



**SLOVENSKI STANDARD**  
**oSIST prEN 12259-12:2017**  
**01-julij-2017**

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**Vgrajene naprave za gašenje - Sestavni deli sprinklerskih sistemov in sistemov s pršečo vodo - 12. del: Črpalke**

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 systèmes d'extinction du type sprinkleur et à pulvérisation d'eau - Partie 12 : Pompe pour sprinkleurs

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

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

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

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 191.

If this draft becomes a European Standard, 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.

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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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**prEN 12259-12:2017 (E)**

## **European foreword**

This document (prEN 12259-12:2017) 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 Enquiry.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports basic work requirements of Regulation (EU) 305/2011 as amended.

For relationship with EU Regulations see informative Annex ZA, which is an integral part of this document.

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## 1 Scope

This part of EN 12259 specifies requirements, test methods, evaluation of conformity and marking of single stage and multi stage pumps with mechanical seal or soft packing intended to be used in automatic sprinkler and water spray systems according to EN 12845 and CEN/TS 14816.

This European Standard is applicable for pumps made of the following materials:

- Body: cast iron, cast steel, stainless steel, bronze or aluminium bronze.
- Pump shafts: stainless steel.
- 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: bronze or stainless steel.

This European Standard is applicable for:

- end suction pumps;
- axial horizontal split case pumps;
- ring section pumps;
- inline pumps (Vertical shaft pump with inlet and outlet in line);
- vertical turbine pumps;
- submersible motor pumps.

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## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 9906:2012, *Rotodynamic pumps. Hydraulic performance acceptance tests. Grades 1 and 2*

EN 12162:2001+A1:2009, *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 12845:2015, *Fixed firefighting systems - Automatic sprinkler systems - Design, installation and maintenance*

## 3 Terms, definitions and symbols

For the purposes of this document, the terms, definitions and symbols given in EN 12723 and EN 12845 apply.

## 4 Product characteristics

### 4.1 Operational Reliability and Performance parameters under fire conditions

#### 4.1.1 Working pressure

4.1.1.1 The pump shall meet the requirements of 4.1.1.2 to 4.1.1.4.

The performance shall be expressed as the working pressure in bar.

4.1.1.2 The maximum allowable casing working pressure shall be specified by the manufacturer and shall be at least equal to the closed valve pressure at maximum rotational speed and maximum impeller diameter plus maximum inlet pressure.

4.1.1.3 The assembled pump shall withstand internal hydrostatic pressure and meet the requirements of EN 12162:2001+A1:2009 when tested in accordance with 5.1.1.1.

4.1.1.4 The pump casing shall withstand the hydrostatic pressure test without rupture in accordance with EN 12162:2001+A1:2009 when tested in accordance with 5.1.1.2.

#### 4.1.2 Range of operation

4.1.2.1 The pump shall meet the requirements of 4.1.2.2 to 4.1.2.7

The performance shall be expressed as description of the range of operation as follows:

- rated flow in l/min or m<sup>3</sup>/h;
- rated speed in 1/min;
- total differential head at rated flow in m;
- pump characteristic curve sheet in accordance with Annex B.

4.1.2.2 Detailed shaft stress calculations shall be provided which show that the shaft is suitable for the maximum impeller diameter at 105 % the maximum rated speed. Detailed shaft stress calculations shall use a density of water of 1035 kg/m<sup>3</sup> at 20 °C.

4.1.2.3 The rated speed shall be specified by the pump manufacturer.

The maximum allowable continuous speed, specified by the pump manufacturer shall be at least 105 % of the rated speed.

4.1.2.4 When tested in accordance with 5.1.2.1 taking into account 5.1.2.3, pumps shall have a stable characteristic curve  $H(Q)$  within the measurement uncertainty range as specified in EN ISO 9906:2012 Grade 2.

4.1.2.5 When tested in accordance with 5.1.2.1 taking into account 5.1.2.3, within the pump design range (where the design range is between 0,3  $Q_r$  and  $Q_r$ , where  $Q_r$  is the rated flow) the NPSHR by the pump shall not exceed 8.5 m for vertical line shaft and submersible pumps or 5 m for all other pumps. The criterion for NPSHR is 3 % drop in total differential head for the first stage of multi-stage pumps or for single-stage pumps as specified in EN ISO 9906:2012. The measurement uncertainty as specified in EN ISO 9906:2012 Grade 2 shall be applied.

4.1.2.6 When tested in accordance with 5.1.2.1 taking into account 5.1.2.3, the flow, power consumption, NPSHR and the corresponding total differential head of the pump shall be determined in accordance with EN ISO 9906:2012 Grade 2.



**4.1.2.7** 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 by-pass flow shall be demonstrated by test as specified in 5.1.2.2.

## **4.2 Durability of Operational Reliability and Performance parameters under fire conditions**

### **4.2.1 Resistance to deterioration**

**4.2.1.1** The pump shall meet the requirements of 4.2.1.2 and 4.2.1.3

The performance shall be expressed as the description "Requirements are met".

**4.2.1.2** The pump casing shall be made from cast iron, cast steel, stainless steel, bronze or aluminium bronze.

Pump shafts shall be made from stainless steel.

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 or stainless steel.

**4.2.1.3** Casing wear rings shall be fitted and shall be prevented from rotating on the following pumps:

- End suction pumps
- Axial horizontal split case pumps
- Inline pumps with cast iron casings
- Vertical turbine pumps
- Submersible motor pumps

## **4.3 Connections**

The dimensions of all connections shall be specified by the pump manufacturer.

## **5 Testing, assessment and sampling methods**

### **5.1 Operational Reliability and Performance parameters under fire conditions**

#### **5.1.1 Working pressure**

**5.1.1.1** Examine the pump for leakage in accordance with the hydrostatic test in EN 12162:2001+A1:2009. The hydrostatic test pressure ( $P_{\text{test}}$ ) shall be calculated assuming the product of the factors ( $K_1 \times K_2$ ) is at least 1.5. Maintain the hydrostatic test pressure for a duration of 10 min.

**5.1.1.2** Examine the pump casing for resistance to pressure using the test methods described in EN 12162 :2001+A1:2009. The hydrostatic test pressure ( $P_{\text{test}}$ ) shall be calculated assuming the product of the factors ( $K_1 \times K_2$ ) is at least 2. Maintain the test pressure for a duration of 10 min.

Minor leakage from joints shall be disregarded, providing the test pressure is maintained for the duration of the test.

**prEN 12259-12:2017 (E)****5.1.2 Range of operation**

**5.1.2.1** Type approval tests and conversion of test data shall be undertaken using methods defined in EN ISO 9906:2012 Grade 2 and the tolerances given there.

Where there are a range of impeller diameters, tests shall include the maximum and minimum impeller diameters. Performance between tested impeller diameters may be interpolated in accordance with EN ISO 9906:2012, Annex B for changes not exceeding  $\pm 4\%$  in impeller diameter.

The test data required for the purpose of evaluation in accordance with EN ISO 9906:2012, are established at a minimum of 7 points uniformly distributed between the lowest rate of flow and the highest rate of flow to be measured. The lowest rate of flow to be measured shall be between zero and the minimum by-pass flow. NPSHR shall be determined for minimum and maximum impeller diameters and speeds at 5 points between  $0,3 Q_r$  and the highest flow, where  $Q_r$  is the rated 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 High Hazard Process (HHP) or High Hazard Storage (HHP) pre-calculated systems shall be tested to at least 140 % of the maximum demand flow where it shall be demonstrated that the total differential head of the pump is at least 70 % of the total differential head at the design flow. (Ref EN 12845:2015, 7.3.2, 10.7.2 and Figure 7). See also Figure B.1

Pump characteristic curve conversions for alternative drivers with differing speeds higher than the minimum tested speed and lower than the maximum tested speed shall be converted using the formula: (Ref EN ISO 9906:2012, Clause 6. Analysis of test results).

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

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NPSHR is the required NPSH

$(NPSHR)_T$  is the corrected NPSHR for the specified speed  $n_{sp}$

$n$  is the speed of rotation

$n_{sp}$  is the specified speed of rotation

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

The test water temperature at the inlet to submersible motor driven pumps shall be  $20 \pm 5$  °C. No motor cooling means shall be used.

**5.1.2.2** The pump shall be run for a minimum of 2 h with the maximum impeller diameter at maximum allowable continuous speed and the minimum by-pass flow specified by the manufacturer.

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 min.

All parameters shall be measured in accordance with EN ISO 9906:2012 Grade 2

Using a temperature measuring device with an accuracy of  $\pm 2$  °C. Temperature measurements shall be made at:

- a) The pump suction inlet;
- b) At an outlet measuring section normally located at a distance of two diameters from the pump outlet housing

**5.1.2.3** Multistage pumps shall be tested in accordance with the minimum and maximum number of stages allowed by their design, in accordance with Table 1

**Table 1 — Evaluation of multistage pumps**

Impeller sizes to be tested	Number of stages to be tested	
	Minimum	Maximum
	Compliance with clauses	
Minimum diameter	4.1.2.4, 4.1.2.5, 4.1.2.6	
Maximum diameter	4.1.2.4, 4.1.2.5, 4.1.2.6	4.1.2.4, 4.1.2.5 <sup>a</sup> , and 4.1.2.7
<sup>a</sup> excluding NPSHR		

## 6 Evaluation of conformity

### 6.1 General

The compliance of pumps with the requirements of this standard and with the performances declared by the manufacturer in the DoP shall be demonstrated by:

- determination of the product type
- factory production control by the manufacturer, including product assessment.

The manufacturer shall always retain the overall control and shall have the necessary means to take responsibility for the conformity of the product with its declared performance(s).

### 6.2 Type Testing

#### 6.2.1 General

All performances related to characteristics included in this standard shall be determined when the manufacturer intends to declare the respective performances unless the standard gives provisions for declaring them without performing tests. (e.g. use of previously existing data, CWFT and conventionally accepted performance).

Assessment previously performed in accordance with the provisions of this standard, may be taken into account provided that they were made to the same or a more rigorous test method, under the same AVCP system on the same product or products of similar design, construction and functionality, such that the results are applicable to the product in question.

NOTE 1: Same AVCP system means testing by an independent third party under the responsibility of a notified product certification body.

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For the purposes of assessment, the manufacturer's products may be grouped into families, where it is considered that the results for one or more characteristics from any one product within the family are representative for that same characteristics for all products within that same family

NOTE 2: Products may be grouped in different families for different characteristics.

Reference to the assessment method standards should be made to allow the selection of a suitable representative sample.

In addition, the determination of the product type shall be performed for all characteristics included in the standard for which the manufacturer declares the performance:

- at the beginning of the production of a new or modified pump (unless a member of the same product range), or
- at the beginning of a new or modified method of production (where this may affect the stated properties); or

they shall be repeated for the appropriate characteristic(s), whenever a change occurs in the pump design, in the raw material or in the supplier of the components, or in the method of production (subject to the definition of a family), which would affect significantly one or more of the characteristics.

Where components are used whose characteristics have already been determined, by the component manufacturer, on the basis of assessment methods of other product standards, these characteristics need not be re-assessed. The specifications of these components shall be documented.

Products bearing regulatory marking in accordance with appropriate harmonized European specifications may be presumed to have the performances declared in the DoP, although this does not replace the responsibility on the pump manufacturer to ensure that the pump as a whole is correctly manufactured and its component products have the declared performance values.

### 6.2.2 Test samples, testing and compliance criteria

The number of samples of pumps to be tested/assessed, the assessment methods and the acceptance criteria shall be in accordance with Clause 5.

### 6.2.3 Test reports

The results of the determination of the product type shall be documented in test reports. All test reports shall be retained by the manufacturer for at least 10 years after the last date of production of the pump to which they relate.

### 6.2.4 Shared other party results

A manufacturer may use the results of the product type determination obtained by someone else (e.g. by another manufacturer, as a common service to manufacturers, or by a product developer), to justify his own declaration of performance regarding a product that is manufactured according to the same design (e.g. dimensions) and with raw materials, constituents and manufacturing methods of the same kind, provided that:

- the results are known to be valid for products with the same essential characteristics relevant for the product performance;
- in addition to any information essential for confirming that the product has such same performances related to specific essential characteristics, the other party who has carried out the determination of the product type concerned or has had it carried out, has expressly accepted<sup>1</sup> to transmit to the manufacturer the results and the test report to be used for the latter's product type determination, as well as information regarding production facilities and the production control process that can be taken into account for FPC;