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British Standard Specification for

China tableware

Vaiselle en porcelaine — Spécifications

Porzellangeschirr

British Standards Institution

Foreword

This revision of BS 5416 has been prepared under the direction of the Furniture and Household Equipment Standards Policy Committee. It supersedes BS 5416 : 1976 which is withdrawn.

There is a wide variety of terms used to describe different types of ceramic tableware, many of which are not well understood. An important class of product is that characterized by low water absorption and a degree of translucency generally known as china in the UK and as porcelain elsewhere. For the purpose of this British Standard the terms 'china' and 'porcelain' are taken as being synonymous. Bone china is a particular type of china which fulfils the requirements set out in this standard but which has, in addition, a distinctive chemical composition which enables it to be precisely identified whenever necessary.

This standard specifies the two principal technical requirements that need to be fulfilled before a product can correctly be called china or porcelain viz. transluency and water absorption, determined by sampling from a consignment. It does not purport to have any relevance in the field of technical or industrial ceramics such as sanitary or electrical ceramics, nor does it cover any other aspects of fitness to purpose. It does not include any requirements for those characteristics which are matters of personal choice or which can be readily assessed by the purchaser at the point of sale.

Attention is drawn to Statutory Instrument 1988 No. 1647 The Ceramic Ware (Safety) Regulations 1988 which limits the amount of lead and cadmium which may be released from ceramic ware for contact with food.

Product certification. Users of this British Standard are advised to consider the desirability of third party certification of product conformity with this British Standard based on testing and continuing surveillance, which may be coupled with assessment of a supplier's quality systems against the appropriate Part of BS 5750.

Enquiries as to the availability of third party certification schemes will be forwarded by BSI to the Association of Certification Bodies. If a third party certification scheme does not already exist, users should consider approaching an appropriate body from the list of Association members.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Contents

Specification

1 Scope

The British Standard specifies requirements for resistance to water absorption and transluency for china tableware which determine that the description is applied correctly to the product. Compliance is determined by testing a representative sample taken from a consignment.

2 Definitions

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

2.1 types of tableware. Cups, saucers, plates, bowls, dishes, jugs, tea-pots and coffee-pots.

2.2 ceramic. Material generally made from a mixture of clays and other materials distinguished from glass and glass ceramic by the fact that it is first shaped and then rendered permanent by firing at a temperature generally well in excess of 1000 °C.

2.3 china. Tableware composed of a hard and translucent ceramic, with low water absorption including hard porcelain, soft porcelain, biscuit porcelain (including parian) and bone china.

2.4 hard porcelain. China made from a body composed of kaolin, quartz, feldspar and sometimes calcium carbonate. After an initial low temperature firing, it is normally covered with a colourless transparent glaze fired at the same time as the body and thus fused together with it.

2.5 soft porcelain. China usually containing less alumina but more silica and fluxes than hard porcelain.

2.6 biscuit porcelain. Unglazed porcelain.

2.7 parian ware. Fine-grained unglazed porcelain containing more feldspar than hard porcelain, often resembling Paros marble in appearance.

2.8 bone china. China containing at least 35 % by mass of the fired body of tricalcium orthophosphate, traditionally in the form of bone ash, which gives a translucent body at a lower firing temperature than is the case with hard porcelain.

2.9 biscuit. Unglazed body of ceramic ware.

2.10 consignment. Number of items supplied in response to a single order.

2.11 water absorption. Capacity of a ceramic body to absorb water.

2.12 translucency. Ability of a ceramic body to transmit a proportion of the light incident upon it.

3 Sampling

Samples for testing shall be taken at random from a consignment in accordance with table 1 and shall be representative of all of the types of tableware included in the consignment. Not more than 50 samples shall be taken from any one consignment.

Table 1. Sample size for testing

No. of items in consignment	Minimum sample size
2 to 10	1
11 to 100	3
101 to 500	5
501 to 1000	10
1001 to 2500	15
2501 to 5000	20
5001 to 10 000	25
> 10 000	35

4 Performance

4.1 Water absorption

When tested in accordance with appendix A, the average value for water absorption for all samples tested shall not exceed 0.2 %. Additionally, when tested in accordance with appendix A, the following shall apply for specific sample sizes.

(a) For a sample size not exceeding 10 items, no item tested shall give an individual value for water absorption exceeding 0.4 %.

(b) For a sample size between 11 and 25 items, not more than one of the items tested shall give an individual value for water absorption exceeding 0.4 %.

(c) For a sample size between 26 and 35 items, not more than two of the items tested shall give an individual value for water absorption exceeding 0.4%.

(d) For a sample size between 36 and 50 items, not more than three of the items tested shall give an individual value for water absorption exceeding 0.4 %.

If the criteria for compliance are not met at the minimum sampling level then it shall be permissible for further samples, to a maximum total of 50, to be tested and for compliance to be determined on the cumulative results of all tests performed.

4.2 Translucency

When tested in accordance with appendix B, the average ratio of the intensity of the light transmitted through the sample to the intensity of the incident light, for all items tested shall exceed 0.75 % for a sample thickness of 2.00 mm.

NOTE. As it is not possible to grind a specimen accurately to a thickness of 2.00 mm, specimens are ground to a series of thicknesses on either side of this value and the transluency at 2.00 mm determined by interpolation.

5 Marking

Each item of china tableware complying with this standard shall be marked with the following.

(a) The name, trade mark or any other means of identifying the UK manufacturer or responsible supplier.

(b) The number of this British Standard, i.e. BS 5416*.

NOTE. The date of the standard, or the manufacturer's own marking of the date of manufacture (such that it is distinct from the date of the standard) may also be included.

(c) The word 'China' or 'Porcelain'.

NOTE. Additional descriptors, in accordance with the definitions given in **2.3** to **2.8** may also be included.

*Marking BS 5416 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.

Appendices

Appendix A. Method of test for the determination of water absorption

A.1 Principle

The water absorption (see **2.11**) of china tableware is assessed as the increase in mass which a prepared test piece undergoes as a result of controlled immersion in water, expressed as a percentage of the mass of the dry test piece.

A.2 Apparatus

A.2.1 *Air-circulating oven,* capable of maintaining a temperature of 110 ± 5 °C.

A.2.2 *Desiccator.*

A.2.3 *Balance,* capable of determining masses of between 5 g and 20 g to an accuracy of 0.001 g.

A.2.4 *Vessel,* from which air can safely be removed and in which boiling of the test pieces in water may take place.

A.2.5 *Source of heat.*

A.2.6 *De-gassed distilled or de-gassed de-ionized water.*

A.2.7 *Smooth cotton cloth.*

A.3 Test pieces

Immediately before commencement of the test procedure break the sample, by impact, and take two test pieces of between 5 g and 20 g in mass from areas of the broken sample as follows.

(a) For flatware, take one test piece from the central area and the second test piece from the rim area of the sample.

(b) For holloware, take one test piece from the top section and the second test piece from the base area of the sample.

A.4 Procedure

Dry the test pieces to constant mass in an air-circulating oven maintained at 110 ± 5 °C. Cool the test pieces in a desiccator (**A.2.2**) to ambient temperature. Weigh the test pieces and record their masses to the nearest 0.001 g.

Place the dry test pieces into a vessel (**A.2.4**), reduce the pressure therein to 2.5 ± 1.5 kPa and maintain at this pressure for 60 ± 5 min.

Without admitting air, admit de-gassed distilled or de-gassed de-ionized water (**A.2.6**) at ambient temperature to the vessel, until the test pieces are fully covered. Then admit air to the vessel, returning it to atmospheric pressure, and boil the water and test pieces for 60 ± 5 min ensuring that the test pieces remain fully submerged. Allow the test pieces to cool for not less than 24 h whilst remaining submerged in the boiled water.

Remove the test pieces from the water and wipe them with a moistened smooth cotton cloth (**A.2.7**) such that glazed surfaces are completely dry and broken surfaces retain a thin film of moisture appearing as a sheen. Weigh each test piece and record their masses to the nearest 0.001 g.

A.5 Calculation and expression of results

For each test piece calculate the water absorption as a percentage of the dry mass of the test piece from the following formula:

$$\frac{100\,(W_2 - W_1)}{W_1}$$

where

W_1 is the mass of the test piece after drying to constant mass (in g).

W_2 is the mass of the test piece after immersion (in g).

Report the individual results and the arithmetic mean of the two results obtained for each sample.

Appendix B. Method of test for the determination of translucency

B.1 Principle

The translucency (see **2.7**) of china tableware is assessed as the ratio of the intensity of light transmitted through a sample to the intensity of light incident upon it, expressed as a percentage for a sample thickness of 2 mm.

B.2 Apparatus

B.2.1 *Photometer,* having a light source capable of emitting white light of colour temperature approximately 3400 K.

NOTE. The photometer should provide incident light in the form of a parallel beam normal to the surface of the test piece and all transmitted light should be collected; the use of an instrument incorporating an integrating sphere is commended as a means of achieving the latter.

B.2.2 *Uniform reference specimens,* of accurately known translucency in the region of 0.75 %.

B.3 Sample preparation

Cut five discs, of a size corresponding to the size of the sample holder of the photometer to be used (see **B.2.1**), from the sample. Grind away the glaze on each side of each disc to provide test pieces of approximate thicknesses 2.5, 2.25, 2.0, 1.75 and 1.5 mm with parallel unglazed faces.

B.4 Procedure

By means of the photometer (**B.2.1**) determine and record the percentage transmission of white light, of colour temperature approximately 3400 K, through each test piece and through the uniform reference specimens (**B.2.2**).

Measure and record the thickness of each test piece to the nearest 0.01 mm.

B.5 Calculation and expression of results

Construct a graph of percentage transmission versus thickness for the five test pieces examined. By interpolation, determine the translucency of the sample for a test piece thickness of precisely 2.00 mm. Correct the value obtained by the photometer factor determined by the results obtained from the uniform reference specimens.

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Furniture and Household Equipment Standards Policy Committee (FHM/-) to Technical Committee FHM/29, upon which the following bodies were represented:

Association of Metropolitan Authorities
Association of Public Analysts
British Ceramic Gift and Tableware Manufacturers' Association
British Ceramic Manufacturers' Federation
British Ceramic Research Ltd.
British Glass Manufacturers Confederation
British Vitrified Hotelware Association
Consumer Policy Committee of BSI
Department of Health
Department of Trade and Industry (Consumer Safety Unit, CA Division)
Institute of Trading Standards Administration
Institute of Vitreous Enamellers
Stoneware Potters' Association
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