BRITISH STANDARD

BS 5404-3: 1977

Specification for

Plastics laboratory ware —

Part 3: Filter funnels

Confirmed November 2011

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Cooperating organizations

The Laboratory Apparatus Standards Committee, under whose direction this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

Agricultural Research Council
Association for Science Education*
Association of Scientific, Technical and Managerial Staffs
British Laboratory Ware Association*
British Lampblown Scientific Glassware Manufacturers' Association
British Pharmacopoeia Commission
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Society of Glass Technology
Standardization of Tar Products Test Committee

The 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:

British Society of Scientific Glassblowers
Consortium of Local Education Authorities for the provision of Science Equipment
Institute of Medical Laboratory Science
Medical Research Council
Individual expert

This British Standard, having been prepared under the direction of the Laboratory Apparatus Standards Committee, was published under the authority of the Executive Board on 30 September 1977

The following BSI references relate to the work on this standard:
Committee reference LBC/28
Draft for comment 76/51531 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 to provide for plastics filter funnels of the type in general use in laboratories. It has been drawn up to align with a Draft International Standard on laboratory glass filter funnels, which, at the time of preparation of this British Standard, was being studied in ISO Technical Committee ISO/TC 48, Laboratory glassware and related apparatus.

Both this British Standard, and the International Standard on glass filter funnels have been based on the sizes of filter papers currently available in Europe which are 55, 70, 90, 110, 125, 150, 185 and 240 mm in diameter.

Differences between this British Standard and the Draft International Standard on glass filter funnels have been limited, as far as possible, to those arising from the differences in physical properties of the respective materials used in their construction. This British Standard specifies filter funnels intended for use with aqueous solutions between 0 °C and 60 °C. **Before using these filter funnels for strong acids and alkalis, oxidizing agents or non-aqueous liquids, or at temperatures outside this temperature range, users should satisfy themselves that the filter funnels are suitable for such applications either by laboratory tests or by reference to the manufacturer or supplier**. Plastics filter funnels complying with this British Standard are marked both with a recommended maximum temperature of use and an indication of the material of construction.

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 details of six preferred sizes of plastics filter funnels up to 200 mm diameter suitable for laboratory use.

2 References

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

3 Sizes

The preferred sizes of filter funnels covered by this British Standard and defined by their internal cone diameters shall be as follows.

35, 55, 75, 100, 150 and 200 mm

The tolerance on diameter shall be ± 5 %.

General designs of filter funnels are illustrated in Figure 1.

4 Material

4.1 General. Filter funnels shall be constructed of generally non-brittle plastics material of suitable chemical and thermal properties, and shall be as free as possible from moulding defects and stress.

4.2 Resistance to extraction of ionic material by water at 60 °C. When tested according to the procedure given in Appendix A, the funnel shall give an aqueous extract, free of suspended matter, and having a conductivity not more than 200 μS/m greater than that of the original water used for the extraction.

NOTE 200 μS/m is equivalent to the conductivity of water containing approximately one part per million of sodium chloride.

5 Dimensions

Dimensions of preferred sizes shall be as given in Table 1.

Table 1 — Dimensions for filter funnels

All dimensions are in millimetres

Internal cone diameter	35	55	75	100	150	200
Maximum external diameter at top of stem	9	11	13	17	22	30
Minimum internal diameter at bottom of stem	4	4	4	6	8	10

6 Construction

6.1 The filter funnel shall consist of a cone having the shape of a frustum of a right circular cone, and a stem which shall be coaxial with the cone.

6.2 The inner wall of the cone shall diverge from the axis so as to give an included angle of 60° + 0, – 3°.

6.3 The cone shall have a flanged rim for rigidity.

6.4 The cone may be ribbed internally.

6.5 The cone and stem shall be ribbed externally with at least three evenly spaced ribs.

6.6 The end of the stem shall be finished at approximately 45° to the axis.

6.7 The length of the stem shall be between 75 % and 100 % of the cone diameter for sizes up to 100 mm and between 60 % and 80 % for sizes above 100 mm.

6.8 The internal surface of the filter funnel shall have smooth contours with a stepless transition from cone to stem.

6.9 The wall thickness and rim design shall be such that, when tested for flexibility in accordance with the procedure detailed in Appendix B, the diameter of the cone at the point of loading shall not increase by more than 5 %.

7 Inscriptions

The following inscriptions shall be durably and legibly marked on all filter funnels.

a) The maker's and/or vendor's name or readily identifiable mark.

b) The material (or its recognized abbreviation as in BS 3502) from which the filter funnel is made and the manufacturer's recommended safe maximum temperature for short term use (several hours) in contact with materials which do not attack the plastics material, e.g. for polypropylene

PP 135 °C max.

NOTE The temperature in the example is merely intended to indicate an inscription and does not represent any particular grade of plastics material.

c) If a size is to be inscribed, the inscription shall refer to the internal cone diameter.

d) The number of this British Standard, i.e. BS 5404.

Appendix A Test for ionic material extracted by water at 60 °C

A.1 Apparatus and solutions required

The following items are required.

A.1.1 *Stoppers*, made of borosilicate glass, sizes appropriate to the filter funnels under test.

A.1.2 *Clock glasses and beakers*, made of borosilicate glass, sizes appropriate to the filter funnels under test.

A.1.3 *Oven*, capable of being maintained at 60 ± 2 °C.

A.1.4 *Conductivity meter*, suitable for measurement of the electrical conductivity of water.

A.1.5 *De-ionized water*, complying with the requirements of BS 3978 except that the conductivity shall be less than 200 μS/m.

A.1.6 *Detergent solution*

A.2 Procedure

Thoroughly wash each filter funnel under test with hot water and detergent solution, then rinse well with hot water followed by cold water and finally with liberal quantities of de-ionized water. Insert a clean borosilicate stopper into the stem of each funnel to seal the end and rinse the inside of each funnel again with liberal quantities of de-ionized water. Suspend each funnel in a suitable size beaker, fill each funnel to within 1 cm of its brim with the de-ionized water and cover with a clean clock glass. Stand each beaker in an oven at 60 ± 2 °C for 3 h.

Remove the funnel and support from the oven and allow the contents to cool to 20 °C. Measure the electrical conductivity of the water in the funnel by the procedure detailed in method 6 of BS 2690-9:1970 and deduct from the value obtained the conductivity of the original water used to prepare the extract, also measured at 20 °C. Note the difference in conductivity in microsiemens per metre.

Appendix B Flexibility test for plastics filter funnels

B.1 Apparatus required

The following items are required.

B.1.1 1 kg *weight*, attached by approximately 20 cm of strong thread to an S hook made by bending iron or steel wire (diameter 3 ± 1 mm) to a radius of curvature at the top bend of approximately 5 mm.

B.1.2 *Soft rubber bung*, to fit lower end of funnel stem.

B.1.3 *Laboratory stand and clamps*

B.2 Procedure

Seal the lower end of the stem with the rubber bung. Assemble the stand and firmly clamp the funnel in a vertical position at a point approximately 1 mm below the junction of the stem and the cone. For funnels having a tapered stem some packing may be required at the clamping point and if necessary a second clamp may be placed at the lower end of the stem. Mark a point on the rim of the funnel cone and measure the external diameter of the cone at this point. Suspend the 1 kg weight to hang freely from the rim of the funnel at the marked point by means of the S hook. Fill the funnel to within 5 mm of the brim with water at 60 ± 2 °C.

One min after filling, and whilst still under stress, re-measure the diameter of the cone at the marked point. Ignore any drop in temperature of the water during this period. Calculate the percentage increase in diameter.

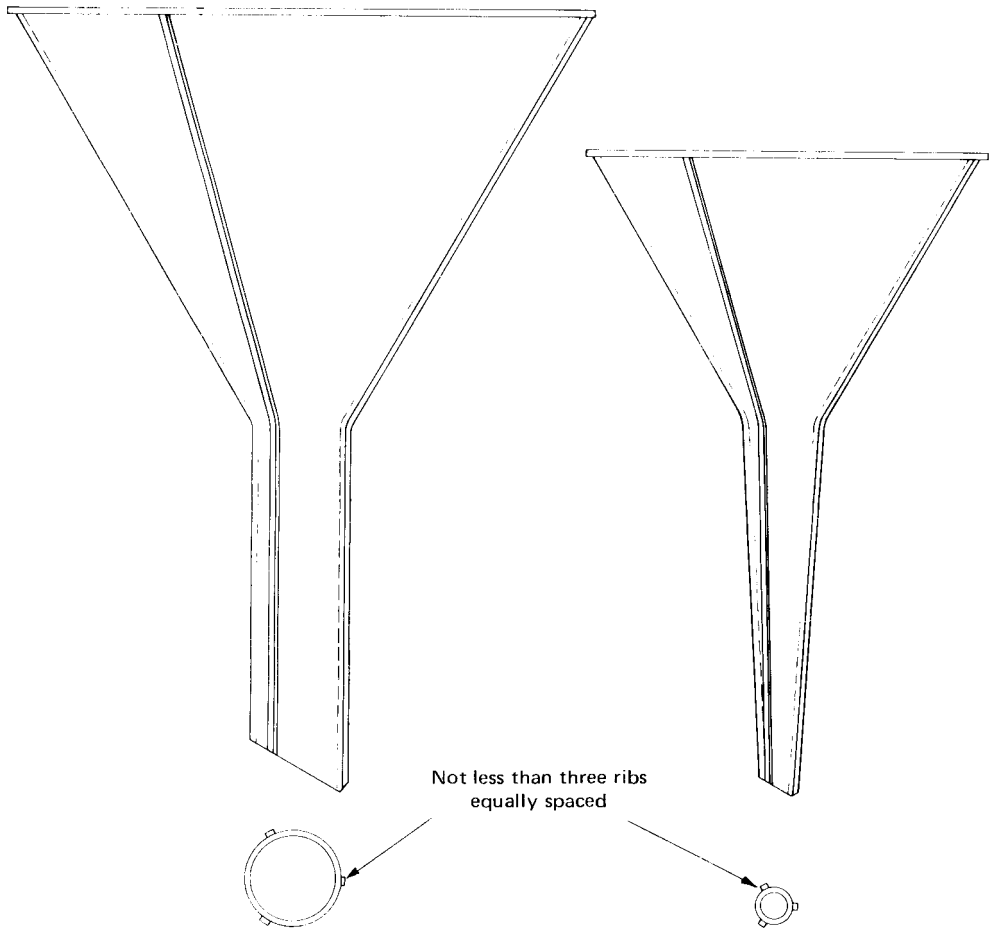

Figure 1 — Plastics filter funnels

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Publications referred to

BS 2690, *Methods of testing water used in industry.*

BS 2690-9, *Appearance (colour and turbidity), odour, suspended and dissolved solids and electrical conductivity.*

BS 3502, *Schedule of common names and abbreviations for plastics and rubbers.*

BS 3978, *Water for laboratory use.*

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