SLOVENSKI STANDARD
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Vgrajene naprave za gaġenje ï Sestavni deli sprinklerskih sistemov in sistemov s prġeļ o vodo ï 12. del: Ļrpalke

Fixed firefighting systems - Components for sprinkler and water spray systems - Part 12: Pumps

Ortsfeste Löschanlagen - Bauteile für Sprinkler- und Sprühwasseranlagen - Teil 12: Sprinklerpumpen

Installations fixes de lutte contre l'incendie - Composants des systemes d'extinction du type sprinkleur et a pulvérisation d'eau - Partie 12: Pompe pour sprinkleurs

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

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Foreword

This document (prEN 12259-12:2005) has been prepared by Technical Committee CEN/TC 191 "Fixed fire fighting systems", the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

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)
b) Gaseous extinguishing systems (EN 12094 & EN ISO 14520) 1
c) powder systems (EN 12416) 1)
d) explosion protection systems (EN 26 184)
e) foam systems (EN13565)
f) hydrant and hose reel systems (EN 671)
g) smoke and heat control systems (EN 12101) 1
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 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	Pumps

1 Scope

This part of EN 12259 specifies requirements for construction and performance of rotodynamic pumps used in automatic sprinklers systems conforming to EN 12845, Automatic sprinkler systems – Design and Installation and EN XXXXX Water spray systems..

2 Normative references

The following referenced documents are indispensable for the application 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.

EN ISO 9906: Rotodynamic pumps. Hydraulic performance acceptance tests. Grades 1 and 2

ISO 3069: End-suction centrifugal pumps. Dimensions of cavities for mechanical seals and for soft packing

EN 12162: Liquid pumps. Safety requirements. Procedures for hydrostatic testing

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

EN 12845 Automatic sprinkler systems

3 Definitions

The definitions of EN 12723:2000 Liquid pumps-General terms for pumps and installations and EN 12845 Automatic sprinkler systems apply to this standard

4 Pump construction and performance

4.1 Connections

Inlet, outlet and threaded connections shall be in accordance with appropriate National or International standards.

4.2 Pump casing strength

The maximum allowable casing working pressure (see EN12723) shall be at least 10 bar and shall be at least equal to the maximum closed valve pressure at maximum rotational speed and maximum impeller diameter plus maximum inlet pressure.

4.3 Construction

4.3.1 All functioning parts or structural components vital to a pumps operation shall be capable of being maintained or replaced.

NOTE 1: Whatever method is adopted, it should permit ready maintenance with a minimum of downtime.

NOTE 2: The interchangeability of parts shall be ensured by the use of standardized tolerances.

NOTE 3: Bearings, shaft packing and also the clearance of rotating parts should be designed so that the pump is capable of operating efficiently even after being static for long periods in the stand-by condition.

4.3.2 Casing wear rings shall be fitted and shall be prevented from rotating.

4.3.3 The pump casing shall be made from grey cast iron or at least an equivalent metal. Internal pump shafts, protective sleeves for shafts, metal parts of mechanical seals, impellers, impeller fastenings (impeller nuts, locking plates or washers and adjusting springs) and wear rings, including their counterparts shall be made from bronze, stainless steel or at least an equivalent metal.

4.3.4 The diameter of the portion of the shaft or shaft sleeve (where fitted) in contact with shaft seals shall be in accordance with ISO 3069.

4.3.5 The supplier shall provide detailed shaft stress calculations which show that the shaft is suitable for the maximum impeller diameter at 105% the maximum rated speed.

4.3.6 Shaft driven pumps shall use mechanical seals or soft packing.

4.3.7 Shaft seal cavity dimensions shall be in accordance with ISO 3069.

4.3.8 Means shall be provided for repacking stuffing boxes without removing or dismantling any part other than gland components and/or guards.

4.4 Rotational speed

The rated speed shall be specified by the pump supplier but shall not exceed 3,600 1/min.

The maximum allowable continuous speed shall be at least 105% of the rated speed.

4.5 Characteristic curves

4.5.1 The *H(Q)* characteristic curve of sprinkler pumps shall be stable (see Annex B). The measurement uncertainty as specified in EN ISO 9906 Grade 2 may be applied.

4.5.2 Within the pump design range the NPSHR by the pump shall not exceed 5 m or in the case of submersible pumps 8.5 m. The criterion for NPSHR is 3 % drop in total differential head for the first stage of multi-stage pumps or for single-stage pumps with constant speed and a fixed rate of flow.

4.5.3 The flow, power consumption, NPSHR and the corresponding delivery head shall be determined in accordance with ISO 9906 Grade 2.

4.5.4 The pump manufacturer shall specify the minimum by-pass flow value to mitigate the possibility of pump failure in the closed valve condition. The minimum flow shall be demonstrated by test as specified in 5.3.

5 Type Approval Tests

5.1 Hydrostatic pressure tests

5.1.1 Leakage test

Examine the pump for leakage in accordance with EN12162 :2001. The hydrostatic test pressure (p_{test}) shall be calculated assuming the product of the factors (K_1 x K_2) is at least 1.5. Maintain the hydrostatic test pressure for a duration of 10 minutes.

5.1.2 Rupture test

Examine the pump casing for resistance to pressure using the test methods described in EN12162 :2001. The hydrostatic test pressure (p_{test}) shall be calculated assuming the product of the factors (K_1 x K_2) is at least 2. Maintain the test pressure for a duration of 10 minutes. The pump casing shall withstand the hydrostatic pressure test without rupture.

Note: Leakage from joints shall be disregarded.

5.2 Main tests

Type approval tests and conversion of test data shall be undertaken using methods defined in ISO 9906 : 1999 Grade 2 and the tolerances given there.

Pumps shall be tested with a range of impeller diameters, which shall include the maximum and minimum impeller diameters. Performance between tested impeller diameters may be interpolated in accordance with ISO 9906: 1999 Annex B for changes not exceeding ± 4% in impeller diameter.

The test data required for the purpose of evaluation in accordance with ISO 9906: 1999, are established at a minimum of 7 points uniformly distributed between the pump minimum flow and the highest rate of flow to be measured. NPSHR shall be determined for minimum and maximum impeller diameters and speeds at 5 points between 0,3 Q_z and highest rate of flow.

The highest flow to be measured shall be sufficient to demonstrate a non-overloading power characteristic or a flow corresponding to at least NPSHR of 16m.

Pumps intended for use in HHP or HHS pre-calculated systems shall be tested to at least 140% of the design flow where it shall be demonstrated that the total differential head is at least 70% of the total differential head at the design flow.

Pump characteristic curve conversions for alternative drivers with differing speeds shall be converted using the formula: (Ref ISO 9906: 1999).

$$(NPSHR)_T = (NPSHR)\left[\frac{n_{sp}}{n}\right]^x$$

The test to verify the validity of the above formula shall entail measuring the NPSHR value for the lowest and highest intended speed.

5.3 Minimum flow

The pump shall be run for a minimum of 2 hours with the maximum impeller diameter at maximum speed and the minimum flow specified by the supplier.

The pump inlet and outlet temperatures shall be measured throughout the test.

The maximum water temperature rise across the pump shall not exceed 10 °C for the duration of the test.

Measure the head, flow rate and power input throughout the test at intervals of not exceeding 15 minutes.

During the test the power input shall not increase by more than 2%, and the head shall not decrease by more than 1.5%

6 Marking and documentation

6.1 Marking

Sprinkler pumps shall be marked, by the supplier, with a permanently attached nameplate, which is legible, indelible, non-combustible and durable.

(In the case of pumps with submersible motors, a duplicate maker's nameplate, for affixing to the control panel shall be delivered loose along with the pump).

A specimen suppliers nameplate is reproduced in annex A.

The suppliers nameplate shall contain the following:

a) suppliers name and trademark;

b) model designation;

c) serial number/year of manufacture;

d) approval number;

e) rated flow Qz in l/min, m^3/h

f) delivery head H in m for the rated flow;

g) rated speed n_n in r/min (or 1/min) at which the sprinkler pump is run;

h) required motor capacity P_m in kW;

i) effective diameter of impeller in mm. In the case of vanes with chamfered ends the largest and smallest diameters should be given (e.g. 280/270).

j) nominal current in amps, for submersible pumps only;

k) maximum allowable casing working pressure in bar

The pump shall be marked with the direction of rotation.

NOTE: In the case of integral pump units an arrow pointing in the direction of rotation on the motor will suffice. The indication may be dispensed with the case of submersible pumps.

6.2 Documentation

The following documents should be supplied for initial type approval tests:

i) assembly drawings of the pump , together with a parts list and material specifications including the drawings of major parts ;

ii) starting torque curve at maximum power consumption;

iii) the operating instructions to be supplied with every pump.

iv) characteristic curve sheets

The characteristic curve sheets shall include the following particulars:

a) rated design flow — l/min and m^3/h;

b) delivery head — m

c) maximum power consumption — kW (see 5.2)

d) (NPSHR) — m

e) rated speed — r/min (or 1/min), see annex B

f) maximum allowable rated speed (see clause 4.4) – r/min (or 1/min)

g) maximum allowable speed – r/min (or 1/min)

h) impeller diameter — mm

i) minimum water cover — m for submersible pumps

j) model designation

k) minimum by-pass rate of flow — l/min, m^3/h

l) nominal bore of pump inlet - mm

m) nominal bore of pump outlet - mm

Rated of flow, delivery head and NPSHR are regarded as guaranteed values within the meaning of ISO 9906, The maximum power requirement for the pump shall not exceed the maximum power consumption stated.

The documents shall make it clear that the above requirements have been met.

Where the requirements of Annex ZA.3 give the same information as above, the requirements of this clause (5) shall be considered to have been met.

7 Evaluation of conformity

7.1 General

The compliance of the component with the requirements of this European Standard shall be demonstrated by:

- initial type testing,
- factory production control by the manufacturer.

NOTE The manufacturer is a natural or legal person, who places the component on the market under his own name. Normally, the manufacturer designs and manufactures the component himself. As a first alternative, he may have it designed, manufactured, assembled, packed, processed or labeled by subcontracting. As a second alternative he may assemble, pack, process, or label ready-made products.

The manufacturer shall ensure:

- that the initial type testing in accordance with this European Standard is initiated and carried out (where relevant, under the control of a product certification body); and