

BRITISH STANDARD 2904 : 1957

**HOSPITAL
STERILIZERS
(BOILING WATER
TYPE)**

BRITISH STANDARD SPECIFICATION

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BRITISH STANDARDS INSTITUTION

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THIS BRITISH STANDARD, having been approved by the Surgical Instruments & Medical Appliances Industry Standards Committee and endorsed by the Chairman of the Chemical Divisional Council, was published under the authority of the General Council on 30th September, 1957.

The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

A complete list of British Standards, numbering over 6000 indexed and cross-indexed for reference, together with an abstract of each standard, will be found in the Institution's Yearbook.

This standard makes reference to the following British Standards :

- B.S. 31. Steel conduits and fittings for electrical wiring.
- B.S. 84. Parallel screw threads of Whitworth form.
- B.S. 93. B.A. screw threads.
- B.S. 143. Malleable cast iron and cast copper alloy pipe fittings for steam, air, water, gas and oil.
- B.S. 192. Open-ended spanners (not including B.A. sizes).
- B.S. 265. Cold rolled brass sheets, strip and foil, copper content 61.5 per cent minimum and under 64 per cent maximum.
- B.S. 267. Cold rolled brass sheets, strip and foil, copper content within range 68 per cent minimum and 72 per cent maximum.
- B.S. 350. Conversion factors and tables.
- B.S. 562. Reversible connectors (with earthing facilities) for portable electrical appliances.
- B.S. 567. Asbestos cement flue pipes and fittings, light quality (up to and including 6 in. diameter).
- B.S. 715. Sheet metal cylindrical flue pipes, fittings and accessories for gas fired appliances.
- B.S. 717. Combustion testing of domestic appliances burning town gas.
- B.S. 766. Draught-diverters on gas appliances, including recommendations for flue terminals.

- B.S. 816. Requirements for electrical appliances and accessories.
- B.S. 899. Rolled copper sheet and strip for general purposes.
- B.S. 1010. Draw-off taps and stop valves for water services.
- B.S. 1038. 99·85 per cent tough pitch copper.
- B.S. 1224. Electroplated coatings of nickel and chromium.
- B.S. 1256. Malleable cast iron (Whiteheart process) and cast copper alloy pipe fittings for steam, air, water, gas and oil.
- B.S. 1387. Steel tubes and tubulars suitable for screwing to B.S. 21, Pipe threads.
- B.S. 1449. Steel plate, sheet and strip.
- B.S. 1526. Nickel and nickel alloy hot-rolled sheet, and cold-rolled sheet and strip for general purposes.
- B.S. 1737. Jointing materials and compounds for water, town gas and low-pressure steam installations.
- B.S. 1963. Pressure-operated relay valves for use with town gas.
- B.S. 2512. Gas heated catering equipment.

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.

The following B.S.I. references relate to the work on this standard :—
Committee reference SGC/14 Draft for comment CV(SGC)2061.

CO-OPERATING ORGANIZATIONS

The Surgical Instruments and Medical Appliances Industry Standards Committee under whose supervision this British Standard was prepared consists of representatives from the following Government departments and scientific and industrial organizations :—

- Admiralty
- Air Ministry
- *Association of Hospital Matrons
- British Dental Association
- British Medical Association
- British Paediatric Association
- *Federation of Surgical Instrument Manufacturers
- Imperial Chemical Industries Ltd.
- Institute of British Surgical Technicians
- Medical Defence Union
- Medical Defence Union of Scotland
- Medical Protection Society
- Ministry of Agriculture, Fisheries and Food
- *Ministry of Health
- Queen's Institute of District Nursing
- Royal College of Midwives
- Royal College of Nursing
- Royal College of Obstetricians and Gynaecologists
- Royal College of Physicians
- Royal College of Surgeons of Edinburgh
- Royal College of Surgeons of England
- Royal Faculty of Physicians and Surgeons of Glasgow
- *Surgical Instrument Manufacturers' Association
- War Office

The Government departments and professional and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard :—

- Associated Offices Technical Committee
- British Electrical and Allied Manufacturers Association
- British Electrical Development Association
- Department of Health for Scotland
- Gas Council
- Institute of Public Supplies Officers
- Institution of Hospital Engineers
- National Blood Transfusion Service
- Royal Institute of British Architects
- Stainless Steel Fabricators Association
- Individual manufacturers

BRITISH STANDARD SPECIFICATION FOR

HOSPITAL STERILIZERS

(BOILING WATER TYPE)

FOREWORD

This British Standard has been prepared at the request of the Hospital Equipment Standards Advisory Committee of the British Standards Institution, whose recommendation was approved by the Surgical Instruments and Medical Appliances Industry Standards Committee.

Sterilization by means of boiling water is one of the most commonly used methods of sterilizing instruments. It should be recognized, however, that this method does not give absolute sterility, since spores are not necessarily killed in the process ; the method is, however, found satisfactory for most general purposes. Water in the sterilizer (with the lid closed) should be allowed to boil for at least five minutes after all the instruments or other equipment have been placed in the sterilizer. Additional utensils should not be added during the sterilization process.

The selection of the range of sizes recommended in this standard was made with a view to reducing the size range to a practical minimum and at the same time giving a reasonable selection for most requirements. Due consideration was given to standardization of those dimensions which effectively contained the more usual sets of equipment required to be sterilized in operating theatres, hospital wards, clinics and those commonly used in dental, ophthalmic or general practice ; at the same time a wide variation in both design and materials has been permitted as far as practicable.

Special attention is drawn to the relation of the overall internal dimensions to the nominal depth, as defined in this standard, to the type and size of equipment, and to the fact that dimensional latitude has been given to manufacturers to allow existing products which conform reasonably closely to the standard sizes to come within the scope of the specification. It is appreciated that manufacturing tools are in use which produce equipment varying slightly in certain dimensions from the sizes given in this standard and that these tools will continue to be used for some time. Nevertheless, it is strongly recommended that the dimensional requirements of this standard become established when re-tooling becomes necessary.

The introduction of thermostatic control will provide economy in operation and will also reduce the nuisance and damaging nature of escaping steam with its consequent risk of scalding the operator ; in addition, it will help considerably in reducing the incidence of sterilizing equipment boiling dry.

The choice of electrical equipment is of particular concern when the apparatus is to be used in an atmosphere which may contain anaesthetic vapours in explosive concentrations. For this reason provision is made for two classes of electrically heated sterilizers, viz. :

Class A : For ordinary use, other than in anaesthetizing suites.

Class B : For use in anaesthetizing suites.

An indication of the warming-up time is given in the Appendix to illustrate the warming-up times typical of apparatus in this series. It should be noted that the warming-up time is dependent on a number of factors not within the range of the standard and that the warming-up times do not form a part of the specification.

It is advisable for the purchaser to ensure that the method of filling meets with the requirements of the water authorities.

It should be noted that B.S. 2745 provides for the requirements for bed pan and urine bottle washers.

NOTE. Where metric equivalents have been given the figures in British units are to be regarded as the standard. The metric conversions are approximate. More accurate conversions should be based on the tables in B.S. 350, 'Conversion factors and tables'.

SPECIFICATION

SECTION ONE : GENERAL

SCOPE

1. This British Standard specifies requirements for electrically heated, gas heated and steam heated sterilizers of the boiling water type for :

- a. Instruments
- b. Bowls and utensils
- c. Crockery
- d. Bowls and instruments (combined)
- e. Bed pans
- f. Babies' feeding bottles.

Provision is made for two classes of sterilizers :

Class A sterilizers intended for use in situations where the atmosphere is unlikely to contain anaesthetic vapours in explosive concentrations.

Class B sterilizers intended for use in situations where the atmosphere may contain anaesthetic vapours in explosive concentrations and for which electricity or steam are the only permissible heating media.

METHOD OF HEATING

2. *a.* Class A sterilizers shall be heated by means of steam, electricity or gas, according to the requirements of the purchaser.

b. Class B sterilizers shall be heated by means of either steam or electricity according to the requirements of the purchaser. Class B electrically heated sterilizers shall comply with the additional requirements given in Clause 31.

c. In a combined bowl and instrument sterilizer the bowl and instrument sections shall be heated separately, except in the case of size $18 \times 14 \times 12$ in., where an instrument tray shall be clipped into the sterilizer or sterilizer basket.

MATERIALS

3. The shell and lid of the sterilizer shall both be made of any one of the following :

a. *Stainless steel sheet* complying with the requirements of any one of the En 58 series of steels specified in B.S. 1449*.

b. *Cupro-nickel alloy sheet* complying with the requirements of B.S. 1526.†

c. *Copper sheet* in the half hard condition complying with the requirements of B.S. 899‡ and having a composition complying with the requirements of B.S. 1038§, except that the material shall be capable of satisfying the bend test (Clause 8 *b* of B.S. 899) with and across the direction of rolling to an angle of 180° .

d. *Brass sheet.* Unless used for drawing purposes, brass sheet shall be in the half hardened condition and shall comply with the requirements of B.S. 265¶, except that the material shall be capable of satisfying the bend test (Clause 6 of B.S. 265) with and across the direction of rolling to an angle of 180° .

If used for drawing, brass sheet shall be in the annealed condition and shall comply with the requirements of B.S. 267||.

DIMENSIONS AND TOLERANCES

4. *a.* *Internal dimensions of tank.* The nominal internal dimensions of sterilizers shall conform to the sizes given in Table 1.

*B.S. 1449, 'Steel plate, sheet and strip'.

†B.S. 1526, 'Nickel and nickel alloy hot-rolled sheet, and cold-rolled sheet and strip for general purposes'.

‡B.S. 899, 'Rolled copper sheet and strip for general purposes'.

§B.S. 1038, '99.85 per cent tough pitch copper'.

¶B.S. 265, 'Cold rolled brass sheets, strip and foil, copper content 61.5 per cent minimum, and under 64 per cent maximum'.

||B.S. 267, 'Cold rolled brass sheets, strip and foil, copper content within range 68 per cent minimum and 72 per cent maximum'.

The actual internal dimensions shall be within $\pm 2\frac{1}{2}$ per cent of the nominal dimensions of Table 1, except for instrument sterilizers for which the tolerance shall be ± 5 per cent.

b. Nominal depth. The nominal depth of sterilizers fitted with immersed heating units, i.e., steam coil or immersion heaters, shall be measured as the distance from the rim to the false bottom of the sterilizer or, where no false bottom is provided, to the tray rest immediately above the heating unit.

The nominal depth of sterilizers fitted with external heating units, i.e. gas heated or electrically heated with clamp-on elements, shall be measured as the distance from the rim to the bottom of the sterilizer.

Where an overflow is provided, the nominal depth given in Table 1 shall be increased by 1 in.

c. Working height. The working height of floor mounted sterilizers shall be 30 in. to 36 in. from the floor to the rim.

d. Thickness of sheet metal. (i) *Shell.* The thickness of sheet metal employed in the manufacture of the body of the sterilizer shall be as given in Table 2.

(ii) *Lid.* The thickness of sheet metal employed in the manufacture of the lid shall be as given in Table 3.

LID

5. The lid shall be flat or domed and of rigid construction, and shall be fitted with a drip flange at the back.

It shall be fitted with a handle at each or either side, and the handle shall be so designed and positioned that it will not get uncomfortably hot and will provide reasonable protection to the user.

When the lid is open, it shall be prevented from swinging too far back by the fitting of a suitable, robust stop.

A counterweight or pedal lifting device may be provided for opening the lid of the sterilizer if required by the purchaser.

EXTERNAL TEMPERATURES

6. *a. Surface temperatures.* When tested in accordance with the methods described in Clause 6 *a* of B.S. 2512*, surfaces which have to be touched in the normal operation of the appliance shall not exceed 150°F (65°C) (or preferably 120°F (50°C)). This includes tap handles, door handles, etc.

The temperature of components with leather diaphragms as used in gas heated sterilizers shall not exceed 140°F (60°C).

*B.S. 2512, 'Gas heated catering equipment'.

TABLE 1. INTERNAL DIMENSIONS OF STERILIZERS

Designation and item number	Nominal internal dimensions (length × width × depth*)		Maximum depth of water for sterilizing	
	in.	cm	in.	cm
a. Instrument sterilizers— all types				
1	9 × 5 × 3	23 × 13 × 8	2	5
2	11 × 5½ × 4	28 × 14 × 10	2¾	7
3	14 × 6½ × 5	35.5 × 16.5 × 13	3¼	8
4	17 × 8 × 6	43 × 20 × 15	4	10
5	20 × 10 × 7	51 × 25 × 18	4¾	12
6	22 × 12 × 10	56 × 30.5 × 25	7	18
b. Bowl and utensil sterilizers				
c. Crockery sterilizers				
7	18 × 14 × 15	46 × 35.5 × 38	12	30.5
8	22 × 16 × 19	56 × 41 × 48	16	41
9	26 × 18 × 19	66 × 46 × 48	16	41
10	30 × 20 × 19	76 × 51 × 48	16	41
d. Combined bowl and instrument sterilizers				
11 <i>Single compartment with one lid</i>	18 × 14 × 15	46 × 35.5 × 38	12	30.5
12 <i>Double compartment with two lids</i>				
combined dimensions	22 × 16 × —	56 × 41 × —	—	—
bowl compartment	14 × 16 × 19	35.5 × 41 × 48	16	41
instrument compart- ment	8 × 16 × 6	20 × 41 × 15	4	10
13 <i>Double compartment with two lids</i>				
combined dimensions	26 × 18 × —	66 × 46 × —	—	—
bowl compartment	17 × 18 × 19	43 × 46 × 48	16	41
instrument compart- ment	9 × 18 × 6	23 × 46 × 15	4	10
14 <i>Double compartment with two lids</i>				
combined dimensions	30 × 20 × —	76 × 51 × —	—	—
bowl compartment	20 × 20 × 19	51 × 51 × 48	16	41
instrument compart- ment	10 × 20 × 7	25 × 51 × 18	4¾	12
e. Bed pan sterilizers				
15 (to contain 2 bed pans)	16 × 12 × 20	41 × 30.5 × 51	17†	43†
16 (to contain 4 bed pans)	22 × 16 × 20	56 × 41 × 51	17†	43†
17 (to contain 6 bed pans)	32 × 16 × 20	81 × 41 × 51	17†	43†
f. Babies' feeding bottle sterilizers				
18 (to contain 16 bottles of Soxhlet type)	12 × 12 × 13	30.5 × 30.5 × 33	10	25
19 (to contain 24 bottles of Soxhlet type)†	19 × 12 × 13	48 × 30.5 × 33	10	25

NOTE. These dimensions do not represent overall sizes. Information on overall dimensions and floor space requirements should be obtained from the manufacturer.

*See Clause 4 for definition of nominal depth.

†Two baskets, fitted with clip-over lids, shall be provided, each to contain 12 bottles.

‡Also see NOTE to Clause 13.