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Domestic and hospitality use ceramic tableware articles intended for contact with foodstuffs – Specification

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Contents

Summary of pages

This document comprises a front cover, an inside front cover, pages i to ii, pages 1 to 14, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 November 2015. It was prepared by Technical Committee CW/29, *Tableware*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard is based on PAS 54:2003, which is expected to be either revised or withdrawn in due course.

Information about this document

Clause **4** covers general and Clause **5** specific application requirements for both domestic and hospitality wares, with separate subclauses where the requirements differ.

This British Standard specifies important safety requirements relating to the release of metals from ceramic tableware in contact with foodstuffs and also specifies other important requirements relevant to ceramic tableware for both domestic and hospitality applications.

This British Standard is not intended to restrict new developments in design and materials.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Requirements in this standard are drafted in accordance with *Rules for the structure and drafting of UK standards*, subclause **J.1.1**, which states, "Requirements should be expressed using wording such as: 'When tested as described in Annex A, the product shall ...'". This means that only those products that are capable of passing the specified test will be deemed to conform to this standard.

Contractual and legal considerations

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.

1 Scope

This British Standard specifies performance requirements for ceramic tableware intended for domestic and hospitality use.

Where domestic and hospitality requirements differ, test methods for both are specified.

NOTE A higher performance specification is typically required for hospitality ware.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Standards publications

ASTM C368, *Standard Test Method for Impact Resistance of Ceramic Tableware*

ASTM C927-80, *Standard Test Method for Lead and Cadmium Extracted from the Lip and Rim Area of Glass Tumblers Externally Decorated With Ceramic Glass Enamels*

BS 4034:1990, *British Standard Specification for Vitrified hotelware*

BS 5416:1990, *British Standard Specification for China tableware*

BS 6748, *Specification for Limits of metal release from ceramic ware, glassware, glass ceramic ware and vitreous enamel ware*

BS EN 1183:1997, *Materials and articles in contact with foodstuffs – Test methods for thermal shock and thermal shock endurance*

BS EN 1184:1997, *Materials and articles in contact with foodstuffs – Test methods for translucency of ceramic articles*

BS EN 1217:1998, *Materials and articles in contact with foodstuffs – Test methods for water absorption of ceramic articles*

BS EN 1900:1998, *Materials and articles in contact with foodstuffs – Non-metallic tableware – Terminology*

BS EN 12875-4, *Mechanical dishwashing resistance of utensils – Part 4: Rapid test for domestic ceramic articles*

BS EN 12875-5, *Mechanical dishwashing resistance of utensils – Part 5: Rapid test for ceramic catering articles*

BS EN 12980, *Materials and articles in contact with foodstuffs – Non-metallic articles for catering and industrial use – Method of test for the determination of impact resistance*

BS EN 13258:2003, *Materials and articles in contact with foodstuffs – Test methods for crazing resistance of ceramic articles*

BS EN 13834:2007+A1:2009, *Cookware – Ovenware for use in traditional domestic ovens*

BS EN 15284, *Materials and articles in contact with food stuffs – Test method for the resistance to microwave heating of ceramic, glass, glass-ceramic or plastics cookware*

Other publications

[N1] LUCIDEON, *Lucideon In-house Method PT32, Modification of BS EN 12980 for handle strength*. Stoke-on-Trent: Lucideon, 2015. [1)]

[N2] LUCIDEON, *Lucideon In-house Method PT35, Tabletop testing*. Stoke-on-Trent: Lucideon, 2015. [1)]

[N3] DODD A.E. and MURFIN D. *Dictionary of Ceramics*. Third edition. Leeds: Maney Publishing, 1994.

[N4] LUCIDEON, *Lucideon In-house Method PT36, Determination of the resistance of ceramic and glass to freezing and freezer to oven usage*. Stoke-on-Trent: Lucideon, 2015. [1)]

[N5] LUCIDEON, *Lucideon In-house Method PT37, Determination of the resistance of ceramic and glass to freezer to microwave usage*. Stoke-on-Trent: Lucideon, 2015. [1)]

[N6] LUCIDEON, *Lucideon In-house Method PT65, Performance test for ceramic cookware intended for use on top of a stove, cooker or hob*. Stoke-on-Trent: Lucideon, 2015. [1)]

[N7] LUCIDEON /CATRA, *Lucideon In-house Method PT38, Method Determination of the susceptibility to metal marking of glazed ceramic tableware*. Stoke-on-Trent: Lucideon, 2015. [1)]

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

3.1 ceramic
inorganic non-metallic material made by firing a mixture of raw materials at high temperature

NOTE The firing temperature is high enough to give the necessary strength to the article, which is already shaped, but lower than the temperature which is necessary to achieve complete fusion of the mixture.

[SOURCE: BS EN 1900:1998, **3.3.1**, modified]

3.2 crazing
formation of very fine cracks in the glaze caused by either moisture expansion of the body or thermal stress, which creates sufficient tension in the glaze to cause it to craze

[SOURCE: BS 4034:1990, **2.7**, modified]

3.3 earthenware
glazed ceramic material of low vitrification, white to cream (or artificially coloured), opaque, with a porous and fine texture

NOTE The different elements of the body (grains, pores) are 0.15 mm or less and therefore not visible to the naked eye. Its body is generally made of clays, silica, feldspar or feldspathic fluxes and/or calcium carbonate. When determined in accordance with BS EN 1217:1998, Test Method A, the water absorption of the body is greater than 3%.

[SOURCE: BS EN 1900:1998, **3.3.7**, modified]

[1)] Lucideon In-house Methods are available by contacting Lucideon, Queens Road, Penkhull, Stoke-on-Trent, Staffordshire, ST4 7LQ.

3.4 glaze
substance resulting from the melting or sintering of inorganic constituents and designed to form a surface layer which is fused, in one or more coats, during the firing process

NOTE Glazes can be opaque or transparent.

[SOURCE: BS EN 1900:1998, **3.5**, modified]

3.5 high alumina ceramic tableware
glazed ceramic tableware vitrified, impervious, white (or artificially coloured), slightly translucent, made of clays, silica, feldspathic flux and a minimum level of 10% of added alumina

NOTE It is typically intended for use in hospitality and commercial catering applications, e.g. restaurants and hotels. When determined in accordance with BS 4034, the mean water absorption of the body is 0.2% with no item exceeding 0.4%.

3.6 holloware
articles having an internal depth of more than 25 mm

NOTE Small holloware has a capacity less than 1.1 litres and large holloware has a capacity of 1.1 litres or more.

[SOURCE: BS EN 1388-1:1996, **3.3**, modified]

3.7 porcelains

3.7.1 bone china
type of china containing at least 35% by mass of the fired body, of tricalcium orthophosphate, which can be introduced in the form of bone ash

[SOURCE: BS EN 1900:1998, **3.3.4**, modified]

*NOTE A similar definition for bone china is available in BS 5416:1990, **2.8**.*

3.7.2 china; porcelain
glazed ceramic material, vitrified, impervious, white (or artificially coloured), translucent and resonant

NOTE It is generally made from kaolin (or other china clays), silica, feldspar or feldspathic fluxes and sometimes calcium carbonate or alumina. When determined in accordance with BS EN 1217:1998, Test Method A, the water absorption of the body is less than 0.5%.

[SOURCE: BS EN 1900:1998, **3.3.4**, modified]

3.7.3 hard (hard paste) porcelain
china made from a body composed of kaolin, quartz, feldspar and sometimes calcium carbonate

NOTE 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.

[SOURCE: BS 5416:1990, **2.4**, modified]

3.7.4 parian ware
fine-grained unglazed porcelain containing more feldspar than hard porcelain

NOTE Parian ware often resembles Paros marble in appearance.

[SOURCE: BS 5416:1990, **2.7**, modified]

3.7.5 soft (soft paste) porcelain
china usually containing less alumina but more silica and fluxes than hard paste porcelain

NOTE After an initial high temperature firing to produce a vitreous biscuit piece, it is normally covered with a colourless transparent glaze and then fired at a lower temperature to mature the glaze.

[SOURCE: BS 5416:1990, **2.5**, modified]

3.7.6 vitreous china
glazed ceramic bodies vitrified, impervious, white (or artificially coloured), slightly translucent

NOTE It is made from clays, silica, feldspar and sometimes alumina. When determined in accordance with BS EN 1217:1998, Test Method A, the water absorption of the body is less than 0.5%.

[SOURCE BS EN 1900:1998, **3.3.5**, modified]

3.8 stonewares

3.8.1 non-vitrified stoneware
glazed ceramic material partially vitrified, impervious, generally naturally coloured, hard and opaque

NOTE It is generally made of clays, silica and flux. When determined in accordance with BS EN 1217:1998, Test Method A, the water absorption of the body is less than 3%.

[SOURCE: BS EN 1900:1998, **3.3.6**, modified]

3.8.2 vitrified stoneware
fully vitreous ceramic material

NOTE When determined in accordance with BS EN 1217:1998, Test Method A, the water absorption of the body is less than 0.5%.

3.9 terracotta
brown or red-brown glazed or partially glazed earthenware or fine pottery items

NOTE 1 When determined in accordance with BS EN 1217:1998, Test Method A, the water absorption of the body is equal to or greater than 5%.

NOTE 2 Attention is drawn to the Combined Nomenclature of the European Communities Heading 6912 00 50 [1].

3.10 thermal shock endurance, Δt_{50}
value for the resistance against sudden change in temperature corresponding to the temperature difference at which, for the first time, 50% of the samples fail

[SOURCE: BS EN 1183:1997, **2.2**, modified]

3.11 translucency
ability of a ceramic body to transmit a proportion of the light incident upon it

[SOURCE: BS EN 1900:1998, **3.7.2**, modified]

3.12 water absorption
capacity of a ceramic body to absorb water

[SOURCE: BS EN 1217:1998, **2.1**, modified]

4 General application requirements

4.1 Metal release

*COMMENTARY ON **4.1***

For products intended for markets outside the UK, note should be taken of the statutory metal release requirements for those markets.

Attention is drawn to Council Directive 84/500/EEC [2] as amended by Council Directive 2005/31/EEC [3], or subsequent amendments or replacements of these documents.

4.1.1 Food contact surfaces

Articles shall conform to the lead and cadmium release limits given in BS 6748.

4.1.2 Lip/rim area

When tested in accordance with ASTM C927-80, articles with lip/rim or external decoration shall release not more than 4.0 ppm lead and 0.4 ppm cadmium.

NOTE Metal release levels are based on the Society of Glass and Ceramic Decorators voluntary limits for lead and cadmium release [4].

4.2 Chemical composition

Bone china (see **3.7.1**) shall contain not less than 35% by mass of the fired body of tricalcium orthophosphate.

4.3 Integrity of handle attachments

4.3.1 Domestic tableware

When tested in accordance with Lucideon PT32 [N1], the failure shall be not at the handle/body interface.

4.3.2 Hospitality tableware

When tested in accordance with ASTM C368 with the article for testing clamped to the test apparatus using the procedure described in Annex A, the failure shall be not at the handle/body interface (see Annex A).

4.4 Resistance to impact breakage in service

4.4.1 Domestic tableware

4.4.1.1 Rim tests

When tested in accordance with BS EN 12980, the impact energy to produce failure shall be not less than 0.05 J (0.04 ft·lbf).

4.4.1.2 Handle strength

When tested in accordance with Lucideon PT32 [N1], the impact energy to produce handle failure shall be not less than 0.05 J (0.04 ft·lbf).

4.4.2 Hospitality tableware

4.4.2.1 Intrinsic strength

When tested in accordance with Annex B, the intrinsic strength of the finished product shall have a mean value of not less than 124.1 MPa (18 000 lbf·in^{-2}).

4.4.2.2 Handle strength

When tested in accordance with ASTM C368 with the article for testing clamped to the test apparatus and using the procedure described in Annex A, the impact energy to produce failure shall be not less than 0.09 J (0.07 ft·lbf).

4.5 Articles intended to serve hot foods

When tested in accordance with BS EN 1183:1997, Test Method B, any articles that are intended to have hot liquids poured into them or have hot food served on them shall have a thermal shock endurance Δt_{50} of not less than 90 °C.

NOTE Lucideon PT33 [5] and BS EN 1183:1997, Test Method A, provide useful information as to the suitability of ceramic articles to hold hot liquids. However, testing to these methods is not a requirement of this British Standard.

4.6 Articles intended for pouring liquids

4.6.1 Lid security

When tested in accordance with Lucideon PT35 [N2], the lids of lidded vessels intended for pouring liquids shall not separate from the body at an angle of less than 90°.

4.6.2 Pouring characteristics

When tested in accordance with Lucideon PT35 [N2], vessels intended for pouring liquids shall pour in a single stream.

4.7 Handle and knob temperature

When tested in accordance with Lucideon PT35 [N2], the surface temperature of any handle or knob on cups, mugs, teapots and coffee pots, or any articles that are intended to have hot liquids poured into them shall not exceed 55 °C.

4.8 Stability

When tested in accordance with Lucideon PT35 [N2] to an angle of 15°, all articles shall remain stable.

4.9 Water absorption

4.9.1 Porcelains

All categories of porcelain (see **3.7**) shall conform to BS 5416.

4.9.2 High alumina ceramic tableware

All high alumina ceramic tableware (see **3.5**) shall conform to BS 4034:1990, **4.1**.

4.9.3 Other categories of ceramicware

When tested in accordance with BS EN 1217:1998, Test Method A, other categories of ceramicware shall conform to Table 1.

Table 1 **Water absorption values for ceramicware other than high alumina ceramic tableware, porcelain, china and vitrified china**

Type of ceramicware	Water absorption (%)	Reference
Stoneware	<3.0	BS EN 1900:1998, **3.3.6**
Vitrified stoneware	<0.5	
Earthenware	>3.0	BS EN 1900:1998, **3.3.7**
Terracotta	≥5.0	Dictionary of Ceramics [N3]

4.10 Crazing resistance

4.10.1 Domestic tableware

All ceramicware, except articles with a water absorption of less than 0.5%, shall be tested for crazing resistance. When tested in accordance with BS EN 13258:2003, Test Method A, the Ceramicware Crazing Resistance Index shall be not less than ten hours.

NOTE Domestic tableware items with a water absorption of less than 0.5% are considered to be sufficiently craze resistant.

Both holloware and flatware items of the same pattern shall be tested for crazing resistance.

4.10.2 Hospitality tableware

All ceramicware shall conform to BS 4034:1990, **4.2**.

4.11 Translucency of porcelains

All categories of porcelains (see **3.7**) shall conform to the translucency requirements of either:

a) BS EN 1184:1997, Test Method A; or

NOTE BS EN 1184:1997, Test Method A and the European Community Regulation No. 679/72, Code 6911 of the Combined Nomenclature of the European Commission (Custom Tariffs) [6] are identical.

b) BS 5416:1990, **4.2**.

5 Specific application requirements

5.1 Microwave usage

When tested in accordance with BS EN 15284, articles having a description that suggests they can be safely used in a microwave shall show no visible adverse effect compared with untreated tableware. Where fitted, handles shall be not greater than 56 °C after the short period heating cycle.

5.2 Freezer usage

5.2.1 Resistance to freezing

When tested in accordance with Lucideon PT36 [N4], articles having a description that suggests they can be safely used in a freezer shall show no visible adverse effect compared with untreated tableware.

5.2.2 Freezer to oven usage

When tested in accordance with Lucideon PT36 [N4], articles having a description that suggests they can be safely taken from a freezer and used immediately in an oven shall show no visible adverse effect compared with untreated tableware.

5.2.3 Freezer to microwave usage

When tested in accordance with Lucideon PT37 [N5], articles having a description that suggests they can be safely taken from a freezer and used immediately in a microwave shall show no visible adverse effect compared with untreated tableware.

5.3 Dishwasher usage (detergent durability)

*COMMENTARY ON **5.3***

*The classifications referred to in **5.3.1** and **5.3.2** are given in BS EN 12875-2:2002, Table 2. These are: 0 = no visible change; 1 = first discernible change; and 2 = clearly visible change.*

5.3.1 Domestic tableware

When tested in accordance with BS EN 12875-4, articles having a description that suggests they can be safely cleaned in a dishwasher shall, on average, show classification 0 or classification 1 change, but shall not show classification 2 change, compared with untreated tableware.

5.3.2 Hospitality tableware

When tested in accordance with BS EN 12875-5, articles having a description that suggests they can be safely cleaned in a dishwasher shall, on average, show classification 0 or classification 1 change, but shall not show classification 2 change, compared with untreated tableware.

5.4 Oven usage

5.4.1 Thermal shock endurance

When tested in accordance with BS EN 1183:1997, Test Method B, articles having a description that suggests they can be safely used in an oven shall have a thermal shock endurance, Δt_{50}, of not less than 150 °C.

5.4.2 Non-stick performance

When tested in accordance with BS EN 13834:2007+A1:2009, **8.2.2**, any item of bakeware and roasting and gratin dishes that permits the test food to be fully released and the surface wiped clean, shall be deemed to have non-stick properties.

5.5 Hob-top usage

When tested in accordance with Lucideon PT65 [N6], articles having a description that suggests they can be safely used on a hob-top shall show no visible signs of damage, compared with untreated tableware.

5.6 Metal marking

*COMMENTARY ON **5.6***

*The classifications referred to in **5.6** are given in Lucideon PT38 [7]. These are: 0 = no visible change; 1 = first discernible change/marking can be removed by cleaning; and 2 = clearly visible change/marking cannot be removed by cleaning.*

When tested in accordance with Lucideon PT38 [N7], articles having a description that suggests they are resistant to metal marking, shall show classification 0 or classification 1 change, but shall not show classification 2 change, compared with untreated tableware.

6 Marking

All products shall be labelled where practical with the following information so that it is visible at the point of sale:

a) the number and date of this British Standard (i.e. BS 8654:2015) [2)];

b) the name, identification or trademark of the manufacturer, importer or retailer and country of origin;

c) where required, the words denoting the appropriate type of ceramicware, e.g. “bone china”, “china”, “porcelain”, “earthenware”, “stoneware”; etc.; and

d) where appropriate, the words and/or symbols “microwave”, “oven”, “freezer” and/or “dishwasher” “safe”, “resistant” or other appropriate terminology.

[2)] Marking BS 8654:2015 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 this British Standard. The accuracy of the claim is solely the claimant’s responsibility. Such a declaration should not be confused with third party certification, which might also be desirable.

Annex A (normative) Modification to ASTM C368 - 88, Standard Test Method for Impact Resistance of Ceramic Tableware

A.1 Principle

The test sample is clamped to the ASTM C368 impact test apparatus with sufficient force to prevent movement of the test sample when impacted.

A.2 Apparatus

A.2.1 *Impact tester*, conforming to ASTM C368.

A.2.2 *Stand*, attached to the base of the impact tester.

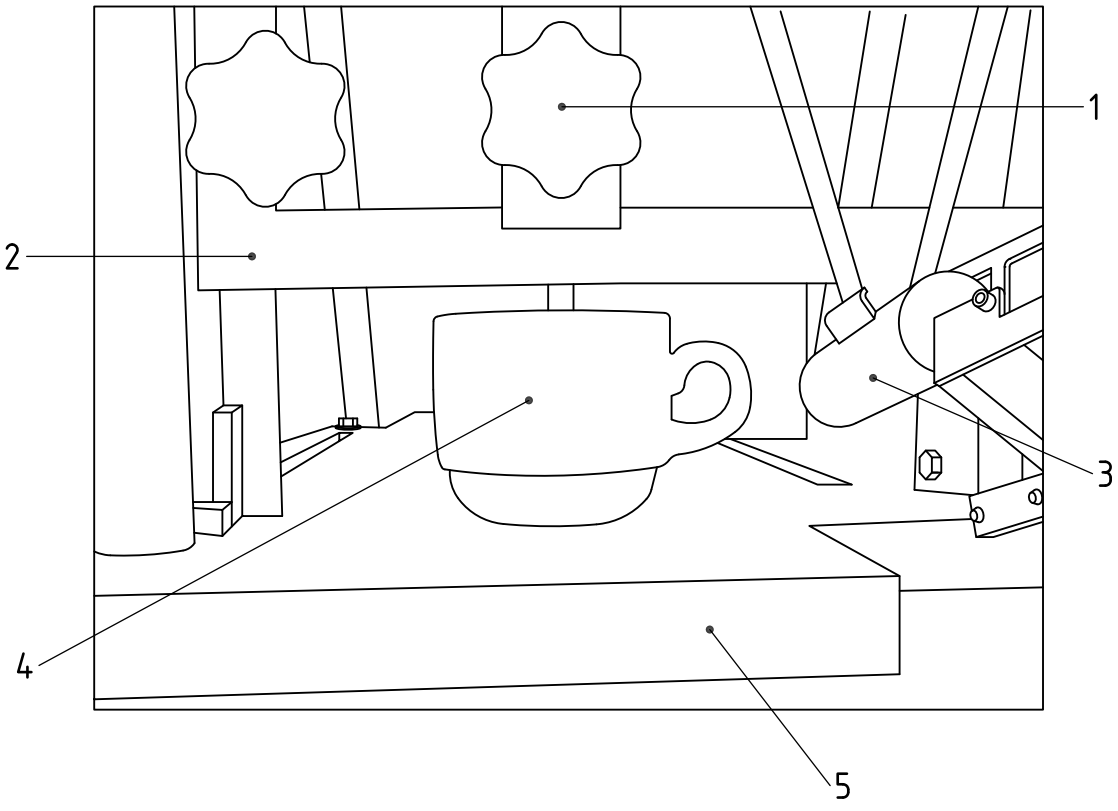
A.2.3 *Clamp,* inserted between the test sample and the horizontal section of the stand.

A.3 Procedure

A.3.1 Place the test sample on the base of the impact tester (A.2.1), underneath the stand (A.2.2) (see Figure A.1).

A.3.2 Turn the clamp (A.2.3) until the test sample is secured against the base of the impact tester (A.2.1) (see Figure A.2).

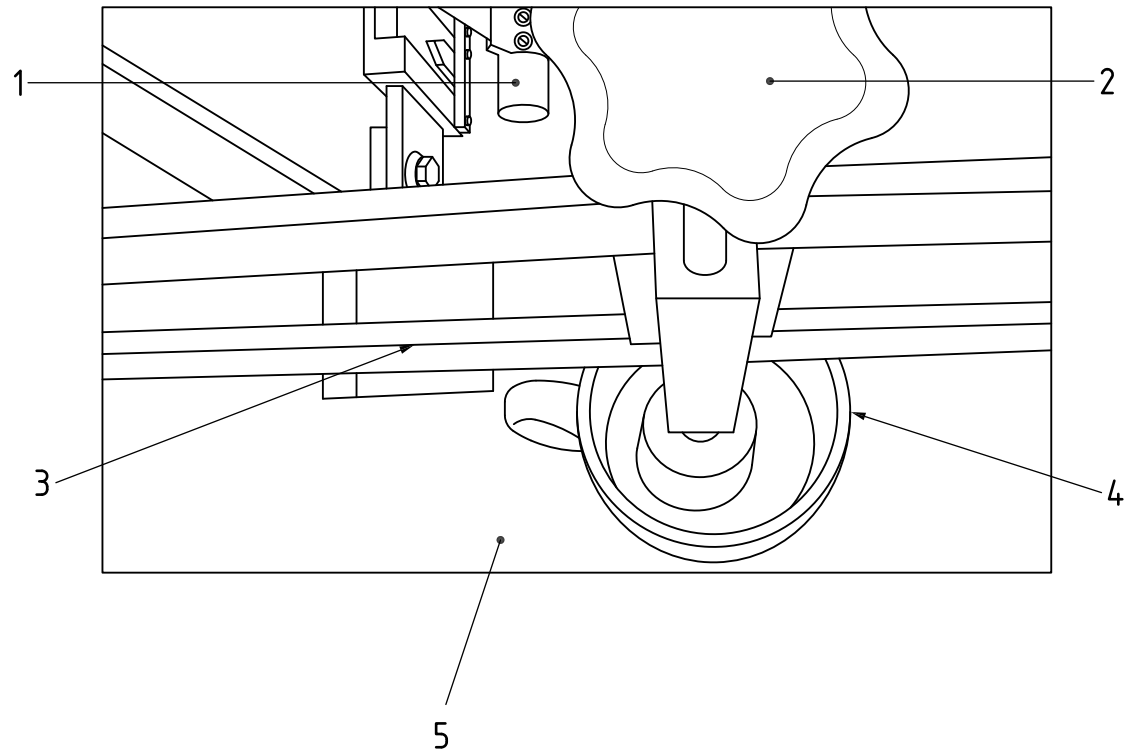
Figure A.1 **Side view of clamp stand, which is attached to the base of ASTM C368 impact testing apparatus**



Key

1 Clamp wheel
2 Clamp stand
3 Impact tester pendulum
4 Test sample
5 Base of ASTM impact tester

Figure A.2 **Plan view of clamp to secure the test sample to the clamp stand and the base of the C368 impact test apparatus**



Key

1 Impact tester pendulum
2 Clamp wheel
3 Clamp stand
4 Test sample
5 Base of ASTM impact tester

Annex B (normative) Determination of the intrinsic strength of glazed ceramic materials

B.1 Principle

Intrinsic strength is the force per unit area measured on a test bar prepared from the materials in question. For high alumina ceramic tableware the test bar comprises a rod extruded from the manufacturer's body, fired using the manufacturer's biscuit firing schedule, glazed with the current production glaze and fired using the manufacturer's glost firing schedule.

B.2 Apparatus

B.2.1 *Extruder*, capable of preparing test rods in a de-aired condition with a nozzle diameter of approximately 5 mm.

B.2.2 *Board*, lightly oiled and ridged, capable of supporting the extruded rods during the initial drying period in order to prevent the rods distorting.

B.2.3 *Refractory bat*, which is of a specification suitable for the firing schedule and capable of supporting the test rods during biscuit firing.

B.2.4 *Supporting device*, for supporting the glazed rods during glost firing.

B.2.5 *Measuring device*, capable of measuring to ±0.01 mm.

B.2.6 *Breaking strength apparatus*, capable of carrying out 3 point bend breaking strength determinations on cylindrical rods.

B.3 Sampling and preparation of test specimens

B.3.1 Pass a representative sample of the body to be tested, in the plastic and thoroughly de-aired form, through the extruder (**B.2.1**).

B.3.2 Place the extruded rods on the board (**B.2.2**). Cut the rods into approximately 120 mm to 150 mm lengths to produce a minimum of ten 100 mm test samples. Dry to a constant weight.

B.3.3 Place the samples on the refractory bat (**B.2.3**), dusted with alumina powder. Fire the samples in the manufacturer's biscuit kiln.

B.3.4 Allow the samples to cool to ambient temperature after firing. Remove attached alumina powder with either a soft brush or cloth. Apply the manufacturer's glaze to the samples. Adjust the viscosity and slurry density of the glaze to the control parameters used in manufacture.

B.3.5 Place the glazed samples on the supporting device (**B.2.4**) and fire in the manufacturer's glost kiln.

B.3.6 The samples are prepared and fired in such a manner as to be straight (devoid of curvature) (see Annex C) and with the glaze surface smooth and free from defects such as inclusions and bubbles.

B.4 Procedure

B.4.1 Using the measuring device (**B.2.5**) set the distance between the breaking strength apparatus (**B.2.6**) supports (breaking span) to (90 ±0.05) mm.

B.4.2 Place a test sample onto the breaking strength apparatus (**B.2.6**). Start the apparatus and record the breaking load.

B.4.3 Using the measuring device (**B.2.5**), measure the diameter of the test sample at the point of fracture to ±0.01 mm.

B.4.4 Repeat procedures **B.4.2** and **B.4.3** until a total of ten samples have been tested.

B.4.5 Calculate the modulus of rupture for each test sample using the following formula:

$$M = \frac{8PL}{\pi d^3}$$

where:

M is the modulus of rupture in megapascals (MPa);

P is the breaking load in Newtons (N);

L is the span in millimetres (mm); and

d is the diameter of specimen in millimetres (mm).

B.5 Test report

The test report shall include the following information:

- span;
- individual modulus of rupture results;
- mean and standard deviation; and
- 95% confidence limits.

Annex C (normative) Determination of straightness of test samples for use in Annex B

C.1 Definition

The straightness (allowable curvature) of ceramic rods shall be defined as the deviation (ΔC) from the centre and/or one edge from the plane in which it lies (see Figure C.1). Mathematically it can be expressed as $\Delta C/L$, or as a percentage $(\Delta C \times 100)/L$.

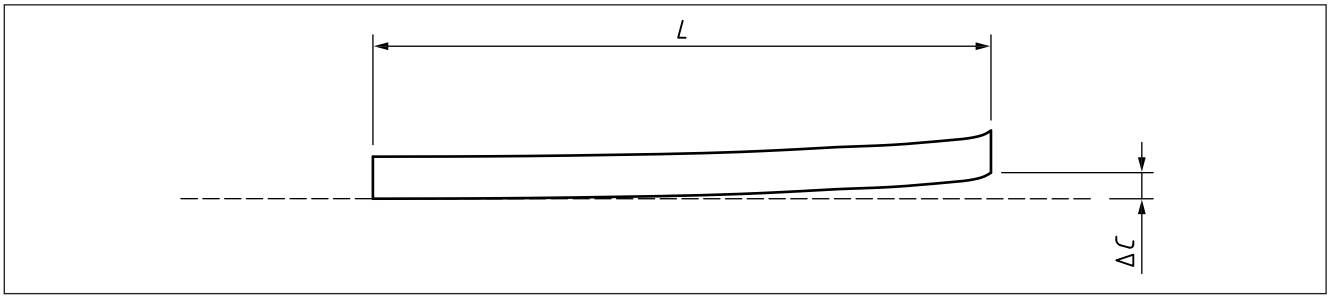
C.2 Specification

The maximum allowable ΔC value on a rod of nominal diameter 5 mm and nominal length (L) of 150 mm is 1 mm.

C.3 Measurement

The straightness of test samples for intrinsic strength measurement shall be determined by passing each test sample through a commercially available round, straight, rigid and seamless, copper, stainless steel or chrome plated tube with a nominal internal diameter of 7 mm and a wall thickness not less than 0.5 mm. The tube length shall be not less than the length of the longest test sample.

Figure C.1 **Illustrating a rod which has distorted from the plane in which it lies (horizontal dotted line)**



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Standards publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS EN 1388-1:1996, *Materials and articles in contact with foodstuffs – Silicate surfaces – Part 1: Determination of the release of lead and cadmium from ceramic ware*

BS EN 12875-2:2002, *Mechanical dishwashing resistance of utensils – Part 2: Inspection of non-metallic articles*

PAS 54:2003, *Specification for domestic ceramicware and glassware – Articles intended for contact with foodstuffs, and vases*

Other publications

[1] EUROPEAN COMMUNITIES. European Commission Combined Nomenclature 6912 00 50, Ceramic products, Ceramic tableware, kitchenware, other household articles and toilet articles, other than of porcelain or china, Earthenware or fine pottery. Luxembourg: Office for Official Publications of the European Communities, 2003.

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[5] LUCIDEON. *Lucideon In-house Method PT33* [3)]*, Determination of thermal shock resistance of holloware items (boiling water method)*. Stoke-on-Trent: Lucideon, 2015.

[6] EUROPEAN COMMUNITIES. 679/72/EEC. Council Directive 679/72 of 29 March 1972 on the classification of goods under headings or subheadings Nos 69.09 A, 69.11, 69.13 B and 69.14 A of the Common Customs Tariff. Luxembourg: Office for Official Publications of the European Communities, 1992.

[3)] Lucideon In-house Methods are available by contacting Lucideon, Queens Road, Penkhull, Stoke-on-Trent, Staffordshire, ST4 7LQ.

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