BRITISH STANDARD

BS EN ISO
6414:1995
Incorporating
Amendment No. 1

Technical drawings for glassware

Committees responsible for this British Standard

This British Standard was published under the direction of the Laboratory Apparatus Standards Committee LBC/-. Its preparation was entrusted to Technical Committee LBC/25 upon which the following bodies were represented:

British Laboratory Ware Association
British Lampblown Scientific Glassware Manufacturers' Association Ltd.
Chemical Industries Association
Department of Health and Social Security
Department of Industry (Laboratory of the Government Chemist)
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 29 April 1983

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The following BSI references relate to the work on this standard:
Committee reference LBC/25
Draft for comment 80/51611 DC

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Amendments issued since publication

Amd. No.	Date of issue	Comments
8620	May 1995	Indicated by a sideline in the margin

Contents

National foreword

This revision of this British Standard, which has been prepared under the direction of the Laboratory Apparatus Standards Committee, is identical with ISO 6414:1982 "*Technical drawings for glassware*" published by the International Organization for Standardization (ISO). ISO 6414 was prepared as a result of discussion in ISO Technical Committee 10, Technical drawings, in which the UK participated.

In 1994 the European Committee for Standardization (CEN) accepted ISO 6414:1982 as European Standard EN ISO 6414:1994. As a consequence of implementing the European Standard this British Standard is renumbered as BS EN ISO 6414:1995 and any reference to BS 2774 should be read as a reference to BS EN ISO 6414:1995.

BS 2774 was first published in 1956. Investigations had shown that the established conventions of engineering drawing were not necessarily applicable to glass apparatus and that alternative conventions had not been codified or generally adopted, even though some were well established. BS 2774:1956 was issued to standardize drawing conventions for glassware and was intended to supplement the established points of drawing conventions given in BS 308 "*Engineering drawing practice*".

In the period from 1956 to 1982, a number of International Standards covering various aspects of technical drawing were published and others were in the course of preparation[1)]. Also, BS 308 was revised in 1964 and again in 1972 to bring the standard into line with ISO recommendations and to minimize divergences between the national standards of the USA, Canada and the UK. In this revision of BS 2774 the text has been simplified and no longer includes information which is not specific to drawings of glassware and/or which may be found in other British and International Standards.

This revision supersedes the previous edition of BS 2774, which is now withdrawn.

Terminology and conventions. The text of the International Standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is especially drawn to the following.

The comma has been used as a decimal marker. In British Standards it is current practice to use a full point on the baseline as the decimal marker.

Wherever the words "International Standard" appear, referring to this standard, they should be read as "British Standard".

Cross-references

International Standard	Corresponding British Standard
ISO/R 128:1959	BS 308 *Engineering drawing practice* Part 1:1972 *General principles* (Technically equivalent)
ISO/R 129:1959 ISO/R 406:1964 ISO 1302:1978	Part 2:1972 *Dimensioning and tolerancing of size* (Technically equivalent)
ISO/R 1101-1:1969 ISO/R 1661:1971	Part 3:1972 *Geometrical tolerancing* (Technically equivalent)

[1)] See clause **2** and Annex.

The Technical Committee has reviewed the provisions of ISO 383, ISO 641, ISO 3098-1, ISO 3898, ISO 4793, ISO 5455, ISO 5456[2] and ISO 5457, to which reference is made in the text, and has decided that they are acceptable for use in conjunction with this standard. British Standards which are related to ISO 383, ISO 641, ISO 3898 and ISO 4793 are respectively BS 572 "*Interchangeable conical ground glass joints*", BS 2761[3] *"Spherical ground glass joints"*, BS 1991 *"Letter symbols, signs and abbreviations"* Part 4 *"Structures, materials and soil mechanics"* and BS 1752[3] *"Laboratory sintered or fritted filters"*.

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 to iv, the EN ISO title page, pages 2 to 8, 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.

[2] In course of preparation.

[3] In course of revision. It is intended that this British Standard will be identical with the corresponding International Standard.

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 6414

October 1994

ICS 01.100.20; 21.120.30

Descriptors: Technical drawings, glassware, laboratory glassware, generalities, graphic methods

English version

Technical drawings for glassware

(ISO 6414:1982)

Dessins techniques de verrerie
(ISO 6414:1982)

Techische Zeichnungen für Glasgeräte
(ISO 6414:1982)

This European Standard was approved by CEN on 1994-10-14. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

This European Standard was taken over by CEN from the work of ISO/TC 10, Technical drawings, product definition and related documentation, of the International Organization for Standardization (ISO).

The Technical Board has decided to submit the final draft for formal vote. The result was positive.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 1995, and conflicting national standards shall be withdrawn at the latest by April 1995.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

0 Introduction

In this International Standard the figures merely illustrate the text and should not be considered as design examples. For this reason the figures are simplified and are not to scale.

For uniformity all figures in this International Standard are in first angle projection. It should be understood that alternative projection methods could have been used without prejudice to the principles established.

1 Scope and field of application

This International Standard establishes rules and conventions for particular use with drawings for technical glassware, for example laboratory glassware or glassware used in other technical fields.

Optical parts are not however, included herein.

2 References

ISO 128, *Technical drawings — General principles of presentation.*

ISO 129, *Technical drawings — Dimensioning*[4].

ISO 383, *Laboratory glassware — Interchangeable conical ground joints.*

ISO 641, *Laboratory glassware — Interchangeable spherical ground joints.*

ISO 1302, *Technical drawings — Method of indicating surface texture on drawings.*

ISO 4793, *Laboratory sintered (fritted) filters — Porosity grading, classification and designation.*

For additional information, see the Annex.

3 General

3.1 As a general principle, all glassware shall be drawn as if it were non-transparent (opaque), see ISO 128.

3.2 In order to meet particular requirements for the design and manufacture of glassware, additional rules and conventions are specified in the following clauses.

4 Sections

4.1 Small sections may be blackened, provided that the distance between their outlines on the actual drawing is not larger than 3 mm. If larger, the section shall be hatched. For thin-walled parts, see **6.1**.

4.2 Parts of different materials such as glass-metal seals which are fused together and shown in section, shall be hatched differently (see Figure 1).

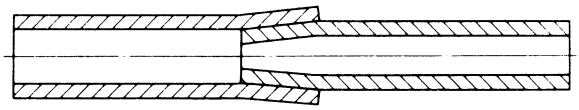


Figure 1

5 Treated parts

5.1 Treated surfaces (for example ground, silver-plated, etched) shall be indicated in accordance with ISO 128, ISO 129 and ISO 1302 (see Figure 2).

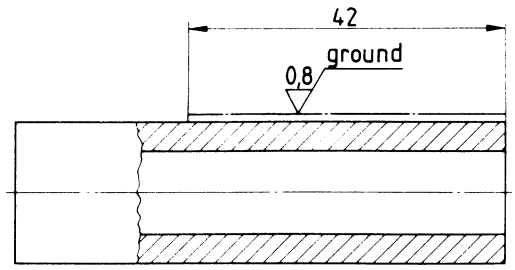


Figure 2

5.2 Interchangeable conical or spherical ground joints complying with the requirements of ISO 383 and ISO 641 respectively, shall be designated in the manner described therein. Accordingly, no detailed dimensioning of that portion and no indication of the surface finish are required.

An example of a code identification for interchangeable conical ground joints is shown in Figure 3.

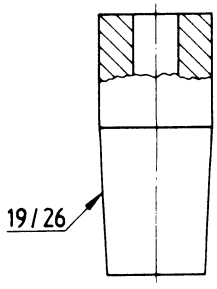


Figure 3

[4] At present at the stage of draft. (Revision of ISO/R 129:1959.)

6 Thin walls

6.1 When drawn in section, thin walls shall be represented, in spite of their real wall thickness, by lines with a thickness of at least twice that used for visible outlines (see Figure 4 and Figure 5, and **4.1**).

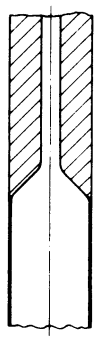


Figure 4

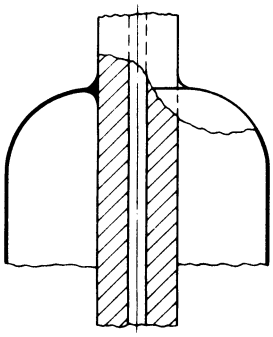


Figure 5

6.2 Unless otherwise specified (see **6.3**), the dimension shown for the diameter of thin walls shall be the external diameter (see Figure 6 and Figure 7). The method to be applied depends on the particular requirement of the drawing.

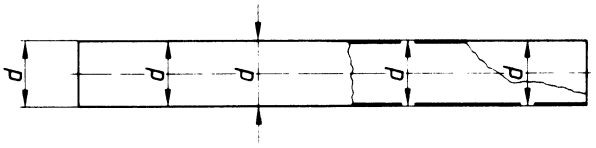


Figure 6

If it is necessary to specify the wall thickness, this shall be done as shown in Figure 7.

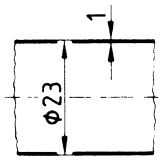


Figure 7

6.3 Internal diameters shall always be designated with the letters "int." (see Figure 8).

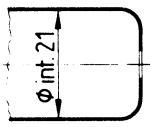


Figure 8

7 Tubes

7.1 Ends of tubes with special features (for example holes or closed ends) shall be drawn in section (see Figure 8).

7.2 Coiled tubes represented in section or in view, may be drawn in a simplified manner (see Figure 9 and Figure 10). Their dimensioning should be determined by the functional requirements or the method of manufacture.

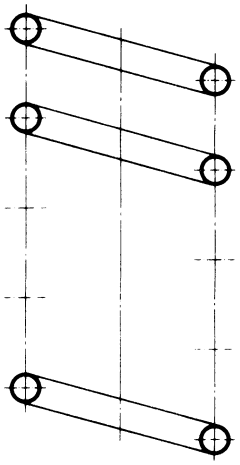


Figure 9

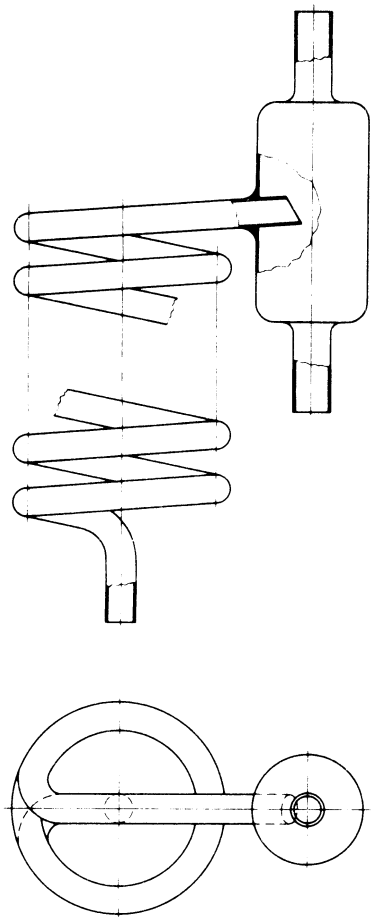


Figure 10

8 Sintered filters

When drawn in section sintered filters are indicated in a simplified manner by means of random dotting[5)](see Figure 11). Any other details shall be indicated separately in accordance with ISO 4793.

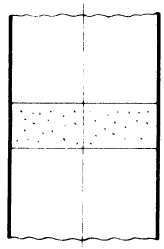


Figure 11

9 Joints

9.1 Where fused joints are to be shown in section, indicate the joint as shown in Figure 12.

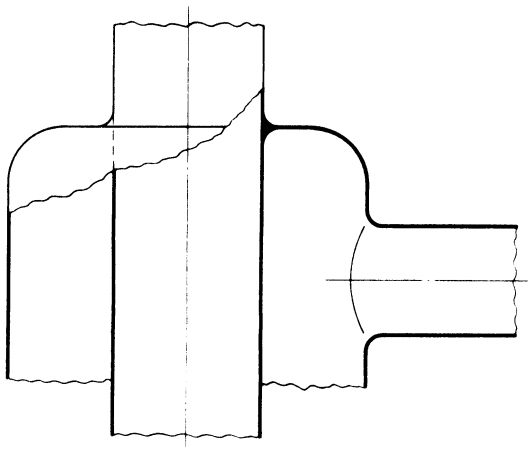
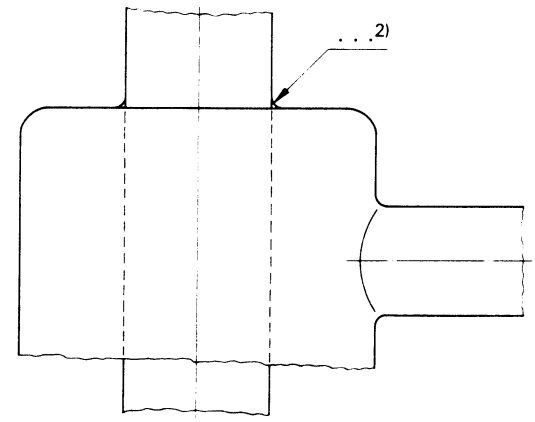


Figure 12

9.2 Where joints are cemented, the specification of the adhesive should be indicated as shown in Figure 13.



[2)] Specification of the adhesive.

Figure 13

[5)] In order to permit copying of any drawing, the dotting shall be very clear.

9.3 Removable parts such as stop-cocks, stirrers, and gland assemblies shall be drawn clearly spaced from each other as shown in Figure 14, Figure 15 and Figure 16. This will avoid ambiguity as to whether the parts are or are not fused together.

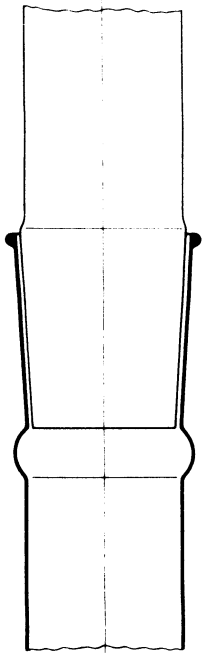


Figure 14

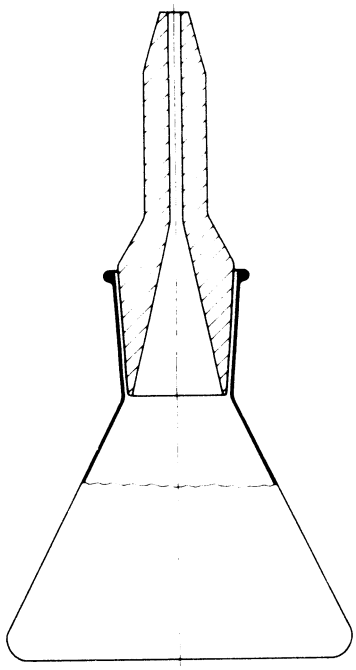


Figure 15

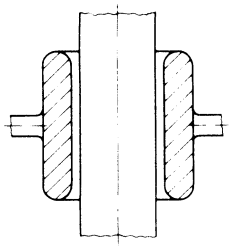


Figure 16

10 Composite glassware

When it is necessary to represent in detail one or more component parts of composite glassware which consists of sealed parts, the drawing of the complete composite glassware may be simplified by separating the details with their dimensions for drawing clarity, as shown in Figure 17.

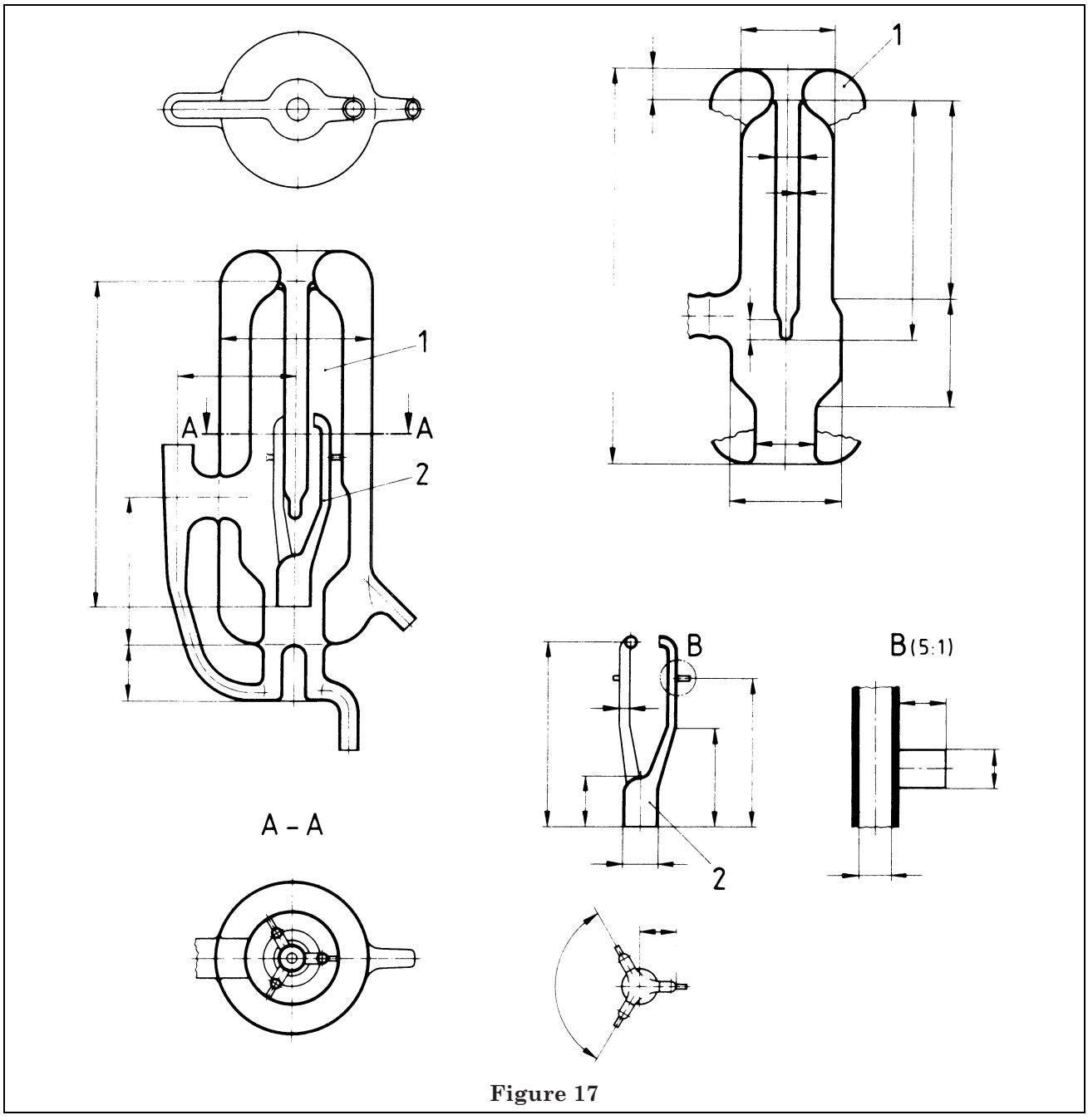


Figure 17

Annex Other International Standards not mentioned in clause 2 applicable for drawing preparation

ISO 406, *Technical drawings — Linear and angular tolerancing — Indications on drawings*[6].

ISO 1101, *Technical drawings — Geometrical tolerancing — Tolerances of form, orientation, location and run-out — Generalities, definitions, symbols, indications on drawings*[7].

ISO 1661, *Technical drawings — Tolerances of form and of position — Part 4: Practical examples of indications on drawings*[8].

ISO 3098-1, *Technical drawings — Lettering — Part 1: Currently used characters.*

ISO 3898, *Bases for design of structures — Notations — General symbols.*

ISO 5455, *Technical drawings — Scales.*

ISO 5456, *Technical drawings — Pictorial representations*[9].

ISO 5457, *Technical drawings — Sizes and layout of drawing sheets.*

[6] At present at the stage of draft. (Revision of ISO/R 406:1964.)

[7] At present at the stage of draft. (Revision of ISO/R 1101-1:1969.)

[8] At present at the stage of draft. (Revision of ISO/R 1661:1971.)

[9] At present at the stage of draft.

Publications referred to

See national foreword.

BSI — British Standards Institution

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