

# SLOVENSKI STANDARD

## SIST EN 1568-4:2018

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**Gasila - Penila - 4. del: Specifikacija za penila za težko peno za površinsko uporabo pri tekočinah, topnih v vodi**

Fire extinguishing media - Foam concentrates - Part 4: Specification for low expansion foam concentrates for surface application to water-miscible liquids

**iTeh STANDARD PREVIEW**

Feuerlöschmittel - Schaummittel - Teil 4: Anforderungen an Schaummittel zur Erzeugung von Schwertschaum zum Aufgeben auf mit Wasser mischbare Flüssigkeiten

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Agents extincteurs - Émulseurs - Partie 4: Specifications pour les émulseurs bas foisonnement destinés à une application à la surface de liquides ayant une affinité pour l'eau

**Ta slovenski standard je istoveten z: EN 1568-4:2018**

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EUROPEAN STANDARD

EN 1568-4

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English Version

## Fire extinguishing media - Foam concentrates - Part 4: Specification for low expansion foam concentrates for surface application to water-miscible liquids

Agents extincteurs - Émulseurs - Partie 4 :  
Spécifications pour les émulseurs bas foisonnement  
destinés à une application à la surface de liquides ayant  
une affinité pour l'eau

Feuerlöschmittel - Schaummittel - Teil 4:  
Anforderungen an Schaummittel zur Erzeugung von  
Schwerschaum zum Aufgeben auf mit Wasser  
mischbare Flüssigkeiten

This European Standard was approved by CEN on 18 September 2017.

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  
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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## European foreword

This document (EN 1568-4:2018) 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 August 2018, and conflicting national standards shall be withdrawn at the latest by November 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 supersedes EN 1568-4:2008.

In comparison with the previous edition, the following significant changes have been made:

- the interfacial tension and spreading coefficient test was removed;
- the freezing point test was introduced;
- the stability/separation test of foam concentrate was introduced;
- the occupational health and ecotoxicological testing was introduced;
- an example of technical data sheet was included; and
- setting-up procedures of foam nozzle for the determination of expansion and drainage times have been modified in the light of ISO 7203.

This document is Part 4 of EN 1568 which has the general title *Fire extinguishing media — Foam concentrates*. The other parts are:

- *Part 1: Specification for medium expansion foam concentrates for surface application to water-immiscible liquids;*
- *Part 2: Specification for high expansion foam concentrates for surface application to water-immiscible liquids;*
- *Part 3: Specification for low expansion foam concentrates for surface application to water-immiscible liquids.*

This European Standard is one of a series of standards specifying requirements for fire extinguishing media in common use. This series includes the following standards:

- EN ISO 5923, *Equipment for fire protection and fire fighting — Fire extinguishing media — Carbon dioxide (ISO 5923);*
- EN 27201-1, *Fire protection — Fire extinguishing media — Halogenated hydrocarbons — Part 1: Specifications for halon 1211 and halon 1301 (ISO 7201-1:1989);*
- EN 27201-2, *Fire protection — Fire extinguishing media — Halogenated hydrocarbons — Part 2: Code of practice for safe handling and transfer procedures (ISO 7201-2:1991);*

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— EN 615, *Fire protection — Fire extinguishing media — Specifications for powders (other than class D powders)*.

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.

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## Introduction

As fire-fighting foams are chemical agents or chemical preparations, Commission Directive 2006/60/CE [1] and Regulations (EC) No 1272/2008 (CLP) [2] and No 1907/2006 (REACH) [3] apply and need to be taken into account.

Fire are classified in EN 2 [4] as follows:

- Class A: fires involving solid materials, usually of an organic nature, in which combustion normally takes place with the formation of glowing embers;
- Class B: fires involving liquids or liquefiable solids;
- Class C: fires involving gases;
- Class D: fires involving metals;
- Class F: fires involving cooking media (vegetable or animal oils and fats) in cooking appliances.

Fire-fighting foams are widely used to control and extinguish Class B fires and to inhibit re-ignition. These foams can also be used for prevention of ignition of flammable liquids and, in certain conditions, to extinguish Class A fires.

Foams can be used in combination with other extinguishing media, particularly gaseous media and powders, which are the subject of other European Standards (see the European foreword).

These specifications have been designed to ensure that fire extinguishing media have the minimum useful fire fighting capability. The user should ensure that the foam concentrates are used accurately at the concentration recommended by the manufacturer. Fire performances indicated by this standard cannot replicate practical fire situations.

Foam concentrates of different types and manufacture should not be mixed.

Some combinations of extinguishing powder and foam can lead to unacceptable loss of efficiency, caused by unfavourable interaction of the chosen media when applied simultaneously or successively to the fire.

It is extremely important that the foam concentrate after dilution with water to the recommended concentration does not in normal usage present a significant toxic hazard to life in relation to the environment. Commission Directive 2006/60/CE [1] and Regulations (EC) No 1272/2008 (CLP) [2] and No 1907/2006 (REACH) [3] apply when considering the testing of ecotoxicological properties and safety in the work environment.

Special quality characteristic is the type test conducted by an independent testing laboratory accredited to EN ISO/IEC 17025 [5].

## EN 1568-4:2018 (E)

## 1 Scope

This European Standard specifies requirements for chemical and physical properties, and minimum performance requirements of low expansion foams suitable for surface application to water-miscible liquids. Requirements are also specified for marking.

**IMPORTANT** — The fire performance is tested using acetone and isopropanol as the fuel, which also forms the basis for the performance classification. However, there are a large number of water-miscible liquids which have more or less different properties to acetone and isopropanol. It has been shown by tests using other fuels that the performance of various foams can differ considerably. Examples of such fuel is Methyl Ethyl Ketone (MEK). It is therefore essential that the user checks for any unfavourable or unacceptable loss of efficiency when the foam is used against fires in any other water-miscible fuels than acetone and isopropanol respectively. The fire test conditions and procedure given in H.2 can be used in order to achieve results comparative with acetone and isopropanol respectively and related requirements.

It is also essential for the user to note that other fuel depths and methods of application than those specified in H.2 can cause considerable loss of efficiency and these matters should be carefully considered by the user when assessing the suitability for particular applications.

**WARNING** — Any type approval according to this standard is invalidated by any change in composition of the approved product.

**NOTE** Some concentrates conforming to this part of the EN 1568 series can also conform to other parts and therefore can also be suitable for application as medium and/or high expansion foams.

## 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 3104, *Petroleum products — Transparent and opaque liquids — Determination of kinematic viscosity and calculation of dynamic viscosity (ISO 3104)*

EN ISO 3219:1994, *Plastics — Polymers/resins in the liquid state or as emulsions or dispersions — Determination of viscosity using a rotational viscometer with defined shear rate (ISO 3219:1993)*

EN ISO 3696, *Water for analytical laboratory use — Specification and test methods (ISO 3696)*

EN ISO 11348-2, *Water quality — Determination of the inhibitory effect of water samples on the light emission of *Vibrio fischeri* (Luminescent bacteria test) — Part 2: Method using liquid-dried bacteria (ISO 11348-2)*

EN ISO 23753-1, *Soil Quality — Determination of dehydrogenase activity in soil — Part 1: Method using triphenyltetrazolium chloride (TTC) (ISO 23753-1)*

ISO 304, *Surface active agents — Determination of surface tension by drawing up liquid films*

ISO 3310-1, *Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth*

OECD 201, *Test No. 201: Freshwater Alga and Cyanobacteria, Growth Inhibition Test*

OECD 202, *Test No. 202: Daphnia sp. Acute Immobilisation Test*

OECD 203, *Test No. 203: Fish, Acute Toxicity Test*

OECD 301, Test No. 301: Ready Biodegradability

OECD 404, Test No. 404: Acute Dermal Irritation/Corrosion

OECD 405, Test No. 405: Acute Eye Irritation/Corrosion

OECD 420, Test No. 420: Acute Oral Toxicity – Fixed Dose Procedure

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions 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>

#### 3.1

##### **25 %/50 % drainage time**

time taken for 25 %/50 % of the volume of the original foam solution to drain out of the generated foam

#### 3.2

##### **Expansion (E)**

##### **expansion value**

##### **expansion ratio**

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

#### 3.3

##### **low expansion foam**

foam which has an expansion ratio less than 20

#### 3.4

##### **medium expansion foam**

foam which has an expansion ratio greater than or equal to 20 but less than 200

#### 3.5

##### **high expansion foam**

foam which has an expansion ratio greater than or equal to 200

#### 3.6

##### **fire-fighting foam**

aggregate of air-filled bubbles formed from a foam solution used for fire fighting

#### 3.7

##### **foam concentrate**

liquid which is diluted with water to produce foam solution

Note 1 to entry: Annex A gives information on grades of foam concentrate.

#### 3.8

##### **foam solution**

solution of foam concentrate in water

**EN 1568-4:2018 (E)****3.9****gentle application**

application (of foam from the test nozzle) indirectly to the surface of the fuel from a backboard

Note 1 to entry: This definition of gentle application relates to the fire test procedures used in EN 1568-3 and EN 1568-4. In practice fire-fighting systems foam can also be applied gently by fixed foam pourers or by indirect application via a tank wall or other surface.

**3.10****sediment**

insoluble particles in the foam concentrate

**3.11****Newtonian foam concentrates**

foam concentrates which have a viscosity which is independent of the shear rate

**3.12****pseudo-plastic foam concentrates**

foam concentrates which have a viscosity which decreases with increasing shear rate

**3.13****surface tension**

tension within the interface between a liquid and air

**3.14****freezing point**

temperature at which the first ingredient of a mixture starts to solidify or freeze out

**3.15****designation****identifying name**

name that corresponds to a chemical formulation and a specific production process

Note 1 to entry: The designation guarantees consistency of the characteristics, performance and conditions of use of the foam concentrate.

**3.16****demineralized water**

water conforming to EN ISO 3696 (Grade 3), the water having a surface tension greater than 70 mN m<sup>-1</sup> when tested in accordance with F.2 and a conductivity of < 5 μS cm<sup>-1</sup>

**4 Sediment in the foam concentrate****4.1 Sediment before ageing**

Any sediment in the foam concentrate sampled in accordance with Annex B, but not aged in accordance with C.1, shall be dispersible through a 180 μm sieve, and the percentage volume of sediment shall be not more than 0,25 % when tested in accordance with Annex C.

**4.2 Sediment after ageing**

Any sediment in the foam concentrate sampled in accordance with Annex B, and aged in accordance with C.1, shall be dispersible through a 180 μm sieve and the percentage volume of sediment shall be not more than 1,0 % when tested in accordance with Annex C.

## 5 Freezing point

The freezing point of the foam concentrate sampled in accordance with Annex B shall be determined in accordance with Annex K.

## 6 Viscosity of the foam concentrate

### 6.1 Newtonian foam concentrates

The viscosity of the foam concentrate at the lowest temperature for use claimed by the manufacturer shall be determined in accordance with EN ISO 3104. If the viscosity is  $> 200 \text{ mm}^2 \text{ s}^{-1}$ , the container shall be marked in accordance with Clause 14, item j).

### 6.2 Pseudo-plastic foam concentrates

The viscosity of the foam concentrate shall be determined in accordance with Annex D. If the viscosity at the lowest temperature for use is greater than or equal to  $120 \text{ mPa}\cdot\text{s}$  at  $375 \text{ s}^{-1}$ , the container shall be marked in accordance with Clause 14, item k).

## 7 pH of the foam concentrate

The pH of the foam concentrate sampled in accordance with Annex B shall be not less than 6,0 and not more than 9,5 at  $(20 \pm 1) ^\circ\text{C}$ .

## 8 Surface tension of the foam solution

The surface tension (determined in accordance with F.2) of the foam solutions prepared using top and bottom half-samples (see E.4) of the foam concentrate sampled in accordance with Annex B and conditioned in accordance with Annex E shall be not less than 0,95 times and not more than 1,05 times the surface tension of the foam solution prepared using the sampled foam concentrate.

## 9 Stability/separation test of foam concentrate

The foam concentrate shall not separate, stratify or precipitate as indicated by two or more distinct layers or the presence of solid deposits at the bottom of the container when tested in accordance with Annex L.

## 10 Determination of expansion and drainage time

### 10.1 Before temperature conditioning

The foam produced from the foam solution prepared from the foam concentrate sampled in accordance with Annex B, at the supplier's recommended concentration with simulated fresh water in accordance with G.4.1, shall be tested in accordance with Annex G. If appropriate, a further sample of the same concentration made with the simulated sea water in accordance with G.4.2 shall also be tested.

### 10.2 After temperature conditioning

The foams produced from the solutions prepared with simulated fresh water by using top and bottom half-samples (see E.4) of foam concentrate sampled in accordance with Annex B at the supplier's recommended concentration, when tested in accordance with Annex G, shall have the following:

- a) expansions which do not differ from each other or from the value obtained in 10.1 using simulated fresh water (i.e. before temperature conditioning) by more than 20 % of the value obtained in 10.1 using simulated fresh water; and

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- b) 25 % drainage times which do not differ from each other or from the value obtained in 10.1 using simulated fresh water (i.e. before temperature conditioning) by more than 20 % of the value obtained in 10.1 using simulated fresh water.

If appropriate, the tests shall be repeated using top and bottom half-samples (see E.4) of foam concentrate, sampled in accordance with Annex B at the supplier's recommended concentration, using foam solutions prepared with the simulated sea water in accordance with G.4.2. These foam solutions shall have the following:

- c) expansions which do not differ from each other or from the value obtained in 10.1 using the simulated sea water (i.e. before temperature conditioning) by more than 20 % of the value obtained in 10.1 using the simulated sea water in accordance with G.4.2; and
- d) 25 % drainage times which do not differ from each other or from the value obtained in 10.1 using the simulated sea water (i.e. before temperature conditioning) by more than 20 % of the value obtained in 10.1 using the simulated sea water in accordance with G.4.2.

NOTE Expansion is dependent on the foam concentrate and the equipment used to make the foam.

**11 Test fire performance**

The foam produced from the foam solutions prepared using the foam concentrate sampled in accordance with Annex B at the supplier's recommended concentration with simulated fresh water in accordance with G.4.1, and if appropriate at the same concentration with the simulated sea water in accordance with G.4.2, shall have an extinguishing performance class and burn-back resistance level as specified in Table 1 when tested in accordance with H.2 and H.3.

NOTE 1 The values obtained with sea water can differ from those obtained with simulated fresh water.

NOTE 2 Annex I describes a small-scale fire test which can be suitable for quality control purposes.

**Table 1 — Extinguishing performance classes and burn-back resistance levels**

Extinguishing performance class	25 % Burn-back resistance level	Extinction time not more than (min)	25 % Burn-back time not less than (min)
I	A	3	15
	B	3	10
	C	3	5
II	A	5	15
	B	5	10
	C	5	5

**12 Occupation health**

The manufacturer shall provide information as specified in Annex M.

**13 Technical data sheet**

The manufacturer should provide information for the foam concentrate. An example of the type of information provided in a manufacturer's technical data sheet is given in Annex N.

## 14 Container marking

Markings on shipping containers should be permanent and legible. The following information shall be marked on the packaging or transport container:

- a) the designation (identifying name) of the concentrate;
- b) the words “low expansion fire-fighting foam concentrate” and the number and date of this European Standard (i.e. EN 1568-4:2018);

NOTE 1 For low expansion concentrates which also conform to other parts of the EN 1568 series additional markings can be used as specified in those parts.

- c) recommended usage concentration (mostly commonly 1 %, 3 % or 6 %);
- d) recommended maximum storage temperature, lowest temperature for use and freezing point;
- e) if the manufacturer advises that the foam concentrate is adversely affected by low temperature storage according to Annex E, the words “Do not freeze”;
- f) the nominal quantity in the container;
- g) the supplier's name and address;
- h) the batch number and the date of manufacture;
- i) the words “Not suitable for use with sea water” or “Suitable for use with sea water” as appropriate;
- j) if the foam concentrate is Newtonian and the viscosity at the lowest temperature for use is greater than  $200 \text{ mm}^2 \text{ s}^{-1}$  when measured in accordance with EN ISO 3104 the words “This concentrate can require special proportioning equipment”;
- k) if the foam concentrate is pseudo-plastic and the viscosity at the lowest temperature for use is greater than or equal to  $120 \text{ mPa}\cdot\text{s}$  at  $375 \text{ s}^{-1}$  the words “Pseudo-plastic foam concentrate. This concentrate can require special proportioning equipment”;
- l) the lowest extinguishing performance class and the lowest burn-back resistance level obtained with all fuels in simulated fresh water and sea water.

NOTE 2 The marking of shipping containers shipped to laboratories for testing are exempt from this requirement.