

**PAIKSED TULEKUSTUTUSSÜSTEEMID
VAHTSÜSTEEMIDE KOMPONENDID
OSA 2: PROJEKTEERIMINE, EHITAMINE JA HOOLDUS**

**Fixed firefighting systems -
Foam systems -
Part 2: Design, construction and maintenance»**

EESTI STANDARDI EESSÕNA**NATIONAL FOREWORD**

See Eesti standard EVS-EN 13565-2:2009 sisaldab Euroopa standardi EN 13565-2:2009 ja selle paranduse AC:2010 ingliskeelset teksti.	This Estonian standard EVS-EN 13565-2:2009 consists of the English text of the European standard EN 13565-2:2009 and its corrigendum AC:2010.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 13.05.2009.	Date of Availability of the European standard is 13.05.2009.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 13.220.20

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

ICS 13.220.20

English Version

Fixed firefighting systems - Foam systems - Part 2: Design, construction and maintenance

Installations fixes de lutte contre l'incendie - Systèmes à
émulseurs - Partie 2: Calcul, installation et maintenance

Ortsfeste Brandbekämpfungsanlagen -
Schaumlöschanlagen - Teil 2: Planung, Einbau und
Wartung

This European Standard was approved by CEN on 24 May 2007.

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 Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

	page
Foreword.....	5
Introduction	6
1 Scope	8
2 Normative references	8
3 Terms and definitions	8
4 Foam extinguishing systems	12
4.1 General.....	12
4.1.1 General requirements.....	12
4.1.2 Environmental considerations	13
4.1.3 Planning.....	13
4.1.4 Documentation.....	13
4.1.5 Supplementary manual foam fire fighting provisions	14
4.1.6 Equipment	14
4.2 Water supply	15
4.2.1 Water demand	15
4.2.2 Operating time.....	15
4.2.3 Quality of water	15
4.2.4 Power supply for water pumps	16
4.3 Foam concentrate	16
4.3.1 General.....	16
4.3.2 Foam concentrate supply – low and medium expansion foams	16
4.3.3 Foam concentrate pumps	17
4.3.4 Supplementary external connections.....	17
4.4 Foam proportioners.....	17
4.5 Pipework.....	18
4.5.1 Water and foam solution pipework	18
4.5.2 Foam concentrate piping	18
4.5.3 Non Newtonian foam concentrate.....	18
4.5.4 Piping of aspirated foam (including that for subsurface foam applications).....	18
4.5.5 Marking	19
4.6 Foam discharge outlets and generators	19
4.7 Operation and control systems.....	19
4.7.1 Detection of fires.....	19
4.7.2 Release of fixed foam extinguishing systems.....	19
4.7.3 Alarms	20
5 Design	20
5.1 Application rates.....	20
5.2 Flammable liquid storage tanks, bunds and process areas	22
5.2.1 General.....	22
5.2.2 Number of foam discharge outlets	24
5.2.3 Fixed cone roof tanks.....	24
5.2.4 Floating roof tanks.....	27
5.2.5 Bunded/diked areas and process areas	28
6 Foam sprinkler and deluge systems.....	31
6.1 Deluge systems.....	31
6.1.1 Deluge applications	31
6.1.2 Deluge limitations	31
6.1.3 Deluge design	31

6.2	Foam enhanced sprinkler systems.....	31
6.2.1	Foam enhanced sprinkler applications.....	31
6.2.2	Foam enhanced sprinkler limitations.....	31
6.2.3	Foam enhanced sprinkler design.....	32
6.3	Foam concentrate.....	32
6.3.1	Aspirated foams.....	32
6.3.2	Non aspirated foams.....	32
6.4	Foam proportioning.....	32
6.5	Drain and flushing connections.....	32
1.1.1	NA.....	33
1.1.2	NA.....	33
1.1.3	N.A.....	34
7	High expansion foam systems.....	35
7.1	General.....	35
7.2	Foam concentrate.....	36
7.3	Equipment.....	36
7.4	System design.....	36
7.5	Equipment location considerations.....	37
7.6	Personnel safety.....	37
7.7	Discharge rate (total flooding systems).....	38
7.8	Discharge time (total flooding systems).....	38
8	Marine loading and unloading docks.....	39
8.1	Water supplies.....	39
8.2	Foam concentrate.....	39
8.3	Foam water monitors.....	39
8.4	Below dock foam systems.....	39
9	Aircraft hangars.....	40
9.1	General.....	40
9.2	Hangar partitioning.....	40
9.3	Fire detection.....	40
9.4	System design philosophy.....	40
9.5	System duration.....	42
9.6	Foam and water pumps.....	42
9.7	Acceptable application methods.....	42
9.8	Foam types.....	42
9.9	Monitors.....	42
9.10	Foam-water deluge systems.....	42
9.11	Medium expansion systems (Type 3 hangars only).....	43
9.12	High expansion systems.....	43
9.13	Headlines.....	43
9.14	Commissioning tests.....	43
10	Liquefied flammable gases (LNG/LPG).....	44
10.1	General.....	44
10.1.1	Liquefied Natural Gas (LNG).....	44
10.1.2	Liquefied Petroleum Gas (LPG).....	44
10.2	Controlled burn-off.....	44
10.3	Un-ignited spills.....	44
10.4	Fire detection.....	44
10.5	Foam properties.....	44
10.6	Foam proportioning system.....	45
10.7	Application techniques.....	45
11	Commissioning, testing, and periodic inspections.....	46
11.1	Instruction of operating personnel.....	46
11.2	Commissioning.....	46
11.2.1	General.....	46
11.2.2	Visual inspection.....	46
11.2.3	Pressure tests.....	46

11.2.4 Tests.....46

11.2.5 Completion certificate46

11.3 The periodic inspection and testing of foam systems.....47

11.3.1 General.....47

11.3.2 Inspections47

11.4 Shut-down49

11.5 Maintenance49

11.6 Alterations49

Bibliography50

Foreword

This document (EN 13565-2:2009) 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 November 2009, and conflicting national standards shall be withdrawn at the latest by November 2009.

EN 13565 *Fixed firefighting systems — Foam systems* consists of the following parts:

Part 1: Requirements and test methods for components

Part 2: Design, construction and maintenance

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

It has been assumed by the drafting of this European Standard, that the application of the contained requirements shall be given to qualified and experienced personnel only. It is considered to apply to new foam systems and so it is not considered to apply to existing foam systems.

Foam systems are designed to provide a homogeneous layer of bubbles, of aerated fire fighting foam concentrate and water, over the surface of flammable liquids (Class B) and/or combustible materials (Class A). The layer of bubbles will suppress the release of flammable vapours, exclude air, and cool the fuel and hot surfaces.

In addition, High Expansion Foam may be used to provide total flooding of enclosures with 3 dimensional hazards of either Class A and/or Class B fuels.

Prior to the selection and design of foam systems the hazards should undergo a risk assessment; however this is outside the scope of this European Standard. Applications for foam systems can be diverse so no one type of foam system can be prescribed. This European Standard provides guidance for the design of various foam systems available to persons with knowledge and experience in determining the selection of foam fire extinguishing systems which will be effective in protecting specific hazard configurations. The requirement for foam systems derives from risk assessment by those competent to carry out such assessments which are outside the scope of this European Standard. Nothing in this European Standard is intended to restrict new technologies or alternative arrangements, provided the level of safety prescribed by this European Standard is not lowered.

Typical uses of the various types of foam system are set out in Table 1 below:

Table 1 — Typical uses of the various types of foam system

Hazard	Low expansion	Medium expansion	High expansion (indoors)
Flammable liquid storage tanks	Yes	No	No
Tank bunds/collecting areas	Yes	Yes	Yes + LNG/LPG
Process areas	Yes	Yes	Yes
Aircraft hangers	Yes	< 1 400 m ² only	Yes
Fuel transfer areas	Yes	Yes	Yes
Plastic packaging and storage	Yes	No	Yes
Plastic recycling	Yes	No	No
Refuse handling and storage	Yes	No	No
Liquefied Natural Gas	No	No	Yes (and outdoors)
Tyre storage	Yes	No	Yes
Rolled paper	No	No	Yes
Marine jetties	Yes	Yes	No
Oil filled transformers and switchgear	Yes	No	Yes
Cable tunnels	No	No	Yes
LPG (Liquefied Petroleum Gas)	No	Yes	Yes (and outdoors)
Warehouses – Class A and B fuels	Yes	No	Yes

NOTE These typical uses are not prescriptive and do not preclude other uses, providing there is a fire engineering basis.

Foam systems may be used to suppress the release of toxic vapours but this application is outside the scope of this European Standard.

The engineering of foam systems is deemed to utilise proportioners and discharge devices evaluated and tested in accordance with EN 13565-1 using foam concentrates complying with EN 1568.

Low and Medium Expansion Foam Systems are not suitable for fire extinguishment of cascading fuel or spray fires, however, they will/may be of value in the control of resultant spill fires.

All foam systems are generally unsuitable for the following:

- chemicals, such as cellulose nitrate, that release sufficient oxygen or other oxidising agents which can sustain combustion;
- energised unenclosed electrical equipment;
- metals such as sodium, potassium and sodium-potassium alloys which are reactive to water;
- hazardous, water-reactive materials such as triethyl-aluminium and phosphorous pentoxide;
- combustible metals such as aluminium and magnesium.

Foam systems reduce the environmental impact of fire by reducing fire effluent both into the atmosphere and onto the ground. This is achieved through a more efficient application of fire extinguishing agent onto the seat of the fire. Such systems also provide increased safety for fire fighting personnel and neighbouring communities.

1 Scope

This European Standard specifies the requirements and describes the methods for design, installation, testing and maintenance of low, medium, and high expansion foam fire extinguishing systems.

This European Standard provides guidance for the design of various foam systems available to persons with knowledge and experience in determining the selection of foam fire extinguishing systems which will be effective in protecting specific hazard configurations.

This European Standard does not cover a risk analysis carried out by a competent person.

Nothing in this European Standard is intended to restrict new technologies or alternative arrangements, provided that the level of safety prescribed in this standard is not lowered, and supported by documented evidence/test reports.

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 54, *Fire detection and fire alarm systems*

EN 1568 (all parts), *Fire extinguishing media — Foam concentrates*

EN 12094-1, *Fixed firefighting systems — Components for gas extinguishing systems — Part 1: Requirements and test methods for electrical automatic control and delay devices*

EN 12259-1, *Fixed firefighting systems — Components for sprinkler and water spray systems — Part 1: Sprinklers*

EN 12845:2003, *Fixed firefighting systems — Automatic sprinkler systems — Design, installation and maintenance*

EN 13565-1:2003, *Fixed firefighting systems — Foam systems — Requirements and test methods for components*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13565-1:2003 and the following apply.

3.1

mode of application

method for the transportation of the foam onto the surface to be protected with the following subdivisions

3.2

semi-subsurface

system where foam is delivered under the surface of the fuel and directed by a floating hose onto the surface to be protected

3.3

subsurface

system where foam is delivered under the surface of the liquid

3.4

conventional (top pouring)

system where foam is delivered onto the surface to be protected