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Porcelain Tableware — Specification and test method

Vaisselle en porcelaine — Spécification et méthode d'essai

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Foreword

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This document was prepared by Technical Committee ISO/TC 166, *Ceramic ware, glassware and glass ceramic ware in contact with food*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Porcelain Tableware — Specification and test method

1 Scope

This document gives specifications, test methods, sampling, marking and labelling of porcelain tableware that is used for the preparation and serving of foods.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6486-1, *Ceramic ware, glass ceramic ware and glass dinnerware in contact with food — Release of lead and cadmium — Part 1: Test method*

ISO 6486-2, *Ceramic ware, glass-ceramic ware and glass dinnerware in contact with food — Release of lead and cadmium — Part 2: Permissible limits*

ASTM C368-88, *Standard test method for impact resistance of ceramic tableware*

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

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

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

BS 8654, *Domestic and hospitality use ceramic tableware articles intended for contact with foodstuffs – Specification*

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

EN 13834, *Cookware. Ovenware for use in traditional domestic ovens*

EN 12875-2, *Mechanical dishwashing resistance of domestic utensils. Inspection of nonmetallic articles*

EN 12875-4, *Mechanical dishwashing resistance of utensils. Rapid test for domestic ceramic articles*

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*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

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

Note 1 to entry: 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[8].

3.2
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 1 to entry: Glazes can be opaque or transparent[8].

3.3
porcelain
glazed ceramic material, vitrified, impervious, white (or artificially coloured), translucent and resonant

Note 1 to entry: 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 EN 1217:1998, Test Method A, the water absorption of the body is less than 0,5 %. Porcelain is generally fired in a kiln at temperatures of between 1,200 °C and 1,400 °C (2,200 °F and 2,600 °F). The fired body presents the simultaneous coexistence of a glassy phase and a mullitic crystalline phase according respectively to the proportions 60 %-80 % and 40 %-20 %[8].

3.3.1
hard (hard paste) porcelain
porcelain made from a body composed of kaolin, quartz, feldspar and sometimes calcium carbonate

Note 1 to entry: 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. The second firing temperature is conventionally between 1 360 °C and 1 400 °C. When determined in accordance with EN 1217:1998, Test Method A, the water absorption of the body is less than 0,5 %[9].

3.3.2
soft (soft paste) porcelain
porcelain usually containing less alumina but more silica and fluxes than hard paste porcelain

Note 1 to entry: 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. The first firing temperature is generally above 1 220 °C. When determined in accordance with EN 1217:1998, Test Method A, the water absorption of the body is less than 0,5 %[9].

3.3.2.1
china
glazed ceramic material, vitrified, impervious, white (or artificially coloured), translucent and resonant

Note 1 to entry: Type of soft paste porcelain generally made from kaolin (or other china clays), silica, feldspar or feldspathic fluxes and sometimes calcium carbonate or alumina. When determined in accordance with EN 1217:1998, Test Method A, the water absorption of the body is less than 0,5 %[8].

3.3.2.2
bone china
type of soft paste porcelain containing at least 35 % by mass of the fired body, of tricalcium orthophosphate, which can be introduced in the form of bone ash. When determined in accordance with EN 1217:1998, Test Method A, the water absorption of the body is less than 0,5 %[8]

3.3.2.3
vitreous china
glazed ceramic bodies vitrified, impervious, white (or artificially coloured), slightly translucent

Note 1 to entry: It is made from clays, silica, feldspar and sometimes alumina. When determined in accordance with EN 1217:1998, Test Method A, the water absorption of the body is less than 0,5 %[8].

3.3.3
parian ware
fine-grained unglazed porcelain containing more feldspar than hard porcelain

Note 1 to entry: Parian ware often resembles Paros marble in appearance[9].

3.4
tableware
all utensils and decorative or white articles used on the table for meal service such as: cups, saucers, plates, bowls, dishes, jugs and tea-pots[7]

3.5
water absorption
capacity of a ceramic body to absorb water

3.6
translucency
ability of a ceramic body to transmit a proportion of the visible light incident upon it[8]

3.7
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

3.8
dishwasher safe
ability of the article to withstand repeated cleaning in a dishwashing machine without significant changes over time[10]

4 Requirements

4.1 General

Articles that bear reference to the present document must be compliant with the requirements specified in the following paragraphs.

NOTE Further standards of interest are listed in the Bibliography, such as ASTM C242, EN 1900, BS 5416 and EN 12875-1

4.2 Chemical composition requirements

Bone china (see 3.3.2.2) shall contain not less than a mass fraction of 35 % of the fired body of tricalcium orthophosphate.

4.3 Physical requirements

4.3.1 Integrity of handle attachments

When tested in accordance with ASTM C368-88 with the article for testing clamped to the test apparatus, the failure or disintegrity shall not occur at the handle/body interface.

The procedure in BS 8654 shall be used, which references LUCIDEON PT32[1].

4.3.2 Resistance to impact breakage in service

4.3.2.1 Rim tests

When tested in accordance with EN 12980, the impact energy to produce failure shall be not less than 0,05 J.

4.3.2.2 Handle strength

When tested in accordance with ASTM C368-88 with the article for testing clamped to the test apparatus, the impact energy to produce handle failure shall be not less than 0,05 J.

The procedure in BS 8654 shall be used, which references LUCIDEON PT32[1].

4.3.3 Water absorption

All categories of porcelain (see 3.3), when tested in accordance with EN 1217:1998, Test Method A, shall have a water absorption of less than 0,5 %.

NOTE Types of porcelain are parian ware, hard (hard paste) porcelain and soft (soft paste) porcelain as china, bone china and vitreous china.

4.3.4 Translucency

All categories of porcelain (see 3.3) shall conform to the translucency requirements of EN 1184:1997, Test Method A.

4.4 Functionality requirements

4.4.1 Metal release (Food Contact Compliance)

Note should be taken of the statutory metal release requirements for the market in which the products are intended to be sold.

When tested in accordance with ISO 6486-1, articles shall conform to the lead and cadmium release limits given in ISO 6486-2.

4.4.2 Dishwasher usage (detergent durability)

The classifications shall be according to those given below in this clause, which are in accordance with EN 12875-2:2002, Table 2[10].

These are: 0 = no visible change; 1 = first discernible change; and 2 = clearly visible change.

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

4.4.3 Articles intended to serve hot foods and beverages

4.4.3.1 Thermal shock endurance

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

4.4.3.2 Handle and knob temperature

When tested, 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 56 °C.

The procedure in BS 8654 shall be used, which references LUCIDEON PT35[2].

4.4.4 Articles intended for pouring liquids

4.4.4.1 Lid security

When tested, the lids of lidded vessels intended for pouring liquids shall not separate from the body at an angle of less than 90°.

The procedure in BS 8654 shall be used, which references LUCIDEON PT35[2].

4.4.4.2 Pouring characteristics

When tested, vessels intended for pouring liquids shall pour in a single stream.

The procedure in BS 8654 shall be used, which references LUCIDEON PT35[2].

4.4.5 Stability

When tested, to an angle of 15°, all articles shall remain stable.

The procedure in BS 8654 shall be used, which references LUCIDEON PT35[2].

4.4.6 Microwave usage

When tested in accordance with EN 15284, articles having a description or bearing a symbol 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.

4.4.7 Oven usage

4.4.7.1 Thermal shock endurance

When tested in accordance with EN 1183:1997, Test Method B, articles having a description or bearing a symbol that suggests they can be safely used in an oven shall have thermal shock endurance, ΔT_{50}, of not less than 180 °C.

4.4.7.2 Non-stick performance

When tested in accordance with EN 13834, 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.

4.4.7.3 Hob-top usage

When tested, articles having a description or bearing a symbol that suggests they can be safely used on a hob-top shall show no visible signs of damage, compared with untested tableware.

The procedure in BS 8654 shall be used, which references LUCIDEON PT65[6].

4.4.8 Freezer usage

4.4.8.1 Resistance to freezing

When tested, articles having a description or bearing a symbol that suggests they can be safely used in a freezer shall show no visible adverse effect compared with untested tableware.

The procedure in BS 8654 shall be used, which references LUCIDEON PT36[3].