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Utgåva 1

**Brand och räddning – Fasta släcksystem –
Komponenter för sprinkler- och vatten-
spraysystem –
Del 5: Flödesvakter**

**Fixed firefighting systems – Components
for sprinkler and water spray systems –
Part 5: Water flow detectors**

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English version

Fixed firefighting systems - Components for sprinkler and water spray systems - Part 5: Water flow detectors

Installations fixes de lutte contre l'incendie - Composants des systèmes d'extinction du type Sprinkleur et à pulvérisation d'eau - Partie 5: Indicateurs de passage d'eau

Ortsfeste Löschanlagen - Bauteile für Sprinkler- und Sprühwasseranlagen - Teil 5: Strömungsmelder

This European Standard was approved by CEN on 10 August 2002.

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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.

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

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Foreword

This document EN 12259-5:2002 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of an identical text or by endorsement, at the latest by March 2003, and conflicting national standards shall be withdrawn at the latest by September 2005.

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 89/106/EEC.

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

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 12259¹⁾);
- gaseous extinguishing systems (EN 12094¹⁾);
- powder systems (EN 12416);
- explosion protection systems (EN 26184);
- foam systems (EN 13565¹⁾);
- hose reel systems (EN 671);
- smoke and heat control systems (EN 12101¹⁾);
- water spray systems (EN xxxx¹⁾).

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
- Part 7: Pipe hangers
- Part 8: Pressure switches

¹⁾ In preparation.

- Part 9: Deluge alarm valve assemblies
- Part 10: Multiple controls
- Part 11: Medium and high velocity water sprayers
- Part 12: Pump sets

The annexes A to J are normative; annex K is informative.

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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies requirements for construction and performance and tests for water flow detectors for use in wet pipe automatic sprinkler systems conforming to EN 12845 «Fixed firefighting systems - Automatic sprinkler systems - Design and Installation»²⁾.

Auxiliary components and attachments to water flow detectors 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 (including amendments).

EN 60335-1, *Safety of household and similar electrical appliances, Part 1: General requirements (IEC 60335-1 :1991 , modified)*.

IEC 61020-6, *Electromechanical switches. Part 6: Sectional specification for sensitive switches*.

ISO 37, *Rubber, vulcanised or thermoplastic - Determination of tensile stress-strain properties*.

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

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

ISO 188, *Rubber, vulcanized or thermoplastic - Accelerated ageing and heat resistance tests*.

ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel - Part 1: Bolts, screws and studs*.

ISO 898-2, *Mechanical properties of fasteners - Part 2: Nuts with specified proof load values; coarse thread*.

²⁾ In preparation

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3 Terms and definitions

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

- 3.1
flow velocity**
water velocity through a pipe of the same nominal size as the water flow detector at the same flow rate
- 3.2
rated working pressure**
maximum working pressure at which the water flow detector is intended to operate
- 3.3
reinforced elastomeric element**
elements in a composite of an elastomeric compound with one or more other components that increases the tensile strength of the combination to at least twice that of the elastomeric material alone
- 3.4
sensitivity**
minimum rate of flow of water flow detector in a downstream direction which will cause operation and give a signal
- 3.5
water flow detector**
device which responds at a pre-set flow rate only in the intended direction and operates electrical contacts

4 Construction and performance

4.1 General

The water flow detector shall be suitable for installation, without modification. It shall be possible to remove completely the water flow detector from the piping without leaving obstructions in the pipe.

Unless otherwise indicated by the supplier the flow switch shall be evaluated for suitability with tube in accordance with ISO 65.

4.2 Connections

The dimensions of all connections shall be specified by the water flow detector supplier.

Verification of the specified dimensions shall be tested as specified in annex A.

4.3 Rated working pressure

The rated working pressure of water flow detectors shall be not less than 12 bar.

4.4 Components

4.4.1 Water pressure retaining parts

The water pressure retaining parts of the detectors (other than gaskets or seals) shall be made of cast iron, bronze, brass, monel metal, stainless steel, titanium, aluminium alloy or materials having equivalent physical and mechanical properties. Aluminium alloy and cast iron shall not be in contact with the water.

4.4.2 Configuration

The design of any component, which may be normally disassembled during servicing, shall be such that it cannot be reassembled wrongly.

4.4.3 Strength

4.4.3.1 The installed water flow detector shall withstand, without leakage, permanent distortion or breakage of components, an internal hydrostatic pressure of four times the rated working pressure, for a period of 5 min, when tested in accordance with annex B.

4.4.3.2 The calculated load of any fastener, excluding the force required to compress the gasket, shall not exceed the minimum tensile strength specified in ISO 898-1 and ISO 898-2, when the water flow detector is pressurised to four times the rated working pressure. The area of the application of pressure shall be calculated as follows:

- if a full-face gasket is used, the area of force application is that extending out to line defined by the inner edge of the bolts; for example in a flanged connection;
- 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.

4.4.4 Fatigue resistance of springs and diaphragms

Springs and diaphragms shall not fracture or rupture during 10 000 cycles of normal operation when tested in accordance with the operational cycling test in F.2.

4.4.5 Materials for contacting parts

Any part and its bearing, excluding seals, gaskets and diaphragms, where rotation or sliding motion is required, shall be made of bronze, brass, monel metal, stainless steel, titanium or materials having equivalent physical and mechanical properties.

4.4.6 Microswitches

Micro switches where incorporated shall be in accordance with IEC 61020-6.

4.4.7 Earthing and electrical connections

Earthing and electrical connections shall be in accordance with EN 60335-1.

4.4.8 Non-metallic components (excluding gaskets and seals)

After ageing in accordance with annex C there shall be no cracking, warping, creep or other signs of deterioration of non-metallic components and the water flow detector shall meet the operational and leak resistance requirements of 4.6 and 4.9 when tested in accordance with annexes F and I.

Separate samples shall be subjected to the tests in C.1 and C.2.

4.4.9 Sealing elements

4.4.9.1 Non-reinforced elastomer sealing elements

Any non-reinforced elastomer sealing element, other than gaskets, shall conform to the following:

- a) either minimum tensile strength 10 MPa and minimum ultimate elongation 300 %; or

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b) minimum tensile strength 15 MPa and minimum ultimate elongation 200 %

and

c) maximum set of 5 mm when 25 mm are stretched to 75 mm, held for 2 min, and measured 2 min after release.

When tested in accordance with the appropriate sections of ISO 37 and D.1, and after exposure to oxygen for 96 h at $(70 + 1,5)$ °C and 20 bar as described in ISO 188:

d) the tensile strength and ultimate elongation shall be not less than 70 % of the corresponding specimens that have not been exposed to oxygen, any change in hardness shall be not greater than 5 type A durometer units.

And after immersion in distilled water at $(97,5 + 2,5)$ °C for 70 h:

e) the tensile strength and ultimate elongation shall be not less than 70 % of the corresponding specimens that have not been heated in water. Change in volume of the specimens shall not be greater than 20 %.

4.4.9.2 Reinforced elastomer sealing elements

Any reinforced elastomer sealing element shall be capable of being flexed without cracking or breaking and shall have a change of volumetric expansion not greater than 20 %, when tested in accordance with D.2.

4.5 Clearances

NOTE Clearances are necessary between moving parts and between moving and stationary part so that corrosion or deposits of foreign matter within an assembly will not render the water flow detector sluggish in action or inoperative.

4.5.1 Press-fit bushings shall conform to the appropriate clauses of ISO 49 when tested in accordance with E.1.

4.5.2 Any water flow detector vane shall operate by over-riding an 8 mm diameter rod attached to the inside of the pipewall along the pipe length when tested in accordance with E.2.

4.6 Operation

4.6.1 When tested in accordance with annex F, the waterflow detector shall not operate to give a signal at all at flows below 10 l/min; and, for all flows above 80 l/min the flow detector shall operate to give a continuous signal.

Any adjustable or fixed time delay device incorporated in the water flow detector shall not delay any signal for more than 30 s. Any interruption of the water flow rate to below 10 l/min shall cause the delay device to reset automatically to its initial state.

4.6.2 The water flow detector shall operate during 10 000 cycles of normal operation, after which it shall meet the requirements of 4.6.1 at 1 bar when tested in accordance with F.1. The electrical contact and insulation resistance of the electrical part of the water flow detector shall remain within the manufacturer's specification when tested in accordance with F.2.1 and F.2.2 respectively.

4.6.3 The water flow detector shall be capable of normal operation between the temperature limits of 2 °C and 68 °C after which it shall meet the requirement of 4.6.1 when tested in accordance with F.3. After the test there shall be no sign, on visual examination, of cracking or failure of any vane.

4.7 Corrosion resistance

The water flow detector shall meet the requirements of 4.6.1 at 1 bar and the electrical contact resistance and insulation resistance of the electrical part shall remain within the manufacturer's specification when tested in accordance with annex G.

4.8 Pressure loss due to hydraulic friction

The pressure loss across the water flow detector shall not exceed 0,2 bar when water is flowing through it at a velocity of 5 m/s when tested in accordance with annex H.

4.9 Leak resistance

An installed water flow detector shall withstand without leakage, permanent distortion or structural failure, an internal pressure equal to two times the rated working pressure or 25 bar whichever is the greater for a period of 5 min when tested in accordance with annex I.

4.10 Endurance

The water flow detector and its moving parts shall operate at the flow velocity 10 m/s for 90 min without any permanent distortion, detachment or breakage when tested in accordance with annex J.

4.11 Maintenance

The water flow detector shall be designed to permit cleaning and maintenance without the use of special tools.

5 Marking

The water flow detector shall be marked as follows:

- a) name or mark of the supplier;
- b) distinctive model number, catalogue designation or equivalent marking;
- c) external wall thickness of connecting pipe;
- d) electrical current and voltage ratings;
- e) rated working pressure in bar;
- f) the actual year of manufacture; or
 - for water flow detector produced in the last three months of a calendar year the following year date; or
 - for water flow detectors produced in the first six months of a calendar year the previous year date;
- g) minimum operating flow in l/min at which the devices operates;
- h) direction of indicated flow;
- i) factory of origin, if manufacture is at two or more factories;
- j) the number of this European Standard.

The marking shall be in figures or letters at least 4,8 mm high and either:

- k) cast directly on the water flow detector; or
- l) on a metal label with raised or depressed characters (for example by etching, casting or stamping) that is mechanically attached (for example by rivets or screws) to the body of the water flow detector; cast labels shall be of non-ferrous metal.

Where ZA.3 covers the same requirements as this clause, the requirements of this clause 5 are met.