BS 5423 : 1987

UDC 614.845

British Standard Specification for

Portable fire extinguishers

Extincteurs d'incendie portatifs — Spécifications

Tragbare Feuerlöscher

BSi British Standards

Amendment No. 1
published and effective from 31 May 1989
to BS 5423 : 1987

Specification for portable fire extinguishers

Revised text

AMD 5989
May 1989

Foreword

At the end of the foreword insert the following.

'Compliance with a British Standard does not of itself confer immunity from legal obligations.'

AMD 5989
May 1989

Clause 11.3 Information

In the last line of item (f), delete '**11.6**' and substitute '**11.5**'.

AMD 5989
May 1989

Clause F.2 Test for minimum burst pressure

Delete the last paragraph, starting 'Subject the component', and substitute the following.

'Apply hydraulic pressure to the component, increasing the pressure from zero to $P_{B_{-0}}^{+1}$ bar in not less than 30 s. For low pressure extinguishers and low pressure cartridges maintain the pressure at $P_{B_{-0}}^{+1}$ bar for 30_{-0}^{+2} s. For high pressure cartridges, further increase the pressure at not more than the previous rate until burst occurs.'

Amendment No. 2
published and effective from 15 May 1994
to BS 5423 : 1987

Specification for portable fire extinguishers

Revised text

Contents list

Delete the titles of tables 2, 3 and 4 and figures 1 and 2 and substitute the word '*Deleted*'.

Clause 2.2 Halons and carbon dioxide acceptable for use

Delete the existing title and text and substitute the following.

'2.2 Halons and carbon dioxide as extinguishing media

2.2.1 Halons

Only halon 1211, which shall comply with BS 6535 : Part 2 : Section 2.1, shall be used.

2.2.2 Carbon dioxide

Carbon dioxide used as the extinguishing medium shall comply with BS 6535 : Part 1.'

Clause 2.3 Propellants

Delete the existing text and substitute the following.

'2.3.1 Halon 1211 and carbon dioxide extinguishers

Any propellant shall be nitrogen, with a water content and tracer content not exceeding those specified in table 1.

2.3.2 Powder extinguishers

The propellant shall be one, or a mixture, of the propellants listed in table 1 with a water content and tracer content not exceeding those specified in table 1.

2.3.3 Water and foam extinguishers

The propellant shall be one, or a mixture of the propellants listed in table 1 with a tracer content not exceeding that specified in table 1.'

Table 1. Propellants

Delete the existing table and substitute the following.

Table 1. Propellants		
Material	**Maximum water content percentage, *m/m*** (not applicable to water and foam extinguishers)	**Maximum tracer gas content percentage, *m/m***
Air	0.006	3.0
Argon	0.006	
Carbon dioxide	0.015	
Helium (conforming to BS 6535 : Part 1)	0.006	
Nitrogen	0.006	

AMD 8110/May 1994

Clause 2.4.2 Halon extinguishers

Delete the number and title of subclause **2.4.2.1** but retain the text.

Delete the numbers, titles and texts of subclauses **2.4.2.2** and **2.4.2.3** entirely.

AMD 8110/May 1994

Clause 3.3 Closures

Delete the existing text and title and substitute the following.

'3.3 Venting

Each closure, and any pressure retaining part 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 closure, or pressure retaining part, securing means is disengaged by not more than one third of full engagement.'

AMD 8110/May 1994

Clause 5.3 Operating head materials

Delete the clause numbers, titles and texts of **5.3.1**, **5.3.2**, **5.3.3**, **5.3.4** and **5.3.5** and substitute the following.

'Operating heads shall be machined from one of the following:

(a) carbon steel; or

(b) austenitic stainless steel; or

(c) copper alloy; or

(d) aluminium alloy.

complying with the material specification for valve bodies of BS 341 : Part 1 : 1991.'

AMD 8110/May 1994

Table 2. Mechanical properties of copper alloys

Delete the existing table.

AMD 8110/May 1994

Clause 5.4.1 Threads of body necks and head stems

Delete the existing text of **5.4.1.1** and **5.4.1.2** and substitute the following.

'**5.4.1.1** *Tapered head stems.* If the operating head stem is tapered the dimensions and tolerances of the stem and the body neck threads shall comply with those specified for 25T tapered valve stems and container neck threads in BS 341 : Part 1 : 1991.

5.4.1.2 *Parallel head stems.* If the operating head stem is parallel the dimensions and tolerances of the stem and the body neck threads shall be as specified 25P parallel valve stems and container neck threads with 'O'-ring seal in BS 341 : Part 1 : 1991.'

AMD 8110/May 1994

5.4.2 Toroidal sealing rings

Delete this subclause entirely and substitute '**5.4.2** *text deleted.*'

AMD 8110/May 1994

5.4.3 Head outlet thread

Delete the existing text and substitute the following.

'The outlet fitting connection of the head shall be as specified for valve outlet connection number 8 in BS 341 : Part 1 : 1991.'

AMD 8110/May 1994

Table 3. Thread of head stem and body neck

Delete the existing table.

AMD 8110/May 1994

Table 4. Thread of head outlet

Delete the existing table.

AMD 8110/May 1994

Figure 1. Thread of head stem and body neck (taper thread)

Delete the existing figure.

AMD 8110/May 1994

Figure 2. Thread for head stem and neck (parallel thread)

Delete the existing figure.

AMD 8110/May 1994

Clause 10.1 General

In the existing text delete lines, 2, 3, 4 and 5 up to and including the words 'type approval,'.

Number the existing 'NOTE' as 'NOTE 1' and add a new NOTE as follows.

'NOTE 2. The quality control scheme should include tests to ensure that all extinguishers and filling packs are charged with extinguishing medium of the performance and specification as tested in the type approval. For powder and foam extinguishers it is appropriate for these tests to include discharge and performance tests; for water, water with additive, carbon dioxide and halon extinguishers discharge and performance testing is not usually necessary if suitable physical and chemical testing is carried out.'

AMD 8110/May 1994

Clause 11.2 Warning markings

Under item (c) in the list identify the existing warning wording as item '(1)' and insert the following text.

'(2) THIS EXTINGUISHER IS NOT SUITABLE FOR USE ON DEEP FAT FIRES.'

AMD 8110/May 1994

Clause 11.3 Information (as amended by Amendment No. 1)

In item (b) of the list delete the existing text from 'the mass of the extinguisher', to '(see **N.3**).' and substitute the following.

'(1) for stored pressure extinguishers not fitted with a pressure indicating device or pressure checking connection, the nominal mass corresponding to an 'L' extinguisher (see **N.3**(b) (1));

(2) for stored pressure extinguishers fitted with a pressure indicating device or pressure checking connection, the pressure or pressure indication corresponding to an 'L' extinguisher (see **N.3**(b) (2)) and the mass (which shall not be less than the minimum nominal fully charged mass less 10 % of the nominal charge) at which the manufacturer recommends the extinguisher should be withdrawn from service;

(3) for cartridge extinguishers, the mass of the cartridge and contents at the reduced content corresponding to an 'L' extinguisher (see **N.3**(b) (3)), and the nominal mass of the extinguisher filled with the lower tolerance of the filling deviation (see **2.1**).'

Delete the existing text of item (g) of the list and substitute the following.

'The following instruction for extinguishers except halon extinguishers:

'Depressurize and recharge after any use'; or 'Depressurize and discard after any use',

whichever is appropriate and the following warning:

'Slacken closures by [manufacturer's appropriate wording to allow automatic release (see **3.3**)] to vent residual pressure before attempting complete removal.' or

the following instruction for halon extinguishers:

'Do not depressurize after any use. Return to supplier or send for processing to recover halon.'

AMD 8110/May 1994

Clause 11.6 Marking of gas cartridges

In line 3 of the note delete 'Although clause **15**(g) of BS 5045 : Part 6 : 1981' and substitute 'Although clause **16** of BS 5045 : Part 6 : 1987'.

In lines 7 and 8 of the note delete 'Similarly clause **15**(i) of BS 5045 : Part 6 : 1981' and substitute 'Similarly clause **16** of BS 5045 : Part 6 : 1987'.

AMD 8110/May 1994

Inside back cover

In the list of publications referred to delete the references to BS 1472, BS 1474, BS 1806, BS 2872, BS 2874, BS 3643 and DIN 477.

Delete the title of BS 341 and substitute the following.

'Transportable gas container valves

Part 1 Specification for industrial valves for working pressures up to and including 300 bar'

AMD 8110/May 1994

Amendment No. 3
published and effective from 15 December 1995
to BS 5423 : 1987

Specification for portable fire extinguishers

Revised text

Clause 11.3 Information (as amended by Amendment No. 1 and No. 2)

Delete clause **11.3** entirely and substitute the following.

11.3 Information

Extinguishers shall be clearly marked with the following.

(a) The manufacturer's or vendor's name and address.

(b) The instruction to inspect the extinguisher regularly; for operational serviceability (see **3.1.3**); possible loss of content or pressure (see **9.4.1**) together with as appropriate:

(1) for stored pressure extinguishers not fitted with a pressure indicating device or pressure checking connection, the nominal mass corresponding to an 'L' extinguisher (see **N.3**(b) (1));

(2) for stored pressure extinguishers fitted with a pressure indicating device or pressure checking connection, the pressure or pressure indication corresponding to an 'L' extinguisher (see **N.3**(b) (2));

(3) for cartridge extinguishers, the mass of the cartridge and its contents at the reduced content corresponding to an 'L' extinguisher (see **N.3** (b) (3)).

(c) The number and date of this British Standard, i.e. BS 5423 : 1987*.

(d) The temperature range over which the manufacturer claims that the extinguisher will operate satisfactorily. Water and foam extinguishers without freezing point depressant shall be marked with a lower limit not less than +1 °C.

(e) The year of manufacture.

(f) The words 'Test pressure...bar' and 'Working pressure (at 20 °C)...bar' (except high pressure extinguishers see **11.5**).

*Marking BS 5423 : 1987 on or in relation to a product is a claim by the manufacturer that the product has been manufactured to the requirements of the standard. The accuracy of such a claim is therefore solely the manufacturer's responsibility. Enquiries as to the availability of third party certification to support such claims should be addressed to the appropriate certification body.

(g) The following instruction for extinguishers except carbon dioxide and halon extinguishers:

'Depressurize and recharge after any use'; or
'Depressurize and discard after any use',

whichever is appropriate and the following instruction for halon extinguishers:

'Do not depressurize after any use. Return to supplier or send for processing to recover halon.'

the following instruction for carbon dioxide extinguishers:

'Recharge after any use.'

(h) Where appropriate, a warning that refillable extinguishers should be recharged in accordance with BS 6643 : Part 1 by a competent person and should comply with the requirements of **2.7** of this British Standard.

(i) The instruction (with reference to any separate leaflet) to service and maintain the extinguisher regularly.

NOTE. Full maintenance instructions for the fire extinguisher should either be marked on the extinguisher, or supplied with the refill, or be given on a separate leaflet as appropriate.

(j) The manufacturer's identification of the extinguishing medium (which may be by means of a reference number).

(k) The manufacturer's identification of any freezing point depressant (which may be by means of a reference number) and the maximum amount which may be used.

NOTE. A tag or label for recording the dates, etc. of servicing is often fixed to extinguishers. This should not obscure any of the markings required or recommended in this clause.

AMD 8585/December 1995

Contents

Foreword

This British Standard is published under the direction of the Fire Standards Committee and is a revision of BS 5423 : 1980, which is now withdrawn, and which in turn had superseded BS 138, BS 740, BS 1382, BS 1721, BS 3326, BS 3465, BS 3709 and BS 5423 : 1977.

An additional new section covering requirements for aircraft extinguishers has been added, superseding British Standard M 29 which is withdrawn.

Account has been taken of the work done by Technical Committee CEN/TC 70, Portable Fire Extinguishers, of the European Committee for Standardization (CEN).

CEN/TC 70 is preparing a European Standard EN 3 of which Parts 1, 2, 4 and 5 have been published and Part 3 is in preparation. The UK has not accepted any of the four published Parts but substantial portions of these documents have been included in this British Standard and Part 3, when published, will be considered with a view to incorporation in this British Standard.

The Commission of the European Communities (CCE) has under consideration a directive for fire extinguishers. Gas cartridges and the bodies of carbon dioxide extinguishers may also be made the subject of a directive of the EEC.

The maximum mass of 23 kg in the definition of 'portable extinguisher' is based on agreement reached in CEN/TC 70. For some persons a mass of 23 kg may not be readily portable and BS 5306 : Part 3 draws attention to the necessity for considering the strength of persons likely to have to use an extinguisher.

Recommendations for the siting and distribution of extinguishers on premises, the suitability of various types for use on fires of different substances, the intervals between routine inspections, details of the maintenance to be carried out at stated intervals and recommended intervals between periodic testing by discharge are given in BS 5306 : Part 3.

That code of practice applies to extinguishers which are installed for the protection of buildings and other premises, but not small private dwellings, and although it does not apply to plant, caravans, small or large marine craft and motor vehicles, much of its content could be so applied.

For the assistance of domestic users and owners of cars, caravans and boats, who may not readily consult BS 5306 : Part 3, it is recommended that distributors of extinguishers likely to be used by such persons should attach a label giving an explanation of the test fire rating system in order that the limitations and suitability for the risk of the fire extinguishers may be appreciated.

In this British Standard requirements are specified for performance in extinguishing test fires of Class A (solid materials) or Class B (liquids or liquefiable solids) according to the classification of BS 4547, and for the assignment of test fire performance ratings. The use and application of these ratings is explained in BS 5306 : Part 3. There are no requirements given for Class C (gases). Extinguishing performance and requirements for Class D (metals) are considered to be a specialist application and are not incorporated in this standard.

Recommendations (see appendix R) for colour coding to indicate the type of extinguishing medium are expressed in a new format which more clearly reflects existing practice. Requirements and recommendations for marking to identify the types of fire for which an extinguisher is most suited have been included.

When BS 5423 was first published in 1977, total discharge extinguishers (i.e. extinguishers not fitted with a means of interrupting the discharge) were not included, although they were included in some of the superseded specifications. It was considered that controllable discharge extinguishers had significant and sufficient advantages to justify this exclusion. These were a reduction in the number of methods of operation, being able to shut-off the discharge after accidental operation or after extinction, thus reducing contamination and retaining some immediate fire-fighting capability and allowing correction of a too early operation of the extinguisher by the operator while being too far from the fire for effective use.

While the above points remain valid for general applications of portable extinguishers, for some applications the advantages of total discharge extinguishers are sufficient to merit their use, in preference to controllable discharge extinguishers. Such applications are where there are fully trained and experienced operators, where contamination by the extinguishing medium is less important, where access for maintenance and recharging is more difficult, and in an aggressive environment where the operation of the more simple operating mechanism of total discharge extinguishers is less likely to be impaired.

Inclusion of total discharge extinguishers in this revision was proposed but rejected. It was considered that controllable discharge extinguishers best met the needs of almost all users, that they represented the larger part of production of extinguishers, and that the change would cause confusion in reference to both this British Standard and to BS 5306 : Part 3, and that the specialized needs of users of total discharge extinguishers could be met by the use of a purchasing specification with selective reference to this British Standard.

The text has been completely rearranged, in particular to distinguish the tests required to be made during production from those for type approval.

In this revision extinguishers are divided into pressure groups; low pressure extinguishers with a working pressure not exceeding 25 bar, and high pressure extinguishers. The higher pressure of 35 bar is used to differentiate between low pressure and high pressure gas cartridges.

High pressure extinguishers include only all carbon dioxide extinguishers and some halon extinguishers. This restriction has been applied because the applicability of the design formulae of BS 5045 (intended for permanent and liquefiable gases) to powder, water and foam extinguishers has not been considered. It is believed that all powder, water and foam extinguishers currently available are in fact low pressure extinguishers.

The word 'halon' which is in common use internationally is used instead of 'vaporizing liquid' in order to make convenient reference to those halogenated hydrocarbons used in extinguishers. The list of acceptable halons does not include some which have been used in extinguishers, for example carbon tetrachloride, which is considered unsuitable because of its toxic properties.

This British Standard calls for the use of substances and/or procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

Product certification. Users of this British Standard are advised to consider the desirability of independent certification of product conformity with this British Standard based on testing and continuing surveillance, which may be coupled with assessment of a supplier's quality systems against the appropriate Part of BS 5750.

Section one. General

1.1 Scope

This British Standard specifies requirements for rechargeable and non-rechargeable metal-bodied portable fire extinguishers containing an extinguishing medium which can be expelled by the action of internal pressure. Extinguishers are classified according to the extinguishing medium they contain. The types referred to in this standard are water, foam, powder, carbon dioxide and halon.

The specification is arranged in sections. The requirements of sections two, three, nine, ten and eleven are general and are applicable as indicated, unless excepted in the text. Requirements, additional to the above general requirements, are given in sections four, five and eight for low pressure extinguishers, high pressure extinguishers and cartridges respectively. Further additional requirements for non-rechargeable extinguishers with permanently attached swaged closures are given in section six, and for extinguishers intended for use in aircraft in section seven. Appendix A gives a test schedule recommended as suitable for type approval assessment. Appendices B to Q give test methods to be used for the verification of requirements. Appendix R gives recommendations for the colour of extinguishers. Appendix S gives requirements for a type of bracket and mounting which is suitable for Ministry of Defence requirements.

NOTE 1. Unless otherwise specified in the text all pressures are gauge pressures and are expressed in bars.

1 bar = 10^5 N/m^2 = 10^2 kPa

NOTE 2. The titles of the publications referred to in this standard are listed on the inside back cover.

1.2 Definitions

For the purposes of this British Standard the definitions given in BS 4547 apply together with the following.

1.2.1 body. The metal shell of an extinguisher, excluding all closures, safety devices and pressure indicators, designed to contain the extinguishing medium, and including any skirt.

1.2.2 charge. The mass or volume of the extinguishing medium contained in the extinguisher expressed in kilograms (powder, halon or carbon dioxide) or litres (water or foam), or the mass of propellant in a gas cartridge expressed in grams.

1.2.3 closure. A component, other than a safety device or pressure indicator, subject to the working pressure and used to close off and seal the filling or pressurizing openings, or both, in the body.

1.2.4 extinguisher. An appliance containing an extinguishing medium that can be expelled by the action of internal pressure and directed on to a fire.

NOTE. This pressure may be stored pressure or be obtained by the release of gas from a cartridge.

1.2.5 controllable discharge extinguisher. An extinguisher fitted with a device to interrupt the discharge of medium.

1.2.6 foam extinguisher. An extinguisher containing an aqueous extinguishing medium expelled as a foam or spray, which achieves class A and class B ratings.

1.2.7 free-standing extinguisher. An extinguisher designed to stand vertically on a flat horizontal surface.

1.2.8 gas cartridge extinguisher. An extinguisher in which the propellant is contained in a gas cartridge, not in the body as a whole.

1.2.9 high pressure extinguisher. An extinguisher whose working pressure (P_S) (see **1.2.23**) exceeds 25 bar.

1.2.10 low pressure extinguisher. An extinguisher whose working pressure (P_S) (see **1.2.23**) does not exceed 25 bar.

1.2.11 non-rechargeable (disposable) extinguisher. An extinguisher designed not to be recharged in the field or at the factory, but intended to be discarded after use.

1.2.12 portable extinguisher. An extinguisher which is designed to be carried and operated by hand and which in working order has a mass of not more than 23 kg.

1.2.13 rechargeable extinguisher. An extinguisher designed to be recharged after use.

1.2.14 stored pressure extinguisher. An extinguisher in which the propellant gas is stored with the extinguishing medium in the body as a whole and in which the extinguisher body is permanently pressurized.

1.2.15 water extinguisher. An extinguisher containing an aqueous extinguishing medium, which achieves only a Class A rating.

1.2.16 extinguishing medium. The substance, including any admixture such as corrosion inhibitor, freezing point depressant or blowing agent, contained in the extinguisher that causes extinction.

1.2.17 filling density. A term applicable to the charge of a halon or carbon dioxide extinguisher, or a gas cartridge. It is the mass in kilograms of charge per litre of container volume, as fitted for use, i.e. complete with valve and internal fittings.

1.2.18 gas cartridge. A pressure container that fits into, or is attached to, the fire extinguisher and that contains the propellant (see **1.2.24**). If the pressure does not exceed 35 bar at 20 °C, the pressure container is designated a low pressure type, and if the pressure exceeds this value, it is designated a high pressure type.

1.2.19 head (operating head). The component that carries the primary, or only, operating mechanism of the extinguisher.

1.2.20 halon. A halogenated hydrocarbon used as an extinguishing medium.

NOTE. Halons are designated by a number in which:

(a) the first digit is the number of the carbon atoms in the molecule;

(b) the second digit is the number of fluorine atoms in the molecule;

(c) the third digit is the number of chlorine atoms in the molecule; and

(d) the fourth digit is the number of bromine atoms in the molecule.

Thus bromochlorodifluoromethane is halon 1211. The halon number does not distinguish between isomers.

1.2.21 design burst (P_B) pressure. A pressure of not less than $3.375P_S$ (see **1.2.23**) or 50 bar whichever is the greater. The term is applied to low pressure extinguishers and cartridges, and to high pressure extinguishers except carbon dioxide types.

1.2.22 design test (P_E) pressure. The pressure equal to $1.35P_S$ (see **1.2.23**) rounded to the next higher integral value. The term is applied to low pressure extinguishers and cartridges and to high pressure extinguishers except carbon dioxide types.

1.2.23 working (P_S) pressure. The equilibrium pressure developed within the extinguisher or cartridge when filled with the nominal charge (see **1.2.2** and **2.1**) and at a temperature of 60 °C.

1.2.24 propellant. A gas in a liquefied or compressed state, that provides the internal pressure used to expel the extinguishing medium.

1.2.25 range. The range of discharge of a water or foam extinguisher (jet or spray) is the mean discharge length and is the distance from the nozzle to the point on the ground beyond which 50 % of the discharge falls.

Section two. Contents, filling and overall mass of extinguishers

2.1 Filling deviation

The actual charge of an extinguisher shall be the nominal charge within the limits:

(a) for water and foam extinguishers $^{+0}_{-5}$ %, by volume

(b) for powder extinguishers

up to and including 1 kg nominal charge	±5 % by mass
more than 1 kg and less than 3 kg nominal charge	±3 % by mass
not less than 3 kg nominal charge	±2 % by mass

(c) for halon extinguishers $^{+0}_{-5}$ %, by mass

(d) for carbon dioxide extinguishers $^{+0}_{-5}$ %, by mass

2.2 Halons and carbon dioxide acceptable for use

2.2.1 Halons

Halon 1211 (bromochlorodifluoromethane) or halon 1301 (bromotrifluoromethane) or mixtures thereof shall be used. Halons shall comply with BS 6535 : Part 2.

2.2.2 Carbon dioxide

Carbon dioxide used in carbon dioxide extinguishers shall comply with BS 6535 : Part 1.

2.3 Propellants

Only propellants listed in table 1, or mixtures thereof, shall be used in extinguishers, whether of the stored pressure or gas cartridge type. The maximum water content shall be as specified in table 1 except when used in stored pressure water or foam extinguishers. Carbon dioxide shall comply with BS 6535 : Part 1. Tracers may be added to the propellant to facilitate leakage detection, but the content shall not exceed 3 % *m/m* of the propellant content.

Table 1. Propellants

Material	Maximum water content Percentage, *m/m*
Air	0.006
Argon	0.006
Carbon dioxide	0.015
Helium	0.006
Nitrogen	0.006

2.4 Filling density for carbon dioxide and halon extinguishers

2.4.1 Carbon dioxide extinguishers

The maximum filling density shall be either:

(a) 0.667 kg/L (filling density No. 1); or

(b) 0.500 kg/L, with a superimposed nitrogen pressure of not more than 14 bar above the normal pressure at 18 °C (filling density No. 2).

2.4.2 Halon extinguishers

2.4.2.1 *Halon 1211.* The maximum filling density for halon 1211 extinguishers shall be 1.47 kg/L.

2.4.2.2 *Halon 1301.* The maximum filling density for halon 1301 extinguishers shall be either:

(a) 0.74 kg/L if a pressure relief device complying with **5.2** is not fitted; or

(b) 1.12 kg/L if a pressure relief device complying with **5.2** is fitted.

2.4.2.3 *Mixtures.* The filling density for mixtures of halon 1211 and halon 1301 shall not exceed that given by the equation:

$$\text{Maximum filling density} = \frac{A \times 1.47}{100} + \frac{(100 - A)}{100} \times 0.74 \text{ kg/L}$$

where

A is the percentage by mass of halon 1211.

Allowance shall be made for the production tolerances on composition of the mixture and the filling density calculated for the maximum content of halon 1301.

2.5 Corrosion inhibitor

If a corrosion inhibitor is used, it shall not constitute more than 5 % by mass of the nominal charge of the extinguisher.

2.6 Freezing point depressant

If a freezing point depressant is used, extinguishers (except those complying with section seven) shall comply with this specification both with the freezing point depressant at the maximum recommended concentration, and without it. (See **9.7.5.**)

2.7 Cleanliness and contents

2.7.1 Carbon dioxide, halon and powder (stored pressure) extinguishers

These shall be supplied filled with the extinguishing media and pressurized and the extinguisher body shall be clean and dry internally at the time of filling.

2.7.2 Water and foam extinguishers

2.7.2.1 Where these extinguishers are supplied uncharged, they shall be supplied with full instructions for filling and pressurizing, and with the requisite gas cartridge, foam concentrate, corrosion inhibitor etc., or with appropriate information regarding these. The instructions shall include wording advising that the extinguisher be clean, but not necessarily dry, at the time of filling.

2.7.2.2 Where these extinguishers are supplied charged, the extinguisher body shall be clean at the time of filling.

2.7.3 Powder (gas cartridge) extinguishers

2.7.3.1 Where these extinguishers are supplied filled and/or charged, the body shall be clean and dry internally at the time of filling. If the cartridge is not fitted, identification of the correct cartridge shall be supplied together with fitting instructions.

2.7.3.2 Where these extinguishers are supplied empty, full instructions for recharging, and either the requisite cartridge and powder, or a specification or an identification (which may be by reference to a trade name) for these shall be supplied.

2.8 Maximum overall mass

The mass of extinguishers complete with all fittings, and charged with the nominal charge and propellant shall not exceed 23 kg.

Section three. Construction. All extinguishers

3.1 Method of operation and discharge control

3.1.1 Extinguishers shall be operated by piercing, opening and/or breaking a sealing device and thus releasing the contents. The method of operation shall be readily apparent. It shall not be necessary for any movement of the actuating mechanism or mechanisms to be repeated in order to initiate discharge.

3.1.2 Extinguishers shall operate without inversion.

3.1.3 Extinguishers shall be so designed that it is apparent whether or not they may have been operated.

3.1.4 Extinguishers shall incorporate a device to prevent inadvertent operation which shall be so constructed that any unaided manual attempt to initiate discharge will not deform or break any part that would prevent the subsequent discharge of the extinguisher.

3.1.5 Extinguishers shall incorporate a controllable discharge device to enable the discharge to be interrupted, and shall comply with **9.5** and **9.6**.

3.2 Mounting

3.2.1 Extinguishers intended for wall mounting shall be provided with a mounting bracket.

NOTE. See appendix S for requirements for a type of bracket and mounting suitable for Ministry of Defence requirements.

3.2.2 Extinguishers of a nominal charge of more than 3 kg or 3 L, and extinguishers which are free-standing, shall either be fitted with means to raise the pressure-retaining part of the body at least 6 mm above the floor, or the thickness of metal in the lowest pressure-retaining part or parts of the body shall be not less than 1.5 times the minimum thickness of the cylindrical part of the body.

3.3 Closures

There shall be provision for the automatic release of any pressure remaining in the extinguisher before the complete removal of any closure or the complete removal of any detachable pressure release device or pressure indicator, except those who do not retain pressure or which are not intended to be removed for servicing or maintenance.

3.4 Hose and nozzle

Extinguishers of nominal charge more than 3 kg or 3 L shall be fitted with a discharge hose and nozzle. Any hose and nozzle assembly shall have a length not less than 80 % of that of the extinguisher body. Any reinforcement in the hose shall be completely embedded.

Any hose shall not be under pressure until the extinguisher is operated.

The hose shall be capable of a 90 ° bend on the length used without kinking or cracking, in the unpressurized state at the minimum and at the maximum operating temperatures before and after carrying out the test described in appendix Q.

3.5 Handle

Extinguishers of nominal charge of more than 3 kg or 3 L shall have a carrying handle that shall not deform in any way that prevents operation of the extinguisher or the normal use of the handle, and that shall not break during manual handling in preparing for, or carrying out, any of the tests, appropriate for the extinguisher, specified in BS 5423.

Section four. Construction. Low pressure extinguishers

4.1 Sealing of gas cartridge powder extinguishers

Gas cartridge powder extinguishers shall be sealed to prevent loss of extinguishing medium or the ingress of moisture.

4.2 Corrosion resistance

4.2.1 All extinguishers

There shall be no internal or external signs of corrosion of the parent metal of extinguisher bodies or their fittings, including any pressure relief device, when extinguishers are tested by the method described in appendix C.

4.2.2 Extinguishers with internal lining (including plastics)

There shall be no complete detachment of any part of the lining nor any signs of corrosion of the parent metal when extinguishers are tested by the method described in appendix C.

4.3 Resistance to impact

Extinguishers shall not release pressure in a potentially dangerous manner when tested by the method described in appendix D, and subsequently shall comply with **4.5**.

4.4 Resistance to shock and mechanical damage

Extinguishers shall show no perceptible leakage permitting loss of pressure or detachment of pressure retaining parts during or immediately after the test described in appendix E.

4.5 Resistance to internal pressure

Extinguisher bodies, and all fittings subject to pressure, except pressure indicators and pressure relief devices and fittings designed to be ruptured by pressure on operation, shall withstand an internal pressure equal to the test pressure P_E (see **1.2.22**) for a continuous period of $30\ ^{+2}_{-0}$ s without perceptible leakage or permanent distortion, when tested by the method described in **F.1**.

4.6 Minimum burst pressure

Extinguisher bodies and all fittings subject to pressure, except pressure relief devices and fittings designed to be ruptured by pressure on operation, shall not burst or otherwise suddenly release pressure at a pressure less than the burst pressure (P_B) (see **1.2.21**) when tested by the method described in **F.2**. Leakage at joints does not constitute failure to meet this requirement provided the pressure P_B is maintained for 30 s and leakage rate does not exceed 10 mL/s.

4.7 Foam and water extinguishers

4.7.1 Discharge strainer for water and foam extinguishers

Water and foam extinguishers shall have a strainer at the intake end of the dip-tube or nozzle. The size of the holes in the strainer shall be less than that of the smallest orifice and the aggregate area of holes shall be not less than the area of the bore of the internal discharge tube.

4.7.2 Adhesion of plastics linings

Foam and water extinguishers with an internal plastics lining shall show no cracking, separation from the wall of the body or lifting of the lining, nor shall there be any bubbles between the lining and the body when tested by the method described in appendix G.

4.7.3 Continuity of plastics linings

When tested by the method described in appendix H, the resistance of plastics linings shall be not less than 500 MΩ.

4.7.4 Electrical conductivity of extinguisher discharge

Water and foam extinguishers that are not marked with the warning given in **11.2**(a), shall not pass a current of more than 0.5 mA when tested by the method described in appendix J.

4.7.5 Sealing of gas cartridge extinguishers

When tested by the method described in appendix K, there shall be no loss of liquid from water or foam gas cartridge extinguishers caused by:

(a) changes in atmospheric conditions;

(b) the evolution of small quantities of gas;

(c) the siphoning action when the extinguisher is restored to its normal position after a simulated accidental upset.

4.7.6 Liquid level indicator

Rechargeable foam and water extinguishers that are intended to be recharged in the field shall have either:

(a) the correct filling level clearly indicated, or demonstrable without the use of additional equipment; or

(b) means to prevent overfilling.

Section five. Construction. High pressure extinguishers

NOTE. High pressure extinguishers include only all carbon dioxide extinguishers and some halon extinguishers.

5.1 Body

Extinguisher bodies shall comply with one of the following:

(a) BS 5045 : Part 1;

(b) BS 5045 : Part 2;

(c) BS 5045 : Part 3.

5.2 Pressure relief device

NOTE. Carbon dioxide extinguishers (see **5.4.4**) and certain halon extinguishers (see **2.4.2**) are required to have pressure relief devices.

5.2.1 General

Any pressure relief device fitted to a high pressure extinguisher shall incorporate an anti-recoil device and shall comply with the appropriate requirements of the appropriate Part of BS 5045 which are summarized in **5.2.2**, **5.2.3** and **5.2.4**.

5.2.2 Outlets

The outlets from all pressure relief devices shall be so sited that free discharge is not impaired.

NOTE. The cooling effect of the contents of the extinguisher during pressure relief should not prevent the effective operation of the device. The outlets should prevent the collection of moisture or other foreign matter that could adversely affect the performance of the device.

5.2.3 Pressure relief valve

If a pressure relief valve is fitted to an extinguisher, it shall be of the spring-loaded type.

NOTE. Where practicable, the pressure at which the relief valve is designed to start lifting should be marked on the relief valve or the outlet valve body where the relief valve forms part of the outlet valve. The full discharge rate from the pressure relief valve should be attained at a pressure not greater than the test pressure (as specified in the appropriate Part of BS 5045) of the extinguisher body. The pressure relief valve should be so constructed as to prevent unauthorized interference with the relief pressure setting during service.

5.2.4 Bursting discs

If a bursting disc is fitted to an extinguisher, it shall comply with BS 2915.

NOTE. The pressure at which the bursting disc is to rupture should, where practicable, be stamped on the bursting disc holder. Rupture should occur at a pressure not greater than the test pressure (as specified in the appropriate Part of BS 5045) of the extinguisher body. If an extinguisher is liable to be subjected to vacuum conditions during servicing or filling, the bursting discs should be fitted with vacuum supports.

5.3 Operating head materials

5.3.1 General

Operating heads shall be machined from one of the following:

(a) carbon steel complying with **5.3.2**; or

(b) austenitic stainless steel complying with **5.3.3**; or

(c) copper alloy complying with **5.3.4**; or

(d) aluminium alloy complying with **5.3.5**.

NOTE. In selecting an appropriate material for head fittings, it is important to design not only for adequate strength in service but also to give consideration to other modes of possible metallic failure, such as atmospheric corrosion, brass dezincification, stress corrosion, shock loads, etc.

Extinguisher heads for use with aluminium alloy bodies manufactured from materials of construction that are not compatible with aluminium alloys, the contents of the extinguisher, or the environment in which the extinguisher is used should be protected by a suitable coating or plating.

5.3.2 Carbon steel

Forged carbon steel, normalized to grade 070M20 of BS 970 : Part 1 shall be used. Chemical composition and mechanical properties shall comply with BS 970 except that:

(a) the sulphur content of the material shall be within the limits of 0.025 % and 0.050 %; and

(b) Charpy V-notch impact tests shall be carried out in accordance with **1.13.3** of BS 970 : Part 1 : 1983. Impact values of not less than 34 J shall be attained.

If any samples do not comply with the requirements of (a) and (b), re-tests shall be carried out in accordance with **1.16** of BS 970 : Part 1 : 1983.

Samples for macroscopic examination shall be prepared from the full cross section of the top end of the top billet and the bottom end of the bottom billet rolled from each ingot to be used in the manufacture of the valve body. The macro section shall show the material to be sound and free from laps, large non-metallic inclusions or other harmful defects.

5.3.3 Austenitic stainless steel

Austenitic stainless steel shall comply with grade 303S11 of BS 970 : Part 1. Chemical composition and mechanical properties shall be in accordance with BS 970, except that:

(a) the minimum 0.2 % proof stress shall be 196 N/mm^2; and

(b) the hardness value shall be within the range 140 HB to 183 HB.

5.3.4 Copper alloys

Leaded brass shall be in accordance with grade CZ122 or CZ128 of BS 2872 or BS 2874 and additionally shall comply with the mechanical properties given in table 2.

NOTE. The high tensile brass CZ 115 of BS 2872 or BS 2874, formerly used sometimes for operating heads of carbon dioxide extinguishers, does not meet the above requirements.

Table 2. Mechanical properties of copper alloys

Property	Value
Minimum tensile strength	386 N/mm^2
Minimum 0.2 % proof stress	160 N/mm^2
Minimum elongation	15 %
Minimum Izod impact test value	20 J
Hardness	100 HB to 150 HB

5.3.5 Aluminium alloys

Forgings or extruded bar shall comply with grade 6082TF of BS 1472 or BS 1474. Chemical composition and mechanical properties shall comply with BS 1472 or BS 1474 except that the minimum elongation of forgings in accordance with BS 1472 shall be 6 %.

5.4 Additional requirements for carbon dioxide extinguishers

5.4.1 Threads of body necks and head stems

5.4.1.1 *Taper threads.* Taper threads shall comply with either:

(a) figure 1 and table 3, i.e. they shall be of right-hand Whitworth form, having a pitch of 14 threads per inch cut normal to the surfaces of the cone; or

(b) BS 341 : Part 1.

NOTE. The thread dimensions of figure 1 and table 3 are those given in DIN 477 Sheet 1, 'Gas cylinder valves, types, sizes, connections, threads', which is used in some parts of Europe. The taper differs from that of the similar thread in BS 341 : Part 1.

5.4.1.2 *Parallel threads.* Parallel threads shall comply with BS 3643 and shall be as shown in figure 2, and shall be provided with an O-ring housed as shown in figure 2.

5.4.2 Toroidal sealing rings

Where a toroidal sealing ring ('O' seal) is used to seal between the body and head, it shall comply with BS 1806 size No. 214.

5.4.3 Head outlet thread

The head outlet thread shall be either as shown in table 4, i.e. of right-hand Whitworth form and pitch of 14 threads per inch parallel, or it shall comply with BS 341 : Part 1.

Table 3. Thread of head stem and body neck

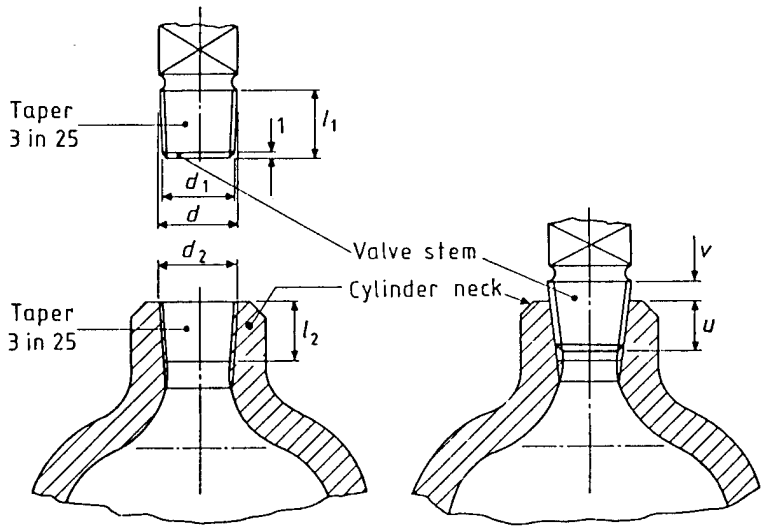
Gas cylinder valve		Head stem			Assembly		Body neck	
Nominal size	Type	d +0.12	d_1 +0.12	l_1	u at theoretical thread dimensions	V at theoretical thread dimensions	d_2 −0.12	l_2 min.
		mm	mm	mm	mm	mm	mm	mm
28.8	A	28.8	25.8	26	17.67	8.33	27.8	22

Table 4. Thread of head outlet (Thread size W21.80 × 1/14 in)

Heat outlet external thread						Union connection internal thread				
Major diameter d		Effective diameter d_2		Minor diameter d_1		Major diameter D	Effective diameter D_2		Minor diameter D_1	
mm max.	mm min.	mm max.	mm min.	mm max.	mm min.	mm min.*	mm min.	mm max.	mm min.	mm max.
21.780	21.387	20.638	20.503	19.476	19.117	21.800	20.638	20.733	19.496	20.066

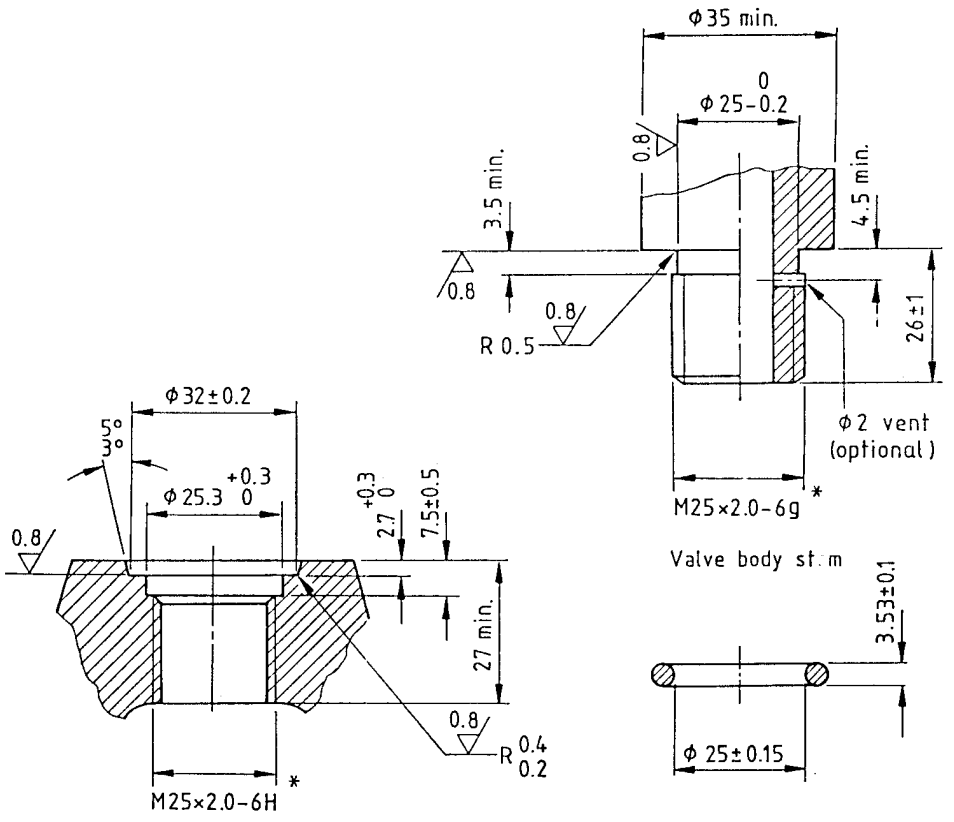
*No maximum is specified for the major diameter.

NOTE. The thread dimensions of table 4 are those of DIN 477 Sheet 1, 'Gas cylinder valves, types, sizes, connections, threads', which is used in some parts of Europe.



Dimensions are in millimetres.

Figure 1. Thread of head stem and body neck (taper thread)



All dimensions are in millimetres.
*Thread in accordance with BS 3643.
†BS 1806 'O' seal size No. 214.

Figure 2. Thread for head stem and neck (parallel thread)

5.4.4 Pressure relief device

The extinguisher shall be provided with a pressure relief device complying with **5.2**, arranged so as to release the gas at an internal pressure between 180 bar and 200 bar at 20 ± 5 °C.

5.4.5 Internal discharge tube

Internal discharge tubes shall remain fixed to the operating head after being subjected to the test described in **M.5**, and the two discharge times shall not differ by more than 4 s.

5.4.6 Fittings

Fittings including the head and any hose, with its couplings, but excluding the pressure relief device fitted to a carbon dioxide extinguisher, shall be capable of withstanding an internal pressure of 285 $^{+5}_{-0}$ bar for a continuous period of not less than 30 $^{+2}_{-0}$ s without perceptible leakage or permanent distortion when tested by the method described in **F.1**.

5.4.7 Nozzle and discharge horn

5.4.7.1 *Electric strength.* When tested by the method described in appendix L, there shall be no electrical flash-over or breakdown of the material of the discharge horn.

5.4.7.2 *Adjustable horns.* A horn fitted directly to the discharge head and intended to be adjustable shall be constructed with a joint which enables the horn to be directed without being held in position.

5.4.7.3 *Securing clips.* Where a horn is not fitted directly to the discharge head but to a hose, provision shall be made for securing it when not in use, either by clips or other means that provide for quick release.

5.4.7.4 *Handgrip.* Extinguishers with a hose shall have a handgrip on the nozzle or horn constructed of thermal insulating material that will protect the operator's hand from the freezing effects of the discharge.

5.5 Additional requirements for high pressure halon extinguishers

5.5.1 Fittings

5.5.1.1 *Resistance to internal pressure.* Fittings, including the head and any hose and couplings subject to pressure, but excluding any pressure relief device, shall withstand an internal pressure equal to the test pressure P_E (see **1.2.22**) for a continuous period of 30 $^{+2}_{-0}$ s without perceptible leakage or permanent distortion, when tested by the method of **F.1**.

5.5.1.2 *Minimum burst pressure.* Fittings, including the head and any hose and couplings subject to pressure, but excluding any pressure relief device shall not burst or otherwise suddenly release pressure at a pressure less than the burst pressure (P_B) (see **1.2.21**) when tested by the method of **F.2**. Leakage at joints does not constitute failure to meet this requirement, provided the pressure P_B is maintained for 30 s and leakage rate does not exceed 10 mL/s.

5.5.2 Corrosion resistance

5.5.2.1 *All extinguishers.* There shall be no internal or external signs of corrosion of the parent metal of extinguisher bodies or their fittings, including any pressure relief device, when extinguishers are tested by the method described in appendix C.

5.5.2.2 *Extinguishers with internal lining (including plastics).* There shall be no complete detachment of any part of the lining nor any signs of corrosion of the parent metal when extinguishers are tested by the method described in appendix C.

Section six. Additional requirements for non-rechargeable extinguishers with permanently attached swaged closures

6.1 Maximum capacity

The gross water capacity of the body shall not exceed 2.5 L.

6.2 Closures

Closures shall be of austenitic stainless steel complying with grade 304S15 of BS 1449 : Part 2. Closures shall be swaged under the neck ring of the extinguisher body.

6.3 Dimensions

The actual swage diameter, and the actual swage depth, shall not differ by more than ± 0.25 mm from the manufacturer's specified nominal values.

Section seven. Additional requirements for aircraft extinguishers

7.1 Classification

Extinguishers intended for use in aircraft shall be classified as one of the following:

(a) type 1(C), which shall contain only acceptable halon or halons (see **2.2.1**) as the extinguishing medium; or

(b) type 1(M), which shall contain only halon 1211 as the extinguishing medium; or

(c) type 2, which shall contain water with a freezing point depressant as the extinguishing medium.

NOTE. The classification (C) denotes application for civil use only, and (M) denotes application for civil or military use.

7.2 Method of operation and discharge control

Extinguishers of overall mass 5 kg or less shall be intended to be carried and used with one hand. It shall be possible to carry out all the handling and the operation of these using one hand only when carrying out the tests described in appendices M and N.

7.3 Discharge at an angle

While being held at 60 ° to the vertical position, extinguishers shall discharge not less than the following:

(a) for type 1: 75 % of the contents (during the liquid phase of the extinguishing medium discharge) (see also **7.4.2** for type 1(M));

(b) for type 2: 85 % of the contents;

when tested by the method described in **M.3.**

7.4 Bracket

7.4.1 Extinguishers shall be provided with a mounting bracket which shall hold the extinguisher securely against either acceleration class 11 for type 1(M) extinguishers, or acceleration class 13 for type 1(C) and type 2 extinguishers, when tested by the method specified in British Standard 3G 100 : Part 2 : Section 3 : Subsection 3.6.

7.4.2 After testing for compliance with **7.4.1**, type 1(M), extinguishers shall comply with **7.3** and **7.4.5.**

NOTE. This requirement determines compliance with British Standard 3G 100 : Part 2 : Section 3 : Subsection 3.6 for equipment of crash acceleration grade F.

7.4.3 The bracket shall prevent operation of the extinguisher by unaided manual means whilst in the bracket.

7.4.4 It shall not be possible to mount the extinguisher upside down in the bracket.

7.4.5 It shall be possible to remove an extinguisher of overall mass 5 kg or less from its bracket using one hand only.

NOTE. The bracket design should be such as to minimize the possibility of inadvertent opening of the bracket release by snagging on clothing etc.

7.5 Duration of discharge

The duration of discharge (see **9.1**) shall be not less than 10 s when measured by the method described in **M.1.**

7.6 Test fire rating

Type 1 aircraft extinguishers of nominal charge of not less than 1.5 kg shall have test fire ratings not less than 3A or 34B as appropriate (see **9.7**).

7.7 Additional extinguishing requirements for type 1 extinguishers

Type 1(M) aircraft extinguishers shall extinguish the 13 B test fire when tested at − 30 ± 2 °C and at +55 ± 2 °C, by the method described in **N.6.**

7.8 Additional marking for extinguishers and brackets

In addition to the appropriate markings specified in section eleven, aircraft extinguishers shall be marked with the full and empty masses in kilograms, with or without the operating head as appropriate; and brackets for type 1 extinguishers shall be marked to indicate suitability for (C) or (M) application (see **7.4**).

NOTE 1. Attention is drawn to British Standard G 229, which is identical to ISO 7137 : 1981, an endorsement of publications EUROCAE/ED-14A and RTCA/DO-160A. These latter have been superseded by EUROCAE/ED-14B and RTCA/do-160B*. ISO 7137 is under revision and there may be a corresponding revision of G 229. Attention is also drawn to British Standard 3G 100 in general.

NOTE 2. Purchasers, or approving authoritiest may specify requirements, additional to those of section seven of this standard, for aircraft extinguishers for general or particular application which make reference to the above standards or publications.

Such requirements were not included in British Standard M 29 which is superseded by this specification. They are not included here but may be considered for a future amendment to this standard.

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*These publications can be obtained from:
EUROCAE (European Organization for Civil Aviation Electronics), 11 Rue Hamelin, 75783 Paris Cedex 16, FRANCE.
RTCA (Radio Technical Commission for Aeronautics), One McPherson Square, 1425 K Street NW, Suite 500, Washington, DC 20005, USA.

†The Approving Authority for British Civil Aircraft Equipment is:
Civil Aviation Authority, Brabazon House, Redhill, Surrey, RH1 1SQ.

Section eight. Construction. Gas cartridges

8.1 General

8.1.1 Filling tolerances

8.1.1.1 *Non-refillable gas cartridges of* 50 mL *water capacity or over and all refillable gas cartridges.* The deviation on nominal charges shall not exceed:

(a) − 0 +2 g for cartridges up to and including 28 g nominal charge; and

(b) ± 2 g for cartridges of over 28 g and up to and including 70 g nominal charge; and

(c) ± 5 g for cartridges of over 70 g nominal charge.

8.1.1.2 *Non-refillable gas cartridges of less than* 50 mL *water capacity.* After heating as described in **P.1**, the actual charge shall be not less than either:

(a) the nominal charge for cartridges up to and including 28 g nominal charge; or

(b) 2 g less than the nominal charge, for cartridges of more than 28 g nominal charge.

8.1.2 Body construction

Bodies of gas cartridges shall be made of one of the following materials:

(a) steel as specified in table 5;

(b) aluminium alloy complying with BS 5045 : Part 3;

(c) steel complying with BS 5045 : Parts 1 and 2.

Table 5. Steel for gas cartridge bodies

Element	Analysis percentage maximum
Carbon	0.25
Manganese	0.80
Silicon	0.30
Sulphur	0.06
Phosphorus	0.06

8.1.3 Corrosion protection

There shall be no signs of corrosion of the parent metal of cartridges or their fittings, and no detachment of any external coating when extinguishers are tested by the method described in appendix C.

8.1.4 Cleanliness

Gas cartridges shall be clean and dry internally at the time of filling.

8.2 Low pressure gas cartridges

NOTE. Low pressure gas cartridges are cartridges with internal pressure not exceeding 35 bar at 20 °C (see **1.2.18**).

8.2.1 Resistance to internal pressure

Cartridge bodies and all fittings subject to pressure, except safety devices, shall withstand an internal pressure equal to P_E (see **1.2.22**) for a continuous period of $30\ ^{+2}_{-0}$ s without perceptible leakage or permanent distortion when tested by the method described in **F.1.**

8.2.2 Minimum burst pressure

Cartridge bodies and all fittings subject to pressure, except safety devices, shall not burst or otherwise suddenly release pressure at a pressure less than P_B (see **1.2.21**) when tested by the method described in **F.2.**

8.3 High pressure gas cartridges

NOTE. High pressure gas cartridges are cartridges with internal pressure exceeding 35 bar at 20 °C (see **1.2.18**).

8.3.1 Resistance to internal pressure

Gas cartridges shall withstand without perceptible leakage a pressure of $250\ ^{+5}_{-0}$ bar for a continuous period of $60\ ^{+2}_{-0}$ s, by the method described in **F.1.**

As a result of the test, steel gas cartridges shall not sustain a permanent stretch of more than 10 % of the volumetric stretch sustained while under pressure and aluminium gas cartridges shall not sustain any permanent volumetric stretch.

8.3.2 Minimum burst pressure

Cartridges shall not burst or otherwise suddenly release pressure at a pressure of less than:

(a) 450 bar for non-refillable cartridges of less than 50 mL water capacity;

(b) 550 bar for cartridges of seamless body construction not covered by (a);

(c) 650 bar for cartridges of welded body construction not covered by (a).

Bursting shall not cause fragmentation of the gas cartridge and the main tear shall not be of the brittle type, i.e. the edges of the fracture shall not be radial but shall be sloped in relation to the diametral plane and shall display a stricture when tested by the method described in **F.2.**

8.3.3 Filling density

8.3.3.1 *Refillable gas cartridges and non-refillable gas cartridges of over* 50 mL *water capacity.* Cartridges shall be charged with carbon dioxide to a filling density of not more than 0.75 g/mL or with nitrogen to a gauge pressure not exceeding 168 bar at 15 °C. Mixtures of nitrogen and carbon dioxide shall be formulated so as not to exceed a pressure of 195 bar when stabilized at a temperature of 60 °C.

8.3.3.2 *Non-refillable gas cartridges of less than* 50 mL *water capacity.* Cartridges shall not burst when tested by the method described in **P.2.**

Section nine. Performance

9.1 Duration of discharge

The duration of discharge shall be not less than as shown in table 6 when measured by the method of **M.1.**

Table 6. Minimum duration of discharge

Nominal charge of extinguisher	Minimum duration of discharge of extinguisher		
	Water	Foam	Others
kg or L	s	s	s
Up to and including 2	10	10	6
More than 2 but less than or equal to 6	30	20	9
More than 6 but less than or equal to 10	45	30	12
More than 10	45	30	15

9.2 Range of discharge

The range (see **1.2.25**) of water or foam jet, or water or foam spray extinguishers shall be maintained at not less than:

(a) 4 m, for extinguishers of nominal charge more than 2 L; or

(b) 2 m, for extinguishers of nominal charge not more than 2 L;

for the minimum duration given in table 6, when measured by the method described in **M.1.**

9.3 Delay on operation and minimum discharge of contents

Not more than 4 s shall elapse between the operation of the control mechanism and the commencement of discharge, when tested by the method described in **M.2.**

A fully charged extinguisher, when tested by the method described in **M.2**, shall discharge not less than the following:

(a) water and foam extinguishers: 95 % of contents;

(b) powder extinguishers after conditioning (see **B.3**) and after full continuous discharge: 85 % of contents;

(c) halon extinguishers during the liquid phase of the extinguishing medium discharge: 85 % of contents;

(d) carbon dioxide extinguishers during the liquid phase of the extinguishing medium discharge: 75 % of contents.

9.4 Retention of charge

9.4.1 Checking

Stored pressure extinguishers of the halon, powder, water or foam type, in which a reduction of propellent and/or halon 1301 content leading to a loss of 10 % of the working pressure (measured at 20 ± 2 °C) corresponds to 1 % or less of the total extinguisher mass, shall be fitted with either:

(a) a connection to enable the internal pressure to be measured directly by an independent apparatus. Such a connection shall be fitted with a pressure retaining cap, and shall communicate directly to the gas space;

or

(b) a built-in pressure indicating device which itself can be checked by an independent apparatus.

This serves as a means of verifying their retention of charge at regular intervals when they are in service.

NOTE 1. A reversible 10 % reduction of pressure will be caused by a temperature drop of 27 °C for powder extinguishers, and by a rather smaller temperature drop for water, halon, and foam extinguishers.

NOTE 2. Stored pressure extinguishers not covered by **9.4.1**, including all halon extinguishers without propellent and all types of gas cartridge, are checkable by weighing (see **11.3** (b)).

9.4.2 Leakage rate

The rate of leakage of stored pressure extinguishers and gas cartridges shall not exceed:

(a) for gas cartridges, carbon dioxide extinguishers and stored pressure extinguishers not covered by **9.4.1**, a rate of loss of content equivalent to 5 % of the mass of contents when fully charged per annum;

(b) for stored pressure extinguishers covered by **9.4.1**, a rate of loss of pressure equivalent to 10 % of the working pressure per annum.

9.5 Intermittent discharge

After operation of the extinguisher with an intermittent discharge, the mass of the contents discharged from the extinguisher shall comply with the appropriate requirement of **9.3**, when tested by the method described in **M.4.**

9.6 Retention of charge following partial discharge

The second pressure, or mass of contents as appropriate, shall be not less than 80 % of the first when tested by the method described in appendix Q.

9.7 Fire extinguishing performance rating

See also **7.6** and **7.7**.

9.7.1 General

Extinguishers shall have a test fire rating for class A and/or class B.

9.7.2 Class A

The class A (solid materials) test fire rating of extinguishers shall be determined by the test method described in **N.4** and is the designation of the largest test fire extinguished under the test conditions and rules given in **N.1**, **N.2** and **N.3**.

9.7.3 Class B

The class B (liquids or liquefiable solids) test fire rating of extinguishers shall be determined by the test method described in **N.5**, and is the designation of the largest test fire extinguished under the test conditions and rules given in **N.1**, **N.2** and **N.3**.

9.7.4 Class C

There is no test fire rating for class C (gases).

9.7.5 Additives

The extinguisher shall also be capable of extinguishing the rated fire when containing any additive (e.g. freezing point depressant or corrosion inhibitor) at the maximum concentration which the manufacturer recommends for use in the extinguisher.

NOTE. Type 2 aircraft extinguishers are tested only with freezing point depressant, and not with water alone (see section seven).

Section ten. Production testing

10.1 General

In addition to any other scheme of quality control, which should include appropriate tests to ensure that all extinguishers, including filling packs, are charged with extinguishing medium of the performance and specification as tested in the type approval, cartridges and extinguishers complying with this standard shall be produced according to the production testing scheme of this section.

NOTE. When carrying out production tests, it may be desired or convenient to exceed the conditions of test given in this standard. For example the test of **10.2.1** could be carried out at a pressure greater than P_E and/or for longer than 32 s; extinguishers showing no perceptible leakage or permanent distortion would comply with **4.5.**

10.2 Low pressure extinguishers and low pressure gas cartridges

10.2.1 Non-destructive testing

All low pressure extinguisher bodies, except those for non-rechargeable extinguishers with permanently attached swaged closures, all low pressure gas cartridges, and all fittings (excluding pressure indicators and pressure relief devices and fittings designed to be ruptured by pressure on operation) subject to pressure shall be tested for resistance to internal pressure and shall comply with **4.5** or **8.2.1** as appropriate.

10.2.2 Destructive testing

One body and one of each fitting subject to pressure, excluding pressure relief devices and fittings designed to be ruptured by pressure on operation, from each production batch of not more than 500, or one in each 500 from each production batch of more than 500, shall be tested for minimum burst pressure and shall comply with **4.6** or **8.2.2** as appropriate. If failure occurs below the specified pressure (P_B), further bodies or fittings shall be taken and tested. The sampling procedures as specified in BS 6001 : Part 1 shall be used to determine the number of bodies to be tested. These vary with the size of the manufacturing batch and are as given in table 7.

Table 7. Batch sampling plan following failure below burst pressure

Batch size	Code letter	Sample size
2 to 15	A	2
16 to 25	B	3
26 to 90	C	5
91 to 150	D	8
151 to 500	E	13
501 to 1200	F	20
Above 1200		See BS 6001 : Part 1 : 1972, table 1, special inspection level S4, from which table 7 is derived

The method of drawing samples shall follow clause **7** of BS 6001 : Part 1 : 1972.

If failure of one or more of the samples occurs, the whole batch shall be rejected. All test samples shall be discarded.

A record of the pressures at which the bodies and fittings burst shall be kept.

10.3 Fittings for high pressure extinguishers

All fittings subject to pressure including heads, hoses and couplings, but excluding discharge horns, swivel horn assemblies, pressure indicators and pressure relief devices, shall be tested for resistance to internal pressure and shall comply with **5.4.6** or **5.5.1.1** as appropriate.

10.4 Non-rechargeable extinguishers with permanently attached swaged closures

During production, the first extinguisher produced from each batch of closures or bodies, and the first extinguisher produced from each swaging head each day, shall be checked for compliance with **6.3.**

If this sample does not comply, a further sample, produced after any appropriate adjustments, shall be tested.

Production shall not be commenced until a sample complying with **6.3** has been tested.

Subsequently one extinguisher in every 100 produced shall be tested; if one fails to comply with **6.3**, then checks to identify all faulty extinguishers shall be made. All extinguishers which do not comply with **6.3** shall be discarded, and the preliminary test procedure above repeated.

A record of the measured dimensions shall be kept.

10. 5 Retention of charge

All stored pressure extinguishers and gas cartridges except non-refillable gas cartridges of less than 50 mL water capacity (see **10.6.2**) shall be subjected to a leakage test after being charged, and shall comply with the appropriate requirements of **9.4.2.**

10.6 Additional tests on high pressure gas cartridges

10.6.1 Non-refillable gas cartridges of 50 mL water capacity or over and all refillable gas cartridges

10.6.1.1 *Non-destructive testing.* All gas cartridges shall be tested for resistance to internal pressure by the method described in **F.1.** There shall be no perceptible leakage (see **8.3.1**).

NOTE. It is not required to examine for or measure any permanent stretch as part of this production test. See **8.3.1** for type approval requirements.

10.6.1.2 *Destructive testing.* One gas cartridge in every 500, or one in each batch, whichever is the smaller number, shall be tested for minimum burst pressure and shall comply with **8.3.2**. A record of the pressure at which the cartridges burst shall be kept.

10.6.2 Non-refillable gas cartridges of less than 50 mL water capacity

10.6.2.1 *Non-destructive testing.* All gas cartridges shall be tested for minimum charge and shall comply with **8.1.1.2**.

Following the elevated temperature test described in **P.1**, two cartridges shall be taken at random from each 1000 produced, or from each batch if the batch is less than 1000, and two shall be tested for leakage. Only if both samples comply with **9.4.2**(a) may the batch be released. If one sample fails to comply, a further two samples shall be tested and only if both of these comply may the batch be released. If both of the original samples fail to comply, a further four samples shall be tested and only if all four of these comply may the batch be released.

10.6.2.2 *Destructive testing.* Following the elevated temperature test described in **P.1**, two cartridges shall be taken at random from each 1000 produced, or from each batch if the batch is less than 1000, and the following tests shall be carried out:

(a) one cartridge shall be raised to a temperature of 75 ± 2 °C and held at that temperature for $10\ ^{+1}_{-0}$ min, during which time it shall not burst; and

(b) one cartridge shall be discharged and tested for minimum burst pressure and shall comply with **8.3.2**, and shall be discarded. A record of the pressure at which the cartridges burst shall be kept.

If either of the cartridges fails the test to which it is subjected, a further two cartridges for each failure shall be taken at random from the batch, and only if all cartridges pass the test by which the original sample(s) failed, may the batch be released.

10.7 Extinguishers with plastics linings

Every water and foam extinguisher with a plastics lining shall be tested by a suitable method such as the method described in appendix H, and shall comply with **4.7.3**.

Section eleven. Marking

NOTE. Recommendations for colour of extinguishers are given in appendix R.

11.1 General

Extinguishers shall be marked with the following.

(a) The words 'fire extinguisher'. Extinguishers which comply with section seven shall be marked 'type 1(M)' or 'type 1(C)' or 'type 2' as appropriate, together with wording to indicate that they are for use on aircraft.

(b) The extinguishing medium ('water', 'foam', 'powder', 'carbon dioxide' or 'halon').

(c) The type ('gas cartridge' or 'stored pressure').

(d) The nominal charge of the extinguishing medium in kilograms or litres, as appropriate.

NOTE. See **7.8** for additional marking requirement for aircraft extinguishers.

(e) The class of fire, ('A' and/or 'B') for which the extinguisher is suitable and the test ratings achieved (see **9.7**):

(1) for extinguishers with a class A rating:

'FIRE TEST RATING . . . . . A'

(2) for extinguishers with a class B rating:

'FIRE TEST RATING . . . . . B'

(3) for extinguishers with an A and B rating:

'FIRE TEST RATING . . . . A: . . . . . B'

NOTE. There is no test for class C effectiveness in this standard. The use of 'class C', or similar markings on an extinguisher is therefore solely the manufacturer's responsibility.

(f) The method of operation in prominent letters including, for water and foam extinguishers of not more than 2 L nominal charge, wording to indicate the range of discharge (see **9.2**).

NOTE. Diagrams may also be used. The diagrams or the wording should indicate the correct attitude of holding the extinguisher when in use.

(g) Wording particular to the type of extinguisher, indicating appropriate and suitable uses.

Water and foam extinguishers that comply with **4.7.4** and that need not carry the warning of **11.2**(a) shall nevertheless not be marked with wording that they are suitable for or intended for use on live electrical equipment.

NOTE. The following wordings are recommended:

(a) on water extinguishers:

'FOR WOOD, PAPER, TEXTILE AND SIMILAR CLASS A FIRES';

(b) on foam extinguishers:

'FOR LIQUID FIRES AND WOOD, PAPER, TEXTILE AND SIMILAR CLASS A FIRES';

(c) on halon or powder extinguishers with a class B rating only, or carbon dioxide extinguishers,

(1) where the manufacturer claims suitability for class C fires:

'FOR LIQUID FIRES, ELECTRICAL EQUIPMENT FIRES AND, IF NO EXPLOSION RISK, GASEOUS FIRES'; or

(2) where the manufacturer does not claim suitability for class C fires:

'FOR LIQUID FIRES AND ELECTRICAL EQUIPMENT FIRES';

(d) on halon or powder extinguishers with both class A and class B ratings,

(1) where the manufacturer claims suitability for class C fires:

'FOR ALL FIRES EXCEPT METAL FIRES AND GASEOUS FIRES HAVING AN EXPLOSION RISK'; or

(2) where the manufacturer does not claim suitability for class C fires:

'FOR ALL FIRES EXCEPT METAL FIRES AND GASEOUS FIRES'.

These wordings are consistent with the recommendations given in clause **4** of BS 5306 : Part 3 : 1985. Particular attention is drawn to **4.2** of that code which points out that gaseous fires should be extinguished by cutting off the gas supply; and to **4.4** which gives advice on the suitability of extinguishers on, or in close proximity to, live electrical equipment.

11.2 Warning markings

Extinguishers shall be marked with appropriate warnings as follows:

(a) on water and foam extinguishers that do not comply with **4.7.4**:

'WARNING: DO NOT USE ON LIVE ELECTRICAL EQUIPMENT';

(b) on water extinguishers:

'WARNING: DO NOT USE ON LIQUID FIRES';

(c) on halon extinguishers:

'WARNING: THE FUMES GIVEN OFF ARE DANGEROUS ESPECIALLY IN A CONFINED SPACE'.

11.3 Information

Extinguishers shall be clearly marked with the following.

(a) The manufacturer's or vendor's name and address.

(b) The instruction to inspect the extinguisher regularly; for operational serviceability (see **3.1.3**); possible loss of content or pressure (see **9.4.1**) together with as appropriate the mass of the extinguisher or the mass of the cartridge, or the pressure indication of the extinguisher corresponding to an 'L' extinguisher (see **N.3**).

(c) The number and date of this British Standard, i.e. BS 5423 : 1987*.

(d) The temperature range over which the manufacturer claims that the extinguisher will operate satisfactorily. Water and foam extinguishers without freezing point depressant shall be marked with a lower limit not less than +1 °C.

(e) The year of manufacture.

*Marking BS 5423 : 1987 on or in relation to a product is a claim by the manufacturer that the product has been manufactured to the requirements of the standard. The accuracy of such a claim is therefore solely the manufacturer's responsibility. Enquiries as to the availability of third party certification to support such claims should be addressed to the appropriate certification body.

(f) The words 'Test pressure . . . bar' and 'Working pressure (at 20 °C) . . . bar' (except high pressure extinguishers see **11.6**);

(g) The following instructions:

'Recharge after complete or partial use'; or

'Discard after complete or partial use',

whichever is appropriate.

(h) Where appropriate, a warning that refillable extinguishers should be recharged in accordance with BS 6643 : Part 1 by a competent person;

(i) The instruction (with reference to any separate leaflet) to service and maintain the extinguisher regularly;

NOTE. Full maintenance instructions for the fire extinguisher should either be marked on the extinguisher, or supplied with the refill, or be given on a separate leaflet as appropriate.

(j) The manufacturer's identification of the extinguishing medium (which may be by means of a reference number);

(k) The manufacturer's identification of any freezing point depressant (which may be by means of a reference number) and the maximum amount which may be used.

NOTE. A tag or label for recording the dates etc. of servicing is often fixed to extinguishers. This should not obscure any of the markings required or recommended in this clause.

11.4 Visibility of markings

Marking requirements specified in **11.1** and **11.2** shall be visible when the extinguisher is correctly mounted, as recommended by the manufacturer, in its means for mounting.

11.5 Marking of high pressure extinguisher bodies

Bodies (cylinders) shall be permanently and legibly marked to comply with one of the following:

(a) BS 5045 : Part 1; or

(b) BS 5045 : Part 2; or

(c) BS 5045 : Part 3;

whichever is applicable.

11.6 Marking of gas cartridges

Gas cartridges shall be permanently and legibly marked with the following information:

(a) the name or chemical symbol of the propellant and the nominal charge, e.g. CO_2 50 g;

(b) the nominal full mass in grams;

(c) the empty mass in grams (to the nearest gram);

(d) the year of manufacture;

(e) the number and date of this British Standard, i.e. BS 5423 : 1987*;

(f) the name or code of the manufacturer.

NOTE. Containers designed, manufactured and tested in accordance with BS 5045 : Part 6 are sometimes used as gas cartridges for extinguishers. Although clause **15**(g) of BS 5045 : Part 6 : 1981 requires the marking of maximum nominal full mass, (i.e. the nominal full mass + maximum positive deviation) of carbon dioxide gas containers, it also requires that, for fire extinguishing purposes, reference shall be made to BS 5423. Similarly clause **15**(i) of BS 5045 : Part 6 : 1981 requires that the container be marked with the number of another British Standard (i.e. not BS 5045 : Part 6) where that standard calls for construction to BS 5045 : Part 6. Thus the markings specified in **11.6**(b) and **11.6**(e) of this standard, i.e. BS 5423, are appropriate.

*Marking **BS 5423** : 1987 on or in relation to a product is a claim by the manufacturer that the product has been manufactured to the requirements of the standard. The accuracy of such a claim is therefore solely the manufacturer's responsibility. Enquiries as to the availability of third party certification to support such claims should be addressed to the appropriate certification body.

Appendices

Appendix A. Recommendations for type approval performance testing

See **1.0.**

The schedule of table 8 may be used for type approval performance testing.

Table 8. Type approval test schedule

Test/Inspection	Clause	Test method	Number to be tested	Comment
Section three				
Hose and nozzle	**3.4**	Appendix Q	1	
Section four				
Corrosion resistance	**4.2.1**	Appendix C	5	
	4.2.2	Appendix C		
Resistance to impact	**4.3**	Appendix D	2	
Resistance to mechanical damage	**4.4**	Appendix E	2	
Resistance to internal pressure	**4.5**	**F.1**	2	
Minimum burst pressure	**4.6**	**F.2**	2	
Adhesion of plastics lining	**4.7.2**	Appendix G	1	
Continuity of plastics lining	**4.7.3**	Appendix H	3	
Electrical conductivity	**4.7.4**	Appendix J	5	
Sealing device	**4.7.5**	Appendix K	1	
Section five				
Internal discharge tube	**5.4.5**	**M.5**	2	
Hose	**5.4.6**	**F.1**	2	
Nozzle and discharge horn	**5.4.7**	Appendix L	2	
Resistance to pressure	**5.5.1**	**F.1**	2	
Minimum burst pressure	**5.5.1**	**F.2**	2	
Section seven				
Discharge at an angle	**7.3**	**M.3**	2	
Bracket:	**7.4**		2	
Discharge time	**7.5**	**M.1**	2	See **9.1**
Fire extinguishing rating	**7.6**	Appendix N	Sufficient to obtain ratings	See **9.7**
Additional extinguishing test	**7.7**	**N.6**		
Section eight				
Corrosion protection	**8.1.3**	Appendix C	5	
Resistance to internal pressure	**8.2.1**	**F.1**	2	
Minimum burst pressure	**8.2.2**	**F.2**	2	
Resistance to internal pressure	**8.3.1**	**F.1**	2	
Minimum burst pressure	**8.3.2**	**F.2**	2	
Section nine				
Initiation of discharge, range and duration of discharge	**9.1/9.2**	**M.1**	2	See also **7.5**
Delay on operation and minimum discharge of contents	**9.3**	**M.2**	2	
Intermittent discharge	**9.5**	**M.4**	1	
Retention of charge following partial discharge	**9.6**	Appendix Q	1	Special sample needed
Fire extinguishing rating	**9.7**	Appendix N	Sufficient to obtain ratings	See also **7.6**

NOTE 1. To minimize the number of samples needed, an extinguisher may be used for more than one test. It is also not necessary to repeat a test on a feature common to different models, or to carry out a test at other than the most severe condition.

NOTE 2. For independent certification, in addition to the specimens for test, the manufacturer may well be expected to supply to the test laboratory mechanical production drawings with details of parts, dimensions, materials, finish and specification of the extinguisher and extinguishing media.

Appendix B. Test conditions

B.1 General

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

B.2 Storing and temperature

Unless otherwise stated, store extinguishers for not less than 24 h at a temperature of 22 ± 8 °C before tests are carried out, and maintain them within this temperature range until tested. Unless stated otherwise, the ambient temperature for carrying out the tests is −5 °C to 30 °C.

B.3 Compaction and storage for powder extinguishers

Subject all powder extinguishers to the following conditioning before testing.

Hold the extinguisher in the vertical position and drop it vertically 500 times from a height of 16 ± 1 mm at a frequency of 1 ± 0.02 Hz onto a rigid horizontal steel plate having dimensions greater than those of the base of the extinguisher. Store the extinguisher at a temperature of 22 ± 8 °C for not less than 90 days.

Appendix C. Test for corrosion resistance of extinguishers and cartridges

See **4.2**, **5.5.2** and **8.1.3**.

Before charging water or foam extinguishers, completely screw to hand-tight and unscrew the filling closure on to and off the extinguisher body 100 times.

Before charging an extinguisher with an internal lining, lay the unfilled extinguisher horizontally on its side on a hard surface. Drop a steel cylindrical hammer, of mass $4.5\ ^{+0.025}_{-0}$ kg with a hemispherical striking surface of diameter 24 ± 1 mm from a height of $450\ ^{+5}_{-0}$ mm on to the horizontal surface of the extinguisher body. A tubular guide may be used to direct the hammer, but it is essential that the hammer falls freely and vertically.

Charge the extinguisher according to the manufacturer's instructions, but omitting any corrosion inhibitor, and store in the normal storage position at 22 ± 8 °C and relative humidity 45 % to 75 % for $90\ ^{+5}_{-0}$ days.

Examine internally and externally for signs of corrosion. In the case of internally lined extinguishers, ignore any external corrosion at the point of impact of the hammer.

Appendix D. Test for resistance to impact

See **4.3**.

Add a suitable antifreeze agent if necessary to prevent freezing of the contents of water and foam extinguishers.

If the extinguisher is of the gas cartridge type, fit the charged cartridge, but do not operate the extinguisher.

Condition the extinguisher, correctly charged and equipped with all the fittings that are subject to internal pressure in normal operation, for $24\ ^{+2}_{-0}$ h at a temperature of −15 ± 5 °C, and maintain it at this temperature during the test.

Mount a steel cylindrical hammer of diameter 75 ± 2 mm, mass $4\ ^{+0.025}_{-0}$ kg, with flat faces in loose guides so that it will drop vertically and freely through a height H (in m) given by the following equation:

$$H = \frac{M}{20} \pm 0.005$$

where

M is the total extinguisher mass (in kg).

Remove the extinguisher from the low temperature environment and place on a rigid flat surface in each of the following two positions in turn:

(a) in the normal upright position, with the longitudinal axis of the hammer coincident with the longitudinal axis of the head cap; and

(b) lying on its side and with the headcap resting on a rigidly fixed steel block, with the longitudinal axis of the hammer intersecting the longitudinal axis of the headcap at right angles.

In each of the above positions, and within one minute of removal from the low temperature environment, subject the headcap of the extinguisher to an impact by allowing the steel hammer to fall vertically on to it from the height H.

If the extinguisher does not release pressure in a potentially dangerous manner, carry out the pressure test described in **F.1** to assess compliance with **4.5**.

Appendix E. Test for resistance to shock and mechanical damage

See **4.4**.

Fill the extinguisher with water to between 88 % and 92 % by volume, as fitted for use, i.e. complete with valve and internal fittings. Adjust the gas pressure to $P_S\ ^{+1}_{-0}$ bar (see **1.2.23**).

Drop the extinguisher, fitted with its fittings (the gas cartridge being empty), from a height of $3\ ^{+0.15}_{-0}$ m on to hard concrete twice; firstly with the body axis horizontal, and with no protrusion downward, and secondly with the body axis vertical and the head up.

It is essential that impact takes place with the body axis substantially horizontal or vertical as appropriate.

Examine the extinguisher for leakage and detachment of parts.

Appendix F. Pressure tests

F.1 Test for resistance to internal pressure

See **4.5**, **5.4.6**, **5.5.1.1**, **8.2.1** and **8.3.1**.

Subject the component to a pressure of $P_{E}{}^{+1}_{-0}$ bar and retain that pressure for $30\,^{+2}_{-0}$ s. Examine for permanent distortion and leakage.

F.2 Test for minimum burst pressure

See **4.6**, **5.5.1.2**, **8.2.2** and **8.3.2**.

Before testing an extinguisher, completely screw and unscrew any plastics head on to and off the extinguisher 100 times.

Before testing non-refillable gas cartridges of less than 50 mL water capacity, charge the cartridge. Test for compliance with **8.1.1.2** by weighing before and after charging. Discharge the cartridge.

Subject the component to an increasing pressure at an average rate not exceeding 2 bar/s, to either:

(a) a pressure of $P_{B}\,^{+1}_{-0}$ bar for $30\,^{+2}_{-0}$ s for low pressure extinguishers and low pressure gas cartridges; or

(b) destruction for high pressure cartridges.

Appendix G. Test for adhesion of plastics linings

See **4.7.2**.

Subject the unfilled extinguisher to impact with the steel hammer as described in appendix C, and then store for $120\,^{+4}_{-0}$ h at 22 ± 8 °C under an air pressure equal to the working pressure (see **1.2.23**). Release the pressure and examine the extinguisher internally for cracking, separation from the wall of the body or lifting of the lining, and bubbles between the lining and body.

Appendix H. Test for continuity of plastics linings

See **4.7.3**.

Fill the extinguisher body to within 10 mm of the top of the lining with a 1 % *m/m* solution of sodium chloride in water containing sufficient hydrocarbon surfactant to reduce the surface tension of the solution to less than 40 mN/m. Check the lining for continuity by the application of a 500 ± 50 V insulation resistance test across the lining through connections made to the metal body and to an electrode introduced into the solution in the extinguisher body.

Appendix J. Test for electrical conductivity

See **4.7.4**.

Hang a metal plate, of dimensions 1 m ± 25 mm × 1 m ± 25 mm, vertically from insulating supports. Connect the plate to a transformer so that an alternating voltage of 35 ± 3.5 KV is established between the plate and earth. The impedance of the circuit should be such that when a voltage equal to 10 % of the normal primary voltage is applied to the primary, and the secondary is short circuited, the current in the secondary is not less than 0.1 mA.

Mount the extinguisher on an insulating support with the nozzle fixed 1 m from the centre of the plate, at right angles to it and directed towards it. Connect the extinguisher to earth. In the case of an extinguisher with a hose connect it to earth by connection at the nozzle, or in the case of an extinguisher not fitted with a hose, by connection at the handle.

Measure any current flowing between the extinguisher and earth when the plate is live and the extinguisher is discharging.

Appendix K. Test for sealing of gas cartridge extinguishers

See **4.7.5**.

From the normal service position, lay a fully and correctly charged extinguisher on its side for 10 s. Return it to the normal service position and examine for leakage caused by siphoning action.

Store the extinguisher for $24\,^{+2}_{-0}$ h at a temperature within ± 2 °C of the lowest temperature marked on the extinguisher (see **11.3**(d)). Move the extinguisher into a cabinet or room at 40 ± 2 °C for $4\,^{+1}_{-0}$ h. Examine for signs of water leakage.

Appendix L. Test for electric strength

See **5.4.7.1**.

Condition the discharge horn for 49 ± 1 h at a relative humidity of between 90 % and 95 % at a temperature of 30 ± 1 °C.

Carry out the test within 10 min of removing the discharge horn from the conditioning environment.

Use a voltage generator that provides a sinusoidal alternating voltage at 50 ± 10 Hz, with amplitude variable from 0 V r.m.s. to 1500 V r.m.s. (effective value) between two

hemispherical test electrodes 50 ± 2 mm in diameter. Apply the electrodes to:

(a) any part of the surface of the discharge horn with a minimum gap of 15 mm between the electrodes;

(b) through the thickness of any part of the discharge horn material with the electrodes positioned on the inner and outer surfaces;

and in each case apply a voltage increasing from 0, at a rate of 300 ± 200 V/s, up to 1500 V and maintain this voltage for 60 ± 5 s. Record any electrical flashover or breakdown of the material of the horn.

Appendix M. Tests for range and duration of discharge, minimum discharge of contents and delay on operation

See **7.2.**

M.1 Range and duration of discharge

See **7.5**, **9.1** and **9.2.**

Prepare an extinguisher as described in appendix B. Operate gas cartridge extinguishers with two control devices by first releasing gas from the cartridge, then allowing the pressure to build up in the extinguisher for 10 s before opening the secondary control device to discharge the distinguisher. Operate other types of extinguisher in the manner which will give the minimum discharge time.

Measure the range (in water and foam extinguishers only) from the end of the nozzle, 1 m above a level surface to the centre point (visually estimated) of the discharge pattern as it reaches the ground. Adjust the nozzle angle as necessary to give the maximum distance. If the form of the discharge can be varied (jet/spray), carry out two tests, one in each form of discharge.

Time the discharge, without including the discharge of any residual expellent gas, from the point of commencement of discharge to the end of the effective discharge, that is, when expelled gas suddenly appears or its proportion suddenly increases, as indicated by a marked change in the character of the discharge.

M.2 Test for delay on operation and minimum discharge of contents

See **9.3.**

Where the extinguisher is empty, weigh it before charging and preparing it as described in appendix B, or in the case of extinguishers supplied for testing already charged, weigh at the end of testing. Operate it by first opening any secondary control device, for example, a valve at the end of the hose, before the primary operating device. Do not repeat any movement of the operating or control mechanisms. Measure the time between operation of the primary operating device and the commencement of discharge. Discharge the extinguisher in its normal working (i.e. vertical) position, with all manual controls in the fully open position to either:

(a) the end of the effective discharge (see **M.1**) for carbon dioxide, foam, halon and water extinguishers; or

(b) exhaustion for powder extinguishers.

Shut off the discharge and weigh the extinguisher. Calculate the mass of contents discharged.

NOTE. The test is carried out as described so that pressure is not allowed to build up in the body of cartridge extinguishers, or in the discharge systems of any type of extinguisher.

M.3 Discharge of aircraft extinguishers at an angle

See **7.3.**

Carry out the test described in **M.2**, but hold the extinguisher at 60 ° to the vertical position during the discharge. Do not move the extinguisher during the test. If the dip tube is asymmetrically placed or cut above the vertical axis of the extinguisher, hold the extinguisher in the least favourable attitude.

M.4 Intermittent discharge

See **9.5.**

Repeat the test described in **M.2**, except that 3 s after the commencement of discharge, close the controllable discharge device for 10 s; then open the device for 3 s and repeat the cycle to the end of the discharge as described in **M.2**. Weigh the extinguisher.

M.5 Repeatability of discharge time for carbon dioxide extinguishers

See **5.4.5.**

After carrying out the test described in **M.1**, recharge the extinguisher as described in **B.1.** Repeat the test described in **M.1** within 6 h of the first test. Compare the two discharge times and check that the discharge tube is fixed to the head.

Appendix N. Test fires

See **9.7**.

N.1 Operator's clothing

To carry out these tests the operator shall wear suitable working clothes, which may include helmet and face visor. Gloves may be worn and for the tests described in **N.6** are necessary to protect the operator's hands from the heated or cooled extinguisher. Highly reflective clothing, e.g. aluminized clothing, shall not be worn. It shall be possible to extinguish the rated test fire without respiratory protection and if necessary additional tests shall be made to confirm this.

NOTE 1. Attention is drawn to the necessity for taking precautions to safeguard the health of personnel conducting the tests against the risk of fire and inhalation of smoke and any toxic products of combustion.

NOTE 2. Respiratory protection may be worn to protect the operator from effects of the repeated testing over a period of time. Such protection is not intended to permit an otherwise intolerable exposure to any fumes and/or smoke from a single fire.

NOTE 3. 'Suitable working clothes' should not be liable to ignite or melt during the fire fighting process.

N.2 Requirements for extinction

Test fires shall be regarded as extinguished if:

(a) in class A fires: all flames are extinguished and there is no recurrence of flaming during the 3 min following complete discharge of extinguisher;

(b) in class B fires: all flames are extinguished and there is a minimum of 3 mm depth of fuel left in the tray.

If the class A crib collapses during the test, it shall be considered void and a fresh test carried out.

N.3 Test schedule and criteria

Carry out tests using 'F' and 'L' extinguishers and charges prepared as described in appendix B, where:

(a) 'F' extinguishers are extinguishers containing the full quantity of medium and propellant;

(b) 'L' extinguishers are extinguishers containing a lower than normal quantity of medium or propellant, as follows:

(1) for stored pressure extinguishers not complying with **9.4.1** (i.e. not fitted with a pressure gauge or pressure connection), a 10 % reduction of content (or the manufacturer's specified figure if less than 10 %); or

(2) for stored pressure extinguishers complying with **9.4.1** (i.e. fitted with a pressure gauge or pressure connection), the minimum pressure at 20 °C specified by the manufacturer; or

(3) for all gas cartridge extinguishers, an extinguisher fully charged with extinguishing medium and fitted with a cartridge showing a 10 % reduction of content (or the manufacturer's specified figure if less than 10 %).

The basic schedule of testing to determine the test fire rating comprises a set of three test fires. A rating is achieved by extinguishing in at least two out of the three. The set comprises either:

(i) type 'F' and 'L' extinguishers, success to be achieved with one 'F' and one 'L' extinguisher; or

(ii) three 'F' extinguishers, success to be achieved with two of these extinguishers, and additional tests to be carried out to show that a 'L' extinguisher is capable of extinguishing the rated test fire.

There is no restriction on the number of sets which may be carried out, but a set comprises fires consecutively carried out and the result of any particular test fire is not to be disregarded. Each set is to be completed before another is started. A set is completed either when all three test fires are carried out or when the first two test fires are either both successful or both unsuccessful.

Use the extinguisher according to the manufacturer's operating instructions.

It is permitted, at the operator's discretion to repeat movements of the operating mechanism or to operate a gas cartridge extinguisher so as to allow the pressure to build up in the body.

N.4 Class A fire performance

N.4.1 Apparatus

N.4.1.1 *Metal frame support,* 250 ± 10 mm high, 900 ± 10 mm wide and of a length equal to that of the test fire (within the tolerance limits). The steel frame (see figures 3 and 4) is constructed of 50 mm × 50 mm angle sections.

NOTE. The larger test fires are liable to sag if supported only at the ends. For fires of designation 21A and above, (see table 9), give additional support to prevent this, either by the use of more than one frame or by additional cross-members of similar cross-sectional dimensions to these larger frames.

If additional support is given to the test fire, (see note), the unsupported length shall be not less than 800 mm and not more than 1300 mm.

N.4.1.2 *Wooden sticks,* made of *Pinus silvestris* containing 12.5 % to 17.5 % of moisture by mass, and of square section of side 39 ± 2 mm. The moisture content of the sticks shall be determined using commercially available instruments which measure electrical conductivity between two needle probes pushed into the sticks.

NOTE 1. Some variation of reading may be obtained due to structural variation of the timber and the direction of the grain. This type of instrument should therefore be calibrated in case of doubt by drying, at 103 ± 2 °C, samples of the sticks, cut to convenient length and to constant mass, and by weighing them at 24 h intervals.

The moisture content expressed as a percentage is given by the following equation:

$$\text{Percentage moisture} = \left(\frac{\text{Initial mass} - \text{dry mass}}{\text{dry mass}}\right) \times 100$$

The wooden sticks shall be stacked in 14 layers on the metal frame(s) as shown in figures 3 and 4.

The sticks in each layer shall be spaced at nominal 100 mm centres with nominal 61 mm gaps between the sticks.

The sticks laid transversely (layers 2, 4, 6, 8, 10, 12 and 14) shall have a length of 500 ± 10 mm.

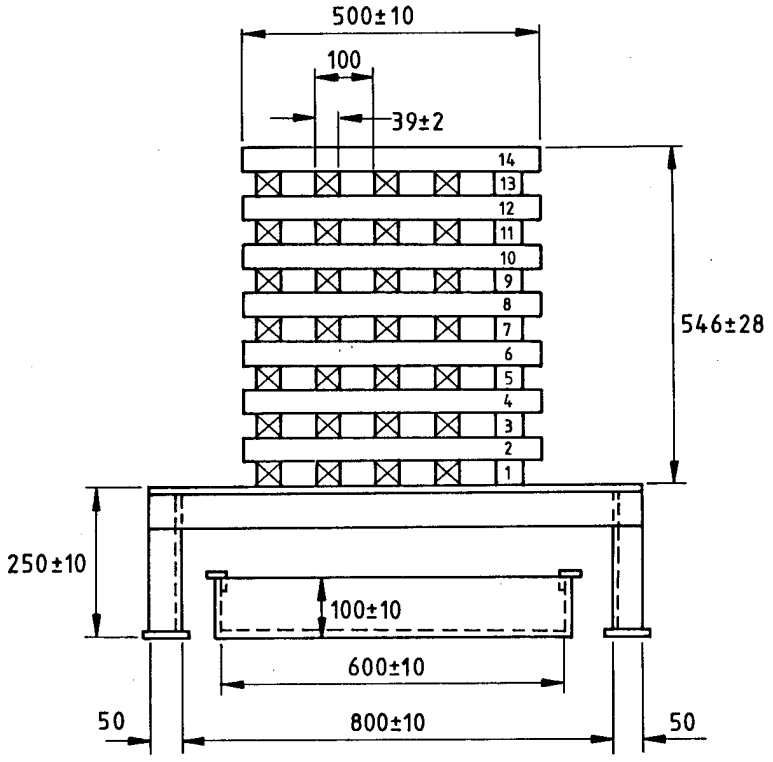
The sticks laid longitudinally (layers 1, 3, 5, 7, 9, 11 and 13) shall have lengths equal to the test fire length as shown in table 9, again with a permissible deviation of ± 10 mm.

NOTE 2. For fires greater in size than 21A (see table 9), the longitudinal layers may be made up using two or more sticks per length.

N.4.1.3 *Lighting fuel,* consisting of an aliphatic hydrocarbon having an initial boiling point of not less than 88 °C and a final boiling point of not more than 105 °C.

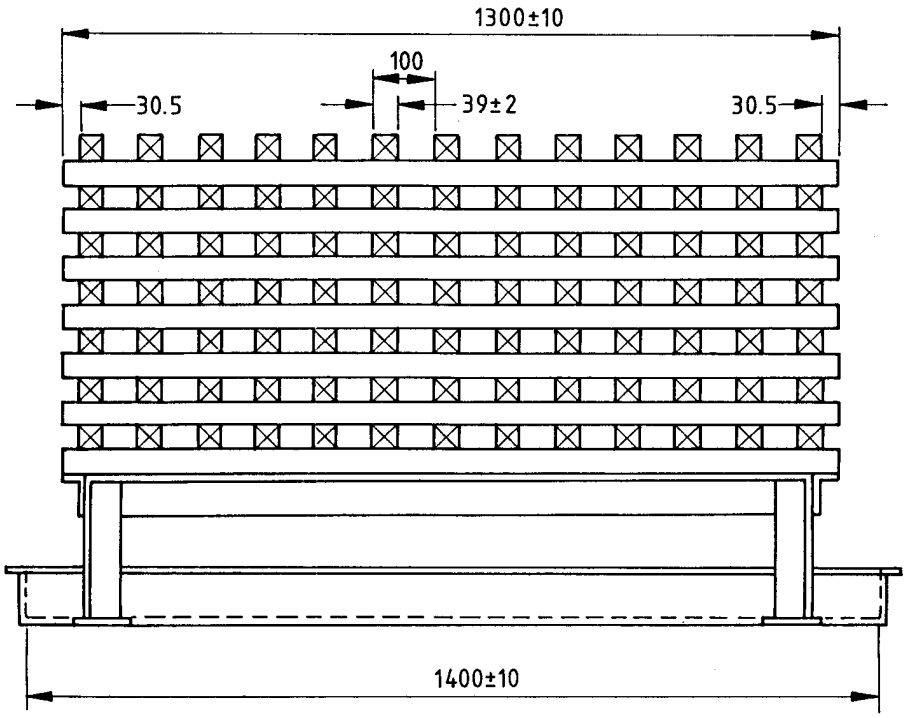
NOTE. Typical fuels meeting this requirement are heptane and certain solvent fractions sometimes referred to as commercial heptane.

N.4.1.4 *Lighting tray,* being 100 ± 10 mm longer than the nominal length of the test fire, of width of 600 ± 10 mm and depth of 100 ± 10 mm. Long lighting trays are difficult to handle, and it is convenient to use any number of smaller trays to give the required length. Arrange with no appreciable gap between the trays.



Front view identical for all test fires.
Dimensions are in millimetres.

Figure 3. Class A test fire front view



Dimensions are in millimetres.

Figure 4. Class A test fire side view showing a 13A fire

N.4.2 Class A test fire dimensions

Each test fire is designated by a number followed by the letter A (see table 9). The designation number of the test fire represents the following:

(a) the nominal length of the test fire in decimetres, i.e. the nominal length of the wooden sticks arranged in the longitudinal direction of the test fire;

(b) the number of 500 mm wooden sticks for each layer arranged in the transverse direction of the test fire.

Table 9. Dimensions of class A test fires

Designation of test fire	Number of 500 mm wooden sticks in each transverse layer	Length of test fire
		m
3 A	3	0.3
5 A	5	0.5
8 A	8	0.8
13 A	13	1.3
21 A	21	2.1
(27 A)	(27)	(2.7)
34 A	34	3.4
(43 A)	(43)	(4.3)
55 A	55	5.5
(70 A)	(70)	(7.0)
89 A	89	8.9

NOTE 1. Each test fire shown not in parentheses is designated by a number in a series in which each term is equal to the sum of the two preceding terms not shown in parentheses, i.e. this series is equivalent to a geometrical progression having a common ratio of about 1.62.

NOTE 2. The additional fires shown in parentheses in the table represent the product of the preceding term and $\sqrt{1.62}$.

Example: $55 \times \sqrt{1.62} = 55 \times 1.27 = 70$

NOTE 3. Test fires larger than those given may be constructed following the rules of notes 1 and 2.

N.4.3 Test fire location

Locate the test fire indoors and sheltered from draughts, in a test chamber that does not impede the natural development of the test fire or effective fire fighting.

N.4.4 Procedure

The procedure is as follows:

(a) Pour water into the lighting tray(s) to form a layer at least 3 mm deep over the whole base of the tray, then add sufficient lighting fuel to give an additional depth of 5 mm of fuel.

(b) Ignite the fuel.

(c) $120\ ^{+10}_{-0}$ s after fuel ignition, withdraw the lighting tray(s) from the crib.

(d) Permit the crib to burn for a further 6 min, making a total pre-burn time of 8 min.

(e) Operate the extinguisher and apply it to the test fire. Extinguishers may be discharged continuously or in successive bursts.

NOTE. The operator may move round the fire in order to obtain the best results.

N.5 Class B fire performance

N.5.1 Apparatus

N.5.1.1 *Test fire trays,* made of welded sheet steel and of circular cylindrical shape. (Dimensions are given in table 10.) The sides are vertical. The bases of the trays are set horizontal above, or level with, the surrounding ground.

NOTE. Reinforcement of the base of the larger test fire trays will be necessary to minimize distortion. In such cases it will be necessary to ensure that the undersides of the trays are not exposed to the atmosphere.

N.5.1.2 *Lighting fuel,* consisting of an aliphatic hydrocarbon having an initial boiling point of not less than 88 °C and a final boiling point of not more than 105 °C.

NOTE. Typical fuels meeting this requirement are heptane and certain solvent fractions sometimes referred to as commercial heptane.

N.5.2 Class B test fire dimensions

Each test fire is designated by a number followed by the letter B (see table 10). The designating number of the test fire represents the volume of the liquid (in litres) contained in the tray.

The area of the test fire tray expressed in square decimetres (in dm^2) is given by this number multiplied by π. The depth of liquid in the trays is approximately 30 mm, with a water base to the fuel. Details of class B test fires are contained in table 10.

N.5.3 Test fire location

Carry out test fires indoors in a building which will not impede the natural development of the fire or outdoors but with the wind speed not exceeding 3 m/s.

N.5.4 Procedure

The procedure is as follows:

(a) Add the appropriate volume of fuel and water as specified in table 10. Add additional water to obviate any distortion of the tray, subject to there being a minimum of 15 mm depth of fuel at any point and a maximum depth of liquid of 50 mm at any point on the periphery of the tray.

(b) For the testing of foam or halon extinguishers, use fresh fuel for each test. When testing extinguishers of other types, it is not necessary to use fresh fuel for each test, provided that previous tests have not contaminated the fuel so that the efficiency of the test fire is impaired.

When testing powder extinguishers, it shall be demonstrable that the rating can be achieved using fresh fuel.

(c) Ignite the fuel.

(d) Permit the fuel to burn freely for a minimum of 60 s.

(e) Stand initially with no part of the body nearer the fire tray than 1.5 m or the tray diameter whichever is less.

Operate the extinguisher, and apply it to the test fire with the control mechanism fully open and maintain the initial discharge for a minimum of 5 s unless the fire has been extinguished. Thereafter extinguishers may be discharged continuously or in successive bursts.

NOTE. The operator may move round the fire in order to obtain the best results.

WARNING. At no time should the operator step on to or into the tray to reach further with the extinguisher discharge or for any other reason. This is unsafe and violates the test conditions.

N.6 Additional test for aircraft type 1(M) extinguishers

See **7.7**.

Except as amended in this clause, the rules and conditions given in **N.1**, **N.2** and **N.3** apply. Condition the extinguishers at −30 ± 2 °C for not less than 24 h. Test against a 13B fire within 1 min of removal from the extreme temperature environment. The test is successful if one fire is extinguished, and further tests need not be carried out. Repeat using extinguishers conditioned at 55 ± 2 °C.

Table 10. Dimensions of class B test fires

Designation of test fire	Minimum volume of			Dimensions of test fire tray			
	Fuel	Water	Fuel and water	Diameter (measured at rim)	Depth	Nominal thickness of walls	Approximate area of fire
	L	L	L	mm	mm	mm	m^2
13 B	10	3	13	720 ± 10	150 ± 10	2.0	0.41
21 B	15	6	21	920 ± 10	150 ± 10	2.0	0.66
34 B	25	9	34	1170 ± 10	150 ± 10	2.5	1.07
55 B	40	15	55	1480 ± 15	150 ± 10	2.5	1.73
(70 B)	50	20	70	(1670) ± 15	(150) ± 10	(2.5)	(2.20)
89 B	60	29	89	1890 ± 20	200 ± 15	2.5	2.80
(113 B)	75	38	113	2130 ± 20	(200) ± 15	(2.5)	(3.55)
144 B	100	44	144	2400 ± 25	200 ± 15	2.5	4.52
(183 B)	125	58	183	(2710) ± 25	(200) ± 15	(2.5)	(5.75)
233 B	150	83	233	3050 ± 30	200 ± 15	2.5	7.32
(296 B)	200	96	296	(3440) ± 30	(200) ± 15	(2.5)	(9.3)
377 B	250	127	377	3880 ± 40	200 ± 15	3.0	11.84
(479 B)	325	154	479	(4380) ± 45	(200) ± 15	(3.0)	(15.05)
610 B	400	210	610	4940 ± 50	200 ± 15	3.0	19.16

NOTE 1. See NOTE 1 to table 9.

NOTE 2. See NOTE 2 to table 9.

NOTE 3. See NOTE 3 to table 9.

Appendix P. Elevated temperature tests for non-refillable gas cartridges of less than 50 mL water capacity

P.1 Minimum charge

See **8.1.1.2.**

Heat the cartridge to 65 ± 2 °C and maintain at that temperature for $9\ ^{+0.5}_{-0}$ h. Cool to 20 ± 5 °C, and after not less than 24 h, weigh to determine the charge.

P.2 Filling density

See **8.3.3.2.**

After testing as described in **P.1**, heat a cartridge complying with **8.1.1.2** to 75 ± 2 °C for $10\ ^{+1}_{-0}$ min. Check that bursting has not occurred.

Appendix Q. Test for retention of charge following partial discharge and hose flexibility

Q.1 Retention of charge following partial discharge

See **9.6.**

Carry out this test in conjunction with the test of **Q.2.**

Prepare an extinguisher as described in appendix B.

Discharge the extinguisher for a period equal to half the duration of discharge time as measured by the method described in **M.1.** Close the control and measure the pressure or mass of contents as appropriate. After a further 5 min with the valve closed, again measure the pressure or mass of contents as appropriate.

NOTE. Extinguishers with normally open control valves shall be deemed for the purposes of this test to be closed when the following static loads are applied statically and normally to the point of application:

(a) finger operation: $100\ ^{+5}_{-0}$ N

(b) hand operation: $200\ ^{+5}_{-0}$ N

Q.2 Hose flexibility

See **3.4.**

Carry out this test in conjunction with the test of **Q.1.**

Fit the hose to a full or empty extinguisher operating head, or other mounting means. Condition for 4 ± 0.5 h at the minimum operating temperature. Within 30 s of removal from the conditioning temperature, bend the hose through 90 °, holding the mounting means and the nozzle handgrip. Examine for cracking. Repeat the conditioning at the maximum operating temperature and test again. Examine for kinking. Repeat both tests after the retention of charge test at room temperature.

Appendix R. Recommendations for extinguisher colour

It is recommended that extinguishers should be one of the following:

(a) coloured predominantly signal red with an area, large enough to be readily apparent, colour coded by medium according to the system of table 11; or

(b) colour coded entirely by medium according to the system of table 11; or

(c) of self-coloured metal with an area, large enough to be readily apparent, colour coded by medium according to the system of table 11.

Colour coding by medium is intended to provide a means of rapid recognition of the type of extinguisher by trained persons at the time when the extinguisher is needed for use. Where the purchase specification is not in accordance with one of these recommendations, then the colour of the extinguisher should be such as not to conflict with the colour coding of table 11.

Table 11. Colour coding by medium

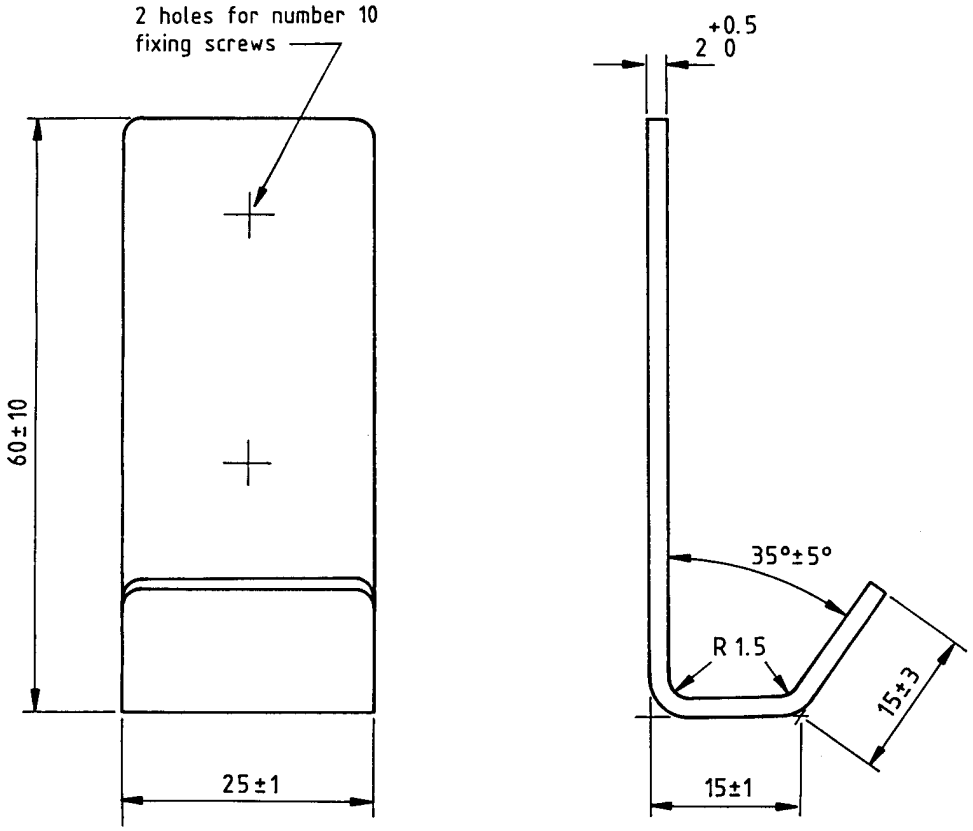
Extinguishing medium	Colour	British Standard colour reference number	BS 5252 equivalent
Water	Signal red	BS 381C ref. 537	04 E 53
Foam	Pale cream	BS 381C ref. 352	10 C 33
Powder (all types)	French blue	BS 381C ref. 166	20 E 56
Carbon dioxide	Black	–	–
Halon	Emerald green	BS 381C ref. 228	14 E 56

Appendix S. Special type of bracket

NOTE. The requirements of this appendix are suitable for Ministry of Defence requirements. The bracket is suitable for use as a wall bracket in buildings, but not on ships or vehicles, with certain foam, powder or water extinguishers.

S.1 The bracket shall be of mild steel or stainless steel and shall comply with the dimensions shown in figure 5.

S.2 The extinguisher shall be provided with a mounting point on the shoulder of the body shell, suitable for use with the bracket.



Linear dimensions are in millimetres.

Figure 5. Special type of bracket

Publications referred to

BS 341 Specification for valve fittings for compressed gas cylinders
Part 1 Valves with taper stems (excluding valves used for breathing and medical purposes)
BS 381C Specification for colours for identification, coding and special purposes
BS 970 Specification for wrought steels for mechanical and allied engineering purposes
Part 1 General inspection and testing procedures and specific requirements for carbon, carbon manganese, alloy and stainless steels
BS 1449 Steel plate, sheet and strip
Part 2 Specification for stainless and heat-resisting steel plate, sheet and strip
BS 1472 Wrought aluminium and aluminium alloys for general engineering purposes — forging stock and forgings
BS 1474 Wrought aluminium and aluminium alloys for general engineering purposes — bars, extruded round tube and sections
BS 1806 Dimensions of toroidal sealing rings ('O' seals and their housings)
BS 2872 Copper and copper alloys. Forging stock and forgings
BS 2874 Copper and copper alloys. Rods and sections (other than forging stock)
BS 2915 Specification for bursting discs and bursting disc devices
BS 3643 ISO metric screw threads
BS 4547 Classification of fires (Identical with EN 2)
BS 5045 Transportable gas containers
Part 1 Specification for seamless steel gas containers above 0.5 litre water capacity
Part 2 Steel containers up to 130 litres water capacity with welded seams
Part 3 Specification for seamless aluminium alloy gas containers above 0.5 litre water capacity and up to 300 bar charged pressure at 15 °C
Part 6 Specification for seamless containers of up to and including 0.5 litre water capacity
BS 5252 Framework for colour co-ordination for building purposes
BS 5306 Fire extinguishing installations and equipment on premises
Part 3 Code of practice for selection, installation and maintenance of portable fire extinguishers
BS 6001 Sampling procedures for inspection by attributes
Part 1 Specification for sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection
BS 6535 Fire extinguishing media
Part 1 Specification for carbon dioxide
Part 2 Specification for halogenated hydrocarbons
BS 6643 Recharging fire extinguishers (manufactured to BS 5423 'Specification for portable fire extinguishers')
Part 1 Specification for procedure and materials
British Standard 3G 100 Specification for general requirements for equipment for use in aircraft
Part 2 All equipment
Section 3 Environmental conditions
Subsection 3.6 Acceleration requirements
British Standard G 229 Schedule for environmental conditions and test procedures for airborne equipment
EN 3* Fire fighting — Portable fire extinguishers
EN 3-I Description, duration of operation, efficiency tests (test fires)
EN 3-II Retention of pressure, dielectric test, test for compaction and resistance to vibrations, special provisions
EN 3-III Construction, resistance to pressure, mechanical tests (in preparation)
EN 3-IV Minimum fires required
EN 3-V Complementary requirements and tests
DIN 477 Gas cylinder valves, types, sizes, connections, threads

*Referred to in the foreword only.

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