

**norm****NEN-EN 1568-4**

Blusmiddelen - Schuimconcentraten -  
Deel 4: Specificatie voor  
schuimconcentraten met lage expansie  
voor gebruik op vloeistoffen die met water  
mengbaar zijn

Publicatie uitsluitend voor commentaar

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

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Voorbeeld  
Preview

June 2005

ICS

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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 - Emulseurs - Partie 4 : Spécification  
pour les émulseurs bas foisonnement destinés à une  
application à la surface des liquides ayant une affinité pour  
l'eau

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

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## Foreword

This document (prEN 1568-4:2005) has been prepared by Technical Committee CEN/TC 191 "Fixed firefighting systems", the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 1568-4:2000.

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

- EN 25923, Fire protection — Fire extinguishing media — Carbon dioxide (ISO 5923:1985)
- EN 27201-1, Fire protection — Fire extinguishing media — Halogenated hydrocarbons — Part 1: Specification 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)
- EN 615, Fire protection — Fire extinguishing media — Specification for powder (other than Class D powders)

This standard is Part 4 of EN 1568 which has the general title "Fire extinguishing media — Foam concentrates". The other parts are, or will be:

- 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.

As fire fighting foams are chemical preparations EC Directives 67/548/EEC, 76/464/EEC and 88/379/EEC apply and should be taken into account.

The annexes A, I, J are informative, the annexes B, C, D, E, F, G, H are normative.

Annex K is an A-Deviation for National Regulations applicable in Denmark and in Germany and is informative.

## Introduction

Classes of fire are defined in EN 2: 1992+A1:2004 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 reignition. 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 Foreword).

These specifications have been designed to ensure that fire extinguishing media have the minimum useful fire fighting capacity. 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.

It should be noted that 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 should not in normal usage present a significant toxic hazard to life in relation to the environment. The current version of EC Directives 67/548/EEC, 76/464/EEC and 88/379/EEC apply when considering the testing of ecotoxicological properties and safety in the work environment.

## 1 Scope

This document 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 given for marking.

**IMPORTANT NOTE** In this part of the document, the fire performance is tested using acetone 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. It has been shown by tests using other fuel that the performance of various foams can differ considerably. Examples of such fuels are Isopropylalcohol (IPA) and 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. The fire test conditions and procedure given in J.2 can be used in order to achieve results comparative with acetone and related requirements. Other fuels can also require the use of other application rates, both higher and lower, to achieve relevant test data. Other fuel trays can then be used correcting the amount of fuel to achieve the same fuel depth as specified in I.2.

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

**NOTE** Some concentrates complying with this Part of EN 1568 can also comply with other Parts and therefore can also be suitable for application as medium and/or high expansion foams.

## 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 3104, *Petroleum products — Transparent and opaque liquids — Determination of kinematic viscosity and calculation of dynamic viscosity (ISO 3104:1994)*

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

ISO 3310-1:1990, *Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth*

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

## 3 Terms and definitions

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

### 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**

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 not greater than 20

**3.4****medium expansion foam**

foam which has an expansion ratio greater than 20 but not greater than 200

**3.5****high expansion foam**

foam which has an expansion ratio greater than 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

Annex A gives information on grades of foam concentrate.

**3.8****foam solution**

solution of foam concentrate in water

**3.9****gentle application**

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

## NOTE

This definition of gentle application relates to the fire test procedures used in EN 1568-3 and 4. In practice fire-fighting systems 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****spreading coefficient**

value which indicates the ability of one liquid to spread spontaneously across the surface of another

**3.12****newtonian foam concentrates**

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

**3.13****pseudoplastic foam concentrates**

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

**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  $\mu\text{m}$  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  $\mu\text{m}$  sieve and the percentage volume of sediment shall be not more than 1,0 % when tested in accordance with annex C.

## 5 Viscosity of the foam concentrate

### 5.1 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.

### 5.2 Pseudoplastic foam concentrates

The viscosity of the foam concentrate shall be determined in accordance with annex D.

## 6 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  $(20 \pm 1) ^\circ\text{C}$ .

## 7 Surface tension of the foam solution

The surface tension (determined in accordance with annex F.2.1) of the foam solutions prepared using top and bottom 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 (determined in accordance with annex F.2.1) of the foam solution prepared using the foam concentrate sampled in accordance with annex B.

## 8 Spreading coefficient of the foam solutions

NOTE The spreading coefficient indicates the possibility of film-forming, but it does not measure its quality. Certain properties of film-forming foams are not defined by this standard.

### 8.1 Before temperature conditioning

The foam solution prepared using the concentrate, if it is claimed by the supplier to be "film-forming", sampled in accordance with annex B shall have a positive spreading coefficient over cyclohexane when tested in accordance with F.2.2.

### 8.2 After temperature conditioning

The foam solution prepared using top and bottom samples, see E.4, of the foam concentrate, if it is claimed by the supplier to be "film-forming", sampled in accordance with annex B and conditioned in accordance with annex E, shall have a positive spreading coefficient over cyclohexane when tested in accordance with F.2.2.

## 9 Expansion and drainage of foam

### 9.1 Before temperature conditioning

The foam produced from the foam solution prepared from the foam concentrate sampled in accordance with annex B, at the suppliers recommended concentration with potable water shall be tested in accordance with annex G. If appropriate, a further sample of the same concentration made with the simulated sea water of G.4 shall also be tested.

### 9.2 After temperature conditioning

The foams produced from the foam solutions prepared with potable water using top and bottom samples, see E 4, of foam concentrate, sampled in accordance with annex B, at the suppliers recommended concentration, when tested in accordance with annex G, shall have the following:

- a) expansion values which do not differ from each other or from the value obtained in 9.1 (i.e. before temperature conditioning) by more than 20 % of the value obtained in 9.1; and
- b) 25 % drainage times which do not differ from each other or from the value obtained in 9.1 (i.e. before temperature conditioning) by more than 20 % of the value obtained in 9.1.

If appropriate repeat the tests using top and bottom samples, see E 4, of foam concentrate, sampled in accordance with annex B, at the suppliers recommended concentration, using the foam solutions prepared with the simulated sea water of G.4.

## 10 Test fire performance

The foam produced from the foam solution prepared using the foam concentrate sampled in accordance with annex B, at the supplier's recommended concentration with potable water, and if appropriate at the same concentration with the simulated sea water of G.4, shall have an extinguishing performance class and burnback resistance level as specified in table 1 when tested in accordance with H.1 and H.2.

NOTE 1 The values obtained with seawater can differ from those obtained with potable 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 burnback resistance levels**

Extinguishing performance class	Burnback resistance level	Exinction time not more than	Time in minutes
			Burnback time not less than
I	A	3	15
	B	3	10
	C	3	5
II	A	5	15
	B	5	10
	C	5	5

## 11 Container marking

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 1568-4:2000);

NOTE For low expansion concentrates which also conform to other Parts of EN 1568 additional markings can be used as given in those Parts.

- c) if the concentrate conforms to clause 8 the words "film-forming";
- d) recommended usage concentration (mostly commonly 1 %, 3 % or 6 % );
- e) any tendency of the foam concentrate to cause harmful physiological effects, the methods needed to avoid them and the first aid treatment if they should occur;
- f) recommended maximum storage temperature and lowest temperature for use;
- g) if the concentrate does not conform to clause 7, 8.2 and 9.2 after conditioning in accordance with E.2 the words 'Do not store below 0 °C';
- h) the nominal quantity in the container;
- i) the supplier's name and address;
- j) the batch number and the date of manufacture;
- k) the words "Not suitable for use with sea water" or "Suitable for use with sea water" as appropriate ;
- l) the extinguishing performance class and the burnback resistance level using potable water, and if appropriate, using seawater ;
- m) if the foam concentrate is Newtonian and the viscosity at the lowest temperature for use is more than 200 mm<sup>2</sup>/s when measured in accordance with EN ISO 3104 the words "This concentrate can require special proportioning equipment";
- n) if the foam concentrate is pseudoplastic the words "Pseudoplastic foam concentrate".

NOTE 1 The packaging of the foam concentrate should ensure that the essential characteristics of the concentrate are preserved when stored and handled in accordance with the supplier's recommendations.

NOTE 2 Markings on shipping containers should be permanent and legible.

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