



SLOVENSKI STANDARD

SIST EN 12845:2003

01-december-2003

Vgrajene naprave za gašenje – Avtomatski sprinklerski sistemi - Projektiranje, vgradnja in vzdrževanje

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

Ortsfeste Brandbekämpfungsanlagen - Automatische Sprinkleranlagen - Planung, Installation und Instandhaltung

Installations fixes de lutte contre l'incendie - Systemes d'extinction automatiques du type sprinkleur - Calcul, installation et maintenance

<https://standards.iteh.ai/catalog/standards/sist/cf664bed-3e96-4a99-8f11-93075a6537f0/sist-en-12845-2003>

Ta slovenski standard je istoveten z: EN 12845:2003

ICS:

13.220.20 Ú[0æ} æÁ æz äæ Fire protection

SIST EN 12845:2003 en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 12845:2003

<https://standards.iteh.ai/catalog/standards/sist/cf664bed-3e96-4a99-8f11-93075a6537f0/sist-en-12845-2003>

EUROPEAN STANDARD

EN 12845

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2003

ICS 13.220.20

English version

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

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

Ortsfeste Brandbekämpfungsanlagen - Automatische
Sprinkleranlagen - Planung, Installation und Instandhaltung

This European Standard was approved by CEN on 29 November 2002.

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 Management Centre or to any CEN member.

This European Standard exists 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

[SIST EN 12845:2003](https://standards.iteh.ai/catalog/standards/sist/cf664bed-3e96-4a99-8f11-93075a6537f0/sist-en-12845-2003)

<https://standards.iteh.ai/catalog/standards/sist/cf664bed-3e96-4a99-8f11-93075a6537f0/sist-en-12845-2003>



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

	page
Foreword	9
Introduction.....	10
1 Scope.....	12
2 Normative references	12
3 Terms and definitions.....	13
4 Contract planning and documentation	20
4.1 General	20
4.2 Initial considerations	20
4.3 Preliminary or estimating stage.....	21
4.4 Design stage.....	21
4.4.1 General	21
4.4.2 Summary schedule	21
4.4.3 Installation layout drawings.....	22
4.4.4 Water supply.....	25
5 Extent of sprinkler protection.....	27
5.1 Buildings and areas to be protected	27
5.1.1 Permitted exceptions within a building	27
5.1.2 Necessary exceptions	27
5.2 Storage in the open air	28
5.3 Fire resistant separation	28
5.4 Protection of concealed spaces	28
5.5 Height difference between the highest and lowest sprinklers	28
6 Classification of occupancies and fire hazards.....	28
6.1 General.....	28
6.2 Hazard classes	29
6.2.1 Light Hazard - LH	29
6.2.2 Ordinary Hazard - OH.....	29
6.2.3 High Hazard - HH.....	30
6.3 Storage	31
6.3.1 General	31
6.3.2 Storage Configuration	32
7 Hydraulic design criteria	34
7.1 LH, OH and HHP	34
7.2 High Hazard Storage - HHS	35
7.2.1 General	35
7.2.2 Ceiling or roof protection only.....	35
7.2.3 Intermediate level in-rack sprinklers.....	36
7.3 Pressure and flow requirements for pre-calculated systems	38
7.3.1 LH and OH systems	38
7.3.2 HHP and HHS systems without in-rack sprinklers	39
8 Water supplies.....	42
8.1 General	42
8.1.1 Duration.....	42
8.1.2 Continuity.....	42
8.1.3 Frost protection.....	42
8.2 Maximum water pressure	42

8.3	Connections for other services	43
8.4	Housing of equipment for water supplies.....	44
8.5	Test facility devices.....	44
8.5.1	At control valve sets	44
8.5.2	At water supplies.....	45
8.6	Water Supply test	45
8.6.1	General	45
8.6.2	Storage tank and pressure tank supplies.....	45
8.6.3	Town main, booster pump, elevated private reservoir and gravity tank supplies	45
9	Type of water supply.....	45
9.1	General	45
9.2	Town mains.....	45
9.2.1	General	45
9.2.2	Boosted mains.....	46
9.3	Storage tanks.....	46
9.3.1	General	46
9.3.2	Water volume.....	46
9.3.3	Refill rates for full capacity tanks	48
9.3.4	Reduced capacity tanks	48
9.3.5	Effective capacity of tanks and dimensions of suction chambers	49
9.3.6	Strainers	51
9.4	Inexhaustible sources - Settling and suction chambers.....	51
9.4.1	51
9.5	Pressure tanks.....	54
9.5.1	General	54
9.5.2	Housing	54
9.5.3	Minimum capacity (water)	54
9.5.4	Air pressure and contents.....	54
9.5.5	Charging with air and water	55
9.5.6	Control and safety equipment.....	55
9.6	Choice of water supply	56
9.6.1	Single water supplies.....	56
9.6.2	Superior water supplies.....	56
9.6.3	Duplicate water supplies	56
9.6.4	Combined water supplies.....	57
9.7	Isolation of water supply	57
10	Pumps.....	58
10.1	General	58
10.2	Multiple pump arrangements	58
10.3	Compartments for pumpsets	58
10.3.1	General	58
10.3.2	Sprinkler protection	58
10.3.3	Temperature.....	59
10.3.4	Ventilation	59
10.4	Maximum temperature of water supply.....	59
10.5	Valves and accessories	59
10.6	Suction conditions	59
10.6.1	General	59
10.6.2	Suction pipe.....	60
10.7	Performance characteristics	63
10.7.1	Pre-calculated systems - LH and OH.....	63
10.7.2	Pre-calculated systems - HHP and HHS with no in-rack sprinklers.....	64
10.7.3	Calculated systems.....	64
10.7.4	Pressure and water capacity of boosted town mains	64
10.7.5	Pressure switches.....	65
10.8	Electrically driven pumpsets.....	65
10.8.1	General	65
10.8.2	Electricity supply.....	65

EN 12845:2003 (E)

10.8.3	Main switchboard	65
10.8.4	Installation between the main switchboard and the pump controller	66
10.8.5	Pump controller	66
10.8.6	Monitoring of pump operation	66
10.9	Diesel engine driven pumpsets	67
10.9.1	General	67
10.9.2	Engines	67
10.9.3	Cooling system	67
10.9.4	Air filtration	67
10.9.5	Exhaust system	67
10.9.6	Fuel, fuel tank and fuel feed pipes	68
10.9.7	Starting mechanism	68
10.9.8	Electric starter motor batteries	69
10.9.9	Battery chargers	69
10.9.10	Siting of batteries and chargers	70
10.9.11	Starter alarm indication	70
10.9.12	Tools and spare parts	70
10.9.13	Engine tests and exercising	70
11	Installation type and size	71
11.1	Wet pipe installations	71
11.1.1	General	71
11.1.2	Protection against freezing	71
11.1.3	Size of installations	72
11.2	Dry pipe installations	72
11.2.1	General	72
11.2.2	Size of installations	72
11.3	Alternate installations	73
11.3.1	General	73
11.3.2	Size of installations	73
11.4	Pre-action installations	73
11.4.1	General	73
11.4.2	Automatic detection system	74
11.4.3	Size of installations	74
11.5	Subsidiary dry pipe or alternate extension	74
11.5.1	General	74
11.5.2	Size of subsidiary extensions	74
11.6	Subsidiary water spray extension	74
12	Spacing and location of sprinklers	75
12.1	General	75
12.2	Maximum area of coverage per sprinkler	75
12.3	Minimum distance between sprinklers	77
12.4	Location of sprinklers in relation to building construction	77
12.5	Intermediate sprinklers in HH occupancies	83
12.5.1	General	83
12.5.2	Maximum vertical distance between sprinklers at intermediate levels	83
12.5.3	Horizontal position of sprinklers at intermediate levels	83
12.5.4	Numbers of rows of sprinklers at each level	85
12.5.5	HHS intermediate sprinklers in non-shelved racks	85
12.5.6	HHS intermediate sprinklers below solid or slatted shelves in racks (ST5 and ST6)	86
13	Pipe sizing and layout	87
13.1	General	87
13.1.1	Pipe sizing	87
13.2	Calculation of pressure losses in pipework	87
13.2.1	Pipe friction loss	87
13.2.2	Static pressure difference	88
13.2.3	Velocity	88
13.2.4	Pressure loss through fittings and valves	88
13.2.5	Accuracy of calculations	90

ITeH STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 12845:2003

standards.iteh.ai/catalog/standards/sist/cf664bed-3e96-4a99-8f11-

93075a6537f0/sist-en-12845-2003

13.3	Pre-calculated systems	90
13.3.1	General	90
13.3.2	Location of Design Points	90
13.3.3	Light Hazard - LH.....	91
13.3.4	Ordinary Hazard - OH.....	93
13.3.5	High hazard - HHP and HHS (except intermediate level sprinklers)	95
13.4.1	Design density	104
13.4.2	Locations of the area of operation	105
13.4.3	Shape of the area of operation.....	105
13.4.4	Minimum sprinkler discharge pressure	108
13.4.5	Minimum pipe diameters	108
14	Sprinkler design characteristics and uses	109
14.1	General	109
14.2	Sprinkler types and application	109
14.2.1	General	109
14.2.2	Ceiling, flush, recessed and concealed pattern.....	110
14.2.3	Sidewall pattern	110
14.2.4	Flat spray pattern	111
14.3	Flow from sprinklers	111
14.4	Sprinkler temperature ratings	111
14.5	Sprinkler thermal sensitivity	111
14.5.1	General	111
14.5.2	Interaction with other measures	112
14.6	Sprinkler guards	112
14.7	Sprinkler water shields	112
14.8	Sprinkler rosettes	113
14.9	Corrosion protection of sprinklers	113
15	Valves	113
15.1	Control valve set.....	113
15.2	Stop valves.....	113
15.3	Ring main valves.....	113
15.4	Drain valves	114
15.5	Test valves	114
15.5.1	Alarm and pump start test valves.....	114
15.5.2	Remote test valves	115
15.6	Flushing connections	115
15.7	Pressure gauges.....	115
15.7.1	General	115
15.7.2	Water supply connections.....	116
15.7.3	Control valve set.....	116
15.7.4	Removal.....	116
16	Alarms and alarm devices	116
16.1	Water flow alarms.....	116
16.1.1	General	116
16.1.2	Water motor and gong	116
16.1.3	Piping to water motor.....	116
16.2	Electrical water flow and pressure switches	117
16.2.1	General	117
16.2.2	Water flow alarm switches	117
16.2.3	Dry and pre-action systems	117
16.3	Fire brigade and remote central station alarm connection.....	117
17	Pipework.....	117
17.1	General	117
17.1.1	Underground piping.....	117
17.1.2	Above ground piping	118
17.1.3	Welding of steel pipe.....	118
17.1.5	Flexible pipes and joints.....	119

STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 12845:2003

//standards.iteh.ai/catalog/standards/sist/cf664bed-3e96-4a99-8f11-93075a6537f0/sist-en-12845-2003

EN 12845:2003 (E)

17.1.6	Concealment.....	119
17.1.7	Protection against fire and mechanical damage	119
17.1.8	Painting	119
17.1.9	Drainage	119
17.1.10	Copper pipe.....	120
17.2	Pipe supports	120
17.2.1	General	120
17.2.2	Spacing and location	120
17.2.3	Design	121
17.3	Pipework in concealed spaces	122
17.3.1	False ceilings above OH occupancies	122
17.3.2	All other cases.....	122
18	Signs, notices, and information.....	122
18.1	Block plan	122
18.1.1	General	122
18.2	Signs and notices	122
18.2.1	Location plate.....	122
18.2.2	Signs for stop valves	123
18.2.3	Control valve set	123
18.2.4	Water supply connections to other services	123
18.2.5	Suction and booster pumps.....	123
18.2.6	Electric switches and control panels	124
18.2.7	Testing and operating devices	125
19	Commissioning and acceptance tests and periodic inspection	125
19.1	Commissioning tests	125
19.1.1	Pipework	125
19.1.2	Equipment.....	125
19.1.3	Water supplies.....	125
19.2	Completion certificate and documents.....	125
20	Maintenance.....	126
20.1	General	126
20.1.1	Programmed work.....	126
20.1.2	Precautions while carrying out work	126
20.1.3	Replacement sprinklers.....	126
20.2	User's programme of inspection and checking	126
20.2.1	General	126
20.2.2	Weekly routine.....	127
20.2.3	Monthly routine	128
20.3	Service and maintenance schedule	128
20.3.1	General	128
20.3.2	Quarterly routine	128
20.3.3	Half-yearly routine.....	129
20.3.4	Yearly routine	129
20.3.5	Yearly routine	130
20.3.6	10 yearly routine.....	130
21	Evaluation of conformity	131
21.1	Sprinkler kit.....	131
21.1.1	General	131
21.2	Sprinkler system	131
21.2.1	General	131
Annex A (normative)	Classification of Typical typical hazards	132
Annex B (normative)	Methodology for categorizing stored goods	135
B.1	General	135
B.2	Material factor (M)	135
B.2.1	General	135
B.2.2	Material Factor 1.....	135
B.2.3	Material factor 2.....	137

B.2.4	Material factor 3	138
B.2.5	Material factor 4	138
B.3	Storage configuration	138
B.3.1	Effect of storage configuration	138
B.3.2	Exposed plastic container with non-combustible content	139
B.3.3	Exposed plastic surface - unexpanded	139
B.3.4	Exposed plastic surface - expanded	139
B.3.5	Open structure	139
B.3.6	Solid block materials	140
B.3.7	Granular or Powdered materials	140
B.3.8	No special configuration	140
Annex C	(normative) Alphabetical listing of stored products and categories	141
Annex D	(normative) Zoning of sprinkler installations	145
D.1	General	145
D.2	Zoning of installations	145
D.3	Requirements for zoned installations	145
D.3.1	Extent of zones	145
D.3.2	Zone subsidiary stop valves	146
D.3.3	Flushing Valves	146
D.3.4	Monitoring	146
D.3.5	Zone test and drainage facilities	146
D.3.6	Installation control valve set	146
D.3.7	Installation monitoring and alarms	146
D.4	Block plan	147
Annex E	(normative) Special requirements for high rise systems	149
E.1	General	149
E.2	Design criteria	149
E.2.1	Hazard group	149
E.2.2	Subdivision of high rise sprinkler systems	149
E.2.3	Standing water pressures at non-return and alarm valves	149
E.2.4	Calculation of distribution pipework for pre-calculated systems	149
E.2.5	Water pressures	150
E.3	Water supplies	150
E.3.1	Types of water supplies	150
E.3.2	Pressure and flow requirements for pre-calculated installations	150
E.3.3	Water supply characteristics for pre-calculated installations	150
E.3.4	Pump performance for pre-calculated installations	150
Annex F	(normative) Special requirements for life safety systems	153
F.1	Subdivision into zones	153
F.2	Wet Pipe pipe installations	153
F.3	Sprinkler type and sensitivity	153
F.4	Control Valve valve set	153
F.5	Water supplies	153
F.6	Theatres	153
F.7	Additional precautions for maintenance	154
Annex G	(normative) Protection of Special special hazards	155
G.1	General	155
G.2	Aerosols	155
G.3	Clothes in multiple garment hanging storage	155
G.3.1	General	155
G.3.2	Categorization	156
G.3.3	Sprinkler protection other than at ceiling	156
G.3.4	Sprinklers in operation	156
G.3.5	Ceiling sprinklers	156
G.3.6	Automatic shutdown	157
G.3.7	Control valve set	157
G.4	Flammable liquid storage	159

EN 12845:2003 (E)

G.5	Idle pallets.....	160
G.6	Spirit based liquors in wooden barrels.....	161
G.7	Non-woven synthetic fabric	161
G.7.1	Free standing storage.....	161
G.7.2	Rack storage.....	162
G.8	Polypropylene or polyethylene storage bins	162
G.8.1	General	162
G.8.2	Classification	162
G.8.3	Palletized rack storage (ST4)	162
G.8.4	All other storage.....	162
G.8.5	Foam additive	162
Annex H (normative) Sprinkler systems monitoring.....		163
H.1	General.....	163
H.2	Functions to be monitored.....	163
H.2.1	General	163
H.2.2	Stop valves controlling water flow to sprinklers	163
H.2.3	Other stop valves	163
H.2.4	Liquid levels.....	163
H.2.5	Pressures	163
H.2.6	Electrical power.....	164
H.2.7	Temperature.....	164
Annex I (normative) Transmission of alarms.....		165
I.1	Functions to be monitored.....	165
I.2	Alarm levels	165
Annex J (informative) Precautions and procedures when a system is not fully operational		167
J.1	Minimizing the effects.....	167
J.2	Planned shut-down	167
J.3	Unplanned shut-down	168
J.4	Action following sprinkler operation	168
J.4.1	General	168
J.4.2	Installations protecting cold storage warehouses (air circulation refrigeration).....	168
Annex K (informative) Twenty-five year inspection		169
Annex L (informative) Special technology		170
Annex ZA (informative) Clauses of this European Standard addressing the provisions of the EU Construction Products Directive.		171
Bibliography.....		175

Foreword

This document (EN 12845:2003) 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 February 2004, and conflicting national standards shall be withdrawn at the latest by August 2006.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

Annexes A to I are normative. The annexes J to L are informative.

This document includes a Bibliography.

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);
- gas systems (EN 12094);
- hydrant and hose reel systems (EN 671);
- smoke and heat control systems (EN 12101);
- water spray systems (EN1).

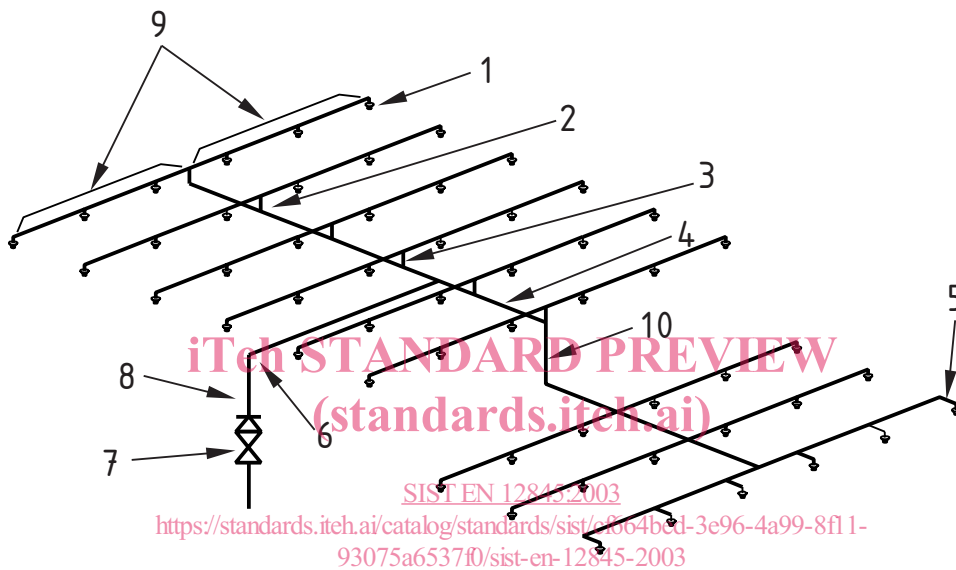
According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

EN 12845:2003 (E)

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
- 2 Riser
- 3 Design point
- 4 Distribution pipe spur
- 5 Arm pipe

- 6 Main distribution pipe
- 7 Control valve set
- 8 Riser
- 9 Range pipes
- 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.

In some life safety applications an authority might specify sprinkler protection only in certain designated areas and solely to maintain safe conditions for the evacuation of persons from the sprinkler protected areas.

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.

This 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 standard is intended only for fixed fire sprinkler systems in buildings and other premises on land. Although the general principles may well apply to other uses (e.g. maritime use), for these other uses additional considerations will almost certainly have to be taken into account.

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.

This standard covers only the types of sprinkler specified in EN 12259-1 (see annex L).

EN 12845:2003 (E)**1 Scope**

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

This standard covers only the types of sprinkler specified in EN 12259-1 (see annex L).

The requirements and recommendations of this 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 standard.

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

This standard also covers sprinkler system kits.

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.

iTech STANDARD PREVIEW
(standards.iTech.ai)

2 Normative references

[SIST EN 12845:2003](https://standards.iTech.ai/catalog/standards/sist/c8664bed-3e96-4a99-8f11-93075a6537f0/sist-en-12845-2003)

<https://standards.iTech.ai/catalog/standards/sist/c8664bed-3e96-4a99-8f11-93075a6537f0/sist-en-12845-2003>

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 54-1, *Fire detection and fire alarm systems — Introduction.*

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

EN 54-3, *Fire detection and fire alarm systems — Fire alarm devices - Sounders.*

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

EN 54-5, *Fire detection and fire alarm systems — Heat detectors – Point detectors.*

EN 54-10, *Fire detection and fire alarm systems — Flame detectors – Point detectors.*

EN 54-11, *Fire detection and fire alarm systems — Manual call points.*

EN 287-1, *Approval testing of welders — Fusion welding — Part 1: Steels.*

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

EN 1254, *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 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.*

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

EN 12723, *Liquid pumps — General terms for pumps and installations — Definitions, quantities, letter symbols and units.*

EN 50342, *Lead-acid starter batteries — General requirements, methods of test and numbering.*

EN 60529, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989).*

EN 60623, *Secondary cells and batteries containing alkaline or other non-acid electrolytes - Vented nickel-cadmium prismatic rechargeable single cells (IEC 60623:2001).*

EN 60947-1, *Low-voltage switchgear and controlgear – Part 1: General rules (IEC 60947-1:1999, modified).*

SIST EN 12845:2003

EN 60947-4, *Low-voltage switchgear and controlgear - Contactors and motor-starters; Electromechanical contactors and motor-starters (IEC 60947-4-1:2000).*

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

ISO 3046 (All parts), *Reciprocating internal combustion engines.*

ISO 3677, *Filler metal for soft soldering, brazing and braze welding — Designation.*

3 Terms and definitions

For the purposes of this European Standard, 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