

Fixed firefighting systems — Components for sprinkler and water spray systems —

Part 3: Dry alarm valve assemblies

The European Standard EN 12259-3:2000, with the incorporation of Amendments A1:2001 and A2:2005, has the status of a British Standard

ICS 13.220.20

National foreword

This British Standard is the official English language version of EN 12259-3:2000, including amendments A1:2001 and A2:2005.

This European Standard is the subject to transitional arrangements agreed under a Commission mandate which is intended to lead to CE marking in support of the Construction Products Directive. In order to allow for any changes in national regulations, the Member States have agreed a transition period.

The UK participation in its preparation was entrusted by Technical Committee FSH/18, Fixed firefighting systems, to Subcommittee FSH/18/2, Sprinklers, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

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**Fixed firefighting systems – Components for sprinkler and water
spray systems – Part 3: Dry alarm valve assemblies
(includes amendments A1:2001 and A2:2005)**

Systèmes fixes de lutte contre l'incendie – Composants des
systèmes sprinkleurs et à pulvérisation d'eau – Partie 3:
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(enthält Änderungen A1:2001 und A2:2005)

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 191, Fixed fire fighting 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of an identical text or by endorsement, at the latest by November 2000, and conflicting national standards shall be withdrawn at the latest by November 2000.

This European Standard 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).

It forms one part of EN 12259, covering components for automatic sprinkler systems, and is included in a series of European Standards planned to cover:

- a) automatic sprinkler systems (EN 12845 & 12259¹⁾);
- b) gas systems (EN 12094 & EN ISO 14520);
- c) powder systems (EN 12416¹⁾);
- d) explosion protection systems (EN 26 184);
- e) foam systems (EN 13565¹⁾);
- f) hydrant and hose reel systems (EN 671);
- g) smoke and heat control systems (EN 12101¹⁾);
- h) water spray systems (EN ¹⁾).

EN 12259 has the general title, Fixed fire fighting systems – Components for sprinkler and water spray systems, and will consist of the following parts:

- Part 1: Sprinklers;
- Part 2: Wet alarm valve assemblies;
- Part 3: Dry alarm valve assemblies;
- Part 4: Water motor alarms;
- Part 5: Water flow detectors;
- Part 6: Pipe couplings;

¹⁾ In preparation.

Part 7: Pipe hangers;

Part 8: Pressure switches;

Part 9: Deluge alarm valve assemblies;

Part 10: Multiple controls;

Part 11: Medium and high velocity water sprayers;

Part 12: Pump sets.

Annexes A, B, C, D, E, F, G, H, I, J and K give test methods and are normative.

Annex L gives an example of a test schedule suitable for type approval of conventional designs and is informative.

This standard is to be entrusted for use to qualified and experienced organizations which have a capability to design and manufacture to recognized international standards.

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, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Foreword to amendment 1

This amendment EN 12259-3:2000/A1:2001 to the EN 12259-3:2000 has been prepared by Technical Committee CEN/TC 191, Fixed fire fighting systems, the Secretariat of which is held by BSI.

This amendment to the European Standard EN 12259-3:2000 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 standard.

It forms one part of EN 12259, covering components for automatic sprinkler systems and is included in a series of European Standards planned to cover:

- automatic sprinkler systems (EN 12259 & EN 12845)¹;
- gaseous extinguishing systems (EN 12094)¹;
- powder systems (EN 12416)¹;
- explosion protection systems (EN 26184);
- foam systems (EN 13565);
- hose reel systems (EN 671)¹;
- smoke and heat control systems (EN 12101)¹;
- water spray systems¹.

EN 12259 has the general title, *Fixed fire fighting systems — Components for sprinkler and water spray systems*, and will be subdivided as follows:

- Part 1: Sprinklers;
- Part 2: Wet alarm valve assemblies;
- Part 3: Dry alarm valve assemblies;
- Part 4: Water motor alarms;
- Part 5: Water flow detectors;
- Part 6: Pipe couplings;
- Part 7: Pipe hangers;
- Part 8: Pressure switches;
- Part 9: Deluge alarm valve assemblies;
- Part 10: Multiple controls;
- Part 11: Medium and high velocity water sprayers;
- Part 12: Sprinkler pump sets.

Foreword to amendment 2

This European Standard (EN 12259-3:2000/A2:2005) has been prepared by Technical Committee CEN/TC 191 “Fixed firefighting systems”, the secretariat of which is held by BSI.

This Amendment to the European Standard EN 12259-3:2000 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2006, and conflicting national standards shall be withdrawn at the latest by August 2007.

This European Standard 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 European Standard.

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

1 Scope

This part of EN 12259 specifies requirements for construction and performance of dry alarm valve assemblies, accelerators and exhausters used in automatic sprinkler systems conforming to annexes A and B of prEN 12845, Automatic sprinkler systems – Design and installation.

Auxiliary components and attachments to dry alarm valve assemblies, accelerators and exhausters are not covered by this standard.

2 Normative references

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.

| *Reference deleted*

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

ISO 868	Plastics and ebonite – Determination of indentation hardness by means of a dorometer (shore hardness).
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ISO 898-1	Mechanical properties of fasteners – Part 1: Bolts, screws and studs.
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ISO 898-2	Mechanical properties of fasteners – Part 2: Nuts with specified proof load values.
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prEN 12845	Automatic sprinkler systems – Design and installation.
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3 Definitions

For the purposes of this standard the following definitions apply.

3.1

accelerator

quick opening device (see 3.18) to hasten the operation of a dry alarm valve using mechanical means other than by reducing the installation air/inert gas pressure, to the valve trip point

3.2

alarm device

mechanical or electrical device to sound an alarm on operation of the dry alarm valve
[EN 12259-2:1999]

3.3

anti-flooding device

device to prevent excessive water from entering any relevant part or parts of the quick opening device (see 3.18) where this might prevent subsequent operation

3.4

anti-reset latch

mechanism to prevent the sealing assembly from returning to its closed position after operation

3.5

automatic drain (valve)

normally open valve to drain water automatically from and vents the intermediate chamber (see 3.14) of dry alarm valve to atmosphere, when the dry alarm valve is in the ready condition (see 3.20) and limits water flow from the alarm line after the dry alarm valve operates

3.6

clapper

type of sealing assembly (see 3.22)
[EN 12259-2:1999]

3.7

differential pressure ratio

ratio of service pressure to installation air/inert gas pressure at the trip point (see 3.27)
[EN 12259-2:1999]

3.8

differential type dry alarm valve

type of dry alarm valve in which downstream air/inert gas pressure acts directly on the sealing assembly to maintain it in the closed position

The air/inert gas sealing assembly seat ring is of larger diameter relative to the water sealing assembly seat ring, with the two separated by an intermediate chamber maintained at atmospheric pressure in the ready condition.

3.9

dry alarm valve

valve to prevent water flow into a dry installation in the ready condition but to permit flow of water into the installation at air or inert gas pressures below the trip point

3.10

exhauster

quick opening device (see 3.18) to discharge installation air/inert gas directly to atmosphere

3.11

flow velocity

water velocity through pipe of the same nominal size as the dry alarm valve at the same flow rate

3.12

holding chamber

chamber pressurized with installation air/inert gas to actuate a quick opening device (see 3.18) at above a specified rate of loss of installation air/inert gas pressure

3.13

installation (air/inert gas) pressure

air/inert gas pressure in a dry installation at the main outlet of the dry alarm valve

3.14

intermediate chamber

part of a dry alarm valve which separates the air/inert gas and water sealing assembly seat rings and is at atmospheric pressure when the dry alarm valve is in the ready condition

3.15

leak point

installation air/inert gas pressure at a specified service pressure at which water begins to flow from the dry alarm valve, intermediate chamber, vent or alarm connection

3.16

mechanical type dry alarm valve

type of dry alarm valve where downstream air/inert gas pressure acts both on the sealing assembly and linking mechanism to maintain it in the closed position

3.17

priming water

water used to seal the sealing assembly and to prevent cementation of the working parts

3.18

quick-opening device

device to reduce the time to reach the trip point

3.19

rated working pressure

maximum service pressure (see 3.24) at which the dry alarm valve or quick opening device is intended to operate

3.20

ready condition

state of the dry alarm valve assembly in a sprinkler installation filled downstream with air/inert gas and upstream with water at predetermined pressures, when there is no flow from any outlet downstream from the sealing assembly, preventing the downstream pipework filling with water
[EN 12259-2:1999]

3.21

reinforced elastomeric element

element of a clapper, clapper assembly or seat seals made of an elastomeric compound with one or more other components that increase the tensile strength of the combination to at least twice that of the elastomeric material alone
[EN 12259-2:1999]

3.22

sealing assembly

main movable sealing element of the dry alarm valve (such as clapper)
[EN 12259-2:1999]

3.23

sealing assembly seat ring

main fixed sealing element of the dry alarm valve
[EN 12259-2:1999]

3.24

service pressure

static water pressure at the inlet to the dry alarm valve in the ready condition
[EN 12259-2:1999]

3.25

supplier

company responsible for design manufacturing and quality assurance
[EN 12259-2:1999]

3.26

trim

external equipment and pipework, excluding the main installation pipework, fitted to the dry alarm valve assembly
[EN 12259-2:1999]

3.27

trip point

point at which the dry alarm valve operates admitting water into the sprinkler installation measured in terms of the installation air/inert gas pressure and service pressure
[EN 12259-2:1999]

3.28

water motor alarm

hydraulically actuated alarm device (see 3.2) fitted to the dry alarm valve to provide a local audible alarm when the sprinkler installation operates
[EN 12259-2:1999]

3.29

water motor transmitter

hydraulically actuated device to generate an electrical current to operate an electrical alarm device

4 Dry alarm valve assembly construction and performance

4.1 Nominal size

The nominal size shall be expressed as the nominal diameter of the inlet and outlet connections, i.e. the pipe size for which the connections are intended. The nominal size shall be 50 mm, 65 mm, 80 mm, 100 mm, 125 mm, 150 mm, 200 mm or 250 mm.

NOTE: The diameter of the waterway through the sealing assembly seat ring may be less than the nominal size.

4.2 Connections to the assembly

4.2.1 General

The dimensions of all connections shall be specified by the dry alarm valve assembly supplier.

4.2.2 Differential type dry alarm valves

If the valve is of the differential type it shall be provided with means of venting water from the intermediate chamber and preventing the build-up of partial vacuum between the upstream and downstream sealing elements of the sealing assembly.

4.3 Rated working pressure

The rated working pressure shall not be less than 12 bar.

NOTE: Inlet and outlet connections may be machined for lower working pressure, to match installation equipment of a lower working pressure.

4.4 Body and cover

4.4.1 Materials

4.4.1.1 The body and any cover shall be made of cast iron, bronze, brass, monel metal, stainless steel, titanium or other materials with equivalent physical and mechanical properties.

4.4.1.2 Cover fasteners shall be made of steel, stainless steel, titanium or other materials with equivalent physical and mechanical properties.

4.4.1.3 If non-metallic materials (other than for gaskets and pipe seals) or metals with melting point of less than 800 °C (other than for gaskets and pipe seals) form part of the dry alarm valve body and any cover, the assembled dry alarm valve shall conform to the leakage requirements of 4.10.1 and the sealing assembly shall open freely and fully when tested in accordance with A.1.

4.4.2 Configuration

It shall not be possible to assemble the dry alarm valve cover plate (if fitted) in position which so affects the operation of the valve that it does not conform to this standard, in particular indication of flow direction, see 6.2 d).

4.4.3 Strength

4.4.3.1 The assembled dry alarm valve with the sealing assembly open shall withstand, without rupture, an internal hydrostatic pressure of four times the rated working pressure, when tested in accordance with annex B.

4.4.3.2 The normal design load of any fastener, excluding the force required to compress the gasket, shall not exceed the minimum tensile strength specified in EN ISO 898-1 and ISO 898-2 or other appropriate European Standards for materials not covered by ISO 898, when the dry alarm valve is pressurised to four times the rated working pressure. The area of the application of pressure shall be calculated as follows:

- a) if a full-face gasket is used, the area of force application is that extending out to a line defined by the inner edge of the bolts;
- b) if a toroidal sealing ring or ring gasket is used, the area of force application is that extending out to the centre line of the toroidal sealing ring or ring gasket.

4.5 Drains

4.5.1 Body

4.5.1.1 The dry alarm valve shall be provided with a connection to drain water from the valve body downstream of the sealing assembly when the valve is installed in any position specified or recommended by the supplier. The minimum nominal size shall be 20 mm.

4.5.1.2 Where the drain opening is also to be used for the draining of the installation pipework then the size of the threaded connection shall conform to the appropriate value given in Table 1.

Table 1 — Minimum size of valve body drain for draining installation pipework

Dimensions in mm	
Nominal valve size	Minimum drain connection
50	20
65 80 100	32
125 150	50
200 250	50

4.5.2 Intermediate chamber

4.5.2.1 The intermediate chamber of the dry alarm valve shall be provided with an automatic drain.

4.5.2.2 Automatic flow or velocity type drain valves used for normally venting intermediate chambers shall close at pressure of not more than 1,4 bar with flow rate through the drain valve just prior to closure of not less than 0,13 l/s and not more than 0,63 l/s when in accordance with C.1.

4.5.2.3 Automatic drain valves shall remain closed during drainage of the installation, until the pressure effective at the sealing mechanism drops to less than 1,4 bar and shall open at pressure between 0,035 bar and 1,4 bar when tested in accordance with C.1.

4.5.2.4 The flow through an open ended drain shall not exceed 0,63 l/s at any service pressure up to the rated working pressure when tested in accordance with annex C.2.

4.6 Sealing assembly

4.6.1 Access for maintenance

Means shall be provided for access to working parts and allow removal of the sealing assembly.

NOTE 1: Whatever method is adopted it should permit ready maintenance by one person with minimum of down-time.

NOTE 2: The design of any element which may normally be disassembled during servicing should be such that it cannot be reassembled wrongly without an external visual indication when the dry alarm valve is returned to service.

NOTE 3: With the exception of the valve seat, all parts intended for field replacement should be capable of being disassembled and reassembled with tools normally employed by the trade.

NOTE 4: While the dry alarm valve is in the ready condition, it should not be possible to tamper with the valve operating mechanism preventing the sealing assembly opening.

4.6.2 *Fatigue resistance of springs and diaphragms*

Springs and diaphragms shall not fracture or rupture during 5 000 cycles of normal operation when tested in accordance with D.1. Failure of diaphragms shall not prevent the sealing assembly from opening fully.

4.6.3 *Resistance to damage of sealing assemblies*

The sealing assembly shall bear against a definite stop in the fully open position. There shall be no sign of damage to the sealing elements of the dry alarm valve or any permanent twist, bend or fracture of any parts after testing in accordance with E.3 and after the test in accordance with D.2.

4.6.4 *Materials for seat rings and bearing surfaces*

4.6.4.1 Seat rings shall be made of bronze, brass, monel metal or stainless steel or materials having equivalent physical and mechanical properties.

4.6.4.2 The bearing surfaces of contacting parts which rotate or slide relative to each other shall be made of bronze, brass, monel metal or stainless steel or materials having equivalent physical and mechanical properties and this may be achieved by bushings or inserts.

4.6.5 *Anti-reset latch*

Dry alarm valves where:

- a) the differential pressure ratio exceeds 1,16 to 1 for service pressures between 1,4 bar and the rated working pressure as measured at the trip point prior to pressure equalization upstream and downstream of the sealing assembly; or
- b) the installation drain is located upstream of the sealing assembly;

shall be provided with an anti-reset latch or other device which prevents the sealing assembly from resetting automatically and which allows drainage until manually reset, without sustaining permanent distortion, cracks, delamination or other signs of failure, when tested in accordance with E.3 and if a quick-opening device is provided E.4, and after the test in accordance with D.3.

4.7 Non-metallic elements (excluding gaskets and seals)

After ageing in accordance with annex F, there shall be no cracking of any non-metallic elements and the dry alarm valve shall meet the performance and leak resistance requirements of 4.12 and 4.13 when tested in accordance with annex G and annex I.

4.8 Sealing assembly elements

4.8.1 There shall be no waste of water when the dry alarm valve assembly is in the ready condition during testing in accordance with E.3.

NOTE: Valve sealing surfaces should withstand ordinary wear and tear, rough usage, compression stresses, and damage due to pipe scale or foreign matter carried by the water.

4.8.2 A seal of elastomer or other resilient materials shall not adhere to the mating surface when tested in accordance with annex H.

4.9 Clearances

4.9.1 The radial clearance (see Figure 1 a)) between the sealing assembly, including the hinge boss areas, and the inside walls of the body (excluding moving catches and latching mechanisms) in every position except the wide open position shall be not less than 12 mm if the body is cast iron or 6 mm if the body and sealing assembly are of non-ferrous metal, stainless steel, titanium or materials having at least equivalent physical, mechanical and corrosion resistant properties.

4.9.2 There shall be diametrical clearance (see Figure 1 b)) between the inner edge of the seat ring and the metal parts of the sealing assembly when in the close position, excluding any latching mechanisms, as follows:

- a) for sealing assemblies of bronze, brass, monel metal, stainless steel or titanium or materials having equivalent physical and mechanical properties, the diametrical clearance shall not be less than 0,7 mm;
- b) for sealing assemblies of other materials, the diametrical clearance shall not be less than 3,0 mm.

4.9.3 Any space in which the sealing assembly may trap debris below the valve seat shall be not less than 3 mm deep.

4.9.4 Valves with a diametrical clearance (see Figure 1 b)) between any pins and their bearings less than 0,125 shall operate correctly when tested in accordance with E.3, E.1 and E.2, following exposure to a salt mist corrosion test in accordance with Annex M.

4.9.5 The axial clearance ($L_2 - L_1$, see Figure 1 c)) between any clapper hinge and the adjacent dry alarm valve body bearing surfaces shall not be less than the value in Table 2

Where applicable, as indicated in Table 2, a means, employing bronze, brass, stainless steel, titanium or materials having at least equivalent physical, mechanical and corrosion resistant properties shall be provided to maintain dimension A (see Figure 1 c)) at not less than the appropriate value in Table 2.

NOTE: Shoulder or projecting straight bushings, projecting hinge pin bearings, or spacers are typically employed as a means of maintaining dimension A.

4.9.6 Any reciprocating guide components in the main valve body, operation of which is essential to allow dry alarm valve to open, shall have minimum diametrical clearance of not less than 0,7 mm in that portion over which the moving component enters the fixed component and of not less than 0,1 mm in that portion of the moving component continuously in contact with the fixed component in the ready condition.

Table 2 — Axial clearance ($L_2 - L_1$) and dimension 'A' values for differing body and sealing assembly construction materials ^a

Body and sealing assembly materials of construction	Axial clearance ($L_2 - L_1$) (see Figure 1 c)) mm	Dimension A (see Figure 1 c)) mm	Additional testing requirements
Body and sealing assembly made of bronze, brass, stainless steel, titanium or materials having at least equivalent physical, mechanical and corrosion resistant properties	$\geq 0,25$	Not applicable	None
Bodies and or sealing assemblies made of materials other than above (for example, cast iron)	$\geq 0,25$ mm	$\geq 3,0$ mm	None
	$\geq 1,50$ mm	$\geq 2,0$ mm	See table footnote
^a The valve shall operate correctly when tested in accordance with E.3, E.1 and E.2 following exposure to a salt mist corrosion test in accordance with Annex M.			

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