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भारतीय मानक मसौदा

पीने योग्य पानी के लिए प्लास्टिक की बोतलें — विशिष्टि

(IS 8688 *का तीसरा पुनरीक्षण*)

Draft Indian Standard

PLASTICS BOTTLES FOR POTABLE WATER — SPECIFICATION

(*Third Revision of* IS 8688)

(ICS 55.120)

Plastics Packaging Sectional Committee, PCD 21	Last date for receipt of comment is **24th June 2025**

FOREWORD

(*Formal clauses to be added later*)

This standard was last published in 2004. This revision has been brought out to incorporate editorial alignment and compliance with various applicable regulations. The major modifications in this revision are:

a. Requirement of material for bottle as well as closures have been modified;
b. Limits on specific migration as per Food Safety and standard (Packaging) Regulations, 2018 has been incorporated;
c. Marking and packing clause has been modified based on the latest requirement;
d. Requirement of mass of the bottle has been deleted; and
e. Requirement of Pendulum Impact Test has been incorporated.

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

1.1 This standard prescribes the requirements and methods of sampling and test for plastics bottles used for carrying/strong drinking water.

1.2 This standard does not include plastics insulated bottles.

2 REFERENCES

The standards listed in Annex A 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 listed in Annex A.

3 TERMINOLOGY

For the purpose of this standard the determinations given in IS 7408 (Part 1) and IS 7019 shall apply.

4 REQUIREMENTS

4.1 Material

4.1.1 *Bottles*

The material used for water bottle shall be made of either Poly(ethylene Terephthalate) or Polypropylene. Poly(ethylene Terephthalate) (PET) shall comply with IS 12252 and IS 13193. Polypropylene (PP) used shall comply with IS 10954.

> NOTE — Recycled/ reprocessed versions of above material are permitted for which standards and guidelines are notified by FSSAI may be used for food contact applications. Additionally, such recycled plastic materials should conform to provisions and parameters relevant to food contact applications as specified under the standard IS 14534.

4.1.2 *Closure materials*

The bottle shall be provided with a closure which shall be made either of:

a) Stainless steel complying with IS 15997;
b) Plastic such as high-density polyethylene (HDPE), PET, polypropylene (PP) or ABS or it's combination with any other suitable plastic material;
c) Combination of plastics and steel may also be used.

NOTE — Recycled/ reprocessed versions of above material are permitted for which standards and guidelines are notified by FSSAI may be used for food contact applications. Additionally, such recycled plastic materials should conform to provisions and parameters relevant to food contact applications as specified under the standard IS 14534.

4.1.3 Pigments and colourants used, if any, in the bottle or closure, shall conform to the limits and tolerances prescribed in IS 9833.

4.1.4 The hanging cord or straps, if provided, shall be of a flexible material which is not affected by water.

4.2 Capacity

4.2.1 The bottles shall be manufactured in normal capacity of 500 ml, 750 ml, 1 000 ml and 1 500 ml or any other capacity as agreed to between the purchaser and the supplier.

4.2.2 The Brimful capacity should be higher than nominal capacity. The tolerance on the nominal capacity shall be ± 5 percent. The brimful capacity shall be determined by the method prescribed in clause **5** of IS 2798.

4.3 Design

The bottle design shall be such that it is stable when kept in vertical position. The shape of the bottle shall be as agreed to between the purchaser and the supplier.

4.4 Neck Size

The neck shall be as agreed between buyer and purchaser.

4.5 Cup

The bottle may be provided with a drinking cup, which shall fit on to the bottle neck.

4.6 Hanging Cord or Strap

A flexible hanging cord or strap to hang the bottle on shoulder or peg may be provided with the bottle. It may be hinged or strapped to the body or Neck /Cap of the bottle.

4.7 Workmanship and Finish

The bottle shall be manufactured in accordance with good manufacturing practices. These shall be free from manufacturing defects such as foreign particles, burnt, oxidised or unhomogenised matter, flash, rocking bottom, sharp edges, dirt or dust particles, etc. The bottles shall be free from any unpleasant odour.

4.8 Dimensions

The height and diameter of the bottle shall be as agreed to between the purchaser and the supplier. The tolerance on agreed dimensions shall be as follows:

a) Up to and including 100 mm	± 1.5 mm
b) Over 100 mm and up to 200 mm	± 2.0 mm
c) Over 200 mm	± 2.5 mm

4.9 Overall Migration

The limit of overall migration with water when tested as prescribed in IS 9845 shall not exceed overall migration limit of 60 mg/l of simulant and 10 mg/dm^2 of the surface of the container with no visible colour migration. In the case of coloured plastic material, colour migrated into the simulant shall not be apparent to the naked eye (see IS 9833). If the colour migrated is clearly visible, such materials are not suitable, even though the extractive value is within the overall migration limit.

4.10 Specific Migration

4.10.1 The specific migration is tested to determine the quantity of a specific substance that can migrate from a food packaging material or food container into food. Specific migration limits are usually expressed as mg/kg food.

4.10.2 The sample/simulants shall be prepared using the procedure described in IS 9845. The testing for detection of toxic substances shall be carried out as per method given in Table 1.

4.10.3 The limit of specific migration of all toxic substances when tested as prescribed in col (4) of Table 1 shall not release the substances in quantities exceeding the specific migration limits listed under Table 1.

Table 1 Specific Migration Limits
(*Clauses* 4.10.2 *and* 4.10.3)

Sl. No.	Toxic substances	Migration Limit, Maximum, mg/kg	Test Method
(1)	(2)	(3)	(4)
i)	Barium	1.0	IS 3025 (Part 2)
ii)	Cobalt	0.05	-do-
iii)	Copper	5.0	-do-
iv)	Iron	48.0	-do-

v)	Lithium	0.6	-do-
vi)	Manganese	0.6	-do-
vii)	Zinc	25.0	-do-
viii)	Antimony	0.04	-do-
ix)	Phthalic acid, Bis(2-ethylhexyl) Ester (DEHP)	1.5	ISO 18856

4.11 Closure Leakage Test

The bottle shall be filled to its nominal capacity with coloured water at ambient temperature and closed rightly with cap. The stopper plug, where provided shall be pressed tight in position and the cap shall be fitted tight by hand. The fitted bottle shall be kept in vertically inverted position over a piece of blotting paper for a period of 30 min. At the end of the test, the closure shall not show any leakage of water.

4.12 Drop Impact Test

The container when subjected to the drop test by the method described in **8** of IS 2798 shall show no sign of rupture or leakage from the walls of the container. Slight deshaping of the body shall not render the container unacceptable in the test.

4.13 Hanging Cord/Strap Strength Test

The hanging cord/strap shall be able to support the mass equal to 3 times the mass of filled bottle for 10 min without breaking. The elongation under load shall not exceed 10 percent of the total length of the cord. Initial stretching due to unwinding of the cord shall not be taken as elongation for the purpose of calculation.

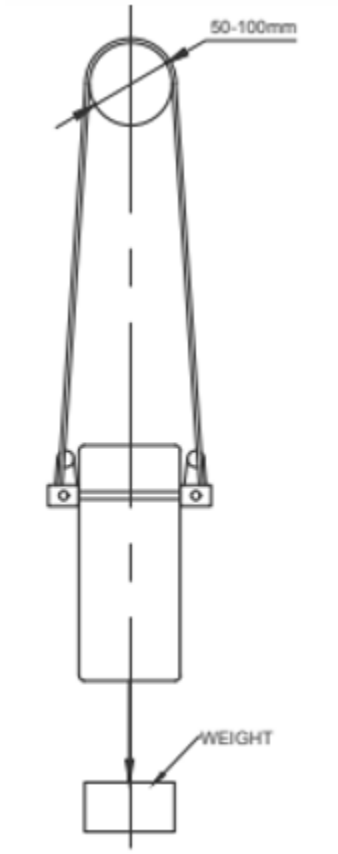

FIG 1. TEST FOR THE SHOULDER STRAP

4.14 Pendulum Impact Test

4.14.1 Fill water in the bottle up to its full capacity at the normal temperature. Raise the bottle to the position of 45° by making the length of the shoulder strap 400 mm. Make the bottle collide with a hard wood board of 30 mm or more in thickness fixed vertically. Typical arrangement for test is shown in Fig. 2

4.14.2 The bottle shall be free from defects which are harmful to use. There shall be no crack or water leakage.

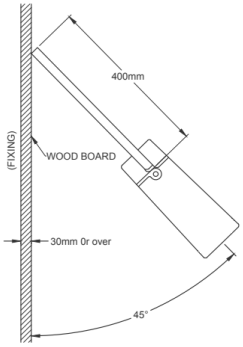

Fig 2

5 WATER POTABILITY TEST

Potable water stored in the bottle for 72 h shall not acquire any unpleasant odour or bitter taste or shall not impair the health when tested according to the method prescribed in Annex B.

6 MARKING AND PACKING

6.1 Each bottle shall be marked with:

a) an identifier of its source (producer); and
b) name of material along with its recycling symbol (as required by IS 14534).

6.2 Each plastic closure shall be marked with:

a) an identifier of its source (producer); and
b) name of material along with its recycling symbol (as required by IS 14534).

6.3 BIS Certification Marking

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.

6.4 Secondary Packaging for Bottles/Closures

6.4.1 Packing slip in each consignment shall include:

a) nominal capacity (only for bottles);
b) batch no. or code no. (for bottles and closures); and
c) quantity (for bottles and closures).

7 SAMPLING

The samples of thee bottle shall be drawn and the criteria for conformity determined as prescribed in Annex C.

ANNEX A
(*Clause* 2)
LIST OF REFERRED STANDARDS

IS No.	*Title*
IS 2798 : 1998	Methods of test for plastics containers (*first revision*)
IS 4905: 2015/ ISO 24153 : 2009	Random sampling and randomization procedures (*first revision*)
IS 7019 : 1998	Glossary of terms in plastics and flexible packaging, excluding paper (*second revision*)
IS 7408 (Part 1) : 2000	Blow moulded polyolefin containers — Specification: Part 1 Up to 5 litres capacity (*second revision*)

IS 7511 (Part 4) : 1986	Dimensions for neck finishes: Part 4 Roll on threads pilferproof (*first revision*)
IS 9833 : 2018	List of colourants for use in plastics in contact with foodstuffs and pharmaceuticals (*second revision*)
IS 9845 : 1998	Determination of overall migration of constituents of plastics materials and articles intended to come in contact with foodstuffs — Method of analysis (*second revision*)
IS 10146 : 1982	Specification for polyethylene for its safe use in contact with foodstuff, pharmaceuticals and drinking water
IS 10151 : 2019	Polyvinyl chloride (PVC) and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water — Specification (*first revision*)
IS 10910 : 1984	Specification for polypropylene and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
IS 12252 : 2017	Polyalkylene terephthalates (PET and PBT), their copolymers and list of constituents in raw materials and end products for their safe use in contact with foodstuffs and pharmaceuticals (*first revision*)
IS 14534 : 2023	Plastics — Recovery and recycling of plastics waste — Guidelines (*second revision*)
IS 15997 : 2012	Low nickel austenitic stainless steel plate, sheet, and strip for utensils and kitchen appliances — Specification
IS 3025 (Part 2) : 2019/ ISO 11885 : 2007	Methods of sampling and test (Physical and Chemical) for water and wastewater: Part 2 Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP — OES) (*first revision*)

ANNEX B
(*Clause* 5)
METHOD OF TEST FOR POTABILITY OF WATER STORED IN PLASTICS BOTTLES

B-1 GENERAL

B-1.1 Odour of water, though very important cannot be determined in absolute units. Olfactory sense, which is most sensitive means of detecting small concentration of oditerous substances, lacks precision and mathematical expression nevertheless a quantitative test is prescribed.

B-1.2 The water for testing shall be clear and fresh free from any suspended or dissolved impurities, if necessary it may be filtered before storage.

B-2 PROCEDURE

Heat the water to a temperature of (38 ± 2) °C and fill the bottles to its nominal capacity and close tightly with the cap. Keep the bottles at (38 ± 2) °C for a period of 72 h at ambient temperature.

B-3 OBSERVATIONS

At the end of 72 h the water shall not give any unpleasant odour or taste. Any visible fungus growth in water shall render the bottle material unfit for use.

ANNEX C
(*Clause* 7)

SAMPLING OF PLASTICS POTABLE WATER BOTTLE

C-1 SCALE OF SAMPLING

C-1.1 Lot

In any consignment all the bottles of the same material and drawn from 1 single batch of manufacture shall be grouped together to constitute a lot.

C-1.2 Scale of Sampling

For ascertaining the conformity of the lot to the requirements of this standard, tests shall be carried out for each lot separately. The number of bottles to be sampled from a lot shall be in accordance with Table 1.

C-1.3 The bottles shall be selected at random from the lot. To ensure the randomness of selection methods given in IS 4905 may be followed.

C-2 CRITERIA FOR CONFORMITY

C-2.1 Visual Examination

The sample bottles selected as per col (2) of Table 2 shall be examined for workmanship and finish (*see* **4.7**). Any bottle failing in one or more of the requirements shall be termed as detective. The lot shall be accepted under this head, if the number of detective bottles in sample does not exceed the acceptance number given in col (3) of Table 2.

C-2.2 Brimful Capacity and Bottles Mass

For the purpose of above tests five bottles for lot size up to 5 000 and 10 bottles for lot size above 5 000 shall be selected at random from the samples already drawn according to **C-1.3**. Each of the samples bottles shall be subjected to tests for brimful capacity (*see* **4.2.2**). There shall be no failure if the lot is to be accepted under this clause.

C-2.3 Test for Closure Leakage and Hanging Cord Strap Strength

The samples bottles drawn according to lot 4 of Table 2 shall be tested for closure leakage test (*see* **4.11**) and hanging cord/strap strength (*see* **4.13**). Any bottle showing leakage, crack or permanent buckling when subjected to tests shall be taken as defective. The number of defectives shall not

exceed the acceptance number given in col 5 of Table 2, for the lot to be accepted as conforming to specifications.

C-2.4 Drop Impact Test

C-2.4.1 For lot size up to 3 000, the sampling shall be as follows:

Take a total sample of sixteen bottles at random from a lot. Divide this sample into two sets of eight each, designated as Set 1 and Set 2. Leakage of water through cracks and closures after the test shall be considered as a defect. However, slight denting shall not be taken as failure of the bottle in the test.

C-2.4.1.1 Each bottle of Set 1 shall be subjected to the drop impact test. If none of the bottles fail in the test, the lot shall be accepted. If only one bottle is found defective, the test shall be repeated on the second set of bottles (*see* **C-2.4.1**) otherwise the lot shall be rejected.

C-2.4.1.2 If in the second set none of the bottles are found defective then the lot shall be accepted as containing to specification.

C-2.4.2 For lot size greater than 3 000 the sampling criteria shall be as follows:

Take a total samples of size twenty-six bottles taken at random from a lot. Divide the sample into two sets of thirteen each designated as Set 1 and Set 2.

C-2.4.2.1 Each bottle lot Set 1 shall be subjected to the drop impact test. If none of the bottles are found defective the lot shall be accepted. If up to two bottles fail in the test of set 1, the test shall be repeated on the second set (*see* **C-2.4**). If the number of defectives in the testing of any individual set is three or more the lot shall be rejected.

C-2.4.2.2 If the total number of bottles found defective in the first and the second set combined is four or more the lot shall be rejected, else accepted as conforming in specifications.

C-2.5 Dimensions and Overall Migration

The sub sample of size given in col (6) of Table 2 shall be subjected to tests for dimensions (*see* **4.8**) and overall migration (*see* **4.9**). No failures shall occur for acceptance of the lot under this clause.

Table 2 Scale of Sampling and Acceptance Number
(*Clauses* C-1.2, C-2.1, C-2.3 *and* C-2.5)

Sl. No.	**Lot Size**	**For Visual Examination** (*see* **4.8** and **4.9**)		**For Tests** (*see* **4.3.1** and **4.3.3**)		**No of Samples for Dimensions and Overall Migration**
			Acceptance		Acceptance	

		Sample Size	Number	Sample Size	Number	(*see* **4.8** and **4.9**)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Up to 500	13	1	5	0	2
ii)	501 to 1 000	20	2	8	0	2
iii)	1 001 to 3 000	32	3	13	0	2
iv)	3 001 to 5 000	50	5	20	1	3
v)	5 001 and above	80	7	32	2	5