इंटरनेट मानक

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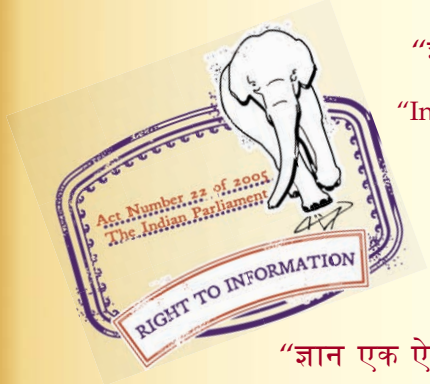
IS 7231 (1994): plastic flushing cisterns for waterclosets and urinals [CED 3: Sanitary Appliances and Water Fittings]



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"Knowledge is such a treasure which cannot be stolen"

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(दूसरा पुनरीक्षण)

Indian Standard

PLASTIC FLUSHING CISTERNS FOR WATER-CLOSETS AND UNRINALS — SPECIFICATION

(Second Revision)

First Reprint OCTOBER 2004

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

June 1994

Price Goup 5

AMENDMENT NO. 1 MARCH 2002
TO
IS 7231 : 1994 PLASTIC FLUSHING CISTERNS FOR WATER-CLOSETS AND URINALS — SPECIFICATION

(Second Revision)

(*Page* 6, *clause* **12.1.1**) — Delete the Note in the end.

(*Page* 6, *clause* **12.1.1**) — Insert the following clauses after clause **12.1.1**:

'**12.2** Where short flush and full flush are operated by a knob, the instructions given in **12.1.1** will not be applicable. Following operating instructions shall be followed.

12.2.1 Each cistern shall incorporate a dual control method of operation that is, one initiating a full flush and the other initiating a half flush.

Discharge capacities shall be as follows:

a) Full flush — 10 ± 0.5 litres

b) Half flush — 5 ± 0.5 litres

NOTE — Details of dual flush system in a cistern with knob are given in Fig. 3. It may however be noted that this figure is a typical illustration only. Dual control may be operated by two top buttons, two handles/knobs on the front side, two concentric but separate handles or any other device in which one knob/handle actuates the full flush and the other knob/handle actuates the half flush.

AMENDMENT NO. 2 JULY 2004
TO
IS 7231 : 1994 PLASTIC FLUSHING CISTERNS FOR WATER-CLOSETS AND URINALS — SPECIFICATION

(Second Revision)

(*Second cover page, Foreword*) — Insert the following new para at the end:

'Two years from the date of publication of this amendment, single flush cistern will be withdrawn from the scope of this standard.'

(*Page* 3, *Table* 1, *col* 4, *Sl No.* 2) — Delete 'IS 4984 : 1987' and 'IS 4985 : 1988'.

(*Page* 5, *clause* **7.5**) — Insert the following at the end of the clause:

'Dual flush cistern of 6/3 litre capacity shall discharge 6 ± 0.5 litres and alternatively a half flush of 3 ± 0.5 litres.'

(*Page* 5, *clause* **7.6**, *line* 3) — Substitute 'within' *for* 'in' at both the places.

(*Page* 5, *clause* **7.6**, *line* 5) — Insert the following after the word 'litres':

'and 6 ± 0.5 litres within 6 s and 3 ± 0.5 litres within 3 s for cisterns of capacity 6/3 litres.'

(*Page* 5, *clause* **7.6**, *line* 8) — Delete 'For dual-flush type cisterns, there is no specified rate of discharge for the short flush.'

(*Page* 6, *clause* **9.2**, *line* 8) — Insert the following after the word 'litres':

'and 6/3 litres'

(*Page* 6, *clause* **12.1**) — Insert the following at the end of the clause:

'Flushing cisterns of 6/3 litres capacity shall be used with sanitary appliances of equivalent capacity.'

[*Page* 6, *clause* **12.2.1**, *lines* 4 *and* 5, (*see also Amendment No.* 1)] — Insert 'or 6 ± 0.5 litres' after '10 ± 0.5 litres' and 'or 3 ± 0.5 litres' after '5 ± 0.5 litres'.

(CED 3)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 3 NOVEMBER 2005
TO
IS 7231 : 1994 PLASTIC FLUSHING CISTERNS FOR WATER-CLOSETS AND URINALS — SPECIFICATION

(Second Revision)

(*Page* 4, *clause* 7.2, *line* 4) — Insert the following at the end:

'Effective top edge shall be taken as edge of the top of the body without considering bead.'

(CED 3)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 4 SEPTEMBER 2006
TO
IS 7231 : 1994 PLASTIC FLUSHING CISTERNS FOR WATER-CLOSETS AND URINALS — SPECIFICATION

(Second Revision)

[*Second cover page, Foreword, last para (see also Amendment No.* 2)] — Delete 'Two years from the date of publication of this amendment, single flush cistern will be withdrawn from the scope of this standard.'

(CED 3)

Reprography Unit, BIS, New Delhi, India

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Sanitary Appliances and Water Fittings Sectional Committee had been approved by the Civil Engineering Division Council.

This standard was first published in 1974 and revised in 1984 when its scope was extend ' 'o cover dual flush type cisterns allowing a short flush of 5 litres and full flush of 10 litres.

In this second revision, apart from general updating, the four amendments issued to this standard have been incorporated.

The composition of the technical committee responsible for the formulation of this standard is given in Annex F.

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, 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

PLASTIC FLUSHING CISTERNS FOR WATER-CLOSETS AND URINALS — SPECIFICATION

(Second Revision)

1 SCOPE

This standard covers requirements for manually-operated high-level and low-level plastic flushing cisterns of capacities 5 litres and 10 litres, both single flush and dual-flush types, for water-closets, squatting pans and urinals.

2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

3 TERMINOLOGY

3.0 For the purpose of this standard, the definitions given in **3.1** to **3.4** shall apply.

3.1 High Level Cistern

A cistern intended to operate at a minimum height of 125 cm between the top of the pan and the underside of the cistern.

3.2 Low-Level Cistern

A cistern intended to operate at a height not exceeding 30 cm between the top of the pan and the underside of the cistern.

3.3 Coupled Cistern

A cistern intended to operate sitting on flat surface provided at the back portion of wash-down water-closets.

3.4 Dual-Flush Cistern

A construction that enables the user to cause a short flush of partial discharge when only urine needs to be flushed away instead of the customary full flush.

NOTE — A typical illustration showing parts of single/dual flush system in a cistern is given in Fig. 1.

4 MATERIALS

The materials for manufacturing various components of the flushing cisterns shall conform to the requirements given in Table 1.

NOTE — Where the requirements for the material of any component or the relevant Indian Standard designation for any material are not specified, these shall be as agreed to between the manufacturer and the purchaser.

5 CONSTRUCTION

5.1 Cistern

The thickness of the body including cover at any point shall not be less than 2 mm for GRP, and not less than 3 mm for other plastic materials. The cistern shall be free from manufacturing faults and other defects affecting its utility. All working parts shall be designed so as to operate smoothly and efficiently. The cistern shall be mosquito-proof. It shall be deemed to be mosquito-proof only when there is no clearance anywhere in it which would permit a 1·6 mm diameter wire to pass through. The outlet of each siphon or stand pipe or flush valve shall be securely connected to the cistern by means of a lock-nut. In the case of plastic siphon, it shall be provided with suitable means of ensuring and maintaining watertight and airtight joint to the cistern.

5.2 Cover

The cistern shall be provided with a removable cover which shall fit closely and shall be secured against displacement. In designs, where the operating mechanism is attached to the cover, the cover may be made in two sections, the section supporting the mechanism being securely fixed or booked to the body.

5.3 Flush Pipe

The flush pipe (except plastic flush pipe) shall have an internal diameter of 32 ± 1 mm for high level cistern and 38 ± 1 mm for low-level cistern. The steel flush pipe shall be not less than 1 mm thick whereas the lead flush pipe shall have a minimum thickness of 3·5 mm. For high density polyethylene pipes, the outside diameter of the pipes shall be 40 mm. For unplasticized PVC plumbing pipes the outside diameter of the pipe shall be 40 mm for high-level cisterns, and 50 mm for low-level cisterns. In the case of high-level flushing cisterns, a pipe clip fitted with a rubber buffer shall be fixed to the flush pipe to prevent damage either to the pipe or to the seat when the seat is raised. No flush pipe is required for coupled cisterns.

NOTE — The minimum thicknesses specified are for normal conditions of service. Where highly corrosive atmospheres are expected, greater thicknesses are recommended.

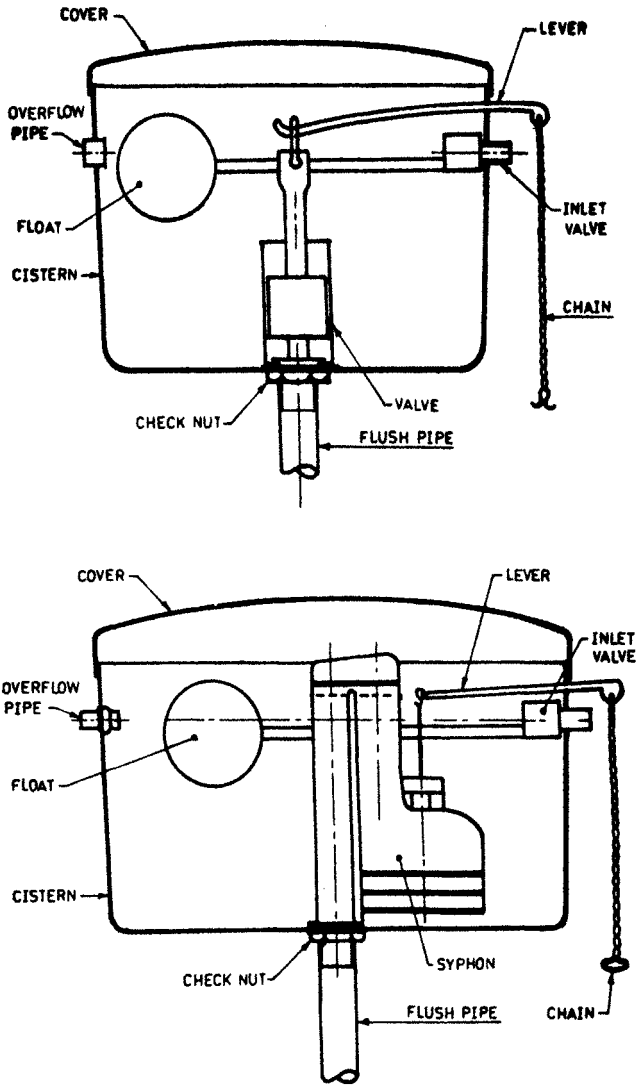

FIG. 1 TYPICAL ILLUSTRATIONS OF FLUSHING CISTERNS

Table 1 Materials for Various Components of Flushing Cisterns

(*Clause* 4)

Sl No.	Component(s)	Material	Conforming to
1.	Cisterns	High density polyethylene (HDPE)	IS 7328 : 1992
		or	
		Polystyrene, high impact	IS 2267 : 1972
		or	
		Polypropylene[1]	—
		or	
		Acrylonitrile-butadiene-styrene (ABS)	—
		or	
		Glass fibre reinforced plastic (GRP)	—
2.	Flush pipe	Steel tube, seamless or welded, medium or light, completely protected inside and outside by hot-dip galvanizing, electroplating or vitreous enamelling	IS 1239 (Part 1) : 1990
		or	
		Lead pipe	IS 404 (Part 1) : 1977
		or	
		Copper alloy tube	IS 407 : 1981
		or	IS 2501 : 1985
		High density polyethylene pipe	IS 4984 : 1987
		or	
		Unplasticized PVC plumbing pipe	IS 4985 : 1988
3.	Cover	Same material as that of the body	
4.	Chain	Hot-dip galvanized steel wires	—
		or	
		Inter-locked non-ferrous metal	
		or	
		Any other corrosion resistant material	
5.	Overflow pipe	High density polyethylene	IS 4984 : 1987
		or	
		Unplasticized PVC	IS 4985 : 1988
		or	
		Any other corrosion-resistant material	
6.	Siphon/Valve	High density polyethylene	IS 7328 : 1992
		or	
		Polystyrene, high impact	IS 2267 : 1972
		or	
		Polypropylene	
		or	
		Acrylonitrile-butadiene-styrene	—
		or	
		Glass fibre reinforced plastic (GRP)	—
7.	Operating Mechanism/ Lever	Non-ferrous metal or any other corrosion-resistant material	—
8.	Float valve	As specified in IS 1703 : 1989	
		or	
		IS 12234 : 1988	
		or	
		IS 13049 : 1991	
9.	Polyethylene float for float valve	As specified in IS 9762 : 1994	—
10.	Coupling nut and lock-nut	Non-ferrous metal,	—
		or	
		Hot-dip galvanized steel	
		or	
		Hot-dip galvanized malleable iron	
		or	
		Any other non-corrosive metal	
		or	
		Injection-moulded HDPE/Polyacetal (*see also* 5.3.1)	

[1] Talc as filler, if used, shall not exceed 20 %.

5.3.1 *Flush Pipe Connection to Cistern*

The flush pipe shall be securely connected to the cistern outlet and made airtight by means of a coupling nut. The nuts made of injection-moulded HDPE/Polyacetal may be used only if the end pipe is also made of plastic. The nominal internal diameter of the cistern outlet shall be not less than 32 mm and 38 mm for high-level and low-level cisterns respectively. The screw threads for connection to the flush pipe shall not be less than size $1\frac{1}{2}$ of IS 2643 (Part 3) : 1975. In the case of polyethylene and unplasticized PVC flush pipes, the upper end of the flush pipe shall be provided with suitable means of ensuring and maintaining a watertight and airtight joint to the flushing cistern. When ordered for use with a flush pipe, the outlet connection may be supplied with coupling nut made of copper based alloy

or other non-corrodible material and a plain tail piece having a minimum length of 60 mm. The centre of the outlet hole shall be generally central to the length of the cistern. The length of the outlet shall be 37 ± 2 mm in the case of interchangeable siphon; however, where integral siphon is provided, the outlet length shall be 20 ± 2 mm.

NOTE — The length of the cistern outlet shall be the dimension from the bottom surface of the cistern to the end of the outlet after the cistern with siphon/stand pipe has been duly fitted with all washers, lock-nuts, etc.

5.4 Inlet and Overflow Holes

The cistern shall be provided with inlet and overflow holes, situated one at each end, which shall be capable of accommodating overflow pipe of not less than 20 mm nominal bore and a 15 mm size float valve (*see* 5.5). The holes shall be cleanly moulded of drilled and the adjacent surfaces shall be smooth.

5.5 Float Valve

The float valve shall be of 15 mm nominal size and shall conform to IS 1703 : 1977 or IS 12234 : 1988 or IS 13049 : 1991.

5.6 Operating Mechanism Lever

5.6.1 The operating mechanism/lever shall not project beyond the side of the cistern for a distance greater than 350 mm measured from the centre of the cistern to the end of the lever arm. The lever arm shall be provided with a suitable hole near the end through which a split ring or S-hook can be inserted. A string (chain) shall be attached to the ring or hook. When S-hook is employed, it shall be effectively closed after assembly to prevent accidental disconnection.

5.6.2 In the case of low-level cisterns, where the mechanism is handle operated, the handle, whether situated on the front or at the end of the cistern, shall be within the projection limit as given in 5.6.1. Particular attention shall be given to the ease of operation of the handle.

5.7 String (Chain)

5.7.1 The string (chain) shall be of such a strength as to sustain a dead load of 500 N without any apparent or permanent deformation.

5.7.2 The string (chain) shall terminate in a suitable handle or pull made of a moulding in any heat-resisting and non-absorbent plastic or any other equally suitable material. The finish shall be smooth and all burrs which are liable to cause injury to the hand when gripped shall be removed.

5.8 Overflow Pipe

5.8.1 The overflow pipe shall be of not less than 20 mm nominal bore and shall incorporate a non-corrodible mosquito-proof device secured in a manner which will permit it to be readily cleaned or renewed when necessary. No provision shall be made whereby the overflow from the cistern shall discharge directly into the water-closet or soil pipe without being detected.

5.8.2 The invert of the overflow pipe in the case of high-level and low-level cisterns and the top edge of the overflow pipe in the case of coupled cistern shall be 19 mm (*Min*) above the working water level. In case of overflow due to any reason, water should drain out through the overflow pipe and not through the siphon pipe (*see also* 7.3).

6 FINISH

The surface of the cistern including cover shall be free from blisters and delamination, and reasonably free from flow lines, streaking or colour variations. The cistern and cover shall be opaque to light.

7 OPERATIONAL AND PERFORMANCE REQUIREMENTS

7.1 Flushing Arrangement

The cistern under working conditions and with the float valve in closed position shall operate on a single operation of the operating mechanism/ lever without calling for a sudden jerk in pulling. If a valve is used instead of siphon for flushing purposes, the valve shall be completely leakproof.

7.2 Working Water Level

The working water level shall be a minimum of 6·5 cm below the effective top edge of the cistern and shall be legibly and permanently marked on the inside of the cistern.

7.3 Freedom from Self Siphonage

The siphonic system shall be capable of being rapidly brought into action when the water is at the working water level, but shall not self-siphon or leak into the flush pipe when the water is up to 1 cm above the invert of the overflow pipe.

7.4 Reduced Water Level

The discharge shall operate satisfactorily when the cistern is filled to a level up to 1 cm below the working water level.

7.5 Discharge Capacity

When tested in accordance with the procedure described in **9.1**, cistern of 5 litres and 10 litres capacities, when required to give a full flush, shall respectively discharge 5 litres and 10 litres with variation of ± 0·5 litres. Dual-flush cistern of 10 litres capacity shall discharge alternatively a short flush of 5 ± 0·5 litres.

7.6 Discharge Rate

When tested in accordance with the procedure described in **9.2**, the discharge rate shall be 10 ± 0·5 litres in 6 seconds and 5 ± 0·5 litres in 3 seconds for cistern of capacities 10 litres and 5 litres respectively. The cistern shall be so designed that there is no appreciable variation in the force of the flush during the discharge of the required quantity of water. For dual-flush type cisterns, there is no specified rate of discharge for the short flush. For coupled cisterns, this test shall not be applicable.

8 SPECIAL REQUIREMENTS

8.1 Distortion Resistance Test

The cistern, complete with its fittings, shall be installed and filled as described in Annex B and observed for any distortion. The cistern shall not buldge more than 6 mm and the cover shall not be dislodged.

8.2 Dead Load Test

When the flushing mechanism incorporates chain pull or hand operated lever, the cistern, complete with its fittings, when installed and filled as described in Annex B and tested by the application of a dead load of 230 N applied 6 mm from the end of the operating lever arm for 30 seconds, shall not distort to such an extent that any part becomes detached. In the case of other operating mechanism, the dead load applied shall be a mass equivalent to the operating force required to overcome the normal hydrostatic head. Thirty seconds after the load is removed, the function and appearance of the cistern shall not be impaired.

8.3 Front Thrust Test

The front thrust test shall be applied only to cisterns intended for low-level use. The cistern, complete with its fittings, when installed and filled as described in Annex B and tested by the method described in Annex C, shall not distort to such an extent as to be inoperable or unsightly when the load is removed.

8.4 Impact Test

The cistern, complete with its fittings, when installed and filled as described in Annex D, shall show no defect after one impact.

8.4.1 Repeat the test but with the cistern empty. The cistern shall show no defect after the further impact.

9 TESTING PROCEDURE

9.0 Cisterns shall be tested in accordance with the test procedures given in **9.1**, **9.2** and **9.3**. The test in **9.1** and **9.2** may be combined in one operation, if desired.

9.1 Test for Discharge Capacity

With the water supply shut off or the cistern disconnected, and with the float valve fitted, fill the cistern with water up to the marked water line. Operate the flush mechanism and on completion of the flush, measure the quantity of water that has to be added to refill the cistern to the level of the marked water line. Alternatively, any suitable device may be used for measuring the quantity of water discharged from the cistern. The cistern should have a flush pipe fitted but need not be connected to a pan for this test.

9.2 Test for Discharge Rate

Connect the cistern to an appropriate flush pipe (*see* **9.2.1**). Fill the cistern to the water line as for the capacity test and place a vessel under the open end of the flush pipe. Operate the flush mechanism and as water appears at the open end of the flush pipe, start a stop watch. At the end of 6 seconds in the case of cistern of 10 litres capacity and 3 seconds in the case of cistern of 5 litres capacity, rapidly draw the vessel clear or otherwise divert the flow of water. Ascertain either by measuring or weighing the volume of water collected in the vessel.

9.2.1 For the purpose of test, the following shall be deemed to be the 'appropriate flush pipe':

a) A vertrical steel pipe, 1 250 mm long, having a nominal internal diameter of 32 mm, in the case of high-level cisterns; and

b) A vertical steel pipe, 300 mm long, having a nominal internal diameter of 38 mm, or the pipe actually supplied/recommended by the cistern manufacturer, in the case of low-level cisterns.

9.3 Endurance Test

A sample of flushing cistern picked at random from production shall be first checked for conformity to the requirements for materials (*see* **4**) and construction (*see* **5**), operational and performance requirements (*see* **7**) and special requirements (*see* **8**), and if it complies with these requirements, it should be operated 3 000 times. After this test, the cistern and its component parts shall not show any damage or defects and all the parts shall be

satisfactory; necessary checks shall be made for this purpose. If a valve has been used instead of siphon, during the test run of 3 000 times, the valve shall show no sign of leakage when the cistern is operated to its rated capacity.

NOTE — This is a type test to be carried out by recognized testing laboratory and shall be conducted whenever there are changes in the design materials, manufacture and construction. Even if no change is envisaged, this test shall be done once in six months.

10 SAMPLING AND CRITERIA FOR CONFORMITY

The sampling procedure and criteria for conformity of a lot to the requirements of this specification shall be as specified in Annex E.

11 SUPPLY CONDITIONS

11.1 High level flushing cistern shall be supplied complete with all components listed in Table 1 with the exception of flush pipe. If agreed to between the supplier and the purchaser, the flush pipe may be supplied with high level cistern.

11.2 Low level flushing cistern shall be supplied complete with all the components as listed in Table 1 including flush pipes (*see* **5.3** and **5.3.1**).

12 OPERATING INSTRUCTION FOR DUAL-FLUSH CISTERNS

12.1 Every cistern of the dual-flush type shall bear in legible lettering in a conspicious position the operations instructions specified in **12.1.1** and these instructions shall not be readily removable. In addition, when so ordered by the purchaser, a separate self-adhesive or other suitable label shall be supplied for use in association with the operating handle when the cistern is installed in a concealed position.

12.1.1 The instructions shall appear on near the lower edge of the front of the cistern shell:

Short flush : Pull and let go खींचे और छोड़ दें

Full flush : Pull and hold खींचे और पकड़े रहें

NOTE — Where short flush and full flush are operated by a knob, the instructions given in **12.1.1** will not be applicable and separate instructions with respect to the operation of the knob shall be provided.

13 MARKING

13.1 Each cistern shall be marked with the manufacturer's name or trade-mark on the body, either inside or outside as found convenient to the manufacturer. The discharge capacity (*see* **7.5**) and operating instructions (*see* **12**) shall also be marked on the cistern.

13.2 A suitable declaration shall be put on each unit indicating to the consumer the list of components supplied.

13.3 BIS Certification Marking

13.3.1 The cisterns may also be marked with Standard Mark. The marking shall be made on the body of the cistern.

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

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
404 (Part 1) : 1977	Specification for lead pipes : Part 1 For other than chemical purposes (*second revision*)
407 : 1981	Specification for brass tubes for general purposes (*third revision*)
1239 (Part 1) : 1990	Specification for mild steel tubes, tubulars and other wrought steel fittings: Part 1 Mild steel tubes (*fifth revision*)
1703 : 1989	Specification for copper alloy float valves (horizontal plunger type) for water-supply fittings (*third revision*)
2267 : 1972	Specification for polystyrene moulding materials (*first revision*)
2501 : 1985	Specification for copper tubes for general engineering purposes (*second revision*)
2643 (Part 3) : 1975	Dimensions for pipe threads for fastening purposes : Part 3 Limits of sizes (*first revision*)

IS No.	*Title*	*IS No.*	*Title*
4905 : 1968	Methods for random sampling	7328 : 1992	Specification for high density polyethylene materials for moulding and extrusion (*first revision*)
4984 : 1987	Specification for high density polyethylene pipes for potable water supplies, sewage and industrial effluents (*third revision*)	9762 : 1994	Specification for polyethylene floats for ball valves (*first revision*)
		12234 : 1988	Specification for equilibrium plastic float valve for cold water services
4985 : 1988	Specification for unplasticised PVC pipes for potable water supplies (*second revision*)	13049 : 1991	Specification for diaphragm type (plastic body) float operated valves for cold water services

ANNEX B

(*Clauses* 8.1, 8.2, 8.3 *and* 8.4)

DISTORTION AND DEAD LOAD TESTS

B-1 Fasten the cistern, complete with its fittings and cover, by its normal fixing devices to a solid background. Fill the cisterns with water to the marked water line.

ANNEX C

(*Clause* 8.3)

FRONT THRUST TEST

C-1 Apply horizontally a front thrust of 110 N through a 150 mm diameter disc as high up as possible to the front of the cistern on its centre line for a period of 5 minutes. After which while the thrust is still in position the cistern shall be tested for its satisfactory operation. The disc shall be faced with a soft material such that the face will conform to the contour of the cistern shell.

A convenient method of applying this thrust is shown in Fig. 2.

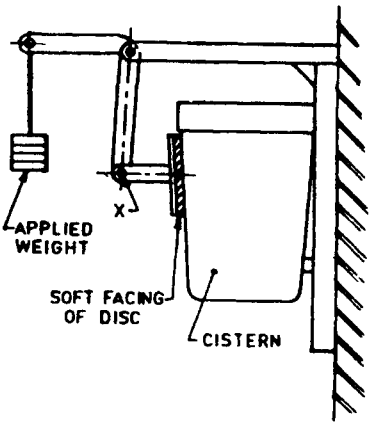

FIG. 2 ARRANGEMENT FOR FRONT THRUST TEST

ANNEX D
(*Clause* 8.4)

IMPACT TEST

D-1 Suspend a 1 kg steel ball by a fine wire 2·5 m long, the point of suspension being located vertically over the point of impact. Release the ball from a point directly in front of the cistern at a horizontal distance of 1 m from the point of impact, the point of impact being 75 mm from the bottom and on the centre line of the cistern. Carry out the test at ambient temperature or, in case of dispute, at 27 ± 2° C.

ANNEX E
(*Clause* 10)

SAMPLING AND CRITERIA FOR CONFORMITY

E-1 SAMPLING

E-1.1 Lot

In any consignment all the cisterns made of the same material, of the same type and from the same batch of manufacture shall be grouped together to constitute a lot.

E-1.1.1 Samples shall be selected and tested from each lot separately to determine conformity of the lot to the requirements of this specification.

E-1.2 The number of cisterns to be selected from a lot shall depend upon the size of the lot and shall be in accordance with col 1 and 2 of Table 2.

E-1.3 The cisterns for the sample shall be selected at random from the lot. For ensuring randomness of selection, procedures given in IS 4905 : 1968 may be followed.

E-2 NUMBER OF TESTS

E-2.1 All the cisterns (*see* col 2 of Table 2) shall be examined for materials (**4**), construction (**5**), finish (**6**) and tested for discharge capacity test (**7.5**) and discharge rate (**7.6**).

E-2.2 The number of cisterns to be subjected to distortion resistance test (**8.1**), dead load test (**8.2**), front thrust test (**8.3**), impact test (**8.4**) shall be in accordance with col 4 of Table 2. This sub-sample shall be selected from those cisterns which have already been examined and tested as in **E-2.1** and have been found conforming to the requirements of this standard.

E-3 CRITERIA FOR CONFORMITY

E-3.1 The lot shall be considered as conforming to the requirements of this specification if the conditions in **E-3.1.1** and **E-3.1.2** are satisfied.

E-3.1.1 The number of cisterns failing to satisfy the requirements of one or more of the characteristics mentioned in **E-2.1** shall not exceed the corresponding number given in col 3 of Table 2.

E-3.1.2 The number of cisterns failing in one or more of the tests mentioned in **E-2.2** shall not exceed the corresponding number given in col 5 of Table 2.

Table 2 Sample Size and Criteria for Conformity

(*Clauses* E-1.2, E-2.1, E-2.2, E-3.1.1 *and* E-3.1.2)

Lot Size	Sample Size	Permissible Number of Defectives from Sample	Sub-Sample Size	Permissible Number of Defectives from Sub-Sample
(1)	(2)	(3)	(4)	(5)
Up to 50	8	0	5	0
51 to 90	13	1	5	0
91 to 150	20	1	8	0
151 to 280	32	2	13	0
281 to 500	50	3	13	0
501 to 1 200	80	5	20	1
1 201 to 3 200	125	7	32	2

ANNEX F

(*Foreword*)

COMMITTEE COMPOSITION

Sanitary Appliances and Water Fittings Sectional Committee, CED 3

Chairman	*Representing*
SHRI S. PRAKASH	Delhi Water Supply and Sewage Disposal Undertaking (MCD), Delhi
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DY HYDRAULIC ENGINEER (*Alternate*)	
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SHRI R. S. ROTITHOR	Kirloskar Brothers Limited, Pune
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SHRI D. K. SEHGAL	Leader Engineering Works, Jallandhar
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Member-Secretary
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