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British Standard

# Fire extinguishing media

## Part 3. Specification for powder

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Agents extinctuers  
Partie 3. Poudre — Spécifications

Feuerlöschmittel  
Teil 3. Löschpulver

## Foreword

This Part of BS 6535 has been prepared under the direction of the Fire Standards Policy Committee. It is one of a series currently being prepared, both nationally and internationally, covering fire extinguishing media. Although other Parts of this standard are identical with the corresponding international standard, this Part differs in some aspects from ISO 7202-1987 'Fire protection — Fire extinguishing media — Powder', published by the International Organization for Standardization (ISO). In particular the test for resistance to low temperature is carried out at  $-30^{\circ}\text{C}$  which the committee considers sufficient for conditions in the UK, and the tests for fire extinguishing performance have been made more stringent. Additionally requirements and test methods have been added which will be appropriate where powder is to be supplied for Ministry of Defence (MoD) use (see appendix L).

The Parts of BS 6535 in preparation or published, and their relationship to the corresponding international standards are as follows:

- Part 1 Specification for carbon dioxide  
(identical with ISO 5923-1984 'Fire protection — Fire extinguishing media — Carbon dioxide')
- Part 2 Specification for halogenated hydrocarbons  
(identical with ISO 7201-1982 'Fire protection — Fire extinguishing media — Halogenated hydrocarbons')
- Part 3 (This Part, related to ISO 7202-1987 'Fire protection — Fire extinguishing media — Powder')
- Part 4\* Specification for foam concentrate  
(will be similar to ISO 7203\*)

These specifications are designed to establish that the medium in question has at least a minimum useful fire extinguishing capability and therefore can be reasonably sold for fire extinguishing purposes.

In particular this Part of BS 6535 does not provide an assessment of the performance of an extinguishing powder in a particular piece of equipment nor does it attempt to compare the performance of different extinguishing powders.

This Part of BS 6535 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 third party 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. Enquiries as to the availability of third party certification schemes will be forwarded by BSI to the Association of Certification Bodies. If a third party certification scheme does not already exist, users should consider approaching an appropriate body from the list of Association members.

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

\* In preparation.

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# Specification

## 0 Introduction

### 0.1 Compatibility between extinguishing powders and foams

Under some circumstances, incompatibility between extinguishing powders and foams may exist. The user should ensure that any combination of extinguishing powder and foam which may be used does not lead to an unacceptable loss of efficiency caused by an unfavourable interaction of the chosen media, when applied simultaneously or successively.

The requirement of 11.1 may be applied for this purpose.

### 0.2 Suitability and equivalence of extinguishing powders in equipment

The requirements of clauses 8 and 9, and the tests of appendices E and F, only establish whether or not the powder is above a minimum acceptable quality, and it is not suggested that the tests can be used to compare the potential performance of different powders in a particular item of equipment.

It is important that a powder complying with the requirements of this British Standard should also be tested for correct function in the particular equipment in which it is to be used, as specified in an appropriate British Standard such as BS 5423, BS 6165, BS 6643 or BS 5306 : Part 7.

## 1 Scope

This Part of BS 6535 specifies requirements for minimum performance levels in defined fire extinguishment tests and for both chemical and physical properties of powders suitable for use against class A, B and/or C fires.

Appendix M gives supplementary requirements for a powder which will be required for certain Ministry of Defence applications.

Powders specifically designed for the control and extinction of class D (metal) fires are not covered by this British Standard.

NOTE 1. The fire classification used throughout the standard is as designated within BS 4547.

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

## 2 Definitions

For the purposes of this Part of BS 6535, the definitions given in BS 4547 apply together with the following.

**2.1 (extinguishing) powder.** An extinguishing medium composed of finely divided solid particles containing one or more principal components which provide fire extinguishing capability mixed with various additives in order to achieve important storage and flow characteristics.

**2.2 class of powder.** The class of fire for which a particular powder is suitable, indicated by adding the letters defined in BS 4547 before the word 'powder'.

NOTE. ABC powder is suitable for class A (solid), class B (liquid) and class C (gases) fires, whereas BC powder is only suitable for class B and class C fires.

## 3 Characterization statement and declared information

The information and data specified in clauses 4, 5 (including the particular test method used), 6 and 7 shall be specified by the manufacturer in the form of a data sheet which shall be supplied on demand with powder deliveries.

NOTE 1. Values declared by the manufacturer should be achieved statistically, corresponding to mean values of material obtained from the manufacturing process.

NOTE 2. The characterization statement is primarily for identification and information purposes and to provide the reference values for the tolerance requirements of clauses 4, 5, 6 and 7.

## 4 Bulk density

The bulk density shall be within  $\pm 0.10$  g/mL of the value declared by the manufacturer, when determined in accordance with appendix B.

NOTE 1. Bulk density may increase after long periods of storage.

NOTE 2. A minimum value of bulk density will be necessary to ensure that the powder can be filled into particular items of extinguishing apparatus. See appendix M for requirements for minimum bulk density of powder required for certain Ministry of Defence applications.

## 5 Particle size

The quantity retained in the 40  $\mu\text{m}$  sieve and on the 63  $\mu\text{m}$  sieve shall not differ from the declared value by more than  $\pm 10\%$  of the total mass of the sample, and the quantity retained on the 125  $\mu\text{m}$  sieve shall not differ from the declared value by more than  $\pm 5\%$  of the total mass of the sample when tested in accordance with appendix C.

## 6 Chemical content

**6.1** The declared chemical content shall include all constituents forming 10 % or more of the powder, and shall comprise not less than 75 % of the chemical content.

**6.2** The content of a declared constituent shall be within  $\pm 10\%$  of the declared value for constituents comprising less than 50 % (*m/m*) of the extinguishing powder, and  $\pm 5\%$  of the declared value for a constituent comprising more than 50 % (*m/m*) of the extinguishing powder.

NOTE. For example a constituent with a declared value of 30 % will have tolerance limits of 27 % and 33 %, and a constituent with a declared value of 80 % will have tolerance limits of 76 % and 84 %.

**Warning.** It is most important that, under normal conditions of use, the various materials and additives used to produce extinguishing powders should be generally recognized as being non-toxic to humans.

## 7 Moisture content

The moisture content shall not exceed 0.25 % (*m/m*) when determined in accordance with appendix D.

## 8 Fire test performance

### 8.1 Class A

Extinguishing powders claimed by the manufacturer to be suitable for class A fires shall extinguish the test fire in two out of a set of three tests when tested in accordance with E.4.

### 8.2 Class B

Extinguishing powders claimed by the manufacturer to be suitable for class B fires shall extinguish the test fire in two out of a set of three tests when tested in accordance with E.5.

NOTE. Tests for effectiveness on class C fires are not included in this standard. Any powder meeting the requirements of 8.2 is, in addition, deemed to possess the potential for achieving an adequate performance on class C fires.

## 9 Discharge performance

**9.1** Not more than 4 s shall elapse between the operation of the control mechanism and the commencement of discharge.

**9.2** Not less than 85 % of the powder shall be discharged from the extinguisher when tested in accordance with appendix F.

## 10 Resistance to caking and lumping

The powder shall be resistant to caking and lumping, i.e. the penetration of the needle shall be more than 15 mm when tested in accordance with appendix G.

## 11 Foam compatibility and water repellency

NOTE 1. A powder may be compatible with one particular foam concentrate but not with another since compatibility depends on the foam as well as the powder.

NOTE 2. While it is recognized that foam compatible powders are less water repellent than other powders, wherever possible foam compatible powders should comply with the requirement for water repellency in 11.2.

### 11.1 Foam compatibility

For foam compatible powders the control time shall be not more than 5 min when tested with any foam concentrate with which it is claimed to be compatible (see clause 14, item (h)), in accordance with appendix L.

NOTE. See appendix M for requirements for foam compatibility of powders required for certain Ministry of Defence applications.

### 11.2 Water repellency

For powders which are not foam compatible there shall be no absorption of the water droplets by the powder when tested in accordance with appendix H.

## 12 Resistance to low temperature

The powder shall be resistant to the effects of low temperature, i.e. all the powder shall fall to the stoppered end of the test tube within 5 s when tested in accordance with appendix J.

## 13 Electrical insulation value

The powder shall have a dielectric breakdown voltage strength of not less than 5 kV, when measured as described in appendix K.

## 14 Marking of packaging

NOTE. Extinguishing powders should be packaged in containers which are essentially moisture and impact resistant. The supplier should ensure that every consignment is packed in such a way as to preserve its essential characteristics when stored and handled in accordance with the manufacturer's recommendations.

The manufacturer or supplier shall provide, marked on each separate package (or on a label firmly attached to the package), the following information:

- (a) the commercial name of the product followed by the wording 'Fire extinguishing powder';
- (b) the wording 'Complies with BS 6535 : Part 3 : 1989\*', suitable for (as appropriate) class A, B or C fires';

\* Marking BS 6535 : Part 3 : 1989 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is therefore solely the responsibility of the person making the claim. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.