SLOVENSKI STANDARD
oSIST prEN 3-8:2015

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Prenosni gasilniki - 8. del: Zahteve za konstrukcijo, odpornost proti tlaku in mehanski preskusi za gasilnike z največjim dovoljenim tlakom, enakim ali nižjim od 30 bar, ki ustezajo zahtevam EN 3-7

Portable fire extinguishers - Part 8: 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 3-7

Tragbare Feuerlöscher - Teil 8: Anforderungen an die konstruktive Ausführung, Druckfestigkeit und mechanischen Prüfungen für tragbare Feuerlöscher mit einem maximal zulässigen Druck kleiner gleich 30 bar, welche die Anforderungen aus EN 3-7 erfüllen

Extincteurs d'incendie portatifs - Partie 8 : Exigences pour la construction, la résistance à la pression et les essais mécaniques des extincteurs conformes aux exigences de l'EN 3 -7 dont la pression maximale admissible est inférieure ou égale à 30 bar

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English Version

Portable fire extinguishers - Part 8: 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 3-7

Extincteurs d'incendie portatifs - Partie 8 : Exigences pour la construction, la résistance à la pression et les essais mécaniques des extincteurs conformes aux exigences de l'EN 3-7 dont la pression maximale admissible est inférieure ou égale à 30 bar

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 70.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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Foreword

This document (prEN 3-8:2015) has been prepared by Technical Committee CEN/TC 70 “Manual means of fire fighting equipment”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 3-8:2006.

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 97/23/EC, see informative Annex ZA, which is an integral part of this document.

This document is included in a series of European Standards planned to cover:

a) classification of fires (EN 2);

b) mobile fire extinguishers (series EN 1866).

EN 3 consists of the following parts, under the general title “*Portable fire extinguishers*”:

— *Part 7: Characteristics, performance requirements and test methods*

— *Part 8: Requirements for the construction, pressure resistance and mechanical tests for extinguishers with a maximum allowable pressure equal to or less lower than 30 bar, which comply with the requirements of* EN 3-7

— *Part 9: Requirements for the assembly, construction and pressure resistance of CO_2 extinguishers which comply with the requirements of* EN 3-7

— *Part 10: Provisions for evaluating the conformity of a portable fire extinguisher to* EN 3-7

Annexes B, C, D, E, F and G are normative; Annexes A and ZA are informative.

The following sections have been revised:

— scope;

— materials;

— design method;

— permanent joining;

— relationship with the ESR’s;

— relationship and titles to EN 3 series.

1 Scope

This European Standard specifies the rules of design, type testing, fabrication and inspection control of portable fire extinguishers which comply with the requirements of EN 3-7; with metallic bodies as far as pressure risk is concerned.

This part of EN 3 applies to portable 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-oxidising fluids.

This European Standard also applies to the marking of metallic propellant gas cartridges (see Annex E).

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

NOTE Annex A gives the classification of the different parts forming the portable fire extinguisher.

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 10204:2004[1)], *Metallic products — Types of inspection documents*

EN ISO 4892-2:2013, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps (ISO 4892-2:2013)*

EN ISO 9017:2013, *Destructive tests on welds in metallic materials — Fracture test (ISO 9017:2001)*

EN ISO 9606-1:2013, *Qualification testing of welders — Fusion welding — Part 1: Steels (ISO 9606-1:2012 including Cor 1:2012)*

EN ISO 9606-2:2004, *Qualification test of welders — Fusion welding — Part 2: Aluminium and aluminium alloys (ISO 9606-2:2004)*

EN ISO 14732:2013, *Welding personnel — Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials (ISO 14732:2013)*

EN ISO 15614-1:2004, *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 15614-1:2004)*

EN ISO 15614-2:2005, *Specification and qualification of welding procedures for metallic materials — Welding procedure test - Part 2: Arc welding of aluminium and its alloys (ISO 15614-2:2005)*

EN ISO 15614-12:2014, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 12: Spot, seam and projection welding (ISO 15614-12:2014)*

1) This standard is also applicable to non-metallic products (see EN 10204:2004, 1.2).

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 3-7:2004+A1:2007 and the following apply.

NOTE Schemes illustrating the different pressures and temperatures is given in Annex B.

3.1
pressure at maximum operating temperature
(pressure experimentally measured)
***P* (T_{max})**
pressure measured in the extinguisher after stabilisation during at least 24 h at maximum operating temperature (T_{max}) and for cartridge operated extinguishers, the maximum pressure is the maximum pressure recorded for 0,5 s during a period of three minutes, excluding the first second after release of the propellant gas

3.2
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})

Note 1 to entry: The value of PS for components should be equal to or greater than the value of PS for the extinguisher assembly.

3.3
bursting pressure
***P*$_r$**
maximum pressure measured during a bursting test

3.4
portable fire extinguisher assembly
assembly of parts to comprise the pressure retaining part of a fire extinguisher which can include a extinguisher body, operating device, filling cap, closure and may include a propellant gas cartridge, hose and other components under pressure, if fitted

3.5
maximum operating temperature
***T*$_{max}$**
maximum operating temperature declared by the manufacturer equal to or less than TS_{max}

3.6
minimum operating temperature
***T*$_{min}$**
minimum operating temperature declared by the manufacturer equal to or higher than TS_{min}

3.7
portable fire extinguisher
fire extinguisher which is designed to be carried and operated by hand and which in working order has a mass of not more than 20 kg

3.8
propellant gas cartridge
refillable or non-refillable pressure receptacle made of metal containing a propellant gas

3.9
fittings
pressure accessories which include operating devices, filling caps and hose assemblies

4 Symbols and abbreviations

For the purposes of this document, the following symbols and abbreviations apply.

PS	Maximum allowable pressure in bar
PT	Test pressure = 1,43[2)] x PS in bar
P_r	Bursting pressure (measured) - in bar
D	Nominal external diameter of the extinguisher body, or the largest external value of the perpendicular section to the axis, in mm
D_B	Diameter of the mandrel used during the crushing test in mm
$P\ (T_{max})$	Pressure at maximum operating temperature, in bar
T_{max}	Maximum operating temperature declared by the manufacturer, in °C
T_{min}	Minimum operating temperature declared by the manufacturer, in °C
S	Minimum wall thickness, in mm
TS_{min}	Minimum allowable temperature, in °C
TS_{max}	Maximum allowable temperature, in °C
R_{mf}	Ultimate tensile strength[2)], in MPa (N/mm^2)

5 Materials

5.1 General

The materials shall be suitable for the intended use. All materials used in the extinguisher assembly shall be compatible with all other components including extinguishing media. Assemblies shall meet the requirements of EN 3-7:2004+A1:2007, 14.1, *Resistance to external corrosion*, and additionally for water based media EN 3-7:2004+A1:2007, 14.2, *Resistance to extinguishing medium of extinguishers using water based media*.

Particular attention shall be given to incompatibilities produced for example by:

— galvanic corrosion;

— stress corrosion.

5.2 Pressure bearing parts

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;

— all processes used, the process parameters and the normal admissible process tolerances;

2) *Guaranteed by the manufacturer after all manufacturing processes have been carried out on the final product.*

— the relevant required material properties after processing.

5.3 Non-pressure bearing parts

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

5.4 Plastic components

Plastic components shall fulfil the clauses of Annex D except hoses and nozzles.

5.5 Documentation

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

6 Design method – Extinguisher Bodies

6.1 General

6.1.1 Design

The design shall be by calculation and verified by experimental data, see Clause 7.

6.1.2 Temperature range

The allowable temperature range declared for the extinguisher body shall be TS_{min} to TS_{max} where:

— TS_{min} = − 30 °C or lower as declared by the manufacturer;

— TS_{max} = + 60 °C or higher as declared by the manufacturer.

Where this is the case, the temperatures and pressures used in this European Standard shall be amended to reflect this new temperature range and the new parameters at these temperatures.

6.1.3 Design of openings

The main closure of the fill opening, intended to be removed during service or maintenance, shall be provided with an automatic means of venting any pressure from the extinguisher.

The initial venting of any pressure shall occur when the means of securing the closure, or pressure retaining part, is disengaged by not more than one third of the full engagement.

The minimum number of turns for the complete removal of the closure shall be 2¼.

The filling opening shall have a minimum diameter of:

i) 20 mm for extinguishers with a nominal charge of less than or equal to 3 kg or 3 l;

ii) 25 mm for extinguishers with a nominal charge of more than 3 kg or 3 l.

6.2 Calculation

6.2.1 Extinguisher Bodies – Requirements for the extinguisher body

The extinguisher body shall have a measured wall thickness which is equal to or greater than the wall thickness calculated using the following formula:

$$S = \frac{(2{,}7 \times PS) \times D}{20R_{mf} + (2{,}7 \times PS)}$$

NOTE R_{mf} is measured on a specimen taken from the area where the burst is expected to occur. This position is established by burst testing a minimum of three extinguisher bodies. The specimen to be measured is taken from an unburst extinguisher body.

6.2.2 Extinguisher Bodies – Requirements for the base

The portable extinguisher shall be constructed so that it may be:

— free standing on a horizontal surface;

and / or

— fixed to a vertical surface.

The shape of the base of the extinguisher body is optional.

Bodies for extinguishers that may be free-standing shall either be fitted with a means to raise the pressure retaining part of the body (base) by at least 5 mm above the horizontal surface or the thickness of metal in the base of the body in contact with the horizontal surface shall be at least the minimum wall thickness S + 0,5 mm as calculated in 6.2.1.

6.3 Bodies – Required for use with plastic components

The threads shall be of the form as specified in D.2.6.

7 Prototype Testing

7.1 General

The design verification shall be by prototype testing.

All the bodies and fittings used for the tests shall bear all normal markings indicated in Clause 9 and shall be in their finished state (e.g. painted).

7.2 Burst Test – low temperature

7.2.1 General

The burst test shall be carried out to confirm the adequate strength.

7.2.2 Extinguisher Bodies

7.2.2.1 Conditions

A minimum of three specimens shall be used.

Tests shall be carried out at TS_{min} (- 4, +0) °C after being conditioned for a minimum of 12 h at this temperature.

A burst of the extinguisher body, 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 burst occurs and also permits the variation of pressure to be recorded as a function of time.

7.2.2.2 Requirements

1) In all tests P_r shall be greater than 2,7 x PS;

2) the burst test shall not cause the extinguisher body to fragment;

3) 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 and shall occur in the cylindrical (parallel) portion of the extinguisher body;

4) the break shall not show any obvious defects in the material;

5) the break shall not originate in the extinguisher body marking area or weld;

NOTE The heat affected zone is not considered to be in or part of the weld.

Should the fracture cross the weld from its point of origin it shall not be considered a failure.

6) the burst pressure tests are carried out at the specified pressures, in the event that a sealing “O” ring or washer moves out of its housing before burst pressure is reached, this shall not be caused by deformation of the valve or the neck ring, then a fitting shall be devised to enable the burst test to be completed.

7.2.3 Fittings (except pressure indicating devices – as defined in EN 3-7)

7.2.3.1 Conditions

A minimum of three specimens shall be used.

Tests shall be carried out at TS_{min} (+0, −4) °C after being conditioned for a minimum of 12 h at this temperature.

A burst of the fitting, 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 fitting bursts and also permits the variation of pressure to be recorded as a function of time.

7.2.3.2 Requirements

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

2) the burst test shall not cause the fitting to fragment;

3) the break shall not show any obvious defects in the material;

4) the break shall not originate in the marking area.

7.2.4 Pressure test – Pressure gauges and pressure indicators

7.2.4.1 Test conditions

Three samples 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 until 2,7 times P (T_{max}) is reached. Maintain this pressure for 30 s.

The samples shall be tested at a temperature of (20 ± 5) °C.