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**Prenosna oprema za črpanje in uporabo gasilnih sredstev iz gasilskih črpalk -  
Prenosna oprema za izdelavo gasilne pene - 4. del: Generatorji pene z veliko  
ekspanzijo PN16**

Portable equipment for projecting extinguishing agents supplied by firefighting pumps -  
Portable foam equipment - Part 4: High expansion foam generators PN16

Tragbare Geräte zum Ausbringen von Löschmitteln, die mit Feuerlöschpumpen gefördert  
werden - Tragbare Schaumgeräte - Teil 4: Leichtschaum-Generatoren PN 16

Equipement portable de projection d'agents d'extinction alimenté par des pompes à  
usage incendie - Equipements mousse portables - Partie 4 : Générateurs de mousse PN  
16 haut foisonnement

**Ta slovenski standard je istoveten z: EN 16712-4:2018**

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EUROPEAN STANDARD  
 NORME EUROPÉENNE  
 EUROPÄISCHE NORM

**EN 16712-4**

August 2018

ICS 13.220.10

English Version

**Portable equipment for projecting extinguishing agents  
 supplied by firefighting pumps - Portable foam equipment  
 - Part 4: High expansion foam generators PN16**

Équipement portable de projection d'agents  
 d'extinction alimenté par des pompes à usage incendie  
 - Equipements mousse portables - Partie 4 :  
 Générateurs de mousse PN 16 haut foisonnement

Tragbare Geräte zum Ausbringen von Löschmitteln, die  
 mit Feuerlöschpumpen gefördert werden - Tragbare  
 Schaumgeräte - Teil 4: Leichtschäum-Generatoren PN  
 16

This European Standard was approved by CEN on 16 April 2018.

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 CEN-CENELEC Management Centre or to any CEN member.

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

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<b>Contents</b>	<b>Page</b>
European foreword.....	3
Introduction .....	4
<b>1 Scope</b> .....	<b>5</b>
<b>2 Normative references</b> .....	<b>5</b>
<b>3 Terms and definitions</b> .....	<b>5</b>
<b>4 Designation</b> .....	<b>7</b>
<b>5 Material and components</b> .....	<b>7</b>
5.1 <b>Material</b> .....	7
5.2 <b>Components</b> .....	8
<b>6 Safety requirements and/or protective/risk reduction measures and verification</b> .....	<b>8</b>
6.1 <b>General</b> .....	8
6.2 <b>Mechanical hazard</b> .....	8
6.2.1 <b>Moving parts</b> .....	8
6.2.2 <b>Stability</b> .....	8
6.2.3 <b>Handling</b> .....	8
<b>7 Performance requirements and verification</b> .....	<b>9</b>
7.1 <b>General</b> .....	9
7.2 <b>Dimensions, mass and flow rate</b> .....	9
7.3 <b>Expansion ratio</b> .....	10
7.4 <b>Endurance</b> .....	10
<b>8 Information for use</b> .....	<b>10</b>
8.1 <b>Instruction and maintenance handbook</b> .....	<b>10</b>
8.1.1 <b>General</b> .....	10
8.1.2 <b>Signals and warning devices</b> .....	11
8.1.3 <b>Instruction handbook</b> .....	11
8.1.4 <b>Maintenance handbook</b> .....	11
8.2 <b>Marking</b> .....	12
<b>Annex A (informative) Alternative applications of the foam generator</b> .....	<b>13</b>
<b>Annex B (informative) Acceptance test on delivery</b> .....	<b>14</b>
<b>Annex C (normative) Datasheet for high expansion foam generators</b> .....	<b>15</b>
C.1 <b>General</b> .....	15
C.2 <b>General data</b> .....	15
C.3 <b>Requirements</b> .....	15
C.4 <b>Optional extra data (no requirements)</b> .....	15
C.5 <b>Data certified by:</b> .....	15
<b>Annex D (informative) Example of completed datasheet for high expansion foam generators</b> .....	<b>16</b>
D.1 <b>General data</b> .....	16
D.2 <b>Requirements</b> .....	16
D.3 <b>Optional extra data (no requirements)</b> .....	16
D.4 <b>Data certified by:</b> .....	16
<b>Annex ZA (informative) Relationship between this European Standard and the essential requirements of Directive 2006/42/EC aimed to be covered</b> .....	<b>17</b>
<b>Bibliography</b> .....	<b>18</b>

## European foreword

This document (EN 16712-4:2018) has been prepared by Technical Committee CEN/TC 192 “Fire and Rescue Service Equipment”, 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 2019 and conflicting national standards shall be withdrawn at the latest by February 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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.

EN 16712 consists of the following parts:

- *Portable equipment for projecting extinguishing agents supplied by fire fighting pumps — Portable foam equipment — Part 1: Inductors PN 16;*
- *Portable equipment for projecting extinguishing agents supplied by fire fighting pumps — Portable foam equipment — Part 2: Pick-up tubes;*
- *Portable equipment for projecting extinguishing agents supplied by fire fighting pumps — Portable foam equipment — Part 3: Low and medium expansion hand-held foam branchpipes PN 16;*
- *Portable equipment for projecting extinguishing agents supplied by firefighting pumps — Portable foam equipment — Part 4: High expansion foam generators PN16.*

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

**EN 16712-4:2018 (E)****Introduction**

This document is a type-C standard as stated in EN ISO 12100.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance, etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in the case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

When requirements of this type-C standard are different from those which are stated in type-A or -B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

## 1 Scope

**1.1** This document applies to high expansion foam generators, having an expansion ratio greater than 200:1, whose only source of external power is the pressure and/or flow of the water supply to the device. This is used by fire and rescue services and contains their specification and test procedures.

NOTE In this document, the term “foam generator” also refers to “high expansion foam generator”.

**1.2** This document deals with all significant hazards, hazardous situations or hazardous events, with the exception of noise, relevant to high expansion foam generator, when it is used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer.

**1.3** This document does not cover misting applications.

**1.4** This document is not applicable to high expansion foam generators which have been manufactured before its date of publication as EN.

## 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.

CEN/TS 15989:2015, *Firefighting and rescue service vehicles and equipment - Graphical symbols for control elements and displays and for markings*

EN 1568-2:2008, *Fire extinguishing media - Foam concentrates - Part 2: Specification for high expansion foam concentrates for surface application to water-immiscible liquids*

EN 16712-2:2015, *Portable equipment for projecting extinguishing agents supplied by fire fighting pumps - Portable foam equipment - Part 2: Pick-up tubes*

EN 61310-2:2008, *Safety of machinery - Indication, marking and actuation - Part 2: Requirements for marking (IEC 61310-2:2007)*

EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13857:2008, *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

EN ISO 14120:2015, *Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards (ISO 14120:2015)*

ISO 7000:2014, *Graphical symbols for use on equipment - Registered symbols*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

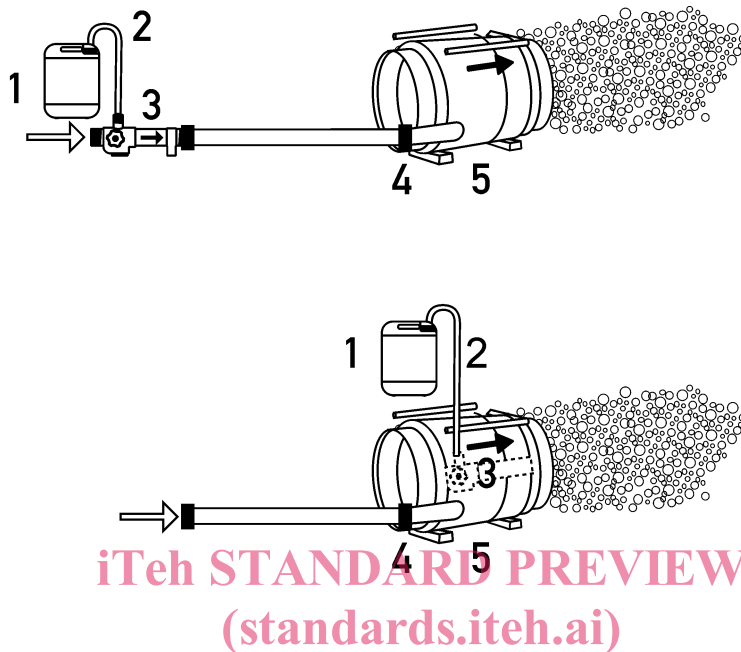
- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

## EN 16712-4:2018 (E)

### 3.1 high expansion foam generator

device, with or without self-inducting system, which produces foam with an expansion ratio greater than 200:1

Note 1 to entry: See examples in Figure 1.



#### Key

- 1 foam concentrate
- 2 pick-up tube
- 3 inductor or self-inducting system
- 4 hose connection
- 5 foam generator

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**Figure 1 — Examples of foam generators**

### 3.2 expansion expansion ratio

ratio of the volume of foam to the volume of the water foam solution from which the foam was made

### 3.3 nominal pressure

$p_N$   
maximum working pressure measured at the inlet of the foam generator

### 3.4 premix

solution produced by introducing a measured amount of foam concentrate into a given amount of water

Note 1 to entry: Foam concentrates are defined in the EN 1568 series.

Note 2 to entry: The premix can be introduced from a tank or from an inductor.



## 4 Designation

Foam generators in compliance with this document shall be designed as follows:

- name of the equipment;
- reference to this document, EN 16712-4;
- flow rate, in l/min ;
- expansion ratio (HX, HXX or HXXX, see below);
- model: portable (P), transportable (T) or wheeled transportable (W);
- self-inducting system, if any, by adding “Y” .

The code to be used in the designation for the expansion ratio of the foam generator at the reference pressure shall be in accordance with Table 1.

**Table 1 — Code for the expansion ratio**

Expansion ratio	Code
200 to 350	HX
351 to 600	HXX
over 600	HXXX

EXAMPLE 1 A high expansion foam generator with a flow rate of 100 l/min, an expansion ration of 350, portable, without self-inducting system is designed as follows:

High expansion foam generator EN 16712-4 — 100 HX — P

EXAMPLE 2 A high expansion foam generator with a flow rate of 200 l/min, an expansion ration of 600, portable, with self-inducting system is designed as follows:

High expansion foam generator EN 16712-4 — 200 HXX — P — Y

## 5 Material and components

### 5.1 Material

Foam generators shall be made of materials (with or without coatings) whose surfaces and function are not affected by the extinguishing agents or the environment in which they operate.

Depending on special application of the foam generator (e.g. fire-fighting on sea-going vessels, disinfection, etc.), the list of appropriate materials to be used (e.g. metal, plastic) shall be agreed upon between the manufacturer and the customer.

All materials shall maintain their structural integrity at 80 °C. This is not to be confirmed by testing but by the relevant material data sheet.

The materials used shall be selected so that all the requirements in Clause 6 are met in accordance with the tests defined in this document.

**EN 16712-4:2018 (E)****5.2 Components**

The foam generator shall be equipped at the water/premix inlet, and at the foam concentrate inlet, with dimensions according to Table 3.

A non-return valve can be installed in the foam concentrate inlet of the foam generator.

The flow direction shall be indicated by an arrow on the body of the foam generator and on the inductor, if the inductor exists.

If fitted with a pick-up tube in accordance with EN 16712-2, then it shall be with an inside diameter of at least 20 mm and a minimum length of 1,5 m  $\pm$  50 mm, including any rigid section.

As foam generators are not usually equipped with a flushing device, a strainer can be fitted at the water inlet of the foam generator if specified by the customer.

NOTE A strainer will cause an additional pressure loss.

**6 Safety requirements and/or protective/risk reduction measures and verification****6.1 General**

Foam generators shall comply with the safety requirements and/or protective/risk reduction measures of this clause.

Foam generators shall be designed according to the principles of EN ISO 12100 for relevant but not significant hazards (e.g. sharp edges), which are not dealt with by this document.

All the tests defined in Clause 6 of this document are type tests.

**6.2 Mechanical hazard**

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**6.2.1 Moving parts**

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Access to moving parts (e.g. fan) shall be prevented during normal operation. If necessary to achieve this requirement the following shall be provided: fixed guards as defined in EN ISO 14120 complying with the safety distances as defined in EN ISO 13857.

Verification

*Inspection and measurement.*

**6.2.2 Stability**

The foam generator shall be designed in such a way that it is stable during normal operation.

Verification

*Functional test under maximum pressure.*

**6.2.3 Handling**

The foam generator shall be equipped with handles and wheels as defined in Table 2.

Table 2 — Handles and wheels

Model	Mass kg	Minimum number of handles	Minimum number of wheels
Portable (1 person)	< 20	1	0
Transportable (2 persons)	< 40	2	0
Wheeled transportable	< 60	1	2

### Verification

Measurement of the mass and visual inspection.

## 7 Performance requirements and verification

### 7.1 General

All the tests defined in Clause 7 of this document are type tests.

NOTE Guidance for acceptance tests on delivery is given in Annex B.

The following pressures, measured at the foam generator inlet, shall be used for the hydraulic tests:

— reference pressure :  $p_R = (5 \pm 0,1)$  bar;

— nominal pressure :  $p_N = (16 \pm 0,1)$  bar.

In accordance with EN 1568-2, the test shall be conducted with the following conditions:

— air temperature  $(20 \pm 5)$  °C;

— foam solution temperature  $(17,5 \pm 2,5)$  °C.

### 7.2 Dimensions, mass and flow rate

Maximum dimensions and masses of the foam generator (without coupling), and the minimum flow rate, shall be in accordance with Table 3.

**Table 3 — Maximum dimensions and masses of foam generators, their minimum flow rate, and dimensions of inlets**

Model	Mass kg	Dimension L × W × H mm	Flow rate at $p_R$ l/min	Water/premix inlet	Foam concentrate inlet
Portable (1 person)	< 20	620 × 700 × 320	100	51 mm (2")	25,4 mm (1")
Transportable (2 persons)	< 40	600 × 750 × 450			
Wheeled transportable	< 60	950 × 1000 × 500			