

# Portable equipment for projecting extinguishing agents supplied by fire fighting pumps — Portable monitors

Part 2: Water nozzles

ICS 13.220.10

## National foreword

This British Standard is the UK implementation of EN 15767-2:2009.

The UK participation in its preparation was entrusted to Technical Committee FSH/17/8, Hydrants, hoses and associated water delivery 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 monitors - Part 2: Water  
nozzles

Équipement portable de projection d'agents d'extinction  
alimenté par des pompes à usage incendie - Lances-canon  
portables - Partie 2 : Diffuseurs à eau

Tragbare Geräte zum Ausbringen von Löschmitteln, welche  
mit Feuerlöschpumpen gefördert werden - Tragbare Werfer  
- Teil 2: Wasserdüsen

This European Standard was approved by CEN on 23 April 2009.

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## Foreword

This document (EN 15767-2:2009) has been prepared by Technical Committee CEN/TC 192 "Fire 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of an identical text or by endorsement, at the latest by December 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

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EN 15767 consists of the following parts, under the general title *Portable equipment for projecting extinguishing agents supplied by fire fighting pumps — Portable monitors*:

Part 1: General requirements for portable monitor assemblies;

Part 2: Water nozzles;

Part 3: Foam devices<sup>1)</sup>.

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1) Under preparation.

## 1 Scope

**1.1** In addition to the requirements given in EN 15767-1, this European Standard is applicable to water nozzles, including water with fire extinguishing additives. It specifies requirements for safety, performance, classification and designation, as well as test methods, instructions for use and maintenance and marking.

**1.2** This European Standard is not applicable to water nozzles that are manufactured before its date of publication.

## 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 15767-1:2009, *Portable equipment for projecting extinguishing agents supplied by fire fighting pumps — Portable monitors — Part 1: General requirements for portable monitor assemblies*

## 3 Terms and definitions

For the purposes of this European Standard, the terms and definitions of EN 15767-1:2009 and the following apply.

### 3.1

#### **water nozzle**

component, without shut-off function, connected to the outlet of the monitor that controls the water stream (shape and quantity)

NOTE Several types of water nozzles are described in 3.1.1, 3.1.2 and 3.1.3.

#### 3.1.1

##### **smooth bore water nozzle**

nozzle providing a solid water stream

#### 3.1.2

##### **flat spray water nozzle**

nozzle providing a flat spray water stream

#### 3.1.3

##### **combination water nozzle**

nozzle with a adjustable pattern, corresponding to the following definitions

##### 3.1.3.1

###### **combination water nozzle – type 1**

nozzle with adjustable pattern at variable flow

NOTE Changing the pattern changes the flow.

##### 3.1.3.2

###### **combination water nozzle – type 2**

nozzle with adjustable pattern at constant flow

NOTE Changing the pattern does not change the flow.



### 3.1.3.3

#### **combination water nozzle – type 3**

nozzle with adjustable pattern at selectable, constant flow

NOTE Changing the pattern does not change the flow.

### 3.1.3.4

#### **combination water nozzle – type 4 (automatic water nozzle)**

nozzle with integrated pressure control device

NOTE Changing the pattern does not change the flow.

#### 3.1.3.4.1

##### **combination water nozzle – type 4.1**

nozzle with adjustable pattern at constant pressure

#### 3.1.3.4.2

##### **combination water nozzle – type 4.2**

nozzle with adjustable pattern and selectable flow at constant pressure

## 3.2

### **median pressure**

$P_m$

for automatic water nozzle, average pressure of the pressure control range

## 3.3

### **jet**

#### 3.3.1

##### **straight jet**

jet having the maximum throw and mechanical effect

#### 3.3.2

##### **spray jet**

any jet different to the straight jet

[EN 15182-1:2007]

## 3.4

### **flush**

position allowing the water nozzle to clear debris

## 3.5

### **manufacturer's stated maximum flow**

$Q_{max}$

flow under which the water nozzle can be operated safely and efficiently

## 4 Requirements

### 4.1 Mechanical characteristics

#### 4.1.1 Mass

The water nozzle shall have a maximum mass as defined in Table 1.



**Table 1 — Maximum mass**

$Q_{\max}$ l/min	Maximum mass of the water nozzle kg
< 2 000	4
2 000 - 4 000	8
4 000 – 8 000	12
> 8 000	20
NOTE The maximum mass does not apply to seawater-resistant nozzles.	

#### 4.1.2 Operating and handling elements

The torques needed to move the operating elements shall not exceed the values given in Table 2 at pressures up to the nominal pressure.

**Table 2 — Maximum torques**

Type of operating element	Torque N·m
Lever	20
Valve handle	15
Rotating operating elements	15

#### 4.1.3 Flow adjustment positions

The settings of the water nozzle equipped with selectable flowrate shall be easily identifiable by visual means.

#### 4.1.4 Jet adjustment positions

The different jet positions of a nozzle equipped with adjustable jet positions shall be clearly marked.

### 4.2 Materials

The materials used shall be selected in such a way that all the requirements in Clause 4 are met, subject to the tests defined in Clause 5.

The water nozzle shall pass the heat and frost tests defined in 5.3.

### 4.3 Flush

**4.3.1** The combination nozzle with  $Q_{\max}$  less than 2 000 l/min, when tested in accordance with 5.4, shall be able to clear or flush a steel ball of 6,35 mm diameter without shutting off the nozzle.

NOTE This should be accomplished either through the full open nozzle position or through a flush feature of the nozzle. In nozzles with flowrate over 2 000 l, blockage due to debris is not likely because of the larger opening of the nozzle.

**4.3.2** Water nozzles equipped with a flush feature shall have a mechanical and/or visual device to indicate to the user when the flush feature is being engaged.

## 4.4 Hydraulic characteristics

### 4.4.1 Pressures

The following pressures, measured at the nozzle inlet, shall be used for the determination of the hydraulic characteristics:

reference pressure:  $p_R = 6 \text{ bar} \pm 0,1 \text{ bar}$ ;

median pressure for automatic water nozzle:  $p_m$ ;

nominal pressure:  $p_N = 16 \text{ bar}$ ;

test pressure:  $p_t = 25,5 \text{ bar}$ .

### 4.4.2 Flowrates

All flowrates indicated on the nozzle shall be measured at straight jet and at the maximum spray angle position at the reference pressure  $p_R$ .

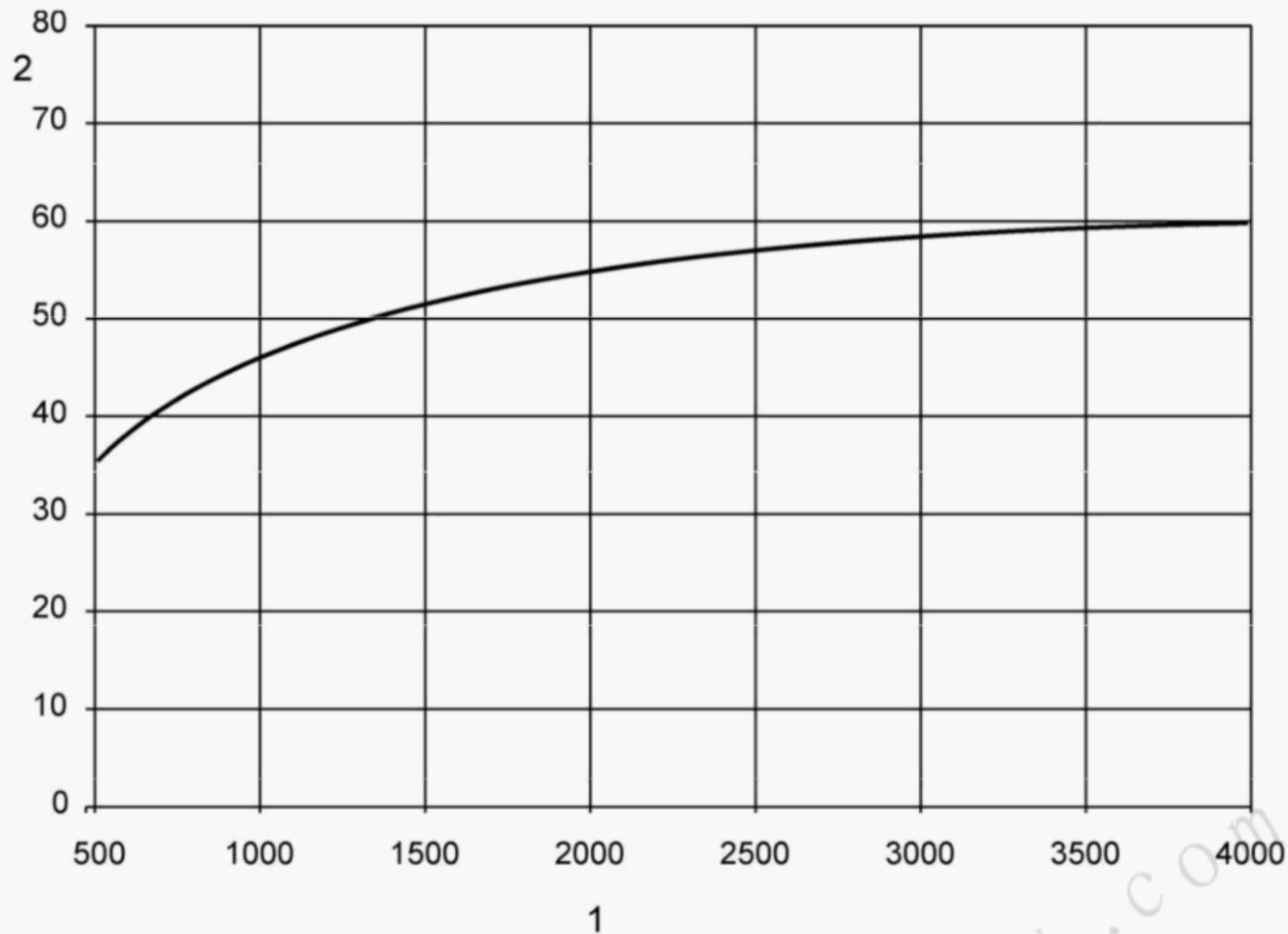
The flowrates measured at the reference pressure  $p_R$  shall not deviate by more than  $- 0/+ 10 \%$  of the flowrate setting of the nozzle.

NOTE The deviation should also apply when the shape of the stream is altered.

### 4.4.3 Effective throw

The water nozzle shall achieve, for each flowrate position above 500 l/min, a minimum effective throw  $d_{\text{eff}}$  as shown in Figure 1, when set to a straight jet at the reference pressure.

For water nozzles above 4 000 l/min, the minimum effective throw shall be at least 60 metres.



**Key**

- 1 Flowrate Q in litres per minute
- 2 Effective throw  $d_{\text{eff}}$  in metres

**Figure 1 — Effective throw**

**4.4.4 Spray jet**

The spray jet shall have a spray angle of at least 100°.

**4.4.5 Automatic water nozzles**

For automatic water nozzles, the regulation range (pressure at the beginning of the range and pressure at the end of the range) shall be stated in the documentation accompanying the product, from which the median pressure is calculated.

The flow should be set at both the minimum and maximum flow and the pressure for each shall be read.

This pressure shall not deviate from the median pressure by more than 30 %.

**4.5 Leak-tightness**

The nozzle shall show no leakage during 1 min at the reference pressure  $p_R = 6$  bar.

NOTE No leakage means no visible weeping or drop formation from the body of the nozzle.

## 5 Testing and verification

### 5.1 General

All tests shall be done with water only.

Unless otherwise specified, tests shall be carried out at the reference pressure  $p_R$ , in the following order.

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

### 5.2 Jet spray angle measurement

Arrange the water nozzle on a fixed support in a horizontal position 1,5 m above the ground, in a zone where the wind speed is lower than 2 m/s.

Arrange a rule perpendicular to the flow at a distance of 1 m. This rule shall be marked in order to determine the spray angle.

### 5.3 Heat and frost test

#### 5.3.1 Sensitivity to heat

It shall be possible to use the water nozzle without restricting its function after it has been stored for 24 h at  $(55 \pm 2) ^\circ\text{C}$ .

NOTE Hand protection should be used when carrying out this test.

#### 5.3.2 Sensitivity to frost

The water nozzle 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  $(- 15 \pm 2) ^\circ\text{C}$  for 30 min. Following this, it shall still be possible to move the operating elements manually.

NOTE Hand protection is recommended.

### 5.4 Flushing

The combination nozzle shall be held in the vertical position, discharge end down.

The steel ball shall pass through the nozzle.

### 5.5 Flow and throw test

The effective throw shall be measured under the following conditions, in accordance with Figure 2:

effective throw (in metre): furthest droplets - 10 % =  $d_{\text{eff}} = 0,9 d_{\text{max}}$ ;

pressure at the inlet of the nozzle:  $p_R = 6$  bar;

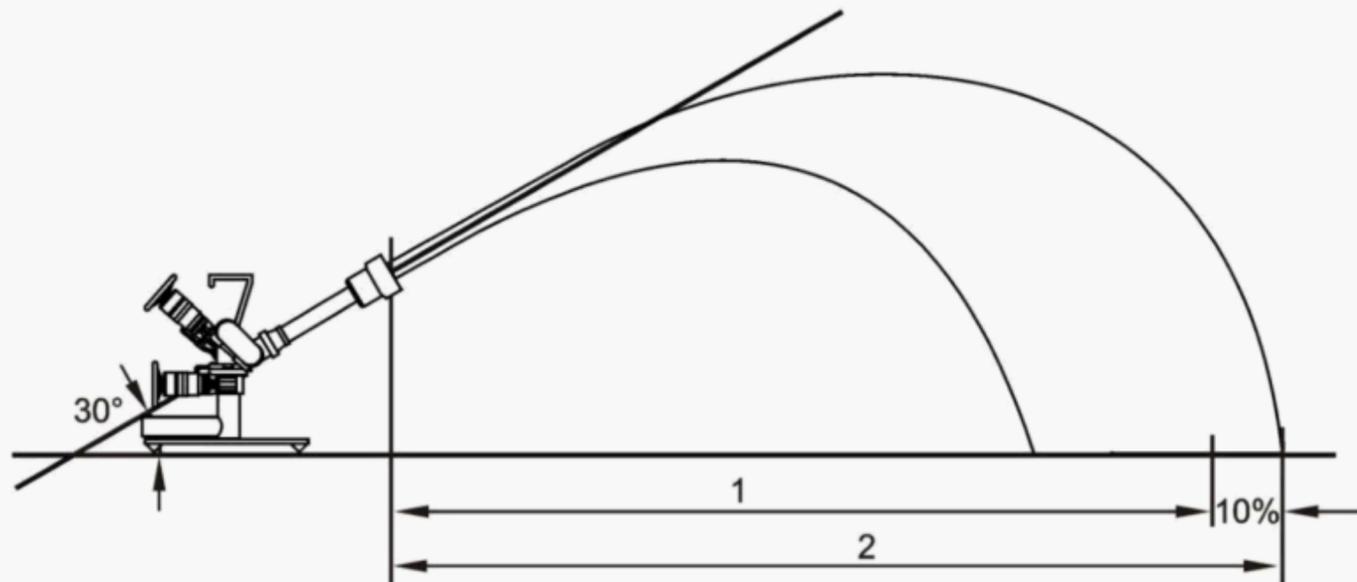
inclination:  $(30 \pm 0,5)^\circ$ ;

height: the outlet of the nozzle shall be no more than 1 m from the ground;

maximum wind speed: 2 m/s (Beaufort scale 3).

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

The maximum effective throw shall be given in the instruction handbook.



### Key

- 1 Effective throw ( $d_{\text{eff}}$ )
- 2 Maximum throw ( $d_{\text{max}}$ )

Figure 2 — Measurement of the effective throw

## 5.6 Leak-tightness test

The leak test shall be conducted in accordance with 4.5.

## 6 Information for use

### 6.1 Instruction and maintenance handbook

#### 6.1.1 General

Each water nozzle shall be delivered with an instruction and maintenance handbook.

NOTE 1 These instructions may be combined with those for the portable monitor body.

NOTE 2 This handbook should be made available, if required by the user, in a digital format.

#### 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:

- maintenance instructions;
- sectional or exploded diagram;
- spare parts list cross-referenced to diagram.

### 6.2 Marking

Water nozzles shall be permanently marked with at least the following information:

- identification of the manufacturer;
- serial or batch number and/or year of manufacture;
- reference to this standard;
- type of water nozzle;
- type of spray;
- $Q_{max}$ ;
- $P_N$ ;
- $p_M$  (for type 4 nozzles);
- jet adjustment directions or positions, where applicable;
- flush position, where applicable;
- various flow positions, where applicable.

## **Annex A**

(informative)

### **Acceptance test on delivery**

Acceptance tests based on the safety and performance requirements of this part of this European Standard may be undertaken on delivery by the customer, by an independent or national testing organisation 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 water nozzle specification has been met by visual and functional inspection or test;

confirmation that the required water nozzle documentation, as specified in the standard, is available;

confirmation that the performance and specification of the water nozzle meet the requirements of the standard.

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## Annex B (normative)

### Datasheet for water nozzles

#### 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 Standard.

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

#### B.2 General data

<b>Manufacturer</b>	
<b>Model</b>	
<b>Type according to EN 15767-2, 3.1.3</b>	
<b>Maximum flowrate (l/min) <math>Q_{max}</math></b>	
<b>Flowrate settings*</b>	
<b>Type of spray*</b>	

#### B.3 Flow – pressure chart

In the charts (see Figures B.3 and B.4), the cone spray types shall be represented by the symbols (or combinations of the symbols) as shown in Figure B.1, where applicable, and the throw shall be represented by the symbols as shown in Figure B.2.



**Key**

- 1 hollow cone spray
- 2 full cone spray
- 3 hollow/full cone spray alternatively
- 4 hollow cone spray combined with narrow spray jet
- 5 hollow cone spray combined with full jet

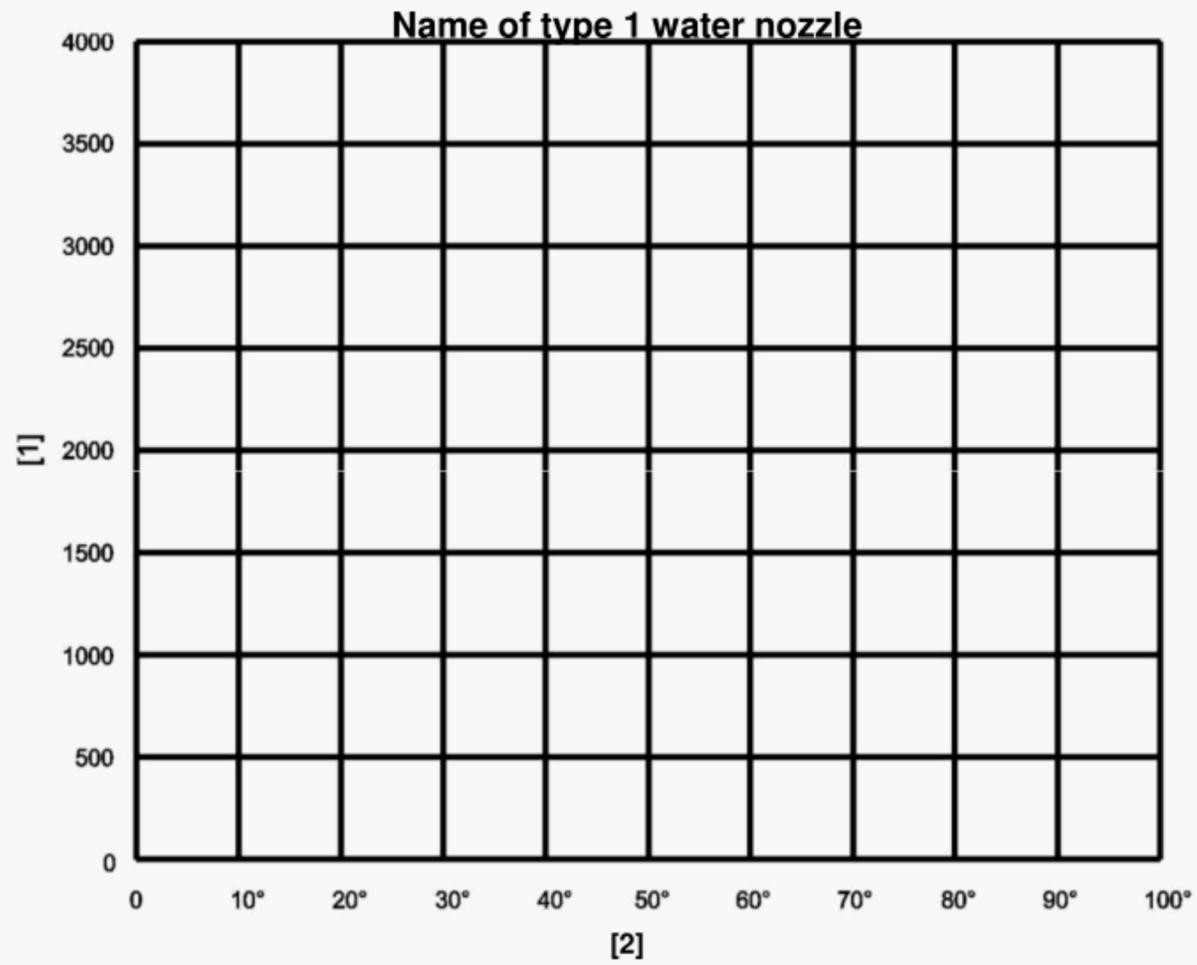
**Figure B.1 — Symbols for spray types**



**Key**

- 1 Full Jet: Throw [m] (using a straight line)
- 2 Maximum Spray Jet: Throw [m] (using a dotted line)
- NN throw (metres)

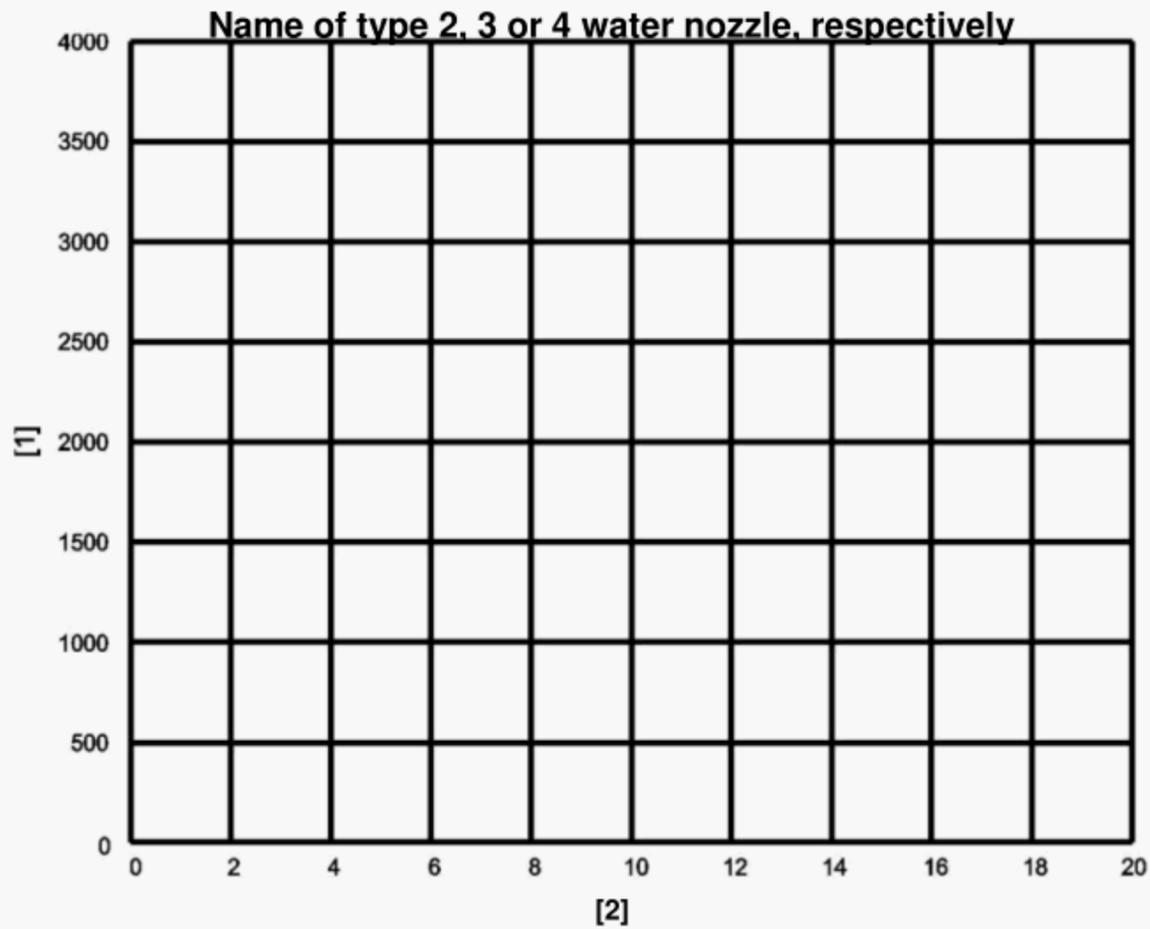
**Figure B.2 — Symbols for throw at spray types**



**Key**

- 1 Flow [l/min]
- 2 Angle of rotation [degrees]

**Figure B.3 — Flow chart template for type 1 water nozzle at  $p_R$ , as specified in EN 15767-2**



**Key**

- 1 Flow [l/min]
- 2 Pressure [bar]

**Figure B.4 — Pressure chart template for water nozzles as specified in EN 15767-2, types 2, 3 and 4 and at minimum and maximum flow settings\***

**B.4 Operational devices**

<b>Fitting system</b>	
<b>Jet / spray system*</b>	
<b>Flow adjustment system*</b>	

## B.5 Requirements

Number of the relevant clause of this part of this Standard	Item	Minimum required	Test result
4.1.1	Maximum mass (kg)		
4.1.2	Maximum torques (N·m)	Rotating elements	
		Valve handle	
		Lever	
4.2	Sensitivity to heat (°C)		
	Sensitivity to frost (°C)		
4.3	Non-obstruction test* (mm)		
4.4.3	Effective throw (m)		
4.4.4	Maximum spray jet*: angle		

## B.6 Optional extra data (no requirements)

Ageing test	UV test	
	Ozone test	
	Corrosion test	

## B.7 Data certified by \*

**Annex C**  
 (informative)

**Example of completed datasheet for water nozzles**

NOTE 1 The symbol \* means "where applicable" in the whole datasheet.

**C.1 General data**

<b>Manufacturer</b>	<b>FED</b>
<b>Model</b>	<b>Nozzle-flow</b>
<b>Type according to EN 15767-2 3.1.3</b>	<b>EN 15767-2, combination water nozzle type 2</b>
<b>Maximum flowrate (l/min) <math>Q_{max}</math></b>	<b>3 000 l/min</b>
<b>Flowrate settings*</b>	<b>None</b>
<b>Type of spray*</b>	<b>Full cone</b>

**C.2 Flow – pressure chart**

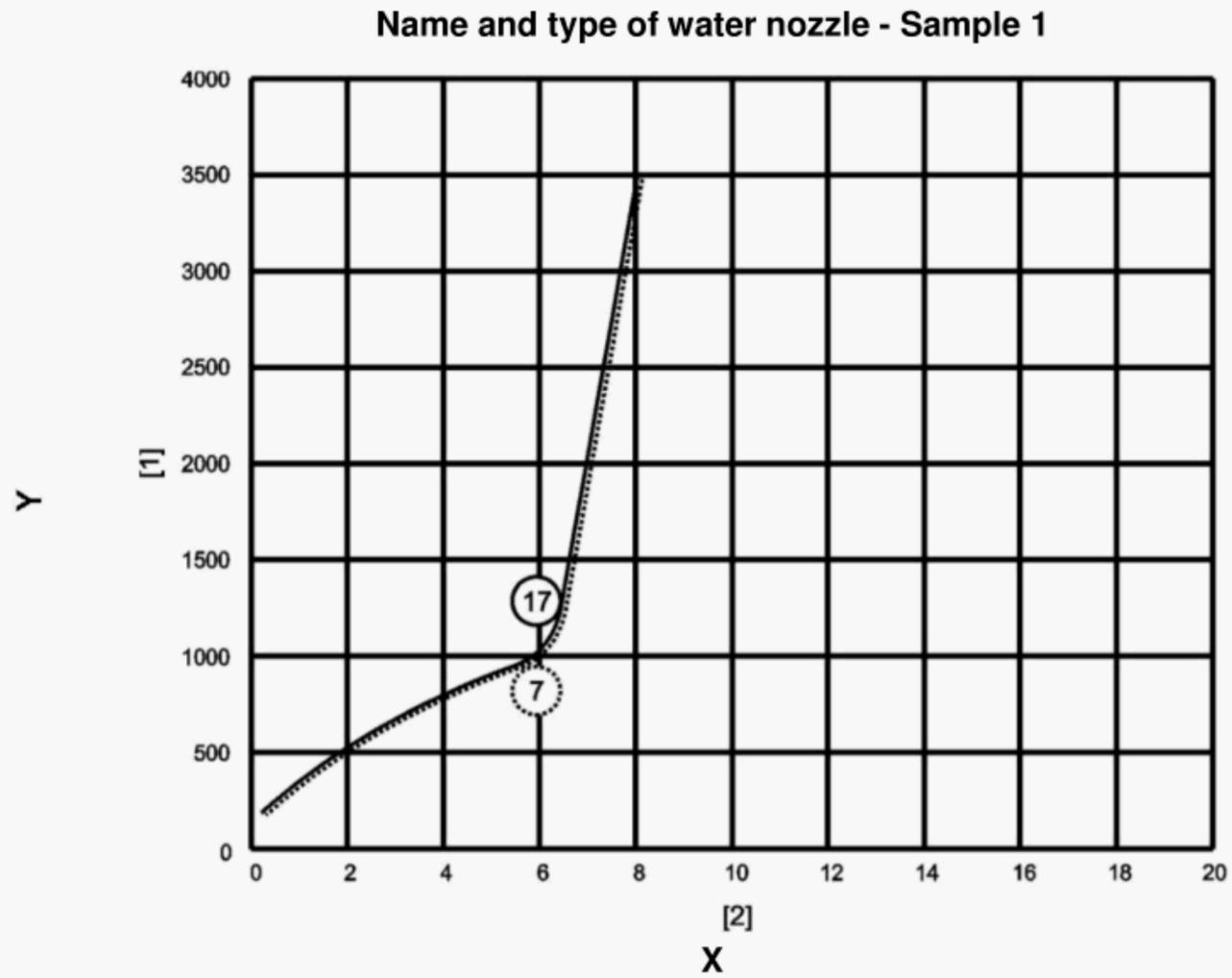
In the charts (see Figures C.2 and C.3), the cone spray types shall be represented by the symbols (or combinations of the symbols) as shown in Figure C.1, where applicable.



**Key**

- 1 hollow cone spray
- 2 full cone spray
- 3 hollow/full cone spray alternatively
- 4 hollow cone spray combined with narrow spray jet
- 5 hollow cone spray combined with full jet

**Figure C.1 — Symbols for spray types**



**Key**

X Pressure [bar]  
Y Flow [l/min]

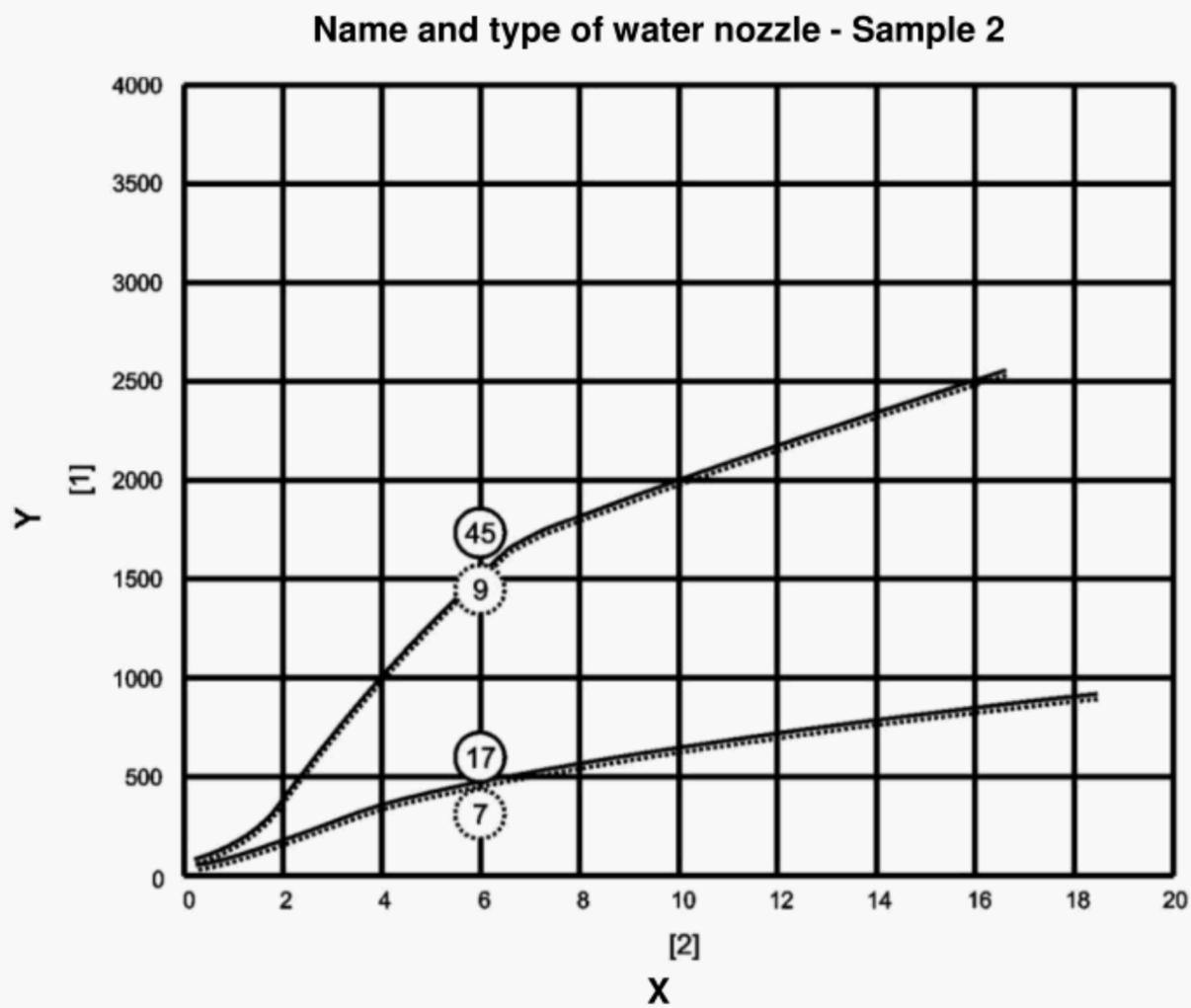


Full Jet: Throw [m] (using a straight line)



Maximum Spray Jet: Throw [m] (using a dotted line)

**Figure C.2 — Pressure chart template (sample 1) for type 4 water nozzle, as specified in EN 15767-2**



**Key**

X Pressure [bar]  
 Y Flow [l/min]

 Full Jet: Throw [m] (using a straight line)

 Maximum Spray Jet: Throw [m] (using a dotted line)

**Figure C.3 — Pressure chart template (sample 2) for water nozzles as specified in EN 15767-2, type 2 at minimum and maximum flow settings**

**C.3 Operational devices**

<b>Fitting system</b>	Swivelling 2 ½ BSP thread (male, according to EN ISO 228-1 [1] and -2 [2])
<b>Jet / spray system*</b>	Rotating elements
<b>Flow adjustment system*</b>	No

## C.4 Requirements

Number of the relevant clause of this part of this		required	Test result
	Item	Minimum	
<b>Standard</b>			
4.1.1	<b>Maximum mass (kg)</b>	< 4,0	3,5
	<b>Rotating elements</b>	15	12
4.1.2	<b>Maximum torques (N·m)</b>		
	<b>Valve handle</b>	15	10
	<b>Lever</b>	20	16
4.2	<b>Sensitivity to heat (°C)</b>	≥ + 55	60
	<b>Sensitivity to frost (°C)</b>	≤ - 15	- 15
4.3	<b>Non-obstruction test* (mm)</b>	-	-
4.4.3	<b>Effective throw (m)</b>	> 58	60
4.4.4	<b>Maximum spray jet*: angle</b>	> 100	110

<b>C.5 Optional extra data (no requirements)</b>		
	<b>UV test</b>	

Ageing test

Ozone test

Corrosion test

## C.6 Data certified by \*



## Bibliography

- [1] EN ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1:2000)*
- [2] EN ISO 228-2, *Pipe threads where pressure-tight joints are not made on the threads — Part 2: Verification by means of limit gauges (ISO 228-2:1987)*
- [3] EN 15182-1:2007, *Hand-held branchpipes for fire service use — Part 1: Common requirements*



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