkler, ceiling or flush
pendent sprinkler for fitting partly above, but with the temperature sensitive element located below the plane of the ceiling

3.56
sprinkler, concealed
recessed sprinkler with a cover plate that disengages when heat is applied

3.57
sprinkler, conventional pattern
sprinkler that gives a spherical pattern of water discharge

3.58
sprinkler, dry pendent pattern
unit comprising a sprinkler and a dry drop pipe unit with a valve at the head of the pipe, held closed by a device maintained in position by the sprinkler head valve

3.59
sprinkler, dry upright pattern
unit comprising a sprinkler and dry rise pipe unit with a valve, at the base of the pipe, held closed by a device maintained in position by the sprinkler head valve

3.60
sprinkler, spray flat
sprinkler that gives a pattern of water discharge with a proportion of the discharge directed above the level of the deflector

3.61
sprinkler, fusible link
sprinkler which opens when a component provided for this purpose melts

3.62
sprinkler, glass bulb
sprinkler which opens when a liquid-filled glass bulb bursts

3.63
sprinkler, horizontal
sprinkler in which the nozzle directs water horizontally

3.64
sprinkler, open
sprinkler not sealed by a temperature sensitive element

3.65
sprinkler, pendant
sprinkler in which the nozzle directs water downwards

3.66
sprinkler, recessed
sprinkler in which all or part of the heat sensing element is above the lower plane of the ceiling

3.67
sprinkler rosette
plate covering the gap between the shank or body of a sprinkler projecting through a suspended ceiling, and the ceiling

3.68
sprinkler, sidewall pattern
sprinkler that gives an outward half-paraboloid pattern discharge

3.69
sprinkler, spray pattern
sprinkler that gives a downward paraboloid pattern discharge

3.70
sprinkler, upright
sprinkler in which the nozzle directs water upwards

3.71
sprinkler system
entire means of providing sprinkler protection in the premises comprising one or more sprinkler installations, the pipework to the installations and the water supply/supplies

3.72
sprinkler yoke (arms)
part of a sprinkler that retains the heat sensitive element in load bearing contact with the sprinkler head valve

3.73
staggered (sprinkler) layout
off-set layout with the sprinklers displaced one-half pitch along the range pipe relative to the next range or ranges

3.74
standard (sprinkler) layout
rectilinear layout with the sprinklers aligned perpendicular to the run of the ranges

3.75
subsidiary alternate (wet and dry pipe) extension
part of a wet installation that is selectively charged with water or air/inert gas according to ambient temperature conditions and that is controlled by a subsidiary dry or alternate alarm valve

3.76
subsidiary dry extension
part of a wet or alternate installation that is charged permanently with air or inert gas under pressure

3.77
suitable for sprinkler use
term applied to equipment or components accepted by the authorities as suitable for a particular application in a sprinkler system, either by conforming to EN product standards where available or if not by compliance with specified criteria

3.78
supply pipe
pipe connecting a water supply to a trunk main or the installation control valve set(s); or a pipe supplying water to a private reservoir or storage tank

3.79
suspended open cell ceiling
ceiling of regular open cell construction through which water from sprinklers can be discharged freely

3.80
terminal main configuration
pipe array with only one water supply route to each range pipe

3.81
terminal range configuration
pipe array with only one water supply route from a distribution pipe

3.82
trunk main
pipe connecting two or more water supply pipes to the installation control valve set(s)

3.83
water supply datum point
point on the installation pipework at which the water supply pressure and flow characteristics are specified and measured

3.84
zone
sub-division of an installation with a specific flow alarm and fitted with a monitored subsidiary stop