

Microbiological safety cabinets —

**Part 1: Specification for design,
construction and performance prior to
installation**

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Health Care Standards Policy Committee (HCC/-) to Technical Committee HCC/28, upon which the following bodies were represented:

- Association of the British Pharmaceutical Industry
- Association of Clinical Pathologists
- Association of Medical Microbiologists
- British Health and Safety Society
- British Laboratory Ware Association
- British Occupational Hygiene Society
- Chartered Institution of Building Services Engineers
- Department of Health
- Guild of Hospital Pharmacists
- Health and Safety Executive
- Institute of Animal Health
- Institute of Biology
- Institute of Hospital Engineering
- Institute of Medical Laboratory Sciences
- Institution of Mechanical Engineers
- Manufacturing Science Finance
- Medical Research Council
- Ministry of Agriculture, Fisheries and Food
- Public Health Laboratory Service
- Royal College of Pathologists
- Coopted members

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Foreword

This Part of BS 5726 was prepared under the direction of the Health Care Standards Policy Committee. Together with Parts 2, 3 and 4 it supersedes BS 5726:1979, which is withdrawn.

Microbiological safety cabinets are also known as biological safety cabinets.

The differences between this Part of BS 5726 and the 1979 edition include the following.

- a) Requirements are specified in terms of performance tests which have been written to relate as far as possible to standards in force in other countries.
- b) Design is specified in terms of performance so that the standard is less restrictive e.g. cabinet length is no longer specified.
- c) The centrally important operator protection test has been modified to include sampling at the lower edge of the front window.

The Parts of this standard are as follows:

— *Part 1: Specification for design, construction and performance prior to installation. This Part is aimed primarily at manufacturers;*

— *Part 2: Recommendations for information to be exchanged between purchaser, vendor and installer and recommendations for installation. This Part is aimed primarily at installers;*

— *Part 3: Specification for performance after installation. This Part is aimed primarily at those commissioning the cabinets;*

— *Part 4: Recommendations for selection, use and maintenance. This Part replaces the notes for users given in appendix G of the previous edition.*

Appendix D gives three methods for determination of the operator protection factor for class I and class II cabinets. If asymmetry of the operator protection factor is to be determined only the microbiological method using slit samplers or the potassium iodide method are suitable.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 14, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This Part of BS 5726 specifies requirements for the design, construction and performance prior to installation for class I, class II and class III microbiological safety cabinets (also known as biological safety cabinets) together with class III cabinets which can subsequently be converted to class I cabinets.

BS 5726 does not specify all requirements for safety cabinets intended for uses other than microbiological use. The principles involved and the methods of test described have wide application but where cabinets are constructed for special purposes, the onus of establishing their effectiveness rests with users. Special safety cabinets for biotechnology or for handling, for example, cytotoxic or radiopharmaceutical material are not covered by this standard but some of the requirements for filters and containment performance specified in this standard may be applicable.

NOTE 1 The titles of the standards publications referred to in this standard are listed on the inside back cover.

NOTE 2 Bibliographical references are listed in appendix J.

2 Definitions

For the purposes of this Part of BS 5726 the following definitions apply.

2.1

microbiological safety cabinet

cabinet intended to offer protection to the user and environment from the aerosol hazards of handling infected and other hazardous biological material, but excluding radioactive, toxic and corrosive substances, with air discharged to the atmosphere being filtered

NOTE Microbiological safety cabinets are intended to reduce the risk to the operator when handling hazardous biological materials but do not necessarily protect the operator from all the hazards involved. Some types of cabinet may also protect the materials being handled in them from environmental contamination.

2.2

class I microbiological safety cabinet

safety cabinet with an opening through which the operator can carry out manipulations inside the cabinet and which is so constructed as to minimize, by means of an inward airflow through the working aperture, the escape of airborne particulate contamination generated within the cabinet

2.3

class II microbiological safety cabinet

safety cabinet with an opening through which the operator can carry out manipulations inside the cabinet, in which the work space is flushed with a unidirectional (so-called laminar) filtered downward airflow and which is so constructed as to minimize, by means of an inward airflow through the working aperture, the escape of airborne particulate contamination generated within the cabinet

2.4

class III microbiological safety cabinet

safety cabinet in which the operator is separated from the work by a physical barrier, i.e. by gloves mechanically attached to the cabinet, and into which filtered air is continuously supplied and from which the escape of any airborne particulate contamination is prevented by exhaust and inlet filtration systems

2.5

working space

part of the interior of the cabinet within which manipulations may be safely carried out

2.6

manufacturer

organization that designs, constructs, supplies and usually tests the cabinet, in accordance with this standard

NOTE By agreement with the purchaser the tests may be carried out by a third party.

3 Materials and components of construction

3.1 General

When the surfaces of all materials and components are examined without magnification by normal or corrected vision, there shall be no cracks or surface defects including those leading to ineffective mating with gasket surfaces or other sealing devices.

NOTE Materials used in the construction of safety cabinets should withstand normal wear, and where appropriate corrosive gas, fume or vapour, be structurally sound and dimensionally stable. All surfaces should be impervious, smooth, abrasion and corrosion resistant and of material which resists crazing, cracking and chipping.

3.2 Materials of construction

3.2.1 All cabinet interior work surfaces, including the sub-floor assembly, where fitted, shall be made of corrosion resistant material.

3.2.2 If carbon steel sheet is used it shall be prime grade stretcher or roller levelled, complying with BS EN 10130 and with tolerances complying with BS EN 10131.

3.2.3 The finish of all interior work surfaces shall be uniform.

NOTE Concealed surfaces or hollow metal sections should be protected by the finish applied after welding and before assembly.

3.3 Chemical resistance

When all cabinet internal work surfaces are tested in accordance with appendix A, and examined without magnification by normal or corrected vision there shall be no visible effect on the finish other than a slight change of gloss or discolouration compared with an untreated area.

3.4 Sealants for joints

Sealants for joints shall be either:

- a) two-part accelerated synthetic rubber (polysulphide type) temperature resistant high adhesion grade or equivalent used in accordance with the manufacturer's recommendations; or
- b) one-part silicone based sealant compound complying with BS 5889, and used in accordance with the manufacturer's recommendations.

3.5 Fans

The index of protection as specified in BS 5490 shall be not less than IP 44.

NOTE Fans of any configuration may be used provided they enable the cabinet to comply with the performance requirements specified in this Part of BS 5726.

3.6 Windows

3.6.1 General

Windows shall be made of either safety glass or safety plastics. Light transmission of windows shall comply with BS AU 178a, and impact resistance shall comply with class A of BS 6206.

NOTE 1 Where glass windows are provided, manufacturers should note the recommendations given in appendix A of BS 3193:1989.

NOTE 2 Manufacturers should note that it is important that safety glass and safety plastics have the durability to continue to perform satisfactorily for their expected life, taking into account the external and internal environments to which they will be exposed and the method of glazing.

3.6.2 Front window

It shall be possible to seal the front window. Means shall be provided to hold the front window open securely for loading equipment etc. before starting work. When closed, the size, position and angle of the window shall be such as to give an unobstructed view into the working space when the operator is seated centrally at the cabinet.

NOTE For class I and class III cabinets, an angle between 55° and 75° to the horizontal has been found to be satisfactory.

3.6.3 Vertical sliding sash windows

Vertical sliding sash windows, if provided, shall be constructed such that the sash cannot fall and endanger the user if the suspending system were to fail.

3.7 Cabinet floor

The base of the cabinet shall be flat and rigid. If the working space has a solid floor, this shall be liquid-tight with a raised edge at least 10 mm high all round.

If the floor is perforated, as in some class II cabinets, the sub-floor into which any spilt liquid may drain shall be liquid-tight with a raised edge at least 10 mm high all round. The perforated floor shall be removable to allow access to the sub-floor for cleaning. The floor and any structures exposed when the floor is removed shall be free from sharp edges.

3.8 Corners

All corners and angles inside the cabinet working space and other normally accessible areas (e.g. during cleaning) shall be:

- a) free from cracks or crevices, when examined without magnification, by normal or corrected vision; and
- b) radiussed to a minimum of 3 mm.

3.9 Sealable panels

A front sealable panel and associated fastenings to cover the open aperture of class I and class II cabinets shall be provided. When tested in accordance with appendix B the concentration of oil aerosol determined from scans around the sealable panel shall not exceed 0.003 % of the challenge concentration at any position. A sealing panel for the inlet filter of class III cabinets shall be provided.

NOTE The panels should be made of rigid, non-flammable, corrosion resistant material and should be easily and quickly attachable and removable, for example, by means of simple spring toggle or finger screw operation which should not be hazardous to the operator. If integral seals are provided they should be so constructed that there is no danger of their coming loose.

4 Stability

4.1 Resistance to overturning

With the cabinet placed on a flat rigid surface, and the front bottom edge of the cabinet prevented from sliding, the rear bottom edge shall not lift off the floor or bench by more than 1.6 mm when a lateral force of 440 N is applied at the centre of the top edge.