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Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

IS 6988 (2002): Fine (Bone) China Crockeryware [CHD 9: Ceramicware]
Indian Standard
FINE (BONE) CHINA CROCKERYWARE — SPECIFICATION
(Second Revision)

ICS 81.060.20; 97.040.60

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

August 2002

Price Group 3
FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by Ceramicware Sectional Committee had been approved by the Chemical Division Council.

This standard was originally published in 1973 and subsequently revised in 1994. In this revision, the limits for release of lead and cadmium have 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 non-tariff 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. 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)'.

The composition of the Committee responsible for the preparation of this standard is given in Annex B.

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 : 1960 'Rules for rounding off numerical values (revised)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.
Indian Standard
FINE (BONE) CHINA CROCKERYWARE —
SPECIFICATION
(Second Revision)

1 SCOPE
This standard prescribes the requirements, and
methods of sampling and test for fine (bone) china
crockeryware.

2 REFERENCES
The following Indian Standards contain provisions
which, through reference in this text, constitute
provision 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:

<table>
<thead>
<tr>
<th>IS No</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>2781 : 1975</td>
<td>Glossary of terms relating to ceramicware (first revision)</td>
</tr>
<tr>
<td>9806 : 2001</td>
<td>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)</td>
</tr>
<tr>
<td>14179 : 1999</td>
<td>Methods of test for ceramic tableware</td>
</tr>
</tbody>
</table>

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 Fine (Bone) China — A white/coloured,
translucent porcelain made from a ceramic body
containing a minimum 35 percent of bone ash.

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.

4 GRADES
4.1 There shall be three grades of fine (bone) china
crockeryware, namely, Grade 1, Grade 2 and Grade 3
depending upon their visual assessment ratings
(see Annex A).

4.2 The material of all the grades shall also satisfy
the requirement prescribed in 5.

5 REQUIREMENTS
5.1 Material
It shall be a ceramic material white/coloured
containing bone ash content at least 35 percent having
low porosity high translucency and high mechanical
strength, biscuit at high temperature, glazed at
relatively lower temperature and covered with a
properly matured fritted soft 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
5.2.0 General
All items of crockeryware in a set shall generally be
of a matching design, colour and decoration.

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

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

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

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

5.2.5 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 fine (bone) china
crockeryware shall be covered by a uniform,
continuous, smooth, glossy impervious and fritted
glaze 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 hollow ware 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 stain have remained.

5.4 Warpage

5.4.1 Out-of-roundness

The out-of-roundness of various items of fine (bone) china crockeryware of Grade 1, Grade 2 and Grade 3 shall not exceed the following limits on the nominal diameter when measured in accordance with the method prescribed in 7.1 of IS 14179.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Limit, percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>3</td>
<td>0.8</td>
</tr>
</tbody>
</table>

5.4.2 Edge-warpage and Slope of Flatware

The edge-warpage and slope of the flatware of Grade 1, Grade 2, and Grade 3 shall not exceed the following limits when measured in accordance with the method prescribed in 7.2 of IS 14179.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Warpage, mm</th>
<th>Slope, °</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.5</td>
<td>1.5</td>
</tr>
<tr>
<td>2</td>
<td>1.0</td>
<td>1.5</td>
</tr>
<tr>
<td>3</td>
<td>1.5</td>
<td>1.5</td>
</tr>
</tbody>
</table>

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 limit of release of lead (Pb) and cadmium (Cd) extracted from fine (bone) china crockeryware shall not exceed the following limits when tested as prescribed in IS 9806.

<table>
<thead>
<tr>
<th>Type of Ware</th>
<th>Minimum Number of Specimen Lead</th>
<th>Cadmium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flatware</td>
<td>4 mg/dm² 0.8 0.07</td>
<td></td>
</tr>
<tr>
<td>Large hollowware</td>
<td>4 mg/l 1.0 0.25</td>
<td></td>
</tr>
<tr>
<td>Small hollowware</td>
<td>4 mg/l 2.0 0.50</td>
<td></td>
</tr>
<tr>
<td>Cups and mugs</td>
<td>4 mg/l 0.5 0.25</td>
<td></td>
</tr>
<tr>
<td>Storage hollowware</td>
<td>4 mg/l 0.5 0.25</td>
<td></td>
</tr>
<tr>
<td>Cooking-ware</td>
<td>4 mg/l 0.5 0.05</td>
<td></td>
</tr>
</tbody>
</table>

NOTE — Flatware shall constitute a minimum source of lead or cadmium burden from porcelain articles. Limits for flatware (lead or cadmium) refer to the value 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 crockeryware shall withstand a thermal shock of 120°C for five cycles when tested in accordance with the method prescribed in 13 of IS 14179.

5.7 Water Absorption

The average water absorption of the fine (bone) china crockeryware, when tested in accordance with the method prescribed in 10 of IS 14179, shall be less than 0.2 percent and the individual value shall not exceed 0.4 percent.

5.8 Impact Strength and Chipping Resistance

The impact strength and chipping resistance of the various items of fine (bone) china crockeryware, when tested in accordance with the method prescribed in 9 of IS 14179, shall be as prescribed below:

<table>
<thead>
<tr>
<th>Item of Crockeryware</th>
<th>Impact Strength, Min Nm</th>
<th>Chipping Resistance, Min Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cup, mug, sugar pot, milk pot, tea pot, coffee pot and bowl</td>
<td>0.30</td>
<td>0.20</td>
</tr>
<tr>
<td>Flatware</td>
<td>0.35</td>
<td>0.20</td>
</tr>
</tbody>
</table>

5.9 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.

5.10 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.

5.11 Crazing Resistance

When tested in accordance with 8 of IS 14179, the articles of the crockeryware shall show no crazing after undergoing five cycles.

6 MARKING AND PACKING

6.1 Marking

Each item of fine (bone) china crockeryware shall be indelibly and legibly marked with on its bottom surface with its source of manufacture.
6.1.1 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;
   f) Decoration quality number, if any; and
   g) Month and year of manufacture.

6.1.2 **BIS Certification Marking**

The packages may also be marked with the Standard Mark.

6.1.2.1 The use of the Standard Mark is governed by the provision of *Bureau of Indian Standard Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

6.2 **Packing**

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

7 **SAMPLING**

Representative samples of the fine (bone) china crockeryware shall be drawn in accordance with 4 of IS 14179.

---

**ANNEX A**

*(Clauses 4.1 and 5.3.1)*

**VISUAL ASSESSMENT FOR GRADING OF FINE (BONE) CHINA CROCKERYWARE**

**A-0 GENERAL**

Visual assessment for grading of fine (bone) china 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-1 ASSESSMENT AND GRADING**

A-1.1 Any item of the fine (bone) china crockeryware having not more than 4 defects out of first thirteen characteristics of Table 1 shall be classified as Grade 1.

A-1.2 Any item of the fine (bone) china crockeryware having not more than 6 defects out of first thirteen characteristics of Table 1 shall be classified as Grade 2.

A-1.3 Any item of the fine (bone) china crockeryware having not more than 10 defects out of first thirteen characteristics of Table 1 shall be classified as Grade 3.
Table 1 Classification of Defects of Fine (Bone) China Crockeryware

(Clauses A-0, A-1.1, A-1.2 and A-1.3)

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Characteristic</th>
<th>Grade 1</th>
<th>Grade 2</th>
<th>Grade 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>i)</td>
<td>Pin holes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Body</td>
<td>2 up to 0.8 mm</td>
<td>3 up to 0.8 mm</td>
<td>4 up to 1.0 mm</td>
</tr>
<tr>
<td></td>
<td>b) Glaze*)</td>
<td>10 up to 1.0 mm</td>
<td>15 up to 1.0 mm</td>
<td>20 up to 1.0 mm</td>
</tr>
<tr>
<td>i)</td>
<td>Grog</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Surface</td>
<td>Nil</td>
<td>1 up to 0.8 mm</td>
<td>3 up to 1.0 mm</td>
</tr>
<tr>
<td></td>
<td>b) Bottom</td>
<td>2 up to 0.8 mm</td>
<td>4 up to 1.0 mm</td>
<td>6 up to 1.0 mm</td>
</tr>
<tr>
<td>ii)</td>
<td>Iron specks and colour specks on glaze/body</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) White glaze</td>
<td>1 up to 1.0 mm</td>
<td>2 up to 1.0 mm</td>
<td>4 up to 1.5 mm</td>
</tr>
<tr>
<td></td>
<td>b) Colour glaze</td>
<td>3 up to 1.0 mm</td>
<td>4 up to 1.5 mm</td>
<td>6 up to 1.5 mm</td>
</tr>
<tr>
<td>iv)</td>
<td>Clay particles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Surface</td>
<td>1 up to 2.0 mm</td>
<td>3 up to 2.0 mm</td>
<td>4 up to 3.0 mm</td>
</tr>
<tr>
<td></td>
<td>b) Handle</td>
<td>4 up to 1.0 mm</td>
<td>6 up to 1.0 mm</td>
<td>8 up to 1.0 mm</td>
</tr>
<tr>
<td>v)</td>
<td>Cracks, lengthwise</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Surface</td>
<td>Nil</td>
<td>2 up to 1.0 mm (thickness 10 percent of the thickness of the item)</td>
<td>2 up to 2.0 mm</td>
</tr>
<tr>
<td></td>
<td>b) Bottom</td>
<td>1 up to 0.8 mm (thickness 10 percent of the thickness of the item)</td>
<td>2 up to 1.0 mm (thickness 15 percent of the thickness of the item)</td>
<td>3 up to 2.0 mm (thickness 20 percent of the thickness of the item)</td>
</tr>
<tr>
<td></td>
<td>c) Handle</td>
<td>Nil</td>
<td>10 percent of the total area between body and handle joining portion and up to 1 mm depth</td>
<td>20 percent of the total area between body and handle joining portion and up to 1 mm depth</td>
</tr>
<tr>
<td>vi)</td>
<td>Handle replacement</td>
<td>5 percent as per design</td>
<td>10 percent as per design</td>
<td>20 percent as per design</td>
</tr>
<tr>
<td>vii)</td>
<td>Chips</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Rim</td>
<td>Nil</td>
<td>2 up to 0.8 mm</td>
<td>3 up to 1.0 mm</td>
</tr>
<tr>
<td></td>
<td>b) Bottom</td>
<td>1 up to 0.8 mm</td>
<td>2 up to 0.8 mm</td>
<td>3 up to 1.0 mm</td>
</tr>
<tr>
<td>viii)</td>
<td>Uneven glaze</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) White</td>
<td>Nil</td>
<td>1 up to 0.8 mm</td>
<td>2 up to 0.8 mm</td>
</tr>
<tr>
<td></td>
<td>b) Colour</td>
<td>10 percent</td>
<td>15 percent</td>
<td>20 percent</td>
</tr>
<tr>
<td>ix)</td>
<td>Glaze cut</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Surface</td>
<td>Nil</td>
<td>1 up to 3.0 mm</td>
<td>3 up to 3.0 mm</td>
</tr>
<tr>
<td></td>
<td>b) Bottom</td>
<td>1 up to 3.0 mm</td>
<td>2 up to 3.0 mm</td>
<td>4 up to 3.0 mm</td>
</tr>
<tr>
<td>x)</td>
<td>Off glaze</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Rim</td>
<td>1 up to 0.5 mm</td>
<td>2 up to 0.5 mm</td>
<td>3 up to 0.5 mm</td>
</tr>
<tr>
<td></td>
<td>b) Surface</td>
<td>2 up to 0.5 mm</td>
<td>3 up to 0.5 mm</td>
<td>4 up to 0.5 mm</td>
</tr>
<tr>
<td></td>
<td>c) Bottom</td>
<td>3 up to 1.0 mm</td>
<td>4 up to 1.0 mm</td>
<td>6 up to 1.0 mm</td>
</tr>
<tr>
<td>xi)</td>
<td>Blister</td>
<td>Nil</td>
<td>2 up to 3.0 mm</td>
<td>4 up to 3.0 mm</td>
</tr>
<tr>
<td>xii)</td>
<td>Dropper</td>
<td>1 up to 3.0 mm</td>
<td>2 up to 3.0 mm</td>
<td>4 up to 3.0 mm</td>
</tr>
<tr>
<td>xiii)</td>
<td>Glaze grinding mark</td>
<td>1 up to 0.8 mm</td>
<td>2 up to 1.0 mm</td>
<td>2 up to 2.0 mm</td>
</tr>
<tr>
<td>xiv)</td>
<td>Scumming</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>xv)</td>
<td>Loss of sound</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>xvi)</td>
<td>Decoration misplacement</td>
<td></td>
<td>10 percent</td>
<td>30 percent</td>
</tr>
<tr>
<td>xvii)</td>
<td>Burning decoration</td>
<td>Nil</td>
<td>Nil</td>
<td>10 percent</td>
</tr>
<tr>
<td>xviii)</td>
<td>Off decoration</td>
<td>Nil</td>
<td>Nil</td>
<td>15 percent</td>
</tr>
</tbody>
</table>

*) Not more than four in a cluster.
ANNEX B

(Foreword)

COMMITTEE COMPOSITION

Ceramicware Sectional Committee, CHD 9

Organizations
Central Glass & Ceramic Research Institute, Ahmedabad
All India Pottery Manufacturers' Association, Kolkata
Bharat Heavy Electricals Limited, Bangalore
Central Glass & Ceramic Research Institute, Kolkata
Chemicals & Allied Products Export Promotion Council, Kolkata
Controller of Quality Assurance, Kanpur
Development Commissioner (SSI), New Delhi
E.I.D. Parry (India) Limited, Chennai
Export Inspection Council of India, New Delhi
Excel Frits & Colours Limited, Kolkata
Geological Survey of India, Kolkata
H.R. Johnsons India Limited, Mumbai
Hindustan Sanitaryware and Industries Limited, Bahadurgarh
Hitkari Potteries Limited, Faridabad
Hotel & Restaurant Association of India, New Delhi
Indian Institute of Ceramics, Kolkata
Industries Commissioner, Government of Gujarat, Gandhi Nagar
Madhusudan Ceramics Ltd, Mehsana
Ministry of Industry, Department of Industrial Development, New Delhi
Ministry of Defence (Defence Materials and Stores Research & Development Establishment), Kanpur
National Test House, Kolkata
Porcelain Enameller's Association, Kolkata
Rajasthan State Mineral Development Corporation Limited, Jaipur
Research, Designs & Standards Organization, Lucknow
West Bengal Ceramic Development Corporation Limited, Kolkata
Welcome Group, Maurya Sheraton Hotel, New Delhi
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SHRI A. K. JOSHI (Alternate)
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(DSC-SS)
SHRI A. K. ROY
SHRI TAPAS DUTTA (Alternate)
Representative
SHRI S. K. CHAUDHURI, Director & Head (Chem)
[Representing Director General (Ex-officio)]
Bureau of Indian Standards

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This Indian Standard has been developed from Doc : No. CHD 9 (925).

Amendments Issued Since Publication

<table>
<thead>
<tr>
<th>Amend No.</th>
<th>Date of Issue</th>
<th>Text Affected</th>
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</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

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