

This Standard is confirmed.
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Specification for glass dispensing measures for pharmaceutical purposes

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Committees responsible for this British Standard

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British Laboratory Ware Association
 Corporation of London Weights and Measures Department
 Department of Health and Social Security
 Department of Trade and Industry (National Weights and Measures Laboratory)
 Guild of Hospital Pharmacists
 Institute of Trading Standards Administration
 National Pharmaceutical Association
 Pharmaceutical Services Negotiating Committee
 Pharmaceutical Society of Great Britain
 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 30 January 1987

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The following BSI references relate to the work on this British Standard:

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Foreword

This British Standard has been prepared under the direction of the Laboratory Apparatus Standards Committee. It was first published in 1953 and was revised in 1969. This revision supersedes the 1969 edition, which is withdrawn.

BS 1922:1987+A2:2011 supersedes BS 1922+A1:2004, which is withdrawn.

That start and finish of text introduced or altered by Amendments No. 1 and No. 2 are indicated in the text by tags **A1** and **A2**. Minor editorial changes are not tagged.

Dispensing measures falling within the legal category “measures for use for trade” are within the scope of the Weights and Measures Regulations: they are thus required to be tested, passed for use in trade and stamped by an Inspector of Weights and Measures employed by a local authority, before they can be used for trade. When these regulations were amended in 1995, they aligned the limits of error of capacity for pharmaceutical measures for dispensing purposes with those given in this British Standard or BS 604, as appropriate to their design.

In British Standards it is the convention to use the symbol “mL” for the millilitre. However conical measures made to this British Standard may also be required to carry a stamp of Government approval, for which purpose only the symbol “ml” is approved. Thus the symbol “ml” is used throughout this British Standard.

The principal differences between BS 1922:1969 and this edition are:

- a) the introduction of a 500 ml conical measure;
- b) the elimination of subjective requirements;
- c) changes in the limits of errors for both the conical and beaker measures;
- d) the introduction of a method of measuring capacity;
- e) changes to the numbering and graduations on all measures;
- f) the introduction of a requirement for the minimum diameter of the foot and the overall height of the beaker measures.

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.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 13 and a back cover.

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Section 1. General

1.1 Scope

This British Standard specifies requirements for eight graduated glass conical measures and two graduated glass beaker measures suitable for pharmaceutical dispensing purposes.

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

1.2 Definitions

For the purposes of this British Standard the following definitions apply.

1.2.1

standard reference temperature

the temperature at which the measure is intended to contain its nominal capacity (nominal volume)

1.2.2

capacity

\overline{A}_1 the actual volume, expressed in millilitres, of water at the standard reference temperature, contained by the measure at any graduation line, when the meniscus is read against the centre of an evenly illuminated matt-white background at least 600 mm square and not more than 200 mm from the measure, which stands on a level non-reflecting surface in an evenly illuminated environment, when the observer's eye is level with the graduation line and when the lowest point of the meniscus appears to touch the top edge of that line \overline{A}_1

1.3 Basis of adjustment

1.3.1 Unit of volume

The unit of volume shall be the millilitre (ml).

NOTE The millilitre is commonly used as the special name for the cubic centimetre, in accordance with the International System of Units (SI).

1.3.2 Reference temperature

The standard reference temperature shall be 20 °C.

1.4 Construction

1.4.1 Material

The measures shall be manufactured from colourless soda-lime-silica or borosilicate glass complying with class 3 or better of BS 3473-2.

NOTE The measures should be reasonably free from visible defects and internal stress.

1.4.2 Pouring lip

Each measure shall be provided with a pouring lip. The form of the lip shall be such that, when the measure is first filled with water to the highest graduation line, the stream poured from the lip falls clear of the outside of the measure.

1.4.3 Base

Each measure shall be provided with a base on which it shall stand vertically without rocking when placed on a horizontal surface. The size of the base shall be such that the measure, when empty, will stand without toppling on a plane inclined at 15° to the horizontal.

1.4.4 Shape of bottom

The bottom of the measuring space shall \overline{A}_2 Text has been deleted. \overline{A}_2 merge smoothly into the sides of the measure.

1.5 Position of scales

The scale shall be vertical with the pouring lip of the measure facing to the right.

1.6 Inscriptions

The following inscriptions shall be permanently and legibly marked on all measures:

- a) the symbol “ml”;
- b) the maker’s and/or vendor’s name or mark;
- c) the number of this British Standard, i.e. BS 1922¹⁾.

¹⁾ Marking BS 1922 on or in relation to a product is a claim by the manufacturer that the product has been manufactured to the requirements of the standard. The accuracy of such a claim is therefore solely the manufacturer’s responsibility. Enquiries as to the availability of third party certification should be addressed to the appropriate certification body.

Section 2. Conical measures

2.1 Series of nominal capacities

The series of nominal capacities shall be in accordance with Table 1.

Table 1 — Graduation and numbering of conical measures

Nominal capacity ml	Graduated at $\langle A_1 \rangle^a$ $\langle A_2 \rangle$ ml	Numbered at ml	Height of lowest graduation line above bottom of measuring space mm
5	1, 2, 3, 4 and 5	1, 3 and 5	$\langle A_2 \rangle 15 \pm 10 \langle A_2 \rangle$
10	1, 2, 3, 4, 5, 6, 7, 8, 9 and 10	1, 5 and 10 $\langle A_1 \rangle$ or 1, 2, 4, 6, 8 and 10 $\langle A_1 \rangle$	$\langle A_2 \rangle 15 \pm 10 \langle A_2 \rangle$
25	1, 2, 3, 4, 5, 10, 15, 20 and 25	1, 3, 5, 10, 15, 20 and 25	$\langle A_2 \rangle 15 \pm 10 \langle A_2 \rangle$
50 (tall)	1, 2, 3, 4, 5, 6, 7, 8, 9, 10 15, 20, 25, 30, 35, 40, 45 and 50	1, 3, 5, 10, 20, 30, 40 and 50	$\langle A_2 \rangle 15 \pm 10 \langle A_2 \rangle$
50 (squat)	5, 10, 15, 20, 25, 30, 35, 40, 45 and 50	5, 10, 20, 30, 40 and 50	$\langle A_2 \rangle 15 \pm 10 \langle A_2 \rangle$
100	10, 20, 30, 40, 50, 60, 70, 80, 90 and 100	10, 20, 40, 60, 80 and 100	25 ± 5
250	25, 50, 75, 100, 125, 150, 175, 200, 225 and 250	25, 50, 100, 150, 200 and 250	40 ± 5
500	50, 100, 150, 200, 250, 300, 350, 400, 450 and 500	50, 100, 200, 300, 400 and 500	50 ± 5

^a $\langle A_1 \rangle$ Conical measures of 10 ml, 25 ml, $\langle A_2 \rangle$ 50 ml (tall), $\langle A_2 \rangle$ 50 ml (squat), 100 ml, 250 ml, and 500 ml nominal capacity shall bear a set of graduation lines including any or all of those listed in the second column of Table 1. $\langle A_1 \rangle$

2.2 Limits of volumetric error

The limits of error of capacity, when determined in accordance with BS 6696, using water complying with BS 3978, shall be as given in Table 2.

Table 2 — Limits of error of capacity for conical measures

Capacity corresponding to graduation line ml	Limits of error of			
	5 ml, 10 ml, 25 ml and 50 ml (tall) measures ml	50 ml (squat) and 100 ml measures ml	250 ml measures ml	500 ml measures ml
1	± 0.06			
2	± 0.08			
3	± 0.10			
4	± 0.15			
5, 6	± 0.15	± 0.25		
7, 8	± 0.15			
9, 10	± 0.20	± 0.30		
15, 20, 25	± 0.30	± 0.35	± 0.4	
30, 35, 40	± 0.35	± 0.4		
45, 50	± 0.4	± 0.5	± 0.5	± 0.6
60		± 0.5		
70, 75, 80, 90		± 0.6	± 0.6	
100, 125		± 0.6	± 0.7	± 0.8
150, 175			± 1.0	± 1.0
200, 225, 250			± 1.5	± 1.5
300, 350				± 2.0
400, 450, 500				± 2.5

2.3 Dimensions

2.3.1 Overall volume

A1 The overall volume shall be such that when the measure is standing on a level surface and is filled with water up to the point immediately before the water begins to overflow from the pouring lip, the volume of water present shall be not less than 1.3 times and not more than **A2** 2.5 **A2** times the nominal capacity of the measure, as represented by the highest graduation line. **A1**

2.3.2 Cone angle

A1 The interior containing space of the measure shall have the form of a cone having an included angle that falls within the following ranges:

- for the 5 ml, 10 ml, 25 ml and 50 ml (tall) measures, from **A2** 7° **A2** to 11°;
- for the 50 ml (squat) and 100 ml measures, from **A2** 9° **A2** to 13°;
- for the 250 ml and 500 ml measure, from 13° to 20°.

NOTE Examples of the shapes of the conical measures are shown. **A1**

2.3.3 Wall thickness

The wall thickness shall be as follows:

- for the 5 ml, 10 ml and 25 ml measures, not less than 1.00 mm;
- for the 50 ml and 100 ml measures, not less than 1.25 mm;
- for the 250 ml and 500 ml measures, not less than 1.50 mm.

NOTE The measures should be of sufficiently sturdy construction and should not show any local departures from uniformity.

2.4 Graduation and figuring

2.4.1 Graduation lines (see Figure 1 to Figure 8)

The graduation lines shall be clean permanent lines of a uniform thickness not exceeding 0.3 mm, except that they are permitted to taper slightly towards the ends.

The graduation lines shall be in planes perpendicular to the axis of the measure and shall be horizontal when the measure is standing on a horizontal surface.

2.4.2 Numbering of graduation lines

The graduation lines shall be numbered in accordance with Table 1 (see Figure 1 to Figure 8). Each number shall be permanently and legibly marked close to the end of the graduation line to which it relates, and shall be in such a position that it would be bisected by a prolongation of the graduation line.

2.4.3 Length of graduation lines

The minimum length of the graduation lines on a measure shall be in accordance with Table 3. The unnumbered graduation lines shall be shorter than the numbered lines and centrally disposed in relation to them.

2.4.4 Position of lowest graduation line

The height of the lowest graduation line above the lowest point in the bottom of the measuring space shall be in accordance with Table 1.

2.4.5 Levelling line

A levelling line shall be permanently and legibly marked on the opposite side of the measure to, and at the same level as, the top graduation line. It shall not be numbered but shall be similar in all other respects to the top graduation line; the same limits of error of capacity shall apply (see Table 2).

Table 3 — Minimum length of graduation lines on conical measures

Nominal capacity of measure ml	Minimum length of numbered lines mm	Minimum length of unnumbered lines mm
5	10	6
10	10	6
25	10	6
50 (tall)	15	10
50 (squat)	15	10
100	17	10
250	20	12
500	22	12

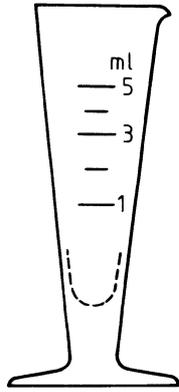


Figure 1 — Example of a 5 ml conical measure

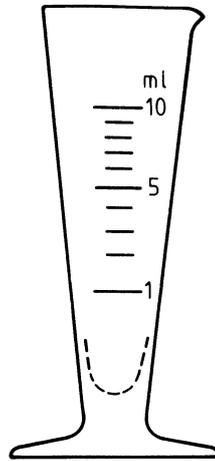


Figure 2 — Example of a 10 ml conical measure

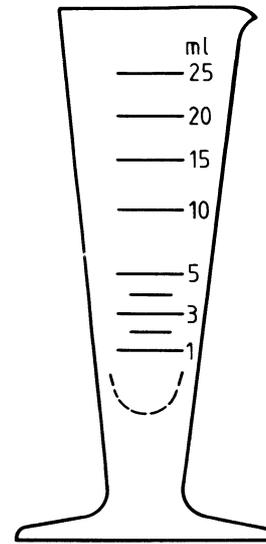


Figure 3 — Example of a 25 ml conical measure

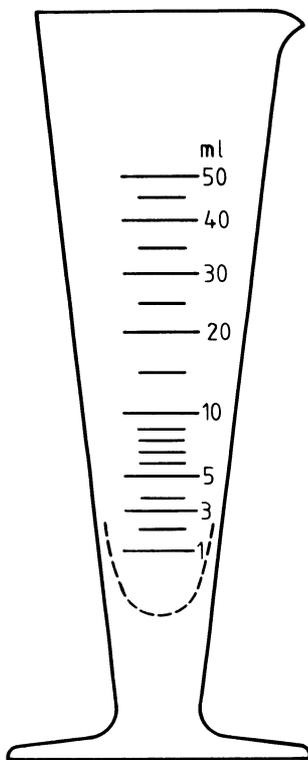


Figure 4 — Example of a 50 ml (tall) conical measure

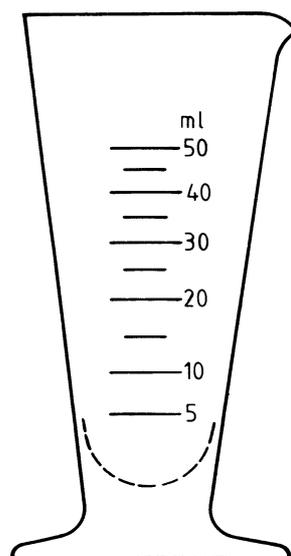


Figure 5 — Example of a 50 ml (squat) conical measure

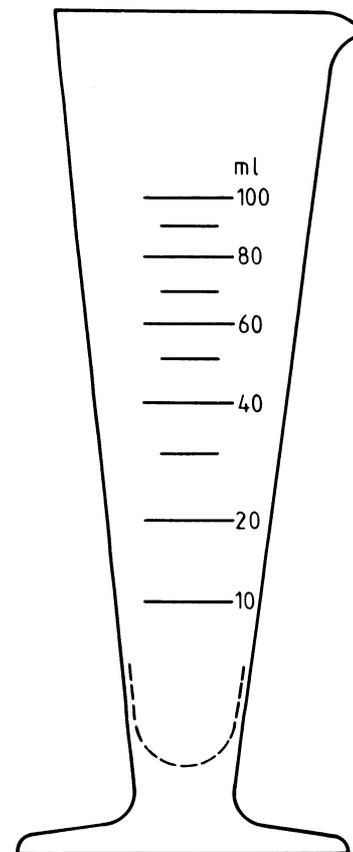
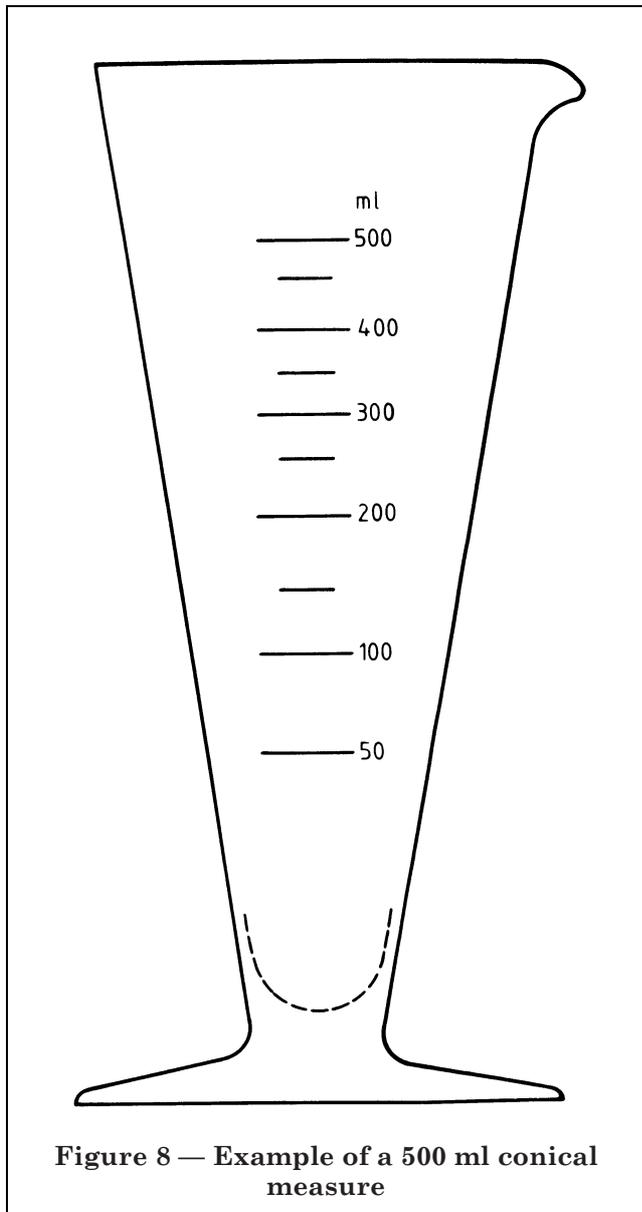
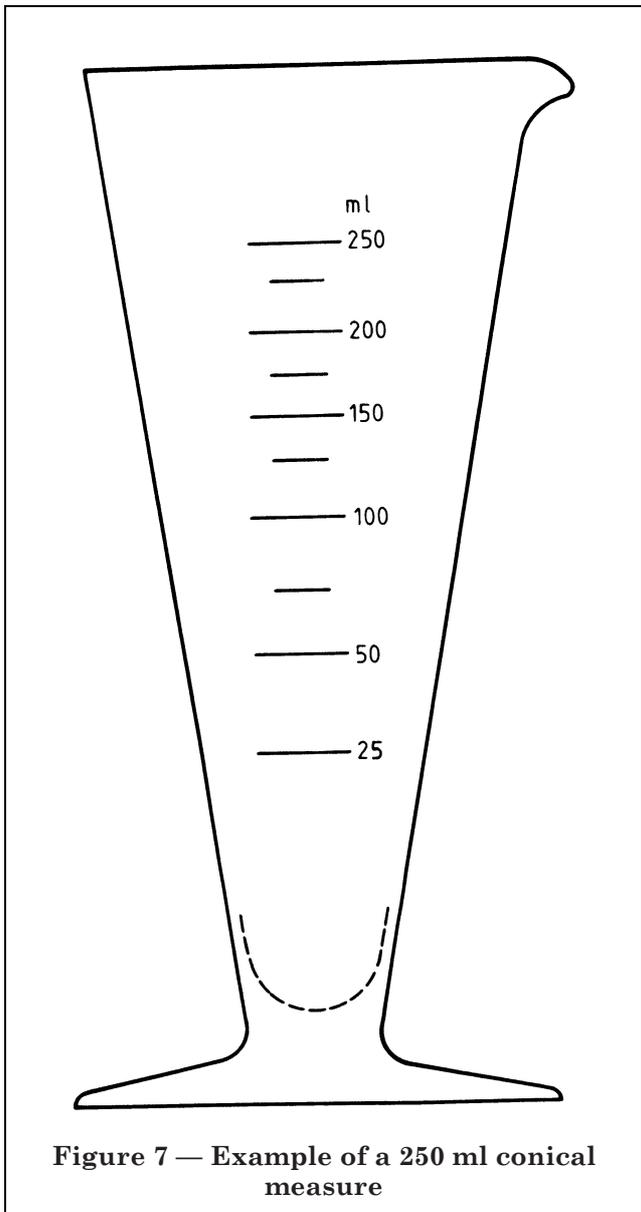


Figure 6 — Example of a 100 ml conical measure



Section 3. Beaker measures

3.1 Series of nominal capacities

The series of nominal capacities shall be in accordance with Table 4.

Table 4 — Dimensions and graduations for beaker measures

Nominal capacity ml	Diameter at rim (excluding pouring lip) mm	Minimum diameter of foot mm	Overall height mm	Graduation lines	Length of scale mm	Height of lowest graduation line above bottom of measuring space mm	Levelling lines
500	100 ± 10	80	180 ± 10	50 ml to 500 ml at each 50 ml, $\overline{A_1}$ or at 50 ml and each 100 ml, $\overline{A_1}$ numbered at 50 ml and each 100 ml	100 ± 5	17 ± 5	Unnumbered levelling lines at 100 ml, 300 ml and 500 ml
1 000	120 ± 10	90	230 ± 10	100 ml to 1 000 ml at each 100 ml, numbered at 100 ml and each 200 ml	120 ± 10	20 ± 10	Unnumbered levelling lines at 200 ml, 600 ml and 1 000 ml

3.2 Limits of volumetric error

The limit of error of capacity, when determined in accordance with BS 6696, using water complying with BS 3978, shall be as given in Table 5.

Table 5 — Limit of error of capacity for beaker measures

Capacity corresponding to graduation line ml	Limits of error	
	500 ml measure ml	1 000 ml measure ml
50	± 2	
100	± 2	± 4
150	± 2	
200	± 2	± 4
250	± 2	
300	± 2	± 4
350	± 2	
400	± 2	± 4
450	± 2	
500	± 2	± 4
600		± 4
700		± 4
800		± 4
900		± 4
1 000		± 4

3.3 Dimensions

3.3.1 Overall volume

The overall volume shall be such that, the measure first being filled with water to the highest graduation line, water shall not overflow from the pouring lip when a further quantity of water, equal in volume to one-quarter of the nominal capacity of the measure, is added.

3.3.2 Diameters and height

The beakers shall comply with the dimensional requirements given in Table 4.

NOTE The shape of the beaker measures is shown in Figure 9 and Figure 10.

3.3.3 Wall thickness

The wall thickness shall be not less than 1.5 mm.

NOTE The measures should be of sufficiently sturdy construction and should not show any local departures from uniformity.

3.4 Graduation and figuring

3.4.1 Graduation lines (see Figure 9 and Figure 10)

The graduation lines shall be clean permanent lines of a uniform thickness not exceeding 0.3 mm, except that they are permitted to taper slightly towards the ends.

The graduation lines shall lie in planes perpendicular to the axis of the measure and shall be horizontal when the measure is standing on a horizontal surface.

NOTE The graduation lines should be without evident irregularities in their spacing.

3.4.2 Numbering of graduation lines

The graduation lines shall be numbered in accordance with Table 4 (see Figure 9 and Figure 10). Each number shall be permanently and legibly marked close to the end of the graduation line to which it relates, and shall be in such a position that it would be bisected by a prolongation of the graduation line.

3.4.3 Length of graduation lines

The length of the graduation lines shall be not less than 22 mm and 25 mm for the numbered lines of the 500 ml and 1 000 ml beakers, respectively, and not less than 12 mm for the unnumbered lines, which shall be shorter than the numbered lines.

3.4.4 Position of lowest graduation line

The height of the lowest graduation line above the lowest point in the bottom of the measuring space shall be in accordance with Table 4.

3.4.5 Levelling lines

Levelling lines shall be permanently and legibly marked on the opposite side of the measure to, and at the same level as, the 100 ml, 300 ml and 500 ml lines on the 500 ml measure and the 200 ml, 600 ml and 1 000 ml lines on the 1 000 ml measure. The levelling lines shall not be numbered but shall be similar in all other respects to the corresponding graduation lines: the same limits of error of capacity shall apply (see Table 5).

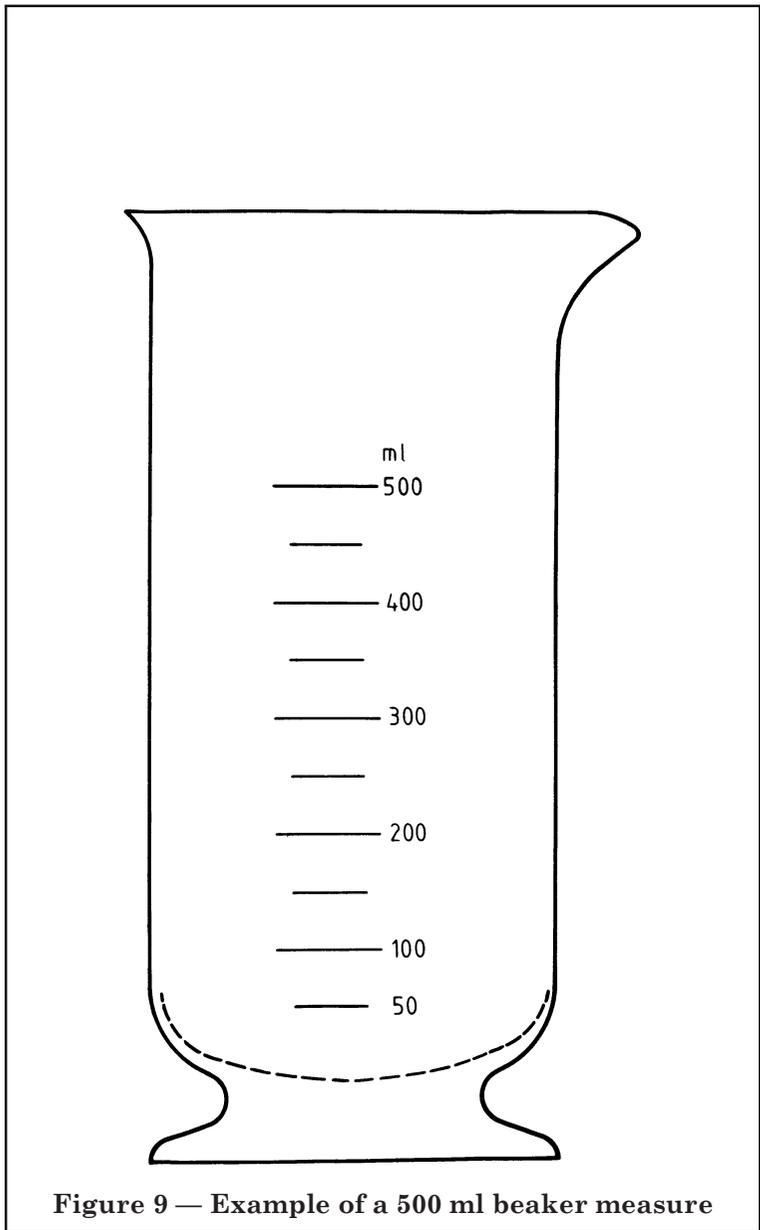


Figure 9 — Example of a 500 ml beaker measure

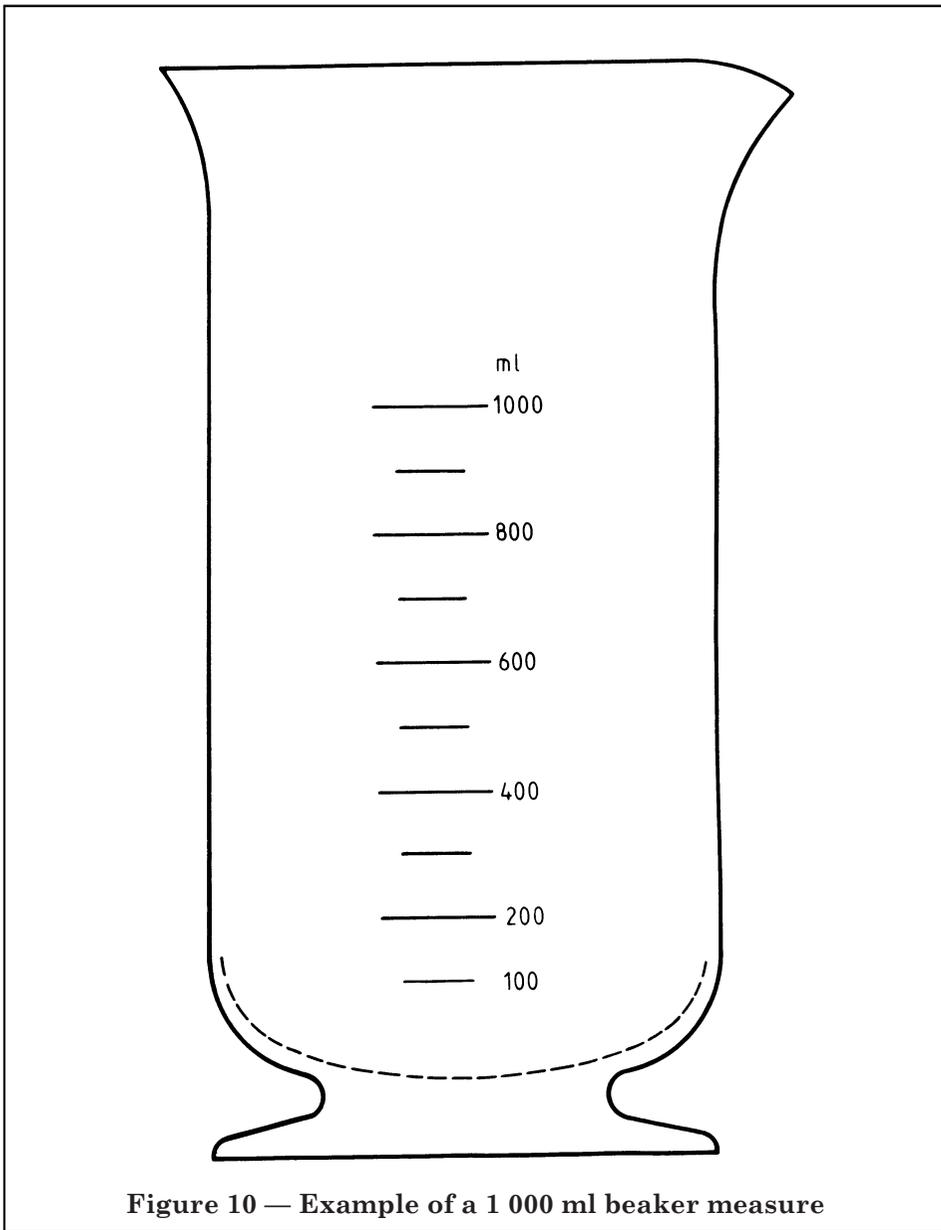


Figure 10 — Example of a 1 000 ml beaker measure

Publications referred to

BS 3473, *Chemical resistance of glass used in the production of laboratory glassware.*

BS 3473-2, *Method for determination of hydrolytic resistance of glass grains at 98 °C.*

BS 3978, *Water for laboratory use.*

BS 6696, *Methods for use and testing of capacity of volumetric glassware.*

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