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Draft Indian Standard

PORCELAIN CROCKERYWARE— SPECIFICATION

(Fourth Revision)

(ICS 81.060.20; 97.040.60)

Ceramicware Sectional Committee, CHD 09

Last Date for Comments: 10 November 2023

FOREWORD

(Formal clause to be added later)

This standard was originally published in 1965 and subsequently revised in 1979 and 1994. The third revision of this standard was brought out in 2002 and the limits for release of lead and cadmium had been modified to align with the ISO/DIS 6486-2 : 1999 ‘Ceramicware, glass ceramicware and glass dinnerware in contact with food—release of lead and cadmium Part 2: ‘Permissible limit’, which incorporates present regulatory requirements of major world bodies, in order to obviate any nontariff barriers apart from ensuring protection of the population against possible hazards arising from the use of improperly formulated and/or processed crockeryware used for preparation, serving and storage of food and beverages.

In this revision, grade 2 and grade 3 has been removed as the grades are only distinguished based on visual assessment test.

The various test methods have been placed in IS 14179:1999 ‘Methods of test for ceramic tableware’ and IS 9806:2001 ‘Methods of test for and permissible limits of toxic materials released from ceramicware, vitreous enamelware glassware and glass ceramicware in contact with food (*first revision*)’.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1 SCOPE

This standard prescribes requirements and methods of sampling and test for porcelain crockeryware.

2 REFERENCES

The following Indian Standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
2781:1975	Glossary of terms relating to ceramicware (<i>first revision</i>)
9806:2001	Methods of test for and permissible limits of toxic materials released from ceramicware, vitreous enamelware, glassware and glass ceramicware in contact with food (<i>first revision</i>)
14179:1999	Methods of test for ceramic tableware

3 TERMINOLOGY

3.1 For the purpose of this standard, the definitions given in IS 2781, in addition to the following, shall apply.

3.1.1 Porcelain — A glazed vitreous white/coloured ceramicware.

3.1.2 Crockeryware — It shall mean all types of dinnerware, tableware, etc (other than artware) made from earthenware, stoneware, fine (bone) china, porcelain, vitreous china and glass ceramics.

3.1.3 Soft Porcelain — A completely vitrified, more or less translucent, white or ivory body, fired below 1 300°C.

3.1.4 Hard Porcelain — A completely vitrified, translucent, generally white, hard body fired above 1 300°C.

4 TYPES

There shall be the following two types of porcelain crockeryware:

- a) *Type 1* — *Soft* porcelain, and
- b) *Type 2* — *Hard* porcelain.

5 REQUIREMENTS

5.1 Material

5.1.1 *Soft Porcelain*

It shall be a ceramic material, white/coloured, having low porosity, very high mechanical strength and low translucency, biscuiting at low temperature, glazed at relatively higher temperature and covered with a properly matured hard raw/fritted glaze. The body shall show, upon fracture, dense, homogeneous and fine-grained vitrified texture. The glaze shall be of uniform colour, smooth, glossy, impervious and as free as possible from visual defects.

5.1.2 *Hard Porcelain*

It shall be a ceramic compound, white/coloured, having low porosity, high mechanical strength and medium translucency, biscuiting at high temperature, glazed at relatively lower temperature and covered with a properly matured soft-fritted glaze. The body shall show, upon fracture, dense, homogeneous and fine-grained vitrified texture. The glaze shall be of uniform colour, smooth, glossy, impervious and as free as possible from visual defects.

5.2 Workmanship

5.2.1 *General*

All items of porcelain crockeryware in a set shall generally be of a matching design, colour and decoration.

5.2.2 The cup shall rest in the middle of the saucer without rocking or spinning.

5.2.3 The handle, where provided, shall not be misplaced.

5.2.4 The lip or spout shall be so designed that liquids may not trickle down from the sides of the ware while pouring.

5.2.5 The lid, where used, shall fit properly and shall not fall down while pouring out liquids.

5.2.6 The capacity of the tea pot/coffee pot in a set shall correspond to the capacity of the cups.

5.3 Finish

The entire surface of items of porcelain crockeryware shall be covered by a uniform, continuous, impervious and medium fired raw/fritted glaze for Type 1 and high fired raw/ fritted glaze for Type 2 except for the resting surface (bottom rim) of the hollow ware which is cleanable and retains this quality. In addition, the resting surface of items other than hollowware shall be non-abrasive in texture.

5.3.1 The glazed surface shall be even, free from defects, namely, craze, speck, crawling, patches, finger prints and pin holes, and shall comply with the requirements of visual assessment as prescribed in Annex A.

5.3.1.1 The pin hole shall be determined by applying a dye-based fountain pen ink on the surface of the article under test. Allow it to dry. Wipe out the ink from the article with a wet cloth and observe the spot, wherever ink stains have remained.

5.4 Warpage

5.4.1 *Out-of-Roundness*

The out-of-Roundness of various items of porcelain crockeryware shall not exceed 0.5 mm on the nominal diameter when measured in accordance with the method prescribed in 7.1 of IS 14179.

5.4.2 *Edge- Warpage and Slope of Flatware*

The edge-warpage and slope of the flatware shall not exceed 1.0 mm and 2° respectively when measured in accordance with the method prescribed in 7.2 of IS 14179.

5.4.3 *Flatness of Dinner Plate*

The eating surface of the dinner plate shall be flat within 2 mm total indicator run out when measured in accordance with the method prescribed in 7.3 of IS 14179.

5.5 Release of Lead and Cadmium (Toxic Elements)

The limits of release of lead (Pb) and cadmium (Cd) extracted from porcelain crockeryware shall not exceed the following limits when tested as prescribed in IS 9806:

<i>Type of Ware</i>	<i>Minimum Number of Specimen</i>	<i>Unit</i>	<i>Lead Limit</i>	<i>Cadmium Limit</i>
Flatware	4	mg/dm ²	0.8	0.07
Large hollowware	4	mg/l	1.0	0.25
Small hollowware	4	mg/l	2.0	0.50
Cups and Mugs	4	mg/l	0.5	0.25
Storage hollowware	4	mg/l	0.5	0.25
Cookingware	4	mg/l	0.5	0.05

NOTE—Flatware shall constitute a minimum source of lead or cadmium burden from porcelain articles. Limits for flatware (lead or cadmium) refer to the values obtained when the individual values of the pieces tested are averaged. All other limits are expressed in Absolute maximum values, in that, no individual unit comprising a sample exceeds these levels.

5.6 Thermal Shock Resistance

All items of porcelain crockeryware shall withstand a thermal shock of 120°C for five cycles for Type 1 and 150°C for three cycles for Type 2 when tested in accordance with the method prescribed in 13 of IS 14179.

5.7 Water Absorption

The water absorption of all items of porcelain crockeryware when tested in accordance with the method prescribed in 10 of IS 14179 shall be less than 0.3 percent.

5.8 Impact Strength and Chipping Resistance

The impact strength and chipping resistance of the various items of porcelain crockeryware when tested in accordance with the method prescribed in 9 of IS 14179 shall be as prescribed below:

<i>Items of Crockeryware</i>	<i>Impact Strength, Min</i>		<i>Chipping Resistance, Min</i>	
	Nm		Nm	
	Type 1	Type 2	Type 1	Type 2
Cup, mug, sugar pot, milk pot, tea pot, coffee pot and bowl	0.22	0.25	—	—
Flatware	0.25	0.30	0.22	0.28

6.9 Resistance to Detergents

When tested- by the method prescribed in 11 of IS 14179, the test article shall not show any loss of gloss of the glaze when compared with the untested test specimen.

6.10 Resistance to Citric Acid

When tested by the method prescribed in 12 of IS 14179, the test article shall not show any loss of gloss of the glaze when compared with the untested test specimen.

6.11 Craze Resistance

When tested in accordance with 8 of IS 14179, the articles of the crockeryware shall show no crazing after undergoing three cycles for Type 1 and five cycles for Type 2.

7 MARKING AND PACKING

7.1 Marking

Each item of porcelain crockeryware shall be indelibly and legibly marked on its bottom surface with its source of manufacture.

7.1.1 In addition to the above, each package shall be marked with the following particulars:

- a) Indication of the source of manufacture;
- b) Description of the items;

- c) Quantity;
- d) Batch number and lot number;
- e) Grade and type;
- t) Decoration quality number, if any; and
- g) Month and year of manufacture.

7.1.2 BIS Certification Marking

The packages may also be marked with the Standard Mark.

7.1.2.1 The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the Bureau of Indian Standards Act, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the standard mark.

7.2 Packing

The crockeryware shall be packed as agreed to between the purchaser and the supplier.

8 SAMPLING

Representative samples of the porcelain crockeryware shall be drawn in accordance with 4 of IS 14179.

ANNEX A

(Clauses A-1, A-2 and A-2.1)

VISUAL ASSESSMENT FOR GRADING OF PORCELAIN CROCKERYWARE

A-1 GENERAL

Visual assessment for grading of porcelain crockeryware is done on the basis of the nature, number and distribution of the defects in the final ware in respect of its appearance, finish and decoration as given in Table 1.

A-2 ASSESSMENT AND GRADING

A-2.1 Any item of the porcelain crockeryware having not more than 4 defects out of first thirteen characteristics as stipulated in Table 1.

Table 1 Classification of Defects Porcelain Crockeryware

(Clauses A-1, A-2 and A-2.1)

Sl No.	Characteristic	Earthenware Crockeryware
(1)	(2)	(3)
i)	Pin holes a) Body	2up to 0.8 mm
ii)	b) Glaze	10upto 1.0 mm
	Grog a) Surface b) Bottom	Nil 2 up to 0.8 mm
iii)	Iron specks and colour specks on glaze/body a) White glaze	1 up to 1.0 mm

	b) Colour glaze	3 up to 1.0 mm
iv)	Clay particle	
	a) Surface	1 up to 2.0 mm
	b) Handle	4 up to 2.0 mm
v)	Cracks, lengthwise	
	a) Surface	Nil
	b) Bottom	1 up to 0.8 mm (thickness 10 percent of the thickness of the item)
	c) Handle	Nil
vi)	Handle replacement	Handle replacement
vii)	Chips	
	a) Rim	Nil
	b) Bottom	1 up to 0.8 mm
viii)	Uneven glaze	
	a) White	Nil
	b) Colour	10 percent
ix)	Glaze cut	
	a) Surface	Nil
	b) Bottom	1 up to 3.0 mm
x)	Off glaze	
	a) Rim	1 up to 0.5 mm
	b) Surface	2 up to 0.5 mm
	c) Bottom	3 upto 1.0 mm
xi)	Blister	Nil
xii)	Droper	1 upto 3.0 mm
xiii)	Glaze grinding mark	1 up to 0.8 mm
xiv)	Scuming	Nil
xv)	Loss of sound	Nil
xvi)	Decoration	Nil
xvii)	Burning decoration	Nil
xviii)	Off decoration	Nil

Note more than four in a cluster
