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Specification for

Glass centrifuge tubes for general laboratory use

UDC 542.2.7:541.18.043.3:542.1

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Laboratory Apparatus Standards Committee (LBC/-) to Technical Committee LBC/25, upon which the following bodies were represented:

Association of Scientific, Technical and Managerial Staffs
British Laboratory Ware Association
CLEAPSE
Chemical Industries Association
Department of Health and Social Security
Glass Manufacturers' Federation
Institute of Medical Laboratory Sciences
Institute of Science Technology
Royal Society of Chemistry

This British Standard, having been prepared under the direction of the Laboratory Apparatus Standards Committee, was published under the authority of the Board of BSI and comes into effect on
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The following BSI references relate to the work on this standard:
Committee reference LBC/25
Draft for comment 86/52987 DC

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Amendments issued since publication

Amd. No.	Date of issue	Comments

Contents

Foreword

This British Standard has been prepared under the direction of the Laboratory Apparatus Standards Committee and deals with a product not previously covered by a British Standard.

The standard has been prepared to provide a limited range of glass centrifuge tubes, with either rounded or conical bottoms, for general laboratory use. The requirements in this standard are designed to provide tubes that:

a) for swing-out head centrifuges, are strong enough to withstand the forces of an acceleration of up to 35 000 m/s^2, i.e. 3 500 times the acceleration due to the earth's gravity;

b) for fixed angle head rotor centrifuges, will withstand up to 30 000 m/s^2, in regular use.

NOTE Certain tougher glasses are capable of withstanding the forces of an acceleration in excess of these values.

The tubes have been designed with sufficient ullage space to permit their use in centrifuges with swing-out heads. Centrifuge manufacturer's recommendations should be followed when the tubes identified in this standard are used in fixed angle headed centrifuges.

Requirements for laboratory centrifuges are specified in BS 4402.

WARNING. Particular attention should be paid to the use of correct size of shield/bucket and cushion profile. Failure to observe these details will considerably reduce safe working limits.

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 4, 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 British Standard specifies requirements for a limited range of two types of glass centrifuge tubes for general laboratory use.

The two types specified are:

a) graduated or ungraduated glass centrifuge tubes with a rounded bottom;

b) graduated or ungraduated glass centrifuge tubes with a conical bottom.

NOTE 1 The two types are shown in Figure 1.

The nominal volumes covered are 6 mL, 9 mL, 13 mL, 25 mL and 40 mL (see clause **3**).

NOTE 2 The nominal volumes indicated are those representative of the actual volume below the fill line. Traditionally these were referred to as 5 mL, 10 mL, 15 mL, 25 mL and 50 mL.

The glass centrifuge tubes specified in this British Standard are suitable for use with solutions of apparent density up to 1.2 g/mL at 20 °C and are designed to withstand the forces due to an acceleration of 35 000 m/s^2.

NOTE 3 The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definition

For the purposes of this British Standard the following definition applies.

nominal volume

volume below the upper line [see **8.1** c)] above which the tube should not be filled

3 Designation

The tubes shall be designated by their nominal volume in millilitres.

4 Sizes

The requirements of this British Standard shall apply to the series of glass centrifuge tubes given in Table 1.

5 Material

The glass centrifuge tubes shall be made from colourless medium wall thickness borosilicate glass 3.3 complying with BS 2598-1, or from soda-lime-silica glass or other glass of at least equivalent strength.

NOTE The tubes should be as free as possible from visible defects and reasonably free from internal stress.

6 Dimensions

6.1 Actual volume

The actual volume shall be ± 10 % of the nominal volume. The nominal volume shall be indicated as specified in **8.1** b) and as shown in Figure 1.

6.2 Length

The length, h_1, shall be as given in Table 1.

6.3 External diameter

The external diameter and the tolerance on the external diameter shall be as given in Table 1 and in BS 5895.

Table 1 — Dimensions for tubes

Nominal volume	Length (h_1 in Figure 1)	External diameter
mL	mm	mm
6	75 ± 2	14
9	110 ± 2	14
13	110 ± 2	17
25	110 ± 2	22
40	110 ± 2	28

6.4 Wall thickness

The wall thickness and the tolerance on the wall thickness shall be as given in BS 5895 for the corresponding medium wall tubing.

6.5 Height of cone

In the case of the conical bottom glass centrifuge tubes, the nominal height, h_3, of the cone from the base shall be as given in Table 2.

Table 2 — Dimensions for the cone of conical bottom tubes

Nominal volume	Nominal height of cone from base (h_3 in Figure 1)
mL	mm
6	18
9	18
13	18
25	23
40	23

6.6 Apex of the cone

In the case of the conical bottom glass centrifuge tubes, the apex of the cone shall be not less than 0.2 times the internal radius, r, of the tube, as shown in Figure 1.

6.7 Bottom of the rounded bottom tubes

In the case of the rounded bottom glass centrifuge tubes, the internal radius, r, of the bottom of the tube shall be 0.5 times the internal diameter of the cylindrical portion, as shown in Figure 1.

7 Details of construction

7.1 General

Except for the part of the tube designated h_3 in Figure 1, the tube shall be cylindrical, and the ovality shall not exceed the limit given in BS 5895.

7.2 Top

The top of each tube shall be smoothly finished at right angles to the axis, with a fire-polished end, or tapered to accommodate stoppers or screwed closures.

NOTE 1 Modification to rim for closure purposes may significantly reduce the actual capacity of the tube. Other dimensions should not be changed.

NOTE 2 WARNING. Attention is drawn to BS 4402:1982, in particular clauses **13**, **14** and **B.2**, when the centrifuging of potentially biologically hazardous or potentially chemically hazardous materials is proposed.

7.3 Bottom

7.3.1 *Rounded bottom tubes*. The bottom of each tube shall be hemispherical. Its wall thickness shall be between 1 and 2 times the vertical wall thickness.

7.3.2 *Conical bottom tubes*. The bottom of each tube shall be conical. Its wall thickness shall be between 1 and 2 times the vertical wall thickness.

8 Inscriptions

8.1 General inscriptions

The following inscriptions shall be marked on each tube.

a) *Material identification*. Each tube shall bear an indication of the type of glass used in its construction.

b) *Volume identification*. Each tube shall be marked to indicate its nominal volume.

c) *Upper line*. To indicate the level above which it is essential not to fill the tube for use in a swing-out head centrifuge, each tube shall be permanently marked with a line 5 mm from the top of the tube, h_2, as shown in Figure 1, except in the case of a tube graduated as in **8.2** which has the upper graduation line between 5 mm and 10 mm from the top of the tube.

8.2 Additional inscriptions

Graduated tubes, in addition, shall be permanently marked with a scale indicating the volume contained in the tube at each scale mark. The tolerance on this scale shall be ± 10 %.

No graduation line shall be marked closer than 5 mm to the top of the tube.

9 Package labelling

Each package of centrifuge tubes shall be marked with the following information:

a) the number and date of this British Standard, i.e. BS 6898:1987[1)];

b) the manufacturer's and/or vendor's name or mark;

c) nominal volume;

d) type, i.e. graduated or ungraduated, rounded or conical bottom;

e) batch number.

[1)] Marking BS 6898:1987 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.

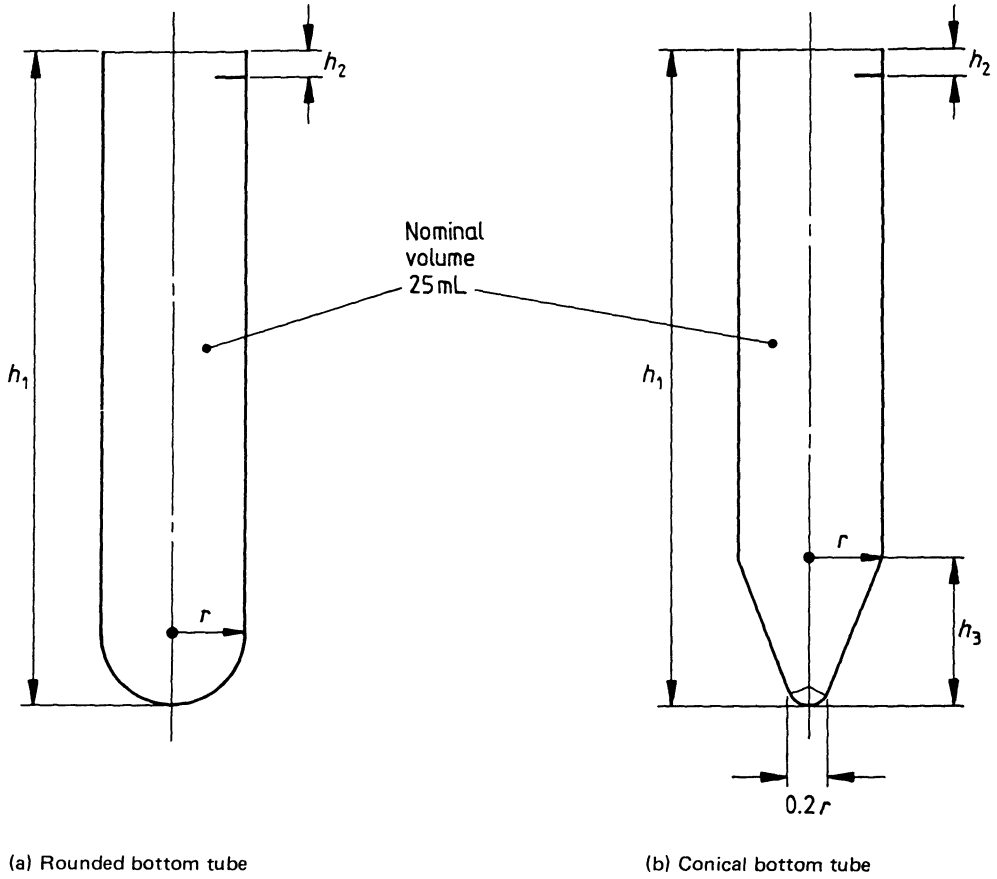

Figure 1 — Dimensions of tubes

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Publications referred to

BS 2598, *Glass plant, pipeline and fittings.*
BS 2598-1, *Specification for properties of borosilicate glass 3.3.*
BS 4402, *Specification for safety requirements for laboratory centrifuges.*
BS 5895, *Specification for borosilicate glass tubing for laboratory apparatus.*

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