BS 5306-3:2009

Incorporating Corrigendum No. 1

BSI Standards Publication

Fire extinguishing installations and equipment on premises –

Part 3: Commissioning and maintenance of portable fire extinguishers – Code of practice

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ISBN 978 0 580 76935 1

ICS 13.220.10

The following BSI references relate to the work on this standard:
Committee reference FSH/2
Draft for comment 07/30152563 DC

Publication history
First published February 1980
Second edition, August 1985
Third edition, October 2000
Fourth edition, November 2003
Fifth (present) edition, July 2009

Amendments issued since publication

Date	Text affected
October 2011	C1. Deletion of step 6 from the sequence of actions for carbon dioxide extinguishers in Table D.1.

Contents

Summary of pages
This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 26, an inside back cover and a back cover.

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Foreword

Publishing information

This part of BS 5306 is published by BSI and came into effect on 31 July 2009. It was prepared by Technical Committee FSH/2, *Fire extinguishers*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This part of BS 5306 supersedes BS 5306-3:2003, which is withdrawn.

Relationship with other publications

The other parts of BS 5306 published are as follows:

- Part 0: *Guide for selection of installed systems and other fire extinguishing equipment*;
- Part 1: *Hose reels and foam inlets*;
- Part 2: *Specification for sprinkler systems*;
- Part 4: *Specification for carbon dioxide systems*;
- Part 5: *Halon systems*:
  - Section 5.1: *Specification for Halon 1301 total flooding systems*;
  - Section 5.2: *Specification for Halon 1211 total flooding systems*;
- Part 6: *Foam systems*:
  - Section 6.1: *Foam systems – Specification for low expansion foam systems*;
  - Section 6.2: *Foam systems – Specification for medium and high expansion foam systems*;
- Part 7: *Extinguishing powder systems*;
- Part 8: *Selection and positioning of portable fire extinguishers*.

Information about this document

This is a full revision of the standard, and introduces the following principal changes:

- introduction of commissioning as a defined service activity;
- presentation of advice for those asked to provide maintenance of extinguishers without a CE mark and/or for which the main text is not in the English language;
- greater definition given of the procedures involving ageing and wear to plastics extinguisher headcaps;
- improvement of the layout of the standard to improve ease of reading and interpretation;
- recognition of changes in relevant legislation.

Hazard warnings

WARNING. This British Standard calls for the use of substances and/or procedures that can 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.

Use of this document

As a code of practice, this part of BS 5306 takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Any user claiming compliance with this part of BS 5306 is expected to be able to justify any course of action that deviates from its recommendations.

Attention is drawn to environmental legislation, especially where this concerns the disposal of media that have been replaced during the course of the maintenance procedures given in this part of BS 5306.

Presentational conventions

The provisions in this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is "should".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

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

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

In particular, attention is drawn to the following statutory regulations and their associated Guidance Notes:

- Regulatory Reform (Fire Safety) Order 2005 [1]; [1)]
- Fire Safety (Scotland) Regulations 2006 [2];
- Fire Precautions (Workplace) Regulations (Northern Ireland) 2001 [3];
- Pressure Systems Safety Regulations 2000 [4];
- Transportable Pressure Vessels Regulations 2001 [5];
- Environmental Protection (Controls on Ozone-Depleting Substances) Regulations 2002 [6];
- Environmental Protection (Controls on Ozone-Depleting Substances) (Northern Ireland) Regulations 2003 [7];
- Health and Safety at Work etc. Act 1974 [8];
- Management of Health and Safety at Work Regulations 1999 [9].

[1)] An equivalent Regulatory Reform Order for Northern Ireland is currently in preparation.

1 Scope

This part of BS 5306 gives recommendations for the initial commissioning of portable fire extinguishers and schedules for the subsequent maintenance of extinguishers installed in all locations. It also gives recommendations for handling certain obsolescent types of extinguishers, for which no maintenance schedules are provided.

This part of BS 5306 gives recommendations for five levels of installation/maintenance: commissioning, basic service, extended service, overhaul procedures and recharge.

2 Normative references

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

BS 5306-8, *Fire extinguishing installations and equipment on premises – Part 8: Selection and positioning of portable fire extinguishers – Code of practice*

BS 6643-1, *Recharging fire extinguishers (manufactured to BS 5423, 'Specification for portable fire extinguishers') – Part 1: Specification for procedure and materials*

BS EN 3 (all parts), *Portable fire extinguishers*

BS EN 25923, *Fire protection – Fire extinguishing media – Carbon dioxide*

BS EN 27201-1, *Fire protection – Fire extinguishing media – Halogenated hydrocarbons – Part 1: Specifications for halon 1211 and halon 1301*

3 Terms and definitions

For the purposes of this part of BS 5306, the terms and definitions given in BS EN 3 and the following apply.

3.1 additive
chemical added to an extinguishing medium for such purposes as corrosion inhibition, freezing point depression, penetration, enhanced wetting, and film or coating formation

3.2 body
extinguisher or gas cartridge, excluding its accessories but including its welded parts

3.3 body fittings
those parts of an extinguisher that, under normal working conditions, are permanently attached to the body shell and are subjected to the working pressure

3.4 body shell
outer case of an extinguisher

NOTE The body shell usually comprises a cylindrical case with dished ends, and apertures which are fitted with components such as nozzles, pressure gauges and closures.

3.5 charge
mass or volume of extinguishing medium contained in an extinguisher

NOTE The charge of a water-based medium is expressed as a volume in litres. Charges for other media are expressed as a mass in kilograms.

3.6 competent person
person with the qualifications, training and experience, with access to the relevant tools, equipment and information, manuals and knowledge of any special procedures recommended by the manufacturer of an extinguisher, to carry out the relevant maintenance procedures

NOTE Information on the training which a competent person is expected to undergo is given in Annex A.

3.7 extinguishing medium
substance contained in an extinguisher which causes extinction of a fire

3.8 fire legislation
current UK legislation relating to fire safety, i.e.

- Regulatory Reform (Fire Safety) Order 2005 [1];[2)]
- Fire Safety (Scotland) Regulations 2006 [2];
- Fire Precautions (Workplace) Regulations (Northern Ireland) 2001 [3]

3.9 gas cartridge
pressure container that fits into, or is attached to, an extinguisher and that contains an expellant gas that, on operation of the extinguisher, expels the extinguishing medium

3.10 gas cartridge extinguisher
extinguisher from which the extinguishing medium is expelled, on the actuation of the operating mechanism, by pressure released from a gas cartridge

3.11 plastics headcap
component manufactured from plastics designed to retain working pressure upon actuation of an extinguisher

NOTE This includes plastics headcaps retained by a metal collar, but excludes metal headcaps which have a plastics shroud where the plastics component does not retain working pressure.

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

NOTE Hereinafter referred to as an "extinguisher".

3.13 primary sealed stored pressure extinguisher
stored pressure extinguisher in which the operating head and the valves controlling the flow of extinguishing medium during discharge can be detached from the body of the extinguisher without releasing propellant or medium, which are retained in the body by a closure that is ruptured on operation

2) An equivalent Regulatory Reform Order for Northern Ireland is currently in preparation.

3.14 recharging
maintenance procedure carried out after complete or partial discharge of an extinguisher, or as part of a scheduled maintenance procedure, to restore the extinguisher to its full operational condition

3.15 responsible person
person or persons responsible for, or having effective control over, fire safety provisions adopted in or appropriate to the premises or building or risk where an extinguisher is installed

NOTE For the purposes of this part of BS 5306, the term "responsible person" includes a nominated representative, and is the person defined by this term in the Regulatory Reform (Fire Safety) Order 2005 [1]. [3)]

3.16 stored pressure extinguisher
extinguisher from which the extinguishing medium is expelled, on the actuation of the operating mechanism, by pressure stored within the body

3.17 test discharge
discharge of extinguishing medium under controlled conditions by, or under the supervision of, a competent person

4 Process of commissioning

4.1 Commissioning

The commissioning of an extinguisher should be carried out by a competent person as defined in **3.6**. Upon removal from its packaging and transit protection, and immediately prior to placing in its designated place, the extinguisher should undergo the sequence of commissioning service actions described in Annex B, taking into account the safety precautions given in Annex C.

Additionally, if the manufacturer has not marked the mass of the extinguisher or a nominal range of mass for the extinguisher, the competent person should consult the manufacturer's workshop manual for that model or consult with the manufacturer to obtain this information.

Upon completion of the above procedures the extinguisher should then be installed and positioned in accordance with BS 5306-8.

4.2 Mounting

Small extinguishers with a total mass up to and including 4 kg should be mounted so as to position the handle approximately 1.5 m from the floor, but the carrying handle of larger, heavier extinguishers should be approximately 1 m from the floor.

WARNING. Care should be taken to ensure that a heavy extinguisher does not itself cause injuries by being dislodged and falling onto limbs or bodies. Extinguishers installed under conditions where they are subject to dislodgement should be installed in specifically designed brackets.

3) An equivalent Regulatory Reform Order for Northern Ireland is currently in preparation.

Extinguishers sited in schools can be particularly susceptible to being dislodged. Where practicable, they should be installed in recessed housings, or in suitable cabinets appropriate to the specific location (e.g. no sharp edges or corners). Any mounting bracket used should conform to BS EN 3-7:2004+A1:2007, Clause **13**.

5 Visual inspection by the responsible person

The responsible person should carry out visual inspections of all extinguishers regularly. These visual inspections should be carried out at least monthly. When circumstances require, inspections should be carried out more frequently.

NOTE 1 Fire legislation [1–3] and its associated Guidance Notes suggest that good practice is to determine whether the extinguisher has been operated and to check for damage on a weekly basis.

When carrying out these visual inspections, it should be ensured that:

a) each extinguisher is correctly located in the designated place;

b) each extinguisher is unobstructed and visible;

c) the operating instructions of each extinguisher are clean and legible and face outwards;

d) each extinguisher has not been operated and is not obviously damaged or has any missing parts;

e) the reading of any pressure gauge or indicator fitted to an extinguisher is within operational and safety limits;

f) the seals and tamper indicators of each extinguisher are not broken or missing.

The responsible person should record the results of these visual inspections and arrange for corrective action, where necessary, by a competent person. In the event of doubt, the responsible person should arrange for a competent person to examine the extinguisher.

NOTE 2 Responsible persons have obligations under fire legislation [1–3] to use a competent person to maintain extinguishing equipment in an efficient state, in efficient working order and in good repair, where it is necessary to provide such equipment to safeguard employees in the event of fire.

6 Basic service, extended service and overhaul

6.1 General

The responsible person should ensure that extinguishers, along with any spare gas cartridges and replacement charges, are maintained regularly. Basic service, extended service and overhaul should be carried out at intervals not less than those recommended in Table 1, in accordance with Annex D, Annex E and Annex F, respectively, taking into account the safety precautions given in Annex C.

NOTE 1 The Management of Health and Safety at Work Regulations 1999 [9] require this to be done by a competent person.

*NOTE 2 It is good practice for the competent person to assess the suitability of the extinguishers provided for the local risks and to report any that are deemed unsuitable (see **9.4.1.1**).*

Table 1 **Maintenance intervals** [A)]

Type of extinguisher	**Basic service** [B), C), D), E)] (see Annex D)	**Extended service** [C), E)] (see Annex E)	**Overhaul** [E)] (see Annex F)
Water and water-based	12-monthly	Every 5 years	—
Powder	12-monthly	Every 5 years	—
Powder-primary sealed	12-monthly	Every 10 years [F)]	—
Halon [G)]	12-monthly	—	Every 10 years
CO_2 [H)]	12-monthly	—	Every 10 years

A) The intervals in this table disregard any recharging of the extinguisher.

B) The maintenance intervals given for basic service have for practical purposes a tolerance of ±1 month.

C) Intervals (other than CO_2 extinguishers) should be taken from:

- basic service: the date of commissioning or the last service;
- extended service:
  - water, water-based and powder: 5 years from the date of commissioning or 6 years from the date of manufacture of the extinguishers, whichever is sooner, and subsequently every 5 years from the date of the last extended service;
  - powder-primary sealed: 10 years from the date of commissioning or 11 years from the date of manufacture of the extinguisher, whichever is sooner, and subsequently every 10 years from the date of the last extended service.

D) Intervals may be shortened on the recommendation of the competent person where inspection reveals environmental and/or special hazards, or at the request of the responsible person.

E) Replacement of parts does not affect these intervals. For example, if the hose of a water-based extinguisher is replaced after the extinguisher has been in service for 6 months from commissioning then the basic service should be carried out after a further 6 months.

F) Primary sealed stored pressure extinguishers should be returned to the manufacturer/supplier for recharging.

G) Service of this type of extinguisher may only be carried out if the extinguisher meets the criteria of the "critical uses" in Annex VII of EC Regulation 2037/2000 [10] (see Annex G).

H) Intervals for CO_2 extinguishers: BS EN 1802:2002 (Clause **5**), BS EN 1803:2002 (Clause **5**), and BS EN 1968:2002 (Clause **5**) require that the stamped date of manufacture or last overhaul be used.

6.2 Labelling

6.2.1 General

Any labelling that is applied to the extinguisher should not obscure any marking required by BS EN 3.

6.2.2 Maintenance label

The maintenance record should be indelibly marked on a durable label that is fixed firmly to the extinguisher without obscuring any of the manufacturer's markings and instructions. Where there is no more space on the maintenance label and a new label is affixed, the date of commissioning and the last extended service/overhaul should be marked on the new label.

The following information should be given on the maintenance label:

a) type of action (commissioning, basic service, extended service, recharge, overhaul, condemned, not maintained);

b) name and postal address of the maintenance supplier;

c) a mark clearly identifying the competent person;

d) the date (year and month) of the action in a) above;

e) either:

1) the measured mass of the extinguisher at the time of maintenance, in kilograms; or

2) the difference between the measured mass at the time of service and the initial recorded mass at commissioning;

f) the date (year and month) of commissioning and the last extended service/overhaul;

NOTE 1 It might also be appropriate to mark the year and month of the next maintenance – this is a legal requirement if the extinguisher is to be installed under the ADR agreement [11].

g) a statement to the effect that the extinguisher has been maintained in accordance with this standard, i.e. BS 5306-3.[4)]

This information should be readable without any special equipment.

Any additional information for the benefit of competent persons may be shown in a more compact form, such as bar codes.

NOTE 2 The information on the maintenance label of each extinguisher may additionally be entered into a central record. In this way one aspect of the important information on fire prevention can be kept readily available.

7 Recharging of extinguishers

7.1 Procedure

The procedures outlined in Annex D should be followed, together with those specified in BS 6643-1 and those detailed by the extinguisher manufacturer. Before recharging, water-based extinguishers (including foam extinguishers) should be thoroughly washed out with clean water, but on no account should this procedure be applied to powder, halon or carbon dioxide extinguishers, which have to be kept completely free from water.

Refill charges recommended by the extinguisher manufacturer should be used for water-based and powder extinguishers, but for halon and carbon dioxide extinguishers, equivalent charges may be used. An equivalent charge is one that has been shown by test results to achieve the fire extinction rating claimed for the original charge. For halon and CO_2 extinguishers, only halons conforming to BS EN 27201-1 and carbon dioxide conforming to BS EN 25923 should be used.

NOTE Under EC Regulation No. 2037/2000 [10] the use of halons as extinguishing media is restricted to a limited number of "critical uses" (see Annex G).

When an extinguisher has been recharged for any reason, the date of recharging should be recorded on the extinguisher's maintenance label attached to the extinguisher (see **6.2.2**).

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4) Marking BS 5306-3 on or in relation to a product represents the maintainer's declaration of conformity, i.e. a claim by or on behalf of the maintainer that the maintenance has been carried out in accordance with the recommendations given in this standard. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third-party certification of conformity.

7.2 Gas cartridges

Replacement gas cartridges for water, water-based (including foam) and powder extinguishers should conform to the appropriate part of BS EN 3, and should be of the correct type and size (capacity and dimensions).

CAUTION. Care should be taken to use the appropriate gas cartridge as specified by the manufacturer.

Cartridges should be removed from service if more than 10 years have elapsed since the date of manufacture.

8 Replacement of components

Only the components and extinguishing media supplied or specified by the manufacturer of the extinguisher, or equivalents, should be used to replace those found to be unsuitable for continued service.

CAUTION. The recharging of an extinguisher, or the replacement of any of its components, can be detrimental to the performance of the extinguisher if not carried out correctly.

9 Evaluation of fitness for service of extinguishers and actions to be taken

9.1 General

Defective extinguishers should be placed in one of the following categories: "Condemned" or "Not maintained".

NOTE Annex H gives information on extinguishers that were manufactured in accordance with British Standards that have now been withdrawn.

9.2 Extinguishers which are to be condemned

9.2.1 General

Any extinguisher with a major defect or defects which make it unsafe for use, and which cannot be rectified during maintenance, should immediately be made safe, removed from its designated place, and marked "CONDEMNED" together with the reason for this assessment. The responsible person should be advised in the written report (see **9.4.1**) that a permanent replacement is needed as soon as possible. Evaluation of whether the damage, wear or corrosion an extinguisher has undergone make it unsafe for use or unfit for service depends on the judgement of the competent person. The competent person should have training and experience with the particular model of extinguisher.

Non-exhaustive lists of examples of the conditions that might affect the function or safety of an extinguisher are given in **9.2.2** and **9.2.3**. The following conditions do not affect the function or safety of an extinguisher and will not therefore require the extinguisher to be condemned:

a) staining or discoloration of linings or diptubes;

b) external blemishes or slight scratches;

c) light rusting of parts which is not likely to impair function or safety;

d) the presence of corrosion products from any metal lining (typically white salts of zinc, or tin and lead).

9.2.2 Conditions indicating that an extinguisher is unsafe for use

Potentially the most serious hazard presented by a defective extinguisher is the sudden uncontrolled release of pressure or ejection of parts. This could be caused by any of the following conditions:

a) corrosion, wear or damage to threads of any pressure retaining part;

b) corrosion of welds;

c) extensive general corrosion or severe pitting;

d) dents or gouges in the body;

e) fire damage to the body or body fittings;

f) any split in a plastics lining;

g) lifting or detachment of a plastics lining from the body;

h) corrosion of the metal body under a plastics lining;

i) corrosion of the metal body under a zinc or tin/lead lining.

Additional reasons for condemning an extinguisher include the following (unless rectified by the replacement of the appropriate components):

1) overpainting or application of any other coating, film or colouring to any plastics component that could be subject to pressure;

2) UV degradation of plastics components;

3) illegible marking or operating instructions;

4) instructions not in English.

9.2.3 Extinguishers for which this standard provides no maintenance schedules

Maintenance schedules for certain extinguishers (because of their type, construction, method of operation, or condition) are not provided in this part of BS 5306. Examples of such extinguishers are as follows:

- soda acid extinguishers;
- extinguishers with a riveted body shell;
- extinguishers with a plastics body shell;
- extinguishers that require inversion to operate;

- non-refillable extinguishers that have reached their expiry date;
- extinguishers manufactured after 2002 which do not carry a CE mark. This excludes refurbished extinguishers (see Note).

  NOTE Refurbished extinguishers cannot carry the CE mark and cannot be condemned for not carrying it.

Any such extinguisher should be marked "CONDEMNED" together with the reason for this assessment, and the competent person should advise the responsible person, in the written report (see **9.4.1**), that the extinguisher has been condemned and that it should be replaced by an extinguisher for which this standard provides a maintenance schedule.

9.3 Extinguishers which are not maintained

When undertaking maintenance in a particular location, the competent person should ensure that they have available the number and types of spare parts that might be required to service the extinguishers involved (see Clause **8**).

If the required spare parts are not available for any of these extinguishers, the maintenance should be interrupted and the extinguisher made safe, removed from its designated place and marked "NOT MAINTAINED", together with the reason for this assessment; and the competent person should advise the responsible person, in the written report (see **9.4.1**), that the maintenance has been interrupted.

The competent person should return to the site with the spare parts and complete the maintenance, or, if the parts prove to be unobtainable, should mark the extinguisher "CONDEMNED" together with the reason for this assessment, and should advise the responsible person, in the written report (see **9.4.1**), that the extinguisher has been condemned and that it should be replaced by an extinguisher for which this standard provides a maintenance schedule.

9.4 Further actions

9.4.1 Documentation

*NOTE The information recommended in **9.4.1.1** and **9.4.1.2** may be amalgamated to form one document.*

9.4.1.1 Provision of a written report

The competent person should advise the responsible person in a written report:

a) of any extinguishers that have been condemned, not maintained and/or are missing;

b) of any permanent replacement extinguishers required to replace those extinguishers reported in a);

c) of any additional extinguishers required to ensure that the level of cover at the premises is at least sufficient and, where applicable, in accordance with BS 5306-8;

d) that any replacement or additional extinguishers reported in b) or c) should be provided as soon as possible; and

e) of the responsible person's obligation under fire legislation to provide an appropriate level of fire-fighting equipment at all times.

9.4.1.2 Maintenance documentation

A certificate of inspection should be issued in all cases.

The certificate of inspection should include the following information:

a) the name, postal address and telephone number of the maintenance company;

b) the date of maintenance;

c) identification of the maintenance technician;

d) a list of all portable extinguishers included in the maintenance programme, including all non-conforming equipment, and recommendations for appropriate corrective action or reference to where this information can be found;

e) the signature of the responsible person, which should be obtained upon completion of the service visit and prior to the service technician leaving the premises, or a record of the reason why this is not possible (e.g. unmanned sites);

f) a statement that, apart from non-conforming extinguishers as recorded, all portable fire extinguishers have been inspected and serviced in accordance with this standard, i.e. BS 5306-3.

9.4.2 Permanent replacement of extinguishers

It is the duty of the responsible person to arrange for permanent replacement extinguishers to be put into place as soon as possible after an inspection has shown that any extinguishers should be replaced. The competent person is responsible for bringing this duty to the responsible person's attention in the written report (see **9.4.1**).

Annex A (informative)

Training of competent persons

A competent person is one who has undergone an initial programme of training which includes "on the job" experience and attendance of a training course, followed by the successful completion of an examination administered by an independent examination body [5)].

To maintain competency, ongoing professional development is considered essential and is covered by the provision of refresher training at 3 year intervals together with an examination.

The nature and content of a typical training course is as follows.

a) **Initial training**

Criteria

A person is deemed competent after successful completion of the following:

1) "on the job" experience – the trainee will be under the supervision of a competent person whilst working;
2) attendance of a training course – the trainee will attend for the length of time recommended by the training institution (typically 3 days);
3) examinations – the trainee has to achieve a minimum standard in both theory and practical examinations administered by an independent examination body [5)].

Theory

Theoretical training on the initial training course is likely to include:

- provisions of BS 5306-3;
- provisions of BS 5306-8;
- provisions of BS EN 3-7;
- classes of fire in BS EN 2;
- legal requirements relating to the transportation of extinguishers (ADR) [11];
- legal requirements set out in the Pressure Equipment Directive [12];
- disposal of extinguishing media;
- safe working practices:
  - in workshop;
  - on site;
- health and safety issues affecting a service technician.

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5) There are three independent examination bodies currently recognized by British Approvals for Fire Equipment (BAFE): the British Fire Consortium (BFC), the Fire Industry Association (FIA) and the Independent Fire Engineering and Distributors Association (IFEDA).

The Fire Extinguishing Trades Association (FETA) and Oldham College of Technology were previously recognized by BAFE; FETA has now been incorporated into FIA, and Oldham College no longer provides examinations in this field.

During 2009 it is envisaged that the three currently recognized independent examination bodies will be melded into one.

Practical

The trainee has to undergo a practical test establishing their skills in fault-finding in, and servicing of, a number of extinguishers.

b) **Refresher training**

A competent person is required either to attend a refresher training course of at least 1 day duration, or to undergo refresher training that is structured as continuing professional development over a period that has documented outlines and training material.

The refresher training has to be completed within a period of 3 years of passing either the initial training course examination or the last refresher training examination. The competent person after completing the refresher training has to take and pass a written examination.

Theory

Theoretical training on the refresher course is likely to include:

- British Standards;
- commissioning services;
- basic services;
- extended services;
- overhauling;
- new classes of fire;
- new products in the market place;
- new requirements;
- practical installation;
- recharging;
- relevant UK statutory regulations including fire legislation.

Annex B (normative) Commissioning service procedures

The commissioning service procedures listed in Table B.1 should be carried out for the appropriate type of extinguisher.

Table B.1 shows a numbered sequence, from start to finish (left to right), of actions necessary to perform a commissioning service on the main types of extinguisher. Each action is composed of one or more operations or inspections, the details of which are described in Table B.2. It is not necessary, or possible, to perform every action on every type of extinguisher.

Table B.1 **Sequence of actions for commissioning service procedures for extinguishers**

Extinguisher type	Sequence of actions [A)]
Stored pressure	
Water, water-based (including foam), powder, and primary sealed powder	1, 2, 3, 4, 5, 9, 10, 11, 13, 15
Carbon dioxide	1, 3, 4, 5, 10, 11, 13, 15
Cartridge-operated	
Water and water-based (including foam)	1, 3, 4, 5, 6, 7, 9, 11, 12, 13, 14, 15
Powder	1, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15

[A)] The numbers refer to actions detailed in Table B.2.

Table B.2 **Commissioning service actions – Initial operations**

Action no.	Component and/or action	Procedure
1	Safety clip and indicating devices	Check the safety clip and indicating devices to determine whether the extinguisher has been operated.
2	Pressure-indicating devices	Check the pressure-indicating device where fitted. If it is not operating freely or if the indicated pressure is outside the specified limits, refer to the extinguisher manufacturer's instructions to ascertain the appropriate action to be taken. Check that any dust covers needed on pressure-indicating or pressure-relief devices are in place and are of a size that does not obscure the reading of the gauge. Where a pressure-indicating device is not fitted, verify, by means of the connection provided for this purpose, that the internal pressure is correct. If it is not correct, refer to the extinguisher manufacturer's instructions to ascertain the appropriate action to be taken.
3	External examination	Examine the exterior for corrosion, dents, gouges or damage that could impair the safe operation of the extinguisher (see Clause **9**). Competent persons carrying out initial service actions on new extinguishers finding these conditions should refer the extinguisher back to the supplier.
4	Initial weight check	Weigh the extinguisher according to the extinguisher manufacturer's instructions (in the case of a CO_2 extinguisher, weigh after removal of the discharge horn/hose assembly). Record this on the maintenance label (see **6.2.2**). In the event of a loss of content of more than 10%, either return the extinguisher to the manufacturer for replacement, or recharge the extinguisher if practicable to do so.

Table B.2 **Commissioning service actions – Initial operations** *(continued)*

Action no.	Component and/or action	Procedure
5	Operating instructions	Check the operating instructions for correctness and legibility, ensuring that the text is in English.
6	Opening a gas cartridge extinguisher	Open the extinguisher by unscrewing the headcap. Remove the gas cartridge.
7	Initial fill of all extinguisher types	Refer to the extinguisher manufacturer's instructions. Examine the interior with the aid of an inspection light. Check for corrosion or lining deterioration. Check that the extinguisher is filled correctly. Follow the correct procedure to fill the extinguisher if it is not filled. Follow the correct procedure if it has been filled incorrectly. For pre-filled, water-based, cartridge-operated types which have the additive in a separate container, remove this container and check it for leakage. If the container has been leaking, discard the container and recharge the extinguisher. Rinse out the body before charging.
8	Initial fill of cartridge-operated powder extinguisher	Where a cartridge-operated extinguisher has been pre-filled, examine the powder in the extinguisher. If there is any evidence of caking, lumps or foreign bodies, or if the powder is not free flowing, or if there is any doubt at all about the condition of the powder, discard all the powder. The use of sieves or machines to remove foreign bodies or caked or lumpy material is not recommended since this will involve considerable exposure of the powder to atmospheric humidity with a risk of subsequent caking. Refer to the extinguisher manufacturer's instructions.
9	Operating mechanism and air passages	Clean if necessary and pass air through the air passages, paying particular attention to the vent holes (or other venting device) in the headcap. Check that the strainer (where fitted), internal discharge tube and breather valve (where fitted) are unobstructed. Rectify any problems or replace with a new tube or valve if necessary. Check the operating mechanism and discharge control (where fitted) for free movement. Rectify any problems or replace with a new operating mechanism or discharge control as necessary. Protect moving parts and threads against corrosion with a lubricant as recommended by the extinguisher manufacturer.
10	Removable operating mechanism	Where the extinguisher is designed to have the operating mechanism removed without the discharge of contents or loss of pressure, remove and check the operating mechanism and discharge control (where fitted) for free movement. Clean and lubricate the operating mechanism, rectify any problems, or replace with a new operating mechanism as necessary.
11	Safety pin	Remove the safety pin and check that the operating lever is undamaged and its movement is unobstructed. Safety precautions should be taken to avoid inadvertent operation. Return the safety pin or, where necessary, a replacement pin to the extinguisher.

Table B.2 **Commissioning service actions – Initial operations** *(continued)*

Action no.	Component and/or action	Procedure
12	Gas cartridge	Examine the gas cartridge externally for corrosion or damage. If the gas cartridge has suffered mechanical damage or is corroded, replace as recommended by the extinguisher supplier (see also **7.2**). Weigh the gas cartridge and check the mass against that marked on the gas cartridge. If the gas cartridge has sustained a loss of content greater than 10% (15% for cartridges with a content mass of less than 30 g) of the original content, withdraw it from service and replace it with a gas cartridge as recommended by the extinguisher manufacturer. Check the date marked on the cartridge (see **7.2**).
13	Seals for the discharge horn, hose, nozzle, valve body and hose diaphragm	Ensure that all seals for the discharge horn, the hose, the nozzle and the valve body are in place, as prescribed in the extinguisher manufacturer's instructions.
14	Reassembly	Reassemble the extinguisher in accordance with the extinguisher manufacturer's instructions. Replace with new any safety element designed to show whether the extinguisher might have been operated. Check that the nozzle, horn and hose are fitted correctly. Follow the correct procedure to fit the nozzle, horn and hose to the extinguisher if any of them are fitted incorrectly.
15	Affix maintenance label	Affix the maintenance label to the extinguisher in an appropriate position on the extinguisher body, and complete the details on the maintenance label, as recommended in **6.2.2**.

Annex C (normative) Safety precautions for extinguishers

NOTE Attention is drawn to the Health and Safety at Work etc. Act 1974 [8], the Management of Health and Safety at Work Regulations 1999 [9] and fire legislation [1–3].

C.1 Precautions for opening extinguishers

WARNING. At all times, when attempting to remove parts from extinguishers, competent persons should ensure that they are clear of any parts which might be ejected. Under no circumstances should any attempt be made to remove the valves of carbon dioxide extinguishers or other high pressure extinguishers or cartridges under field conditions. Extreme caution should be used when opening any extinguisher.

C.2 Precautions for charging powder extinguishers

Before any powder extinguisher is opened it should be ascertained that, during inspection and maintenance, the precautions described in this annex can be and will be observed.

Only extinguishers containing the same type of powder should be opened and examined at any one time.

It is especially important that mixing or cross-contamination of different types of powder be avoided. Some mixtures can react, sometimes after a long delay, producing water and carbon dioxide with consequent caking of the dry powder and, in closed containers, a pressure rise. This rise in pressure could cause the extinguisher to explode.

Powder extinguishers should be opened only in dry conditions, and for the minimum time necessary for examination, to minimize the effect of atmospheric moisture on the powder.

Powder can absorb harmful amounts of moisture if exposed to air of high relative humidity, or if the powder is colder than the ambient air. Powder refills should only be opened immediately before use, and bulk refills should be resealed immediately after use, to reduce the possibility of contamination or absorption of moisture from the atmosphere.

Re-using powder should be avoided as re-used powder can eventually become lumpy and interrupt the flow of powder when the extinguisher is operated (see BS 6643-1).

In addition, each filling machine should be used with only one type of powder.

Annex D (normative) General basic service procedures

The commissioning service procedures listed in Table D.1 should be carried out for the appropriate type of extinguisher.

Table D.1 shows a numbered sequence, from start to finish (left to right), of actions necessary to perform a basic service on the main types of extinguisher. Each action is composed of one or more operations or inspections, the details of which are described in Table D.2. It is not necessary, or possible, to perform every action on every type of extinguisher.

Table D.1 **Sequence of actions for basic service procedures for extinguishers**

Extinguisher type	Sequence of actions [A)]
Stored pressure	
Water, water-based (including foam), powder, and primary sealed powder	1, 2, 3, 4, 5, 10, 11, 13, 17, 18, 19, 20
Carbon dioxide	1, 3, 4, 5, 11, 13, 18, 19, 20
Cartridge-operated	
Water and water-based (including foam)	1, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20
Powder	1, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 15, 17, 18, 19, 20

[A)] The numbers refer to actions detailed in Table D.2.

Table D.2 **Basic service actions – Initial operations**

Action no.	Component and/or action	Procedure
1	Safety clip and indicating devices	Check the safety clip and indicating devices to determine whether the extinguisher might have been operated.
2	Pressure-indicating devices	Check the pressure-indicating device where fitted. If it is not operating freely or if the indicated pressure is outside the specified limits, refer to the extinguisher manufacturer's instructions to ascertain the appropriate action to be taken. Check that any dust covers needed on pressure-indicating or pressure-relief devices are in place and are of a size that does not obscure the reading of the gauge. Where a pressure-indicating device is not fitted, verify, by means of the connection provided for this purpose, that the internal pressure is correct. If it is not correct, refer to the extinguisher manufacturer's instructions to ascertain the appropriate action to be taken.
3	External examination	Examine the exterior for corrosion, dents, gouges or damage that could impair the safe operation of the extinguisher (see Clause **9**), paying particular attention to any plastics headcap for signs of degradation.
4	Weight check	Weigh the extinguisher according to the extinguisher manufacturer's instructions (in the case of a CO_2 extinguisher, weigh after removal of the discharge horn/hose assembly), check the mass against that recorded when first put into service or when last recharged, and record this on the maintenance label (see **6.2.2**). In the event of a loss of content of more than 10%, discharge and recharge according to Annex C, Clause **7** and Clause **8**.
5	Operating instructions	Check the operating instructions for correctness and legibility (see **6.2.1** and **9.2.2**).

Table D.2 **Basic service actions – Initial operations** *(continued)*

Action no.	Component and/or action	Procedure
6	Opening a gas cartridge extinguisher	Open the extinguisher by unscrewing the headcap. Remove the gas cartridge.
7	Water, water-based, and foam charges	Pour the original charge into a clean container and, if it is to be reused, check it in accordance with the extinguisher manufacturer's instructions. Where the additive is in a separate container, remove this container and check it for leakage. If the container has been leaking, discard the container and charge. Rinse out the body.
8	Powder charges	Examine the powder of the extinguisher. Agitate the powder by inverting and shaking the extinguisher, taking care to avoid spillage. If there is any evidence of caking, lumps, or foreign bodies, or if the powder is not free flowing, or if there is any doubt at all about the condition of the powder, discard all the powder and recharge in accordance with Annex C. The use of sieves or machines to remove foreign bodies or caked or lumpy material is not recommended since this will involve considerable exposure of the powder to atmospheric humidity with a risk of subsequent caking.
9	Operating mechanism and air passages	Clean if necessary and pass air through the air passages, paying particular attention to the vent holes (or other venting device) in the headcap. Check that the strainer (where fitted), internal discharge tube and breather valve (where fitted) are unobstructed. Rectify any problems or replace with a new tube or valve if necessary. Renew gas-band, where fitted. Check the operating mechanism and discharge control (where fitted) for free movement. Rectify any problems or replace with a new operating mechanism or discharge control as necessary. Protect moving parts and threads against corrosion with a lubricant as recommended by the extinguisher manufacturer.
10	Removable operating mechanism	Where the extinguisher is designed to have the operating mechanism removed without the discharge of contents or loss of pressure, remove and check the operating mechanism and discharge control (where fitted) for free movement. Clean and lubricate the operating mechanism, rectify any problems, or replace with a new operating mechanism as necessary.
11	Safety pin	Remove the safety pin and check that the operating lever is undamaged and its movement is unobstructed. Safety precautions should be taken to avoid inadvertent operation. Return the safety pin or, where necessary, a replacement pin to the extinguisher.
12	Gas cartridge	Examine the gas cartridge externally for corrosion or damage. If the gas cartridge has suffered mechanical damage or is corroded, replace as recommended by the extinguisher supplier (see also **7.2**). Weigh the gas cartridge and check the mass against that marked on the gas cartridge. If the gas cartridge has sustained a loss of content greater than 10% (15% for cartridges with a content mass of less than 30 g) of the original content, withdraw it from service and replace it with a gas cartridge as recommended by the extinguisher manufacturer. Check the date marked on the cartridge (see **7.2**).

Table D.2 **Basic service actions – Initial operations** *(continued)*

Action no.	Component and/or action	Procedure
13	Seals for the discharge horn, hose, nozzle, valve body and hose diaphragm	The seals for the discharge horn, the hose, the nozzle and the valve body should be replaced with new seals when these components are removed from the extinguisher. If the hose is fitted with a diaphragm, this should always be replaced with a new diaphragm. Check the condition and fitness for use of the discharge nozzle, horn and hose, and ensure that the nozzle, horn and hose, if fitted, are not obstructed, cracked, worn, or damaged. Replace with a new nozzle, horn and/or hose if necessary.
14	Body: water, water-based and foam	Examine the interior with the aid of an inspection light. Check for corrosion or lining deterioration. Check separate containers for additives and replace if they are leaking or damaged.
15	Body: powder	Examine the interior with the aid of an inspection light. Check for corrosion and deterioration of lining, if fitted.
16	Water and water-based (including foam) charges	Return the original charge to the extinguisher, or replace with new charge according the instructions of the extinguisher manufacturer.
17	Reassembly	Reassemble the extinguisher in accordance with the instructions of the extinguisher manufacturer. Replace with new any safety clip and indicating device designed to show whether the extinguisher might have been operated.
18	Maintenance label	Complete the details on the maintenance label as recommended in **6.2.2**.
19	Mounting bracket/stand	Check any mounting bracket or stand if accessible and rectify any problems.
20	Report	Write an inspection report advising the responsible person of the state of maintenance of the extinguisher (see **9.4.1**).

Annex E (normative) Extended service procedures

The maintenance supplier should arrange for the extended service procedures given in Table E.1, together with the appropriate basic service procedures given in Annex D, to be carried out by a competent person.

Table E.1 **Extended service procedures**

Action no.	Procedure
1	Prior to performing the test discharge, the extinguisher should be examined externally for any obvious signs of damage to the body or operating mechanism. If a plastics headcap is coated in such a way as to disguise degradation (e.g. by painting), replace with a new headcap before proceeding to action 2. In the case of stored pressure extinguishers, additional safety precautions should be observed.
2	Perform the test discharge on the extinguisher.
3	Examine the body internally and in detail for corrosion, dents, cuts, gouges or lining damage (see Clause **9**). Pay special attention to the welds. Follow the extinguisher manufacturer's instructions where there are any doubts about the welds.
4	Examine and check all closures for thread wear, damage and corrosion as applicable (see Clause **9**).
5	Return the extinguisher to operational condition. If the extinguisher was fitted with a plastics headcap, it should be fitted with a new headcap, if this has not already been fitted in action 1. Reassemble and recharge the extinguisher in accordance with the extinguisher manufacturer's instructions (see Clause **7**).
NOTE	*The precautions described in Annex C should be taken when handling a powder extinguisher.*

Annex F (normative) Overhaul, including periodic inspection and test procedures for CO_2 and halon extinguishers

The maintenance supplier should arrange for the overhaul procedures given in Table F.1 and Table F.2, together with the procedures in Table D.1 and Table E.1, to be carried out.

*NOTE Requirements for the periodic inspection and testing of CO_2 and halon types of portable extinguishers are specified in BS EN 1802, BS EN 1803 and BS EN 1968, depending on the construction of the extinguisher body. These are the only types of extinguishers that are not excluded from the Pressure Systems Safety Regulations 1999 [4]. The maintenance intervals recommended in Table 1 (Clause **6**) are expected to be acceptable as representing general good practice for schemes of examination for extinguishers under these Regulations.*

Table F.1 **Overhaul procedures for carbon dioxide (CO_2) extinguishers**

Action no.	Procedure
1	Discharge the extinguisher. Remove the swivel horn/hose assembly, the valve and the valve assembly, and remove the diptube from the valve assembly. Destroy the valve.
2	Pressure-test the body shell in accordance with the test pressure indicated on the body. Do not overhaul the body if it is unmarked. Permanently mark the body shell with the retest date and the identification of the organization performing the test. (Attention is drawn to the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2007 [13].)
3	Reassemble and recharge the extinguisher with new headcaps/valves.

Table F.2 **Overhaul procedures for halon extinguishers (see Annex G)**

Action no.	Procedure
1	Empty the extinguisher and strip the components down completely.
2	Reassemble and recharge the extinguisher with new headcaps and valves.

Annex G (informative) Halon extinguishers

G.1 Halon legislation

Under the 1987 Montreal Protocol on substances that deplete the ozone layer, the production of halons identified as ozone-depleting compounds was banned. This ban was implemented and enforced in the European Community through EC Regulation No. 3093/94 [14], which prohibits the production of halons, and controls their supply and use. The use of halon 1211 and 1301 is restricted to the "critical uses" listed by Annex VII to EC Regulation No. 3093/94.

Amendments to the Montreal Protocol during the 1990s, along with the increased availability of technologies for replacing ozone-depleting substances, led to the introduction of control measures stricter than those imposed by EC Regulation No. 3093/94 [14]. EC Regulation No. 2037/2000 [10] prohibits the placing on the market and use of halons and of products and equipment containing halons, except for the "critical uses" listed in Annex VII of this Regulation. This was implemented in the United Kingdom by the Environmental Protection (Controls on Ozone-Depleting Substances) Regulations 2002 [6] and the Environmental Protection (Controls on Ozone-Depleting Substances) (Northern Ireland) Regulations 2003 [7]. After 31 December 2002 it became an offence to supply halons that have been recovered, recycled or reclaimed in existing extinguishers, and after 31 December 2003 it became an offence to possess a halon extinguisher, unless this is for one of the "critical uses". The Ozone-Depleting Substances (Minimum Qualifications) Regulations 2006 [15] require any person handling equipment containing halons, either for recovery or for the "critical uses", to have completed the approved training course cited in the Regulations and be certificated as having completed that training course.

G.2 Withdrawal of halon extinguishers from service

Halon extinguishers withdrawn from service are required to be emptied in such a way that the halon is recovered, either for the limited possibility of re-use or for disposal by a non-contaminating method. To this end, they have to be sent to an authorized disposal agent with the facilities and expertise required to recover or destroy the halon.

G.3 Halon replacement gases

Selected halon alternative agents have superseded halon usage in fixed fire suppression system and portable fire extinguisher applications. Among the chemical halon alternatives, hydrofluorocarbons (HFCs), which exhibit zero ozone depletion potential, are now in common usage. Owing to their global warming potentials (GWP) these are captured within the Kyoto Protocol. In 2001, as part of the European Climate Change programme (ECCP), the European Commission convened a Fluorinated Gases (F Gases) Working Group to discuss a Europe-wide approach to containing and reducing fluorinated gas emissions. The resulting Regulation (EC Regulation 842/2006 [16]) encompasses the placing on the market for specific gases and applications; the containment, use, recovery, recycling and destruction of these gases; labelling and disposal issues; annual reporting; and the training and certification of relevant personnel. As with halons, the EU Regulations and the UK implementation of them require that only trained and certificated personnel handle equipment containing F gases.

Annex H (informative) Extinguishers manufactured in accordance with withdrawn British Standards

Extinguishers conforming to British Standards which were in existence before BS EN 3 was originally published in 1996 might still be found in service. Though these are now more than 10 years old they may still be accepted as part of the extinguisher provision for the premises provided that they can be returned to a serviceable state; that is, when inspected they do not fall within the categories covered in **9.2.2** and **9.2.3**.

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