

SLOVENSKI STANDARD

SIST EN 1866-2:2014

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Nadomešča:
SIST EN 1866:2006

Prevozni gasilniki - 2. del: Zahteve za konstrukcijo, tlačno odpornost in mehanski preskusi za gasilnike, katerih največji dovoljeni tlak je enak ali nižji od 30 barov, v skladu z zahtevami standarda EN 1866-1

Mobile fire extinguishers - 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

Fahrbare Feuerlöscher - Teil 2: Anforderungen an die konstruktive Ausführung, Druckfestigkeit und mechanischen Prüfungen für Feuerlöscher mit einem Höchstdruck kleiner gleich 30 bar, die den Anforderungen von EN 1866-1 entsprechen

Extincteurs d'incendie mobiles - Partie 2 : Exigences sur la construction, la résistance à la pression et les essais mécaniques des extincteurs conformes aux exigences de l'EN 1866-1, dont la pression maximale admissible est inférieure ou égale à 30 bar

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EUROPEAN STANDARD

EN 1866-2

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Mobile fire extinguishers - 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

Extincteurs d'incendie mobiles - Partie 2: Exigences pour la construction, la résistance à la pression et les essais mécaniques des extincteurs conformes aux exigences de l'EN 1866-1, dont la pression maximale admissible est inférieure ou égale à 30 bar

Fahrbare Feuerlöscher - Teil 2: Anforderungen an die konstruktive Ausführung, Druckfestigkeit und mechanischen Prüfungen für Feuerlöscher mit einem Höchstdruck kleiner gleich 30 bar, die den Anforderungen von EN 1866-1 entsprechen

This European Standard was approved by CEN on 20 March 2014.

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Foreword

This document (EN 1866-2:2014) 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of an identical text or by endorsement, at the latest by November 2014 and conflicting national standards shall be withdrawn at the latest by November 2014.

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, with EN 1866-1 and EN 1866-3, 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 97/23/EC.

For relationship with EU Directive 97/23/EC, see informative Annex ZA, which is an integral part of this document.

This European 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 CO₂ extinguishers which comply with the requirements of EN 1866-1.*

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.

EN 1866-2:2014 (E)**1 Scope**

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

This part applies to mobile fire extinguishers of which the maximum allowable pressure PS is lower than or equal to 30 bar and containing non-explosive, non-flammable, non-toxic and non-oxidizing fluids or powder.

This European Standard does not apply to carbon dioxide fire extinguishers.

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 3-7:2004+A1:2007, *Portable fire extinguishers - Part 7: Characteristics, performance requirements and test methods*

EN 1866-1:2007, *Mobile fire extinguishers - Part 1: Characteristics, performance and test methods*

EN 10204:2004, *Metallic products - Types of inspection documents*

EN 13134, *Brazing - Procedure approval*

EN 13445-1, *Unfired pressure vessels - Part 1: General*

EN 13445-2, *Unfired pressure vessels - Part 2: Materials* 1866-2:2014

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EN 13445-3:2009, *Unfired pressure vessels - Part 3: Design* 1866-2:2014

EN 13445-4, *Unfired pressure vessels - Part 4: Fabrication*

EN 13445-5, *Unfired pressure vessels - Part 5: Inspection and testing*

EN ISO 9017, *Destructive tests on welds in metallic materials - Fracture test (ISO 9017)*

EN ISO 9606-1, *Qualification testing of welders - Fusion welding - Part 1: Steels (ISO 9606-1)*

EN ISO 9606-2, *Qualification test of welders - Fusion welding - Part 2: Aluminium and aluminium alloys (ISO 9606-2)*

EN ISO 4892-2, *Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps (ISO 4892-2)*

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

EN ISO 13585, *Brazing - Qualification test of brazers and brazing operators (ISO 13585)*

EN ISO 14732, *Welding personnel - Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials (ISO 14732)*

EN ISO 15609-1, *Specification and qualification of welding procedures for metallic materials - Welding procedure specification - Part 1: Arc welding (ISO 15609-1)*

EN ISO 15614-1, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1)*

EN ISO 15614-2, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 2: Arc welding of aluminium and its alloys (ISO 15614-2)*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1866-1:2007 and the following 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)

$P_{T_{max}}$

pressure measured in the extinguisher after stabilization during at least 24 h at maximum operating temperature T_{max} (≥ 60 °C); for cartridge operated extinguishers, the maximum pressure is the maximum pressure recorded for 0,5 s during a period of 3 min, excluding the first 5 s after release of the propellant gas

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 $P_{T_{max}}$

3.4

bursting pressure

P_r

maximum pressure measured during a bursting test

3.5

fittings

pressure accessories, including operating devices, filling caps, hose assemblies, pressure gauges and pressure indicators

3.6

T_{max}

maximum operating temperature declared by the manufacturer

3.7

T_{min}

minimum operating temperature declared by the manufacturer

4 Symbols and abbreviations

For the purposes of this standard, the following symbols and abbreviations apply:

PS maximum allowable pressure in bar

PT test pressure in bar

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D	nominal external diameter of the body, or the largest external value of the perpendicular section of the axis, in mm
P_r	bursting pressure in bar
T_{\max}	maximum operating temperature, in °C
$P_{T_{\max}}$	pressure at maximum operating temperature, in bar
T_{\min}	minimum operating temperature, in °C

5 Materials

All materials shall be suitable for the intended use and assemblies shall meet the requirements of EN 1866-1:2007, 7.2 Corrosion tests.

The materials used for pressure bearing parts shall be defined in a detailed specification which forms an integrated part of the design.

This specification shall contain at least detailed descriptions of:

- all raw materials used, including the normal production tolerances;
- the processes used, the process parameters and the normal admissible process tolerances;
- the relevant required material properties after processing.

The materials used for non-pressure bearing parts and accessories of extinguishers shall be compatible with the materials used for the pressure bearing parts.

Plastic components shall fulfil the clauses of Annex B except hoses, pistons and nozzles.

For the materials used in the type testing and type approval, inspection documents in accordance with Annex G shall be provided.

All materials used in the extinguisher assembly shall be compatible with all other components including extinguishing media. Particular attention shall be given to incompatibilities that may result in galvanic corrosion and stress corrosion.

6 Design and prototype testing**6.1 Calculation design method**

EN 13445-3:2009, Clause 7 contains recognized calculation methods. If a body of a mobile fire extinguisher is designed in accordance with these recognized calculation methods no burst pressure test is required.

If these recognized calculation methods are used for the design of the body, all relevant aspects from EN 13445 parts 1 to 5 shall be observed.

6.2 Experimental design method

The experimental design method may be used for bodies with a volume up to 200 l.

If a body of a mobile fire extinguisher is designed with an experimental design method, a burst test of the body is required.

The wall thickness of the body shall not be less than the wall thickness given by the formula below.

$$S = \frac{D \times PT}{20 \times R} \text{ for the wall thickness of the body} \quad (1)$$

where

- S* is the wall thickness, in millimetres;
- D* is the external diameter of the body, in millimetres;
- PT* is the test pressure, being 1,43 x *PS*, in bar;
- R* is 80 % of the minimum yield strength of the material specified by the manufacturer, in MPa.

6.3 Prototype testing

6.3.1 Pressure test

6.3.1.1 Test conditions

Two bodies including accessories shall be submitted to the hydrostatic pressure test which shall be carried out using apparatus that permits a regular increase of pressure at a maximum of 2 bar/s up to the moment the test pressure *PT* is reached.

6.3.1.2 Requirements

The test pressure *PT* shall not be less than 1,43 times the maximum allowable pressure *PS*, with a minimum of 20 bar.

The test pressure shall be maintained for a minimum of 30 s and the body shall remain tight.

After the test, the volume of the body shall not increase by more than 1 %.

6.3.2 Burst test

6.3.2.1 Test conditions

If the body is not designed in accordance with EN 13445 parts 1 to 5, one sample shall be subjected to a burst test.

The burst test under hydraulic pressure shall be carried out using an installation which permits a regular increase of pressure at not more than 2 bar/s until the body bursts and also permits the variation of pressure to be recorded as a function of time.

6.3.2.2 Requirements - Bodies

The burst pressure *P_r* shall not be less than 2,7 times the maximum pressure *PS*.

The burst test shall not cause the body to fragment.

The main break shall show no signs of brittleness, for example the edges of the break shall not be radial, but shall be inclined relative to a diametrical plane and shall have a reduction in area over their entire thickness.

The break shall not show any obvious defects in the material.

The break shall not originate in the body marking or weld.

EN 1866-2:2014 (E)**6.3.2.3 Requirements – Fittings**

The bursting test shall be carried out on three samples of all fittings, except for hoses and coupling (see Clause 7).

The bursting pressure P_r shall not be less than 2,7 times the maximum allowable pressure PS .

The burst test shall not cause the valve and fitting to fragment.

The break shall not show any obvious defects in the material.

The break shall not originate in the valve or fitting marking area.

6.4 Macroscopic examination

On two bodies each weld subject to pressure shall be examined; the macroscopic examination of a transverse section of the weld, in accordance with EN ISO 9017, shall show complete fusion over the area with preparation acid and any defects shall be revealed.

If there is any doubt, a microscopic examination of the suspect area shall be carried out.

6.5 Attached parts

Attached parts shall be made so not to cause any dangerous stresses or any specific corrosion risks.

6.6 Overfill pressure test

This test is required for water based extinguishing media cartridge operated extinguishers only.

One extinguisher shall be tested in accordance with Annex D. During this test, no components shall be ejected.

6.7 Requirements for components subject to pressure**6.7.1 Test conditions**

Two samples of each type of component subject to internal pressure shall be submitted to the pressure test which shall be carried out using apparatus that permits a regular increase of pressure at a maximum of 2 bar/s up to the moment the test pressure PT is reached.

6.7.2 Requirements

The test pressure PT shall not be less than 1,43 times the maximum allowable pressure PS , with a minimum of 20 bar.

The test pressure shall be maintained for a minimum of 30 s and the components shall remain leak-tight and show now defects such as cracks, splits or ejection of parts.

6.8 Hose assembly and attached components**6.8.1 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.

6.8.2 Prototype testing

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

- three times the maximum allowable pressure PS , the test being carried out at $(20 \pm 5) ^\circ\text{C}$;
- twice $P(T_{\max})$, the test being carried out at $(T_{\max} \pm 2) ^\circ\text{C}$ and at $(T_{\min} \pm 2) ^\circ\text{C}$.

6.9 Propellant gas cylinders

Propellant gas cylinders shall fulfil the requirements of Annex F.

7 Manufacturing

7.1 General requirements

The manufacturer of the wheeled extinguisher or his sub-supplier where applicable, shall have manufacturing means and processes suitable for fabricating the extinguisher assembly and its composing parts in accordance with this document.

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

7.2 Welded and brazed parts

7.2.1 General

Butt welds in the strength envelope shall be formed using an automatic welding procedure. Welds and brazed joints shall be free from defects which may impair the safe use of the body.

7.2.2 Welding procedures

The weld design and the welding procedures shall be described in a welding procedure specification in accordance with EN ISO 15609-1 and shall be qualified in accordance with EN ISO 15614-1 or EN ISO 15614-2.

7.2.3 Welding personnel

The welders shall be qualified in accordance with EN ISO 9606-1 or EN ISO 9606-2 and the operators in accordance with EN ISO 14732.

7.2.4 Brazing procedures

The braze design and the brazing procedures shall be described in a brazing procedure specification in accordance with EN 13134.

7.2.5 Brazing personnel

The brazers shall be qualified in accordance with EN ISO 13585.

7.3 Traceability

7.3.1 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 meets the specification of the design.