BS EN 16712-3:2015

BSI Standards Publication

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

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee FSH/17, Fire brigade equipment.

A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

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

Equipement portable de projection d'agents d'extinction alimenté par des pompes à usage incendie - Equipements mousse portables - Partie 3 : Lances à mousse à main PN 16 bas et moyen foisonnement

Tragbare Geräte zum Ausbringen von Löschmitteln, die mit Feuerlöschpumpen gefördert werden - Tragbare Schaumgeräte - Teil 3: Schwer-und Mittelschaumrohre PN 16

This European Standard was approved by CEN on 1 August 2015.

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

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European foreword

This document (EN 16712-3:2015) 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of an identical text or by endorsement, at the latest by March 2016, and conflicting national standards shall be withdrawn at the latest by March 2016.

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

EN 16712 consists of the following parts, under the general title "*Portable equipment for projecting extinguishing agents supplied by fire fighting pumps — Portable foam equipment*":

— Part 1: Inductors PN 16;

— Part 2: Pick-up tubes;

— Part 3: Low and medium expansion hand-held foam branchpipes PN 16;

— Part 4: High expansion foam generators PN 16.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Hand-held foam branchpipes are used to expand foam water solution by the addition of air and to project the foam onto a fire or fire risk.

1 Scope

1.1 This European Standard applies to hand-held foam branchpipes, and self-inducting foam branchpipes, for low and medium expansion foam used by fire and rescue services and defines their specification and test procedures.

NOTE In this European Standard, the term "branchpipe" also refers to "hand-held foam branchpipes".

1.2 This European Standard is not applicable to hand-held foam branchpipes which have been manufactured before its date of publication as European Standard.

2 Terms and definitions

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

2.1
handheld foam branchpipe
hand-operated device in which the water foam solution is mixed with air to produce foam that is then expelled in the form of a jet

Note 1 to entry: The branchpipe may be equipped with a pressure gauge.

2.2
combination handheld foam branchpipe
handheld foam branchpipe capable of producing either low expansion foam or medium expansion foam

Note 1 to entry: The branchpipe may be equipped with a pressure gauge.

2.3
pressures
Note 1 to entry: Pressures are expressed in bar.

Note 2 to entry: 1 bar = 0,1 MPa (10^5 Pa).

2.3.1
working pressure
p_1
pressure measured at the inlet of the branchpipe

2.3.2
nominal pressure
p_N
maximum working pressure measured at the inlet of the branchpipe

2.3.3
reference pressure
p_R
pressure measured at the inlet of the branchpipe used for performance tests

2.3.4
test pressure
p_t
static pressure used for leakage tests

2.4
expansion
expansion ratio
ratio of the volume of foam to the volume of the water foam solution from which it was made

2.4.1
low expansion foam
foam which has an expansion ratio less than 20

[SOURCE: EN 1568-3:2008, 3.3]

2.4.2
medium expansion foam
foam which has an expansion ratio greater than or equal to 20 but less than 200

[SOURCE: EN 1568-3:2008, 3.4]

2.5
self-inducting foam branchpipe
foam branchpipe and an induction system integrated into one device

3 Types

3.1 Branchpipes are classified according to Table 1 based on

— foam expansion,

— water foam solution flow at working pressure p_1 (in litres per minute).

3.2 Branchpipes are divided in two groups (low and medium expansion). The group they belong to shall be identified in the standard description and shall be marked according to 6.2.

Table 1 — Branchpipe types

Type	**Foam expansion**		**Reference pressure**	**Water foam solution flow**	
					Permitted deviation
			bar	l/min	%
S 1	Low expansion	4 to < 20	5	100	+10 0
S 2				200	
S 4				400	
S 8				800	
M 0,5	Medium expansion	20 to 200	5	50	+10 0
M 1				100	
M 2				200	
M 4				400	
M 8				800	

4 Designation

The designation of hand-held foam branchpipes in compliance with EN 16712-3 comprises

— name of the equipment,

— reference to EN 16712-3,

— type,

— self inducting system, if any, by adding “Y”.

EXAMPLE 1 A hand-held foam branchpipe for low expansion with a flow rate of 800 l/min is designated as follows:

Hand-held foam branchpipe EN 16712–3 — S 8

EXAMPLE 2 A combination hand-held foam branchpipe with a flow rate of 200 l/min is designated as follows:

Hand-held foam branchpipe EN 16712–3 — S 2/M 2

EXAMPLE 3 A hand-held foam branchpipe for low expansion with a flow rate of 800 l/min with self-inducting system is designated as follows:

Hand-held foam branchpipe EN 16712–3 — S 8 Y

EXAMPLE 4 A combination hand-held foam branchpipe with a flow rate of 200 l/min with self-inducting system is designated as follows:

Hand-held foam branchpipe EN 16712–3 — S 2/M 2 Y

EXAMPLE 5 A hand-held foam branchpipe for medium expansion with a flow rate of 400 l/min is designated as follows:

Hand-held foam branchpipe EN 16712–3 — M 4

5 Requirements and verification

5.1 Mechanical characteristics

5.1.1 Dimensions and mass

Dimensions and mass of branchpipes (without inlet coupling) shall be in accordance with Table 2.

Table 2 — Maximum dimensions and mass

Type	Dimensions			Mass
	Length	Width	Height	
	mm	mm	mm	kg
S 1	500	150	110	1,5
S 2	850	260	110	3
S 4	1 080	260	155	5
S 8	1 300	280	180	6
M 0,5	600	150	500	2
M 1	500	150	200	2
M 2	920	280	340	6
M 4	1 300	330	340	7
M 8	1 610	430	370	10
S 2/M 2	920	300	300	7
S 4/M 4	1 300	350	350	9
NOTE The maximum mass does not apply to seawater-resistant branchpipes.				

Verification

Dimensions and mass shall be measured in accordance with Table 2.

5.1.2 Operating and handling elements

At pressures up to the nominal pressure, the maximum torque required to operate the shut-off valve shall not exceed the values given in Table 3.

Table 3 — Torque

Flow rate	Torque
l/min	Nm
≤ 400	20
> 400	35

Verification

The torques shall be measured in accordance with Table 3. This test shall be conducted with water only.

5.2 Materials

The materials used shall be selected so that all the requirements in Clause 5 are met, subject to the tests defined in this European Standard.

The resistance to foam concentrate or additive shall be agreed between the supplier and the user.

5.3 Hydraulic characteristics

5.3.1 General

Unless otherwise specified, tests shall be carried out at the reference pressure p_R, in the following order: dimensions and mass according to 5.1.1, verification of operating and handling elements according to 5.1.2, heat test according to 5.3.2, frost test according to 5.3.3, verification of the effective throw according to 5.3.4, leak-tightness according to 5.3.5 and hydrodynamic behaviour according to 5.3.6.

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

The following pressures shall be used for the determination of the hydraulic characteristics.

— reference pressure: p_R = (5 ± 0,1) bar;

— nominal pressure: p_N = 16 bar;

— test pressure: p_t = 25,5 bar

— burst pressure: p_B = 60 bar.

5.3.2 Sensitivity to heat

Branchpipes shall resist the heat test defined below.

Verification

It shall be possible to use the foam branchpipe without restricting its function after it has been stored for 24 h at (55 ± 2) °C.

This test shall be conducted with water only.

Hand protection should be used when carrying out this test.

5.3.3 Sensitivity to frost

Branchpipes shall resist the frost test defined below.

Verification

The foam branchpipe shall be disconnected following operation for 1 min at the reference pressure p_R. It shall then be drained for 1 min and stored at a temperature of (-15 ± 2) °C for 30 min. Following this, it shall still be possible to move the operating elements manually.

Hand protection should be used when carrying out this test.

5.3.4 Effective throw

The branchpipe shall achieve a minimum effective throw d_{eff} as given in Table 4 and shown in Figure 1, when set at the reference pressure.

Combination hand-held foam branchpipes shall meet both relevant requirements for low and medium expansion as specified in Table 4.

Table 4 — Performance of the foam branchpipe

Type	Water	Multipurpose synthetic foam concentrate	
	Effective throw (at p_R) m	Effective throw m	Foam expansion ratio
S 1	10	9	> 5
S 2	15	12	> 5
S 4	25	20	> 5
S 8	30	25	> 5
M 0,5	—	3	> 40
M 1	—	4	> 40
M 2	—	7	> 40
M 4	—	8	> 40
M 8	—	12	> 40

Verification

The effective throw shall be measured under the following conditions, in accordance with Figure 1:

— *inclination: (30 ± 2)°;*

— *pressure at the inlet of the branchpipe:* p_R = 5 bar ± 0,1 bar;

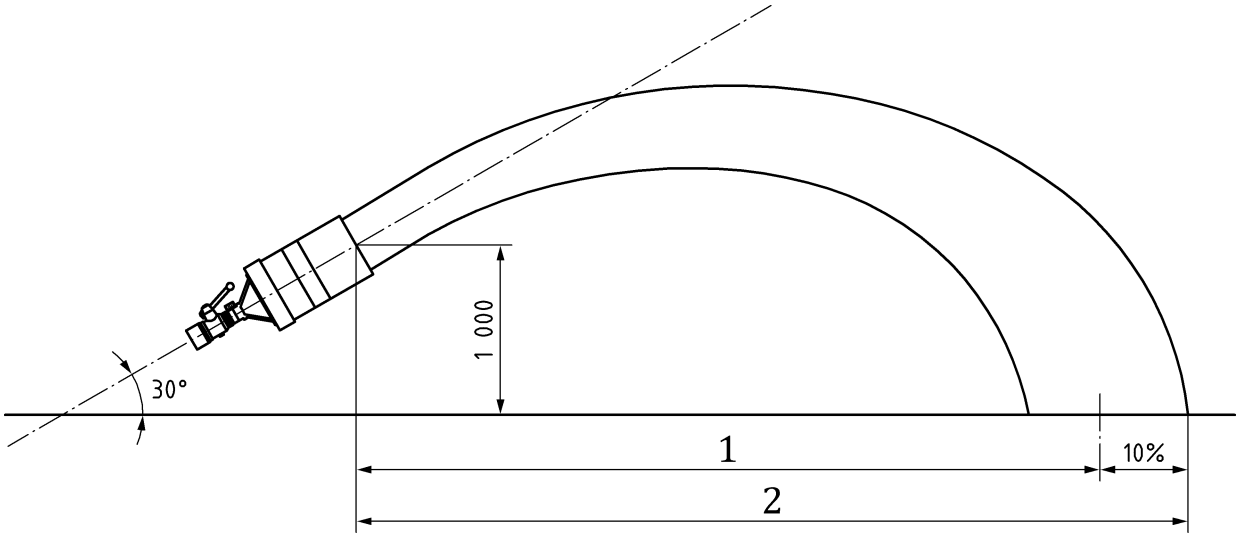
— *maximum wind speed: 1 m/s;*

— *effective throw (in metre): furthest droplets - 10 % =* d_{eff} = 0,9 d_{max} .

The measurement shall be carried out when the system is stabilized.

The effective throw shall be given in the instruction handbook.

Dimensions in millimetres



Key

1 effective throw (d_{eff})

2 maximum throw (d_{max})

Figure 1 — Effective throw

5.3.5 Leak-tightness

The foam branchpipe shall be constructed to ensure it does not leak during normal operation.

Verification

The closed branchpipe shall show no leakage for 1 min at the test pressure p_t = 25,5 bar.

NOTE No leakage means no visible weeping or drop formation.

This test shall be conducted with water only.

5.3.6 Hydrodynamic behaviour

The foam branchpipe shall be constructed to ensure it resists the effects of water hammer.

Verification

The foam branchpipe shall be mounted in a closed position on a device capable of exerting a hydrostatic pressure of 60 bar (burst pressure p_B). All air shall be bled out of the system.

The pressure shall be increased by 3 bar increments and held for 30 s at each pressure up to p_B.

This maximum pressure shall be held for 1 min without rupturing the branchpipe.

This test shall be conducted with water only.

If the branchpipe is equipped with a pressure gauge, the test shall be carried out without it.

6 Information for use

6.1 Instruction and maintenance handbook

6.1.1 General

Each branchpipe shall be delivered with an instruction and maintenance handbook. This handbook should be made available either on paper and/or in a downloadable self-contained digital format (e.g. CD-ROM, DVD, USB stick, website, etc.).

6.1.2 Instruction handbook

The instruction handbook shall contain at least the following information:

— name and/or logo and contact details of manufacturer;

— data sheet according to Annex B (see also an example of a complete data sheet in Annex C);

— product warnings;

— general information for use.

6.1.3 Maintenance handbook

The maintenance handbook shall at least contain the following:

— maintenance instructions;

— sectional or exploded diagram;

— spare parts list cross-referenced to diagram.

6.2 Marking

Branchpipes shall be permanently marked with at least the following information:

— identification of the manufacturer;

— serial or batch number and year of manufacture;

— reference to this European Standard;

— type.

6.3 Colour coding

The water foam solution flow shall be identifiable by a coloured band, with a minimum width of 15 mm, as described in Table 5.

Table 5 — Colour coding

Nominal flow l/min	**Colour**
50	No requirement
100	No requirement
200	Yellow
400	Red
800	Blue

It is allowed to add complementary information e.g. flowrate, pressure, corporate logo, etc. on the coloured band. The printed area shall not exceed 50 % of the surface area of the band (see an example in Figure 2).

Figure 2 — Example

Annex A
(informative)

Acceptance test on delivery

Acceptance tests based on the safety and performance requirements of this European Standard may be undertaken on delivery by the customer, by an independent or national testing organization or by any other third party of the customers' choice and the results of the tests recorded.

The inspection may include

— examination of all of the test results and the conformity documentation,

— confirmation that the branchpipe specification has been met by visual and functional inspection or test,

— confirmation that the required branchpipe documentation, as specified in this European Standard, is available,

— confirmation that the performance and specification of the branchpipe meet the requirements of this European Standard.

Annex B
(normative)

Datasheet for hand-held foam branchpipes

B.1 General

NOTE 1 The symbol * means “where applicable” in the whole datasheet.

NOTE 2 The actual test results can be entered in the data sheet, when these exceed the minimum requirements given in this European Standard.

Information shall be provided describing the equipment and method used for flow measurement.

B.2 General data

Manufacturer	
Type	
Flowrate(s) (l/min) **at p_R (5 bar) ***	

B.3 Requirements

Number of the relevant subclause of this European Standard	Item	Required by this European Standard	Result
5.1.1	**Mass** (kg)		
5.1.2	**Torque** (N·m)		
5.3.2	**Sensitivity to heat** (°C)		
5.3.3	**Sensitivity to frost** (°C)		
5.3.4	**Effective throw** (m) **at p_R (5 bar)** — with water (except type M) — with foam concentrate		

B.4 Optional extra data (no requirement)

Ageing test	**Corrosion test**	

B.5 Data certified by*:

……

Annex C
(informative)

Example of completed datasheet for hand-held foam branchpipes

C.1 General

NOTE The symbol * means "where applicable" in the whole datasheet.

C.2 General data

Manufacturer	**COMPAGNIE-XYZ**
Type	**S 4**
Flowrate (l/min) **at p_R (5 bar)**	**400 l/min**

C.3 Requirements

Number of the relevant subclause of this European Standard	Item	Required by this European Standard	Test result
5.1.1	**Mass** (kg)	< 5,0	3,6
5.1.2	**Torque** (N·m)	< 20	12
5.3.2	**Sensitivity to heat** (°C)	≥ + 55	60
5.3.3	**Sensitivity to frost** (°C)	≤ −15	- 15
5.3.4	**Effective throw** (m) **at p_R (5 bar)**		
	— with water (except type M)	> 25	38
	— with foam concentrate	> 20	30

C.4 Optional extra data (no requirement)

Ageing test	**Corrosion test**	—

C.5 Data certified by*:

……

Bibliography

[1] EN 1568-3:2008, *Fire extinguishing media — Foam concentrates — Part 3: Specification for low expansion foam concentrates for surface application to water-immiscible liquids*

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