BRITISH STANDARD

BS EN
1866-1:2007

Mobile fire extinguishers —

Part 1: Characteristics, performance and test methods

The European Standard EN 1866-1:2007 has the status of a British Standard

ICS 13.220.10

National foreword

This British Standard is the UK implementation of EN 1866-1:2007. This standard BS EN 1866-1:2007 is one of a series of three standards which replace BS EN 1866:2005. BS EN 1866 parts 1, 2 and 3 have been drafted to allow parts 2 and 3 to be harmonized with the European Pressure Equipment Directive (PED).

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.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

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Mobile fire extinguishers - Part 1: Characteristics, performance and test methods

Extincteurs d'incendie mobiles - Partie 1 : Caractéristiques, performances et méthodes d'essai

Fahrbare Feuerlöscher - Teil 1: Eigenschaften, Löschleistung und Prüfungen

This European Standard was approved by CEN on 30 June 2007.

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Foreword

This document (EN 1866-1:2007) 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of an identical text or by endorsement, at the latest by February 2008, and conflicting national standards shall be withdrawn at the latest by February 2008.

This document supersedes EN 1866:2005.

This standard consists of the following parts under the general title "Mobile fire extinguishers":

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

— *Part 2: Additional requirements to EN 1866-1 for the construction, resistance to pressure and mechanical tests for extinguishers with a maximum allowable pressure equal to or lower than 30 bar* [1)]

— *Part 3: Additional requirements to EN 1866-1 for pressure resistance of CO_2 extinguishers* [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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1) In preparation.

1 Scope

This European Standard specifies the rules of design, type testing and inspection during manufacturing, ratings and classification of mobile fire extinguishers and test methods to be used. It applies to mobile fire extinguishers with a total mass above 20 kg for powder, water based and CO_2 extinguishers. This standard applies to mobile fire extinguishers that are manoeuvred by an operator on foot only.

It does not cover fire tests for class C and class F fires, but the used extinguishing media can be effective on these types of fire. Class D fires are considered to be a very specialist application and are not included in this standard, but may be made the object of national specification.

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 3-7, *Portable fire extinguishers — Part 7: Characteristics, performance requirements and test methods*

EN ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests (ISO 9227:2006)*

3 Terms and definitions

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

3.1
pressure at maximum operating temperature, PTS_{max}
(pressure experimentally measured)
pressure measured in the extinguisher after stabilisation during at least 24 h at a maximum operating temperature TS_{max} (≥ 60 °C) and for cartridge operated extinguishers, the maximum pressure shall be the maximum pressure recorded for 0,5 s during a period of 3 min, excluding the first 5 s after releasing the propellant gas

3.2
body
shell of the mobile fire extinguisher not fitted with accessories, but fitted with all welded parts

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

3.4
charge of an extinguisher
mass or volume of the extinguishing media contained in the mobile fire extinguisher

NOTE For extinguishers expressed as a volume (in litres) for water based extinguishers and as a mass (kilograms) for powder and CO_2 extinguishers.

3.5
closure
component, other than a safety device or pressure indicator, subject to the internal pressure and used to close off and seal the body

3.6
extinguisher body
assembly of parts to comprise the pressure retaining part of a fire extinguisher which can include a body, operating device, filling cap, closure, valve, hose

3.7
duration of operation
time during which the extinguishing media is discharged, without any interruption in the discharge and with the valve fully opened not including the residual propellant gas

3.8
fire extinguisher
appliance containing an extinguishing medium, which can be expelled by the action of internal pressure and be directed onto a fire

NOTE This pressure may be stored pressure (stored pressure extinguisher) or obtained by the release of a propellant gas from a separate cylinder (cartridge extinguisher).

3.9
extinguishing media
substance contained in the extinguisher that causes extinction

3.10
mobile fire extinguisher
extinguisher designed to be transportable and operated by hand and that has a total mass of more than 20 kg

NOTE 1 A mobile fire extinguisher is mounted on wheels. In this standard the mobile fire extinguisher shall be called "Extinguisher"

NOTE 2 Two bodies can be combined to form a single unit subject to the limits given in Table 1.

3.11
propellant gas
gas in a liquefied or compressed state, which provides the internal pressure used to expel the extinguishing media

3.12
propellant container
gas cylinder that fits into or is attached to the extinguisher and that contains the propellant

3.13
residual charge
mass or volume of the extinguishing medium remaining after continuous discharge including all propellant gas

3.14
water based extinguisher
extinguisher containing only water or water with additives

NOTE This includes foam extinguishers.

3.15
powder extinguisher
extinguisher containing fire extinguishing powder

3.16
bursting pressure Pr
maximum pressure measured during a bursting test

3.17
TS_{max}
maximum operating temperature declared by the manufacturer

3.18
TS_{min}
minimum operating temperature declared by the manufacturer

3.19
gripping device
device intended for moving the extinguisher

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

D Nominal external diameter of the body, or the largest external value of the perpendicular section of the axis, in mm

DN Diameter in mm for circular products submitted to pressure or the diameter in mm of the equivalent flow section for non circular parts

Pr Bursting pressure in bar

TS_{max} Maximum operating temperature, in °C

PTS_{max} Pressure at maximum operating temperature, in bar

TS_{min} Minimum operating temperature, in °C

5 Description of an extinguisher

5.1 Type of extinguisher

An extinguisher is described by the type of extinguishing medium it contains. This standard covers:

— powder extinguishers;

— water based extinguishers;

— CO_2 extinguishers.

Water based extinguishers, including foam, containing different proportions of antifreeze shall be treated as separate and distinct models especially for the purpose of testing the range of operating temperatures (see 6.1.1), electrical conductivity (see clause 7.3), and fire ratings.

5.2 Components of extinguisher

A wheeled fire extinguisher consists of the following components:

— extinguisher body;

— wheels;

— gripping device;

— body fittings that are attached or screwed to the body, and include the following:

  — cylinder for propellant (not applicable for stored pressure extinguishers);

  — control device;

  — hose assembly;

  — main closure;

  — operating device.

6 Requirements

6.1 Effective range of operating temperatures

6.1.1 General

Extinguishers shall be able to operate between TS_{max} and TS_{min}:

TS_{max}	for all extinguishers: shall be 60 °C or higher;
TS_{min}	for all powder extinguishers and CO_2 extinguishers: shall be - 20 °C, - 30 °C or lower;
TS_{min}	for water based extinguishers: shall be + 5 °C, 0 °C, - 5 °C, - 10 °C, - 15 °C, - 20 °C, - 25 °C, -30 °C or lower. For water based extinguishers without any protection against freezing. TS_{min} shall be + 5 °C;
TS_{max} and TS_{min}	claimed by the manufacturer shall be used for the tests.

6.1.2 Requirements

After the test described in A.6, the requirements for all extinguishers are as follows:

— shall operate satisfactorily;

— discharge shall commence within 10 s of the opening of the control valve; cartridge operated extinguishers shall be activated 30 s prior to opening the control valve;

— duration of operation shall be according to A.2 and not be less than the value applicable given in Table 4, Table 5, and Table 6;

— residual charge remaining in the extinguisher after one single and complete discharge including full decompression shall be as given in Table 7.

6.1.3 Additional Requirements for CO_2 extinguishers

For the duration of operation of CO_2-extinguishers the following applies at:

— TS_{max} the duration of operation shall be no more than the value established at 20 °C.

— TS_{min} the duration of operation shall be no more than 2,5 times the value established at 20 °C.

The value established at 20 °C.

6.2 Filling specifications

6.2.1 Nominal charges

Nominal charges of extinguishers shall be equal to one of the values given in the Table 1 depending on to the nature of the extinguishing media.

Table 1 — Nominal charges for extinguishing media

Powder in kg	Water based in l	CO_2 in kg [a]
25, 50, 100, 150	20, 25, 45, 50, 90, 100, 135, 150	10, 20, 30, 50
[a] It is allowed to reduce the charge of the cylinder by 10 % to avoid overpressure in areas with high ambient temperatures.		

6.2.2 Filling tolerances

The actual charge of the extinguisher shall be equal to the nominal charge within the tolerances given in Table 2.

Table 2 — Filling tolerances on nominal charges

Powder	Water based	CO_2
± 2 %	0 %	0 %
	− 5 %	− 5 %

6.2.3 Propelling agent

Only propellants listed in Table 3 or mixtures thereof, shall be used in extinguishers, whether they are the stored pressure type or cartridge extinguisher type. The maximum proportion of water in mass shall be as specified in Table 3, except when used in stored pressure water based extinguishers. Tracers may be added to the propellant to facilitate leakage detection, but the content shall not exceed 3 % of the propellant content.

Table 3 — Maximum water content of the propellant

Propellants	
Gases	**Maximum proportion of water in mass** %
Air	0,006
Argon	0,006
CO_2	0,015
Helium	0,006
Nitrogen	0,006

For the charge of the propellant cartridge, the tolerance shall be + 0 %, – 5 % in mass for CO_2 and for compressed gases + 0 %, – 5 % in pressure at 20 °C.

6.3 Duration of operation, residual mass and discharge range

6.3.1 Duration of operation

6.3.1.1 Powder extinguishers

When determined in accordance with A.2, the duration of operation of powder extinguishers shall be as given in Table 4.

Table 4 — Duration time for powder extinguishers

Nominal charge in kg	Min. Duration time in s
25	15
50	30
100	60
150	90

6.3.1.2 Water based extinguishers

When determined in accordance with A.2, the duration of operation of water based extinguishers, shall be as given in Table 5.

Table 5 — Duration time for water based extinguishers

Nominal charge in l	Min. Duration time in s
20/25	20
45/50	40
90/100	80
135/150	120

6.3.1.3 CO_2 extinguishers

When determined in accordance with A.2, the duration of operation of CO_2 extinguishers, shall be as given in Table 6.

Table 6 — Duration time for CO_2 extinguishers

Nominal charge in kg	Min. Duration time in s
10	15
20	18
30	27
50	36

6.3.2 Maximum residual mass

When tested in accordance with A.2, the maximum percentage of residual mass of the extinguishing media shall be less than or equal to the values given in the Table 7.

Table 7 — Maximum residual mass

Powder	All other extinguishing media
10 % for ABC powder 15 % for BC powder	5 %

6.4 Retention of propellant

6.4.1 General

Extinguishers and propellant containers shall be designed in such a way as to permit their retention of propellant to be verified at regular intervals.

6.4.2 Propellant container

The mass and/or the pressure of the propellant gas shall be validated by weighing or by checking the pressure.

All required information (type of propellant; nominal charge; tare weight) shall be permanently marked on the cylinder.

6.4.3 Stored pressure extinguishers

6.4.3.1 Water based and powder extinguishers

It shall be possible to check the state of charge of stored pressure extinguishers by measuring the internal pressure. This shall be obtained by means of a connection to enable the internal pressure to be checked directly by an independent apparatus. Such a connection shall be fitted with a pressure retaining cap and shall communicate directly to the contents under pressure. A pressure indicator shall be fitted.

6.4.3.2 CO_2 extinguishers

The state of charge of CO_2 extinguishers is checked by weighing.

6.4.4 Acceptance levels

Leakage from an extinguisher, or propellant cartridge, shall not exceed the following for:

a) stored pressure extinguishers a maximum pressure loss of 5 % per year measured at 20 °C;

b) extinguishers and propellant cartridges tested by weighing, a rate of 5 % of the nominal charge per year;

c) extinguishers, pressurised only at the moment of operation, between pressurization and opening of the control valve, the pressure loss shall be less than 1 % per minute.

6.5 Control valve

Extinguishers shall be fitted with a control valve to enable the discharge to be temporarily interrupted. Furthermore, the valve shall be resistant to leakage following cessation of the emission. This shall be verified in accordance with A.5. The difference in pressure shall not be more than 20 %.

The control valve with a nozzle must be situated at the end of the hose.

6.6 Working position

In normal working position, the extinguishers with its nominal charge shall remain stable when the hose completely unrolled, is pulled with a force of 150 N. The direction of the force is applied under the least favourable condition.

6.7 Hose and coupling

The length of the flexible section of the hose assembly shall be not less than 5 m.

The hose and coupling system 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 Operation devices

6.8.1 General

With the exception of safety devices to prevent inadvertent activation of the operating mechanism (see 6.8.3), the extinguisher shall have no components which need to be added or removed before use.

6.8.2 Operating and jet control mechanisms devices

The activation of the extinguisher shall not depend upon the repetition of a given action on the same device. When measured in accordance with A.3 or A.4 as appropriate, the force or the energy required to activate the operating device(s) shall not be greater than the values laid down in Table 8 for the operating temperature range.

Activation implies the totality of actions required for pressurisation (if the extinguisher is not permanently under pressure) and the initial release of the extinguishing media.

Table 8 — Maximum force or energy of operation

Type of device	Maximum allowance	
	Force in N	Energy in J
Operating lever and squeeze grip lever	200	-
Valve wheel	100[a]	-
Strike knob	-	2
[a] The force shall be measured at the outside edge of the wheel.		

6.8.3 Safety devices

The operating mechanism shall be provided with a safety device to prevent inadvertent operation. The release of the safety device shall involve an operation distinct from that of the operating mechanism, shall require a force between the limits of 20 N and 100 N and shall in no way affect the operation of the equipment. It shall be possible to determine whether the safety device has been operated, by means of a safety element, consisting for example of a metal wire and seal. This device shall be so constructed that any unaided manual attempt, using a force or impact equal to twice the relevant value in Table 8 to initiate discharge without first operating the safety device shall not deform or break any part of the mechanism in such a way as to prevent the subsequent discharge of the extinguisher.

6.8.4 Discharge from water based extinguishers

The discharge from water based extinguishers shall be ensured as follows:

— in case of a dip tube, it shall be made from materials resistant to the extinguishing agent;

— discharge of the extinguishing media shall be through a filter, in order to retain foreign matter.

This filter shall be placed upstream of the smallest section of the discharge passage. Each orifice of the filter shall have an area smaller than that of the smallest cross section of the discharge passage. The total area of the combined filter orifices shall be at least equal to eight times the smallest cross section of the discharge passage.

This filter shall be accessible to facilitate maintenance.

6.8.5 Pressure gauge

6.8.5.1 General

Powder and water based stored pressure extinguishers shall be provided with a pressure gauge.

This pressure gauge shall be capable of being checked to ensure that it is in good working order by an independent apparatus which uses the application of pressure.

6.8.5.2 Requirements for the scale of pressure gauges

The scale of the pressure gauge shall have:

— zero zone (to indicate zero pressure). If there is an end stop for the moving pointer, this shall be on the negative pressure side of the zero zone. The pointer shall not contact the end stop at zero pressure;

— green zone (working zone), covering pressures at temperatures over the range of operating temperatures (see 6.1.1).

The scale of the pressure gauge shall be calibrated in bars.

The zones at either side of the green zone shall be red.

A diagram of the scale of the pressure gauge is shown in Figure 1.

Errors in the pressure gauge calibration shall not exceed the following:

— - 15 % at the low pressure end of the green zone (TS_{min});

— + 6 % of the pressure reading at the high pressure end of the green zone (TS_{max}).

The pressure at 20 °C (P (20 °C)) shall be indicated on the scale (see Figure 1). The error in this indication shall not exceed ± 0,5 bar.

To ensure that the pressure indication is visible, the pressure gauge shall conform to the following:

— gauge shall have a moving pointer extending radial into the green zone with a length of between 50 % and 80 % of the green zone height;

— position of the pointer at both ends of the green zone and at the P (20 °C) point shall be such that it is clearly visible;

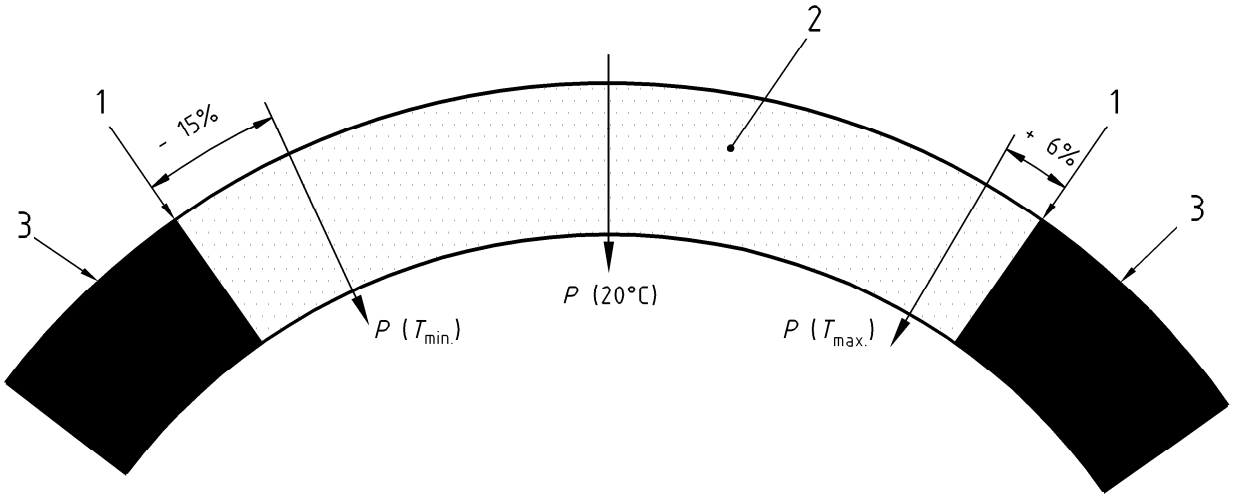
— scale of the gauge shall have a total length equal to or greater than 1,5 times the length from zero to the high pressure end of the green zone.

6.8.5.3 Operating test of pressure gauges

When tested at (20 ± 5) °C, the pressure gauge shall operate within the range of error permitted by 6.8.5.2 after having been subjected to 1 000 pressure cycles from zero to PTS_{max} and back to zero at an average rate of pressure change of (20 ± 5) bar/min.

6.8.5.4 Materials for pressure gauges

The materials of construction of the pressure gauge that could be in contact with the extinguishing medium and propellant gas shall be compatible with these or protected from them.



Key

1 Rounded to the nearest 0,5 bar
2 Green
3 Red
PTS_{min} Pressure at the minimum temperature claimed by the manufacturer (see 6.1.1)
PTS_{max}) Pressure at a temperature of + 60 °C or higher

Figure 1 — Scale on pressure gauge

6.8.6 Other characteristics

6.8.6.1 Design of the filling opening

Except for CO_2 extinguishers:

— filling opening shall have a minimum diameter of 45 mm;

— main closure of the filling opening, intended to be removed during service or maintenance, shall be provided with an automatic means of venting any residual pressure from the extinguisher. The initial venting of any residual pressure shall occur when the means of securing the closure, or pressure retaining part, is disengaged by not more than one third of full engagement.

6.8.6.2 Diameter of the two wheels

The diameter of the two wheels shall be equal to or greater than 280 mm.

NOTE Any additional wheel may be smaller in diameter.

6.8.6.3 Width of the tyres

The width of the tyres shall be ≥ 50 mm, measured at the widest point of each tyre.

6.8.6.4 Distance between the handle and the floor

The distance between the handle and the floor, in storage position, shall be between 0,7 m and 1,6 m.

6.8.6.5 Socket for the nozzle

The extinguisher shall be equipped with a storage socket for the nozzle.

6.8.6.6 Damage of the hose

The hose shall not be damaged when rolled up or stored.

6.9 Identification

6.9.1 Colour

The colour of the body shall be red RAL 3000 as specified in Farbregister RAL-841-GL.

National regulations may require a zone of colour with an area up to 10 % of the surface area of the extinguisher body to be used to identify the extinguishing agent.

6.9.2 Marking

The marking on the mobile fire extinguisher shall be in contrasting colours to the background. The marking shall be divided into five parts as shown in Figure 2.

The marking required for Parts 1, 2, 3 and 5 shall be contained on the same label or in the same frame. The label (or frame) shall be positioned so that it can be clearly read.

The marking required for Part 4 may be placed elsewhere on the extinguisher.

The height H of the letters of Parts 2 and 3 shall be not less than 5 mm.

The height of the lettering of Parts 1, 2, 3 and 4 shall be as follows subject to a tolerance of ± 10 %:

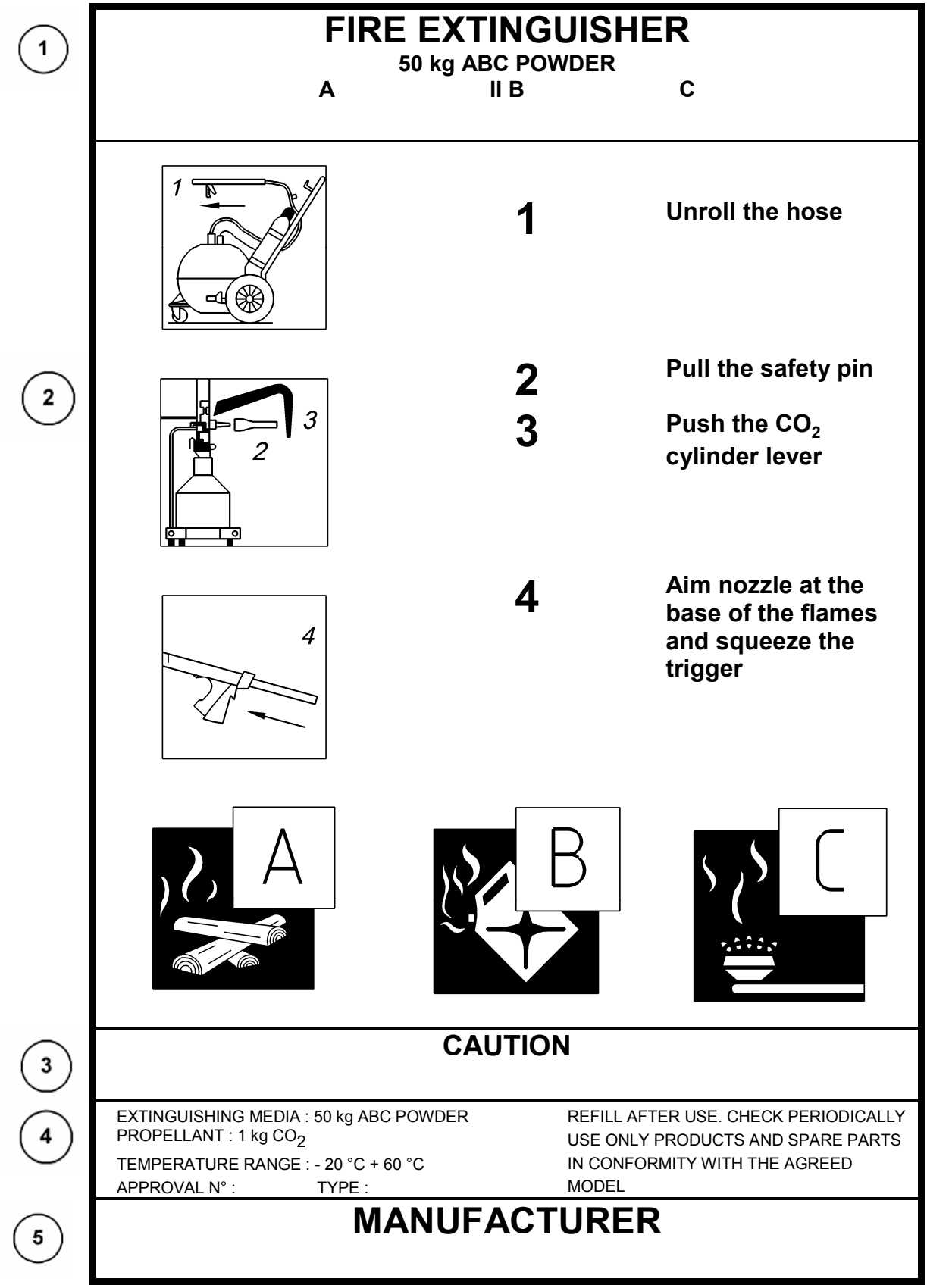
— Part 1: 1,5 x H for the word “Fire Extinguisher”; 0,75 x H for the other indications;

— Part 2: 1 x H;

— Part 3: 1 x H;

— Part 4: 0,5 x H.

The height of the frame containing Part 5 shall not exceed 1/3 of the total height of Parts 1, 2 and 3.



NOTE The circled numbers indicate the parts of the marking and the numbers to the right of each part indicate the height of the lettering as a proportion of H (see 6.9.2).

Figure 2 — Informative marking of a mobile fire extinguisher

Part 1 shall contain the following information in sequence:

— words “fire extinguisher”; or “extinguisher” plus medium, or “ fire extinguisher” plus medium;

— type of extinguishing medium and the nominal charge;

— fire rating or ratings of the extinguisher (see clause 8).

Part 2 shall contain the following information:

— instructions for use, which shall include one or more pictograms each with an explanation.

The text of the instructions for use shall be in the language or languages of the country where the extinguisher is to be used, the different actions to be carried out being shown one after the other vertically from top to bottom.

The pictograms shall be located in the same position with regard to the relevant texts and the direction of the movements to be carried out shall be indicated by arrows.

— Pictograms representing the type of fires are shown in Figure 3. Class A and Class B pictograms shall only be used where the corresponding fire rating is shown on the marking. The Class C pictogram shall only be shown on powder extinguishers where Class C suitability is shown on the marking. These pictograms shall be arranged horizontally on one line under the instructions for use.

The pictograms representing the types of fire shall appear in square boxes with sides of minimum 25 mm. A square containing a code letter shall appear at the corner of each pictogram as shown in Figure 3.

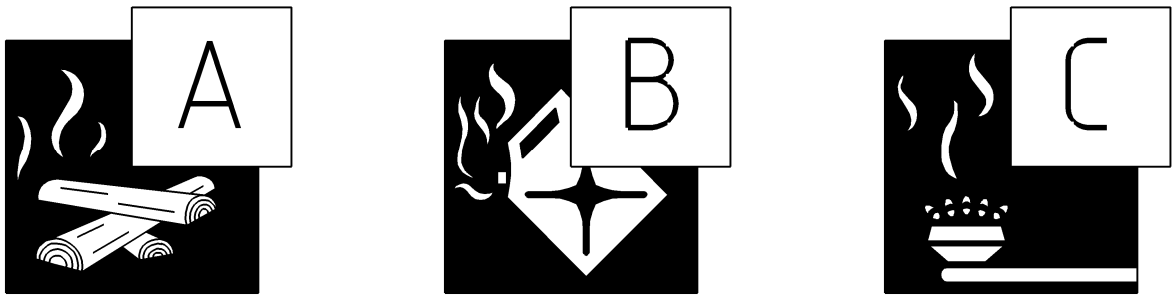


Figure 3 — Pictograms

Part 3 shall contain information relating to any restrictions or dangers of use, particularly in relation to toxicity and electrical risk.

NOTE Attention is drawn to national regulations.

Wheeled fire extinguishers using water or foam and not tested to, or not meeting the requirements of clause 7.3 shall be marked with the following warning:

"WARNING — Do not use on live electrical equipment."

Fire extinguishers using other agents and fire extinguishers meeting the requirements of 7.3 shall be marked to indicate that they are suitable for use on live electrical equipment e.g. "suitable for use on live electrical equipment up to 1 000 V at 1 m".

NOTE Attention is drawn to national regulations.

Part 4 shall contain at least the following:

— instruction to refill after any operation; an instruction to check periodically and to only use products and spare parts in conformity with the agreed model for refilling and maintenance.

The identification of the extinguishing medium and, in particular, identification and percentage of additives for water base media:

— if applicable, the identification of the propellant gas;

— numbers(s) or reference(s) relating to the approval of the extinguisher;

— manufacturer's model designation;

— temperature limits;

— warning against the risk of freezing (if applicable);

— reference to the European Standard EN 1866-1:2007.

Part 5 shall contain:

— name and address of the wheeled extinguisher manufacturer and/or supplier.

In addition, the year of manufacture shall be marked somewhere on the mobile extinguisher.

6.10 Periodical checking

It shall be possible to regularly check each extinguisher in accordance with national specifications.

7 Tests

7.1 Temperature test

The extinguisher shall be tested in accordance with A.6. After testing the extinguisher shall operate as specified in 6.1.2.

7.2 Corrosion tests

7.2.1 External corrosion test

All functional parts of the extinguishers shall be subjected to a salt spray test as defined in EN ISO 9227 for a 480 h, the functional parts are:

— operating devices;

— safety devices;

— control valve;

— pressure indicators;

— hose assemblies.

At the conclusion of the test:

— mechanical operation of all functional parts shall be unimpaired.

There shall be no corrosion of the metal of these parts likely to impair the operation or safety of the extinguisher.

7.2.2 Internal corrosion test for water based extinguishers

Two extinguishers charged in accordance with the manufacturer's filling instructions shall be subjected to the internal corrosion test described in A.7.

There shall be no visible signs of corrosion of the metal or detachment, cracking or bubbling of any protective coating. There shall be no visible change in colour of the extinguishing media other than that resulting from the thermal cycling.

NOTE Allowance should be made for a change of colour that occurs naturally due to the temperature changes. It is recommended that two samples of the extinguishing media are stored in closed glass containers and subjected to the same cycles as the extinguishers in order to establish a reference sample.

7.3 Dielectric test

The dielectric test is designed to determine whether the water based extinguisher is suitable for use on live electrical installations. The test shall be carried out in accordance with EN 3-7.

8 Fire performances

8.1 Class A fire test object

8.1.1 General

Class A test fire shall comply with EN 3-7.

NOTE These fire extinguishers will not be tested on class A fire rating.

8.1.2 Powder extinguishers

The powder shall be already successfully tested by an accredited laboratory in a 9 kg portable fire extinguisher according to EN 3-7 on at least 34 A fire as specified in EN 3-7.

8.1.3 Water based extinguishers

The water based extinguishing media shall be already successfully tested by an accredited laboratory in a 9 l portable extinguisher according to EN 3-7 on at least 13 A as specified in EN 3-7.

8.2 Class B fire test object

8.2.1 General

For powder extinguishers and water based extinguisher (if class B rating is required) the classification of B test fires is given in Table 9.

For CO_2-extinguishers other fire test objects according to EN 3-7 shall be used.

Table 9 — Types of B Fires

Type	Number of 233 B	Number of 21 B
I B	1	1
II B	1	2
III B	1	3
IV B	1	4

The 21B trays shall be installed directly alongside the 233 B tray.

The arrangement shall be as follows:

— IIB at 0° and 180° of the 233 B;

— IIIB at 0°, 120° and 240° of the 233 B;

— IVB at 0°, 90°, 180° and 270° of the 233 B.

A mobile fire extinguisher shall be deemed to satisfy the relevant fire performance requirements when two test fires of a series of three are extinguished. A test series is complete after three fires, or when the first two fires have both been extinguished or have both not been extinguished. Each test series shall be completed before the next is commenced. There is no restriction on the number of series that may be carried out on the same type of portable fire extinguisher without modifications, but a series shall consist of consecutive fires and results shall not be ignored.

The upper parts of the wall of the different trays are put on the same level.

The indicated Class B test fires shall comply with EN 3-7.

8.2.2 Powder extinguishers

Powder extinguishers have to full fill the required type of test fire as per Table 10.

Table 10 — Required B test fire for powder extinguishers

Nominal charge in kg	Minimum required test fire
25	I B
50	II B
100	III B
150	IV B

NOTE If an extinguisher, when part of a range of extinguishers of the same type (same manufacturer; same basic design; same nozzle and same average discharge output rate), achieves a test fire then the larger size will be accepted to have the same fire rating without fire test.

Average discharge output rate = (filling mass/residual mass)/duration of operation.

8.2.3 Water based extinguishers

Water based extinguishers have to full fill the required type of test fire as per Table 11.

Table 11 — Required B test fire for water based extinguishers

Nominal charge in l	Minimum required test fire
20/25	I B
45/50	II B
90/100	III B
135/150	IV B

NOTE If an extinguisher, when part of a range of extinguishers of the same type (same manufacturer; same basic design; same nozzle and same average discharge output rate), achieves a test fire then the larger size will be accepted to have the same fire rating without fire test.

Average discharge output rate = (filling mass/residual mass)/duration of operation.

8.2.4 CO_2 extinguishers

CO_2 extinguishers have to full fill the required type of test fire as per Table 12.

Table 12 — Required B test fire for CO_2 extinguishers

Nominal charge in kg	Minimum required test fire
10	70 B
20	89 B
30	113 B
50	144 B

NOTE If an extinguisher, when part of a range of extinguishers of the same type (same manufacturer; same basic design; same nozzle and same average discharge output rate), achieves a test fire then the larger size will be accepted to have the same fire rating without fire test.

Average discharge output rate = (filling mass/residual mass)/duration of operation.

Annex A
(normative)

Test methods

A.1 Test methods

Except where specified otherwise in the text, fill and charge the extinguishers according to the manufacturer's instructions before testing.

If it is not specified, the required ambient temperature (20 ± 5) °C shall be included for all tests.

A.2 Duration of operation and residual mass

NOTE See 6.3.1.1, 6.3.1.2, 6.3.1.3 and 6.3.2.

With the extinguisher in its normal working position, time the discharge, without interruption and with the valve fully opened.

Carry out the test (15 ± 2) s. after the extinguisher is ready for operation. Weigh the residual mass of the extinguishing media.

A.3 Measurement of the force

NOTE See 6.8.2.

Apply the forces statically and perpendicularly at the normal point where force is used to render the extinguisher operable.

Measure the force with a suitable gauge.

A.4 Measurement of the energy

NOTE See 6.8.2.

The energy of 2 J is obtained as follows:

Placed a cylindrical steel weight with flat surfaces measuring 75 mm diameter and weighing 4 kg is to be in a structure that will allow it to free-fall vertically from a height of 50 mm. Apply the impact in the direction of the operating mode.

A.5 Measurement of leakage of the control valve

NOTE See 6.5.

Operate an extinguisher until the extinguishing media is discharged for between 5 % and 15 % of the duration of the operation and then close the valve by a simple action intended to interrupt the emission of the extinguishing media.

In the case of a cartridge extinguisher the discharge shall take place 3 min after the extinguisher is pressurized.

Measure the internal pressure within (10 ± 2) s of the controllable valve having been closed and again after (300 ± 10) s the valve having remained closed for that period.

A.6 Temperatures test

NOTE See 6.1.2. and 7.1

Subject one extinguisher during 48 h. to the minimum operating temperature and another to the maximum operating temperature for a period of 48 h. Within 5 min of removal from the conditioning chamber the extinguisher shall operate as specified in 6.1.2.

A.7 Internal corrosion test

NOTE See 7.2.2.

Subject the extinguishers eight times to the temperature cycle defined in Table A.1:

Table A.1 — Temperature cycle for internal corrosion test

Stage	Duration	Temperature
	h	°C
1	24 ± 1	TSmin ± 5
2	≥ 24	20 ± 5
3	24 ± 1	TSmax ± 5
4	≥ 24	20 ± 5
NOTE The temperature refers to the ambient temperature of the conditioning chamber. A liquid bath should not be used.		

On completion of the eight temperature cycles, all internal parts shall be examined.

Bibliography

[1] EN 2, Classification of fires

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