BS EN 1866-3:2013

BSI Standards Publication

Mobile fire extinguishers

Part 3: Requirements for the assembly, construction and pressure resistance of CO_2 extinguishers which comply with the requirements of EN 1866-1

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National foreword

This British Standard is the UK implementation of EN 1866-3:2013. Together with BS EN 1866-1:2007 and BS EN 1866-2 it supersedes BS EN 1866:2005, which will be withdrawn upon publication of BS EN 1866-2.

The UK participation in its preparation was entrusted to Technical Committee FSH/2, Fire extinguishers.

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

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Mobile fire extinguishers - Part 3: Requirements for the assembly, construction and pressure resistance of CO_2 extinguishers which comply with the requirements of EN 1866-1

Extincteurs d'incendie mobiles - Partie 3: Exigences relatives au montage, à la construction et à la résistance à la pression des extincteurs au dioxyde de carbone conformes aux exigences de l'EN 1866-1

Fahrbare Feuerlöscher - Teil 3: Anforderungen an die Herstellung, konstruktive Ausführung und Druckfestigkeit von Kohlendioxid-Feuerlöschern, die den Anforderungen von EN 1866-1 entsprechen

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Contents

Page

Foreword

This document (EN 1866-3:2013) has been prepared by Technical Committee CEN/TC 70 “Manual means of fire fighting equipment”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by November 2013, and conflicting national standards shall be withdrawn at the latest by November 2013.

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.

This document, together with EN 1866-1 and EN 1866-2, supersedes EN 1866:2005.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

This standard EN 1866 consists of the following parts under the general title, *Mobile fire extinguishers*:

— *Part 1: Characteristics, performance and test methods*

— *Part 2: Requirements for the construction, pressure resistance and mechanical tests for extinguishers, with a maximum allowable pressure equal to or lower than 30 bar, which comply with the requirements of EN 1866-1*

— *Part 3: Requirements for the assembly, construction and pressure resistance of CO_2 extinguishers which comply with the requirements of EN 1866-1*

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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.

1 Scope

This European Standard specifies the rules of design, assembling, testing and inspection during manufacturing of mobile CO_2 fire extinguishers, which comply with the requirements of EN 1866-1, as far as pressure resistance is concerned.

NOTE 1 Design is limited to design of the assembly.

NOTE 2 The classification of the different parts forming the assembly is given in Annex A.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1866-1, *Mobile fire extinguishers — Part 1: Characteristics, performance and test methods*

EN ISO 4126-2, *Safety devices for protection against excessive pressure — Part 2: Bursting disc safety devices (ISO 4126-2)*

EN ISO 10297, *Transportable gas cylinders — Cylinder valves — Specification and type testing (ISO 10297)*

EN ISO 11363-1, *Gas cylinders — 17E and 25E taper threads for connection of valves to gas cylinders — Part 1: Specifications (ISO 11363-1)*

EN ISO 15245-1, *Gas cylinders — Parallel threads for connection of valves to gas cylinders — Part 1: Specification (ISO 15245-1)*

3 Terms and definitions

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

3.1
mobile fire extinguisher
portable fire extinguisher with a total mass > 20 kg, fitted with wheels to enable the user to manually move and operate the extinguisher

3.2
pressure at maximum operating temperature
pressure experimentally measured
P_{Tmax}
pressure measured in the extinguisher after stabilisation during at least 24 h at maximum operating temperature T_{max} (≥ 60 °C)

3.3
maximum allowable pressure
maximum declared pressure
PS
maximum pressure for which the equipment is designed, as specified by the manufacturer and which is in any case greater than or equal to P_{Tmax}

3.4
cylinder valve
component subject to the internal pressure and used to close off and seal the cylinder

3.5
cylinder subassembly
subassembly consisting of a cylinder and a cylinder valve with integrated bursting disc

3.6
fire extinguisher assembly
an assembly of the cylinder subassembly or subassemblies, manifold, if required, hose and discharge valve

3.7
discharge valve
valve fitted at the end of the discharge hose, intended to regulate or temporarily stop the discharge of extinguishing agent

3.8
bursting pressure
P_r
maximum pressure measured during a bursting test

3.9
$\boldsymbol{T_{max}}$
maximum operating temperature declared by the manufacturer

3.10
$\boldsymbol{T_{min}}$
minimum operating temperature declared by the manufacturer

4 Symbols and abbreviated terms

For the purposes of this document, the following symbols and abbreviated terms apply:

PS maximum allowable pressure in bars

PT test pressure in bars

P_r bursting pressure in bars

T_{max} maximum operating temperature, in °C

P_{Tmax} pressure at maximum operating temperature, in bars

T_{min} minimum operating temperature, in °C

5 Materials

Non-metallic materials are not permitted by this standard for:

— bodies;

— bodies of cylinder valves;

— bodies of operating valves;

— hose couplings.

Materials of components that may be in contact with the contents shall be compatible with both the contents and the material of other components.

6 Design

6.1 General

6.1.1 Introduction

A wheeled CO_2 extinguisher is an assembly of the following pressure parts:

— extinguishing agent cylinder subassembly or subassemblies with cylinder and cylinder valve;

— hose assembly and attached components.

It is important that the cylinder subassembly should fulfil the requirements of the Transportable Pressure Equipment Directive and bear the PI-marking.

6.1.2 Filling ratio

There is a relationship between the filling ratio, the maximum allowable pressure and the maximum allowable temperature depending on the pressure-temperature curves of carbon dioxide. Commonly used filling ratios are 0,667, 0,675 and 0,750. For these filling ratios, the corresponding pressures at 60 °C (P_{Tmax}) are shown in Annex D.

The maximum allowable pressure PS of the extinguisher assembly shall be equal to or higher than P_{Tmax} and shall not exceed the maximum allowable pressure PS of any component of the extinguisher assembly.

6.2 Cylinder subassembly

6.2.1 Cylinder

6.2.1.1 It is important that cylinders should fulfil the requirements of the Directive 2010/35/EU (TPED) and bear the PI-marking.

6.2.1.2 Cylinders shall be suitable for the chosen filling ratio.

6.2.1.3 The thread of the cylinder shall be corresponding with the thread of the cylinder valve. This thread shall be in accordance with the thread code as indicated in Annex B and shall be marked on the cylinder.

6.2.2 Cylinder valve

6.2.2.1 It is important that cylinder valves should fulfil the requirements of the Directive 2010/35/EU (TPED) and bear the PI-marking.

6.2.2.2 Cylinder valves shall be submitted to the impact test in accordance with EN ISO 10297.

6.2.2.3 The thread of the cylinder valve shall be corresponding with the thread of the cylinder. This thread shall be in accordance with the thread code as indicated in Annex B and shall be marked on the valve.

6.2.2.4 The cylinder valve shall be fitted with an integrated bursting disc device to provide a controlled discharge of the contents of the extinguisher in case of overfilling and/or excessive ambient temperatures, e.g in case of a fire. The bursting disc device shall comply with EN ISO 4126-2.

6.3 Hose assembly and attached components

6.3.1 Requirements

The hose assembly and attached components shall function throughout the operating temperature range, and coupling systems shall be designed and fitted in such a way that they cannot damage the hose.

6.3.2 Prototype testing

When tested in accordance with Annex C, the bursting pressure P_r of the hose shall conform to:

— three times the maximum allowable pressure PS, the test being carried out at (20 ± 5) °C, and;

— twice $P(T_{max})$, the test being carried out at (T_{max} ± 2) °C and at (T_{min} ± 2) °C.

7 Assembling and marking

7.1 General requirements

The manufacturer shall ensure that they have available the manufacturing means and processes suitable for the assembly of the extinguisher in accordance with this standard.

The manufacturer shall ensure that the materials and components used in the fabrication of the body are free from any defect likely to impair the safe use of the extinguisher.

The compatibility between the thread of the cylinder and the thread of the cylinder valve shall be checked.

The manufacturer's declared torque between the cylinder valve and the cylinder and the valve and the bursting disc device shall be utilised.

Manufacturing processes shall be defined and controlled and shall not adversely affect the materials and components of the extinguisher.

7.2 Traceability

7.2.1 Pressure retaining parts

The identification and the control of the materials for all pressure retaining parts shall be such as to ensure that the materials used in manufacture meet the specification of the design.

Adequate procedures internal to the manufacturer, such as batch control, shall be applied.

7.2.2 Cylinder valves and hose assemblies

The cylinder valves and hose assemblies, which are or may be subjected to pressure during normal use, shall be indelibly marked to permit subsequent identification and traceability.

The thread code shall be marked on the cylinder valve according to Annex B.

7.2.3 Marking

7.2.3.1 Cylinder valve

The cylinder valve shall be marked with:

— the thread code according to Annex B;

— PI mark including applicable associated markings.

7.2.3.2 Cylinder

The cylinder shall be marked with:

— the thread code according to Annex B;

— PI mark including applicable associated markings.

7.2.3.3 Extinguisher assembly

The extinguisher assembly shall be marked with:

— mark of the extinguisher manufacturer as registered, for identification;

— serial or batch number of the extinguisher;

— year of manufacture of the extinguisher, represented by four digits, e.g. 2013;

— tare in kg, including permanently attached accessories (necessary for refilling);

— maximum filling mass – kg;

— contained gas;

— operating temperature range of the extinguisher assembly (T_{min}/T_{max});

— maximum allowable pressure PS.

The markings specified above shall be permanently marked.

NOTE Marking requirements for the complete extinguisher are specified in EN 1866-1.

7.3 Inspection and testing

7.3.1 Cylinders and valves

Prior to assembly, it is important that the manufacturer should ensure that the cylinders and cylinder valves have fulfilled the requirements of the Directive 2010/35/EU (TPED) and bear the PI marking. The manufacturer shall keep record of all relevant certificates.

The cylinders and valves shall be pressure tested prior to assembly, because a hydrostatic test after assembly would be harmful.

7.3.2 Hose assemblies

Prior to assembly, the manufacturer shall ensure that the hose assemblies have been tested for resistance to test pressure.

The hydrostatic test pressure PT shall not be less than 1,43 times the allowable pressure PS. The test pressure shall be maintained for a minimum of 30 s; no leakage or permanent deformation shall occur.

The manufacturer shall keep record of all test certificates.

7.3.3 Final inspection

The content of the extinguisher shall be checked by weighing to ensure it is filled in accordance with the filling tolerances specified in EN 1866-1 and in the approved design of the extinguisher.

After complete assembly of the mobile extinguisher, a final inspection shall be carried out to ensure that all parts comply with the approved design of the extinguisher and manufacturing records and that the assembly was carried out correctly.

Annex A
(informative)

Classification of the different parts of an extinguisher subject to internal pressure

In the framework of "Pressure Equipment Directive" the different parts under pressure forming the assembly of an extinguisher can be classified as indicated in Table A.1.

Table A.1 — Classification

Part	Type of equipment	Category	Table from Annex II
Hose	Piping	Art. 3 § 3 or category I in function of DN	Table 7
Hose assembly and attached components	Pressure accessory	Art. 3 § 3 or category I in function of DN	Table 7
Discharge valve	Pressure accessory	Art. 3 § 3 or category I in function of DN	Table 7

Annex B
(normative)

Thread sizes for cylinder and valves of mobile CO_2 extinguishers

NOTE See 7.2.3.

Table B.1 — Thread code

Thread code	M25	25E
Standard	EN ISO 15245-1	EN ISO 11363-1

The thread code shall be stamped, engraved or embossed on the cylinder and the valves.

Annex C
(normative)

Test for burst pressure of hose assembly with attached components

NOTE See 6.3.

Where testing is to be carried out at a temperature other than 20 °C, condition the hose and attached components at the relevant temperature for a period of between 12 h and 24 h.

The hose and attached components shall be fitted to a means of providing the required pressure and the open end blanked off by suitable means.

Increase the pressure in the hose and attached components to the minimum applicable value as specified in 6.3.2 in a time of not less than 30 s and maintain the pressure for a further 30 s. If the hose and attached components do not burst, increase the pressure until the hose and/or attached components do burst and record the pressure at which it occurs.

Annex D
(informative)

Filling ratios and pressures for CO_2

NOTE See 6.1.2.

Table D.1 — Filling ratios and pressures

Filling Ratio kg/l	T_{max} °C	P_{Tmax} Bar
0,667	60	169,3
0,675	60	173,8
0,750	60	216,1

Annex ZA
(informative)

Relationship between this European Standard and the essential requirements of EU Directive 97/23/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 97/23/CE.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Directive 97/23/EC

Clauses in EN 1866-3	Essential requirements of Directive 97/23/EC	Qualifying remarks/Notes
6.1, 6.2, 6.3	2.8	Assemblies
6.1, 6.2.1.2, 6.2.1.3, 6.2.2.2, 6.2.2.3, 6.3	2.3	Safe handling and operation
7.2	3.1.5	Traceability
7.3	3.2.1	Final inspection
7.3.2	3.2.2	Proof test
7.2	3.3a	Marking and labelling
7.3.2	7.4	Hydrostatic test pressure

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Bibliography

[1] Directive 2010/35/EU of the European Parliament and of the Council of 16 June 2010 on transportable pressure equipment (TPED) and repealing Council Directives 76/767/EEC, 84/525/EEC, 84/526/EEC, 84/527/EEC and 1999/36/EC

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