उत्पाद मैन्युअल
आई एस 7231:2021 के अनुसार
शौचकुण्डों व मूत्रालयों के लिए प्लास्टिक
की प्रधावन टंकियां के लिए

दस्तावेज़ संख्या – पी एम/ आई एस 7231/3/जून 2022

भारतीय मानक ब्यूरो की स्कीम-I (अनुरूपता मूलयांकन) विनियम , 2018 के तहत यह उत्पाद मैन्युअल प्रमाणीकरण के प्रचालन में रीति और पारिर्शिता की सुसंगतता सुनिश्चित करने के लिए सभी क्षेत्रीय/शाखा कार्यालयों और लाइसेंसी द्वारा संदर्भ सामग्री के रूप में उपयोग किया जाएगा। बीआईएस प्रमाणीकरण लाइसेंस/ प्रमाणपत्र प्राप्त करने के इच्छुक भावी आवेदकों द्वारा भी इस दस्तावेज़ का उपयोग किया जा सकता है ।

PRODUCT MANUAL FOR
PLASTIC FLUSHING CISTERNS FOR
WATER CLOSETS AND URINALS
ACCORDING TO IS 7231: 2021

Document No.- PM/ IS 7231/3/June 2022

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
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New Delhi – 110002

PRODUCT MANUAL FOR PLASTIC FLUSHING CISTERNS FOR WATER CLOSETS AND URINALS ACCORDING TO IS 7231:2021

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1.	**Product**	:	IS 7231 : 2021
	Title	:	PLASTIC FLUSHING CISTERNS FOR WATER CLOSETS AND URINALS
	No. of Amendments	:	Nil
2.	**Sampling Guidelines:**		
a)	**Raw material**	:	As per clause 4 and Table 1 of IS 7231 : 2021
b)	**Grouping guidelines**	:	Please refer ANNEX -A
c)	**Sample Size**	:	2 cisterns for all tests
3.	**List of Test Equipment**	:	Please refer ANNEX – B
4.	**Scheme of Inspection and Testing**	:	Please refer ANNEX – C
5.	**Possible tests in a day :** Please refer ANNEX – D		
6.	**Scope of the Licence :**		
	Licence is granted to use Standard Mark as per IS 7231 : 2021 with the following scope:		
	Name of the product		Plastic Flushing Cisterns for Water Closets and Urinals
	Type		Dual-Flush cistern, Discharge capacity------litre,
			Exposed/ Concealed Cistern
	Water Efficiency Rating (additional requirement)		1 Star/ 2 Stars/ 3 Stars

ANNEX A

Grouping Guidelines

1. Plastic Flushing Cisterns for Water Closets and Urinals as per IS 7231 : 2021 is classified as given below:

   a) ***Discharge Capacity****:*
      - 6/3 litre
      - 4.8/2.8 litre
      - 4/2 litre

   b) ***Additional requirements for Water Efficiency:***
      In case a manufacturer opts for water efficiency ratings and labelling of cisterns, the requirements given in IS 17650 (Part 1):2021 shall be complied with.

   c) Concealed Cistern

2. Considering the above, following grouping guidelines for GoL/CSoL have been developed:

   a) Flushing cistern of each discharge capacity and type (i.e. Exposed or Concealed) shall be tested for all requirements to cover that particular discharge capacity and type.

   b) Each water efficiency rating shall be tested for all the requirements given in IS 17650 (Part 1) : 2021 to cover that particular water efficiency rating in the scope of licence.

3. The Firm shall declare the varieties of Flushing Cisterns intended to be covered in the Licence. The Scope of Licence may be restricted based on the Manufacturing capability and Testing facilities of the Manufacturer.

4. During the operation of the Licence, BO shall ensure that all the Varieties covered in the Licence are tested in rotation to the extent possible.

ANNEX B

List of Test Equipment

Major test equipment required to test as per the Indian Standard

S. No.	Tests used in with Clause Reference	Test Equipment
1	Construction (Clause 5)	Micrometre
		Wire of diameter 1.6 mm
		Vernier calliper
		Thread ring gauges
		Steel scale
2	Opacity (Clause 6)	Opacity meter with standard
3	Discharge capacity (Clause 7.5)	Measuring jar
4	Discharge rate (Clause 7.6)	Measuring jar
		Stop watch
5	Endurance test (Clause 9.3)	Endurance test setup
6	Distortion resistance test (Clause 8.1)	Solid background for fixing cistern
7	Dead load test (Clause 8.2)	Dead load of 250 N
		Vernier calliper
		Stop watch
8	Front thrust test (clause 8.3)	Arrangement for front thrust test with soft facing load disc of 150 diameter for applying thrust of 110 N.
		Stop watch
9	Impact test (Clause 8.4)	Steel ball of 1 kg
		Steel scale
		Air conditioner
10	Endurance test (Clause 9.3)	Endurance test setup with counter
11	Additional tests for Water efficient Cistern (water closet pan is required along with cistern with water connection to perform these tests) -	
	Surface Wash test	- Ink, methylene blue, Vernier caliper
	Granule and ball test	- Cylindrical HDPE granules (2500 No) & Nylon balls (100 No) as per clause 4.7.2.1 of IS 17650 (Pt 1)
	Bean and Sausage test	- Drop guide apparatus as per clause 4.7.3.1 of IS 17650 (Pt 1) - Test media as per clause 4.7.3.2 of IS 17650 (Pt 1) - Thermometer and refrigerator - Pressure gauge

	Drain line transport characterization test	- Polypropylene balls (100 No) as per clause 4.7.4.1 of IS 17650 (Pt 1) - Water supply arrangement and test set up as per fig 2 of IS 17650 (Pt 1)
	Overflow test for gravity flush tanks	- Water supply arrangement and test set up as per fig 2B of IS 17650 (Pt 1)

The above list is indicative only and may not be treated as exhaustive.

ANNEX C

Scheme of Inspection And Testing

1. LABORATORY - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipment.

2. TEST RECORDS – The manufacturer shall maintain test records for the tests carried out to establish conformity.

3. LABELLING AND MARKING – As per the requirements of IS 7231:2021.

3.1 For the additional water efficiency rating label requirement, the Guidelines on Labelling and Marking Requirements for Water Efficiency Rating of Plumbing Products – Sanitaryware & Sanitary Fittings as per IS 17650 (Part 1):2021 & IS 17650 (Part 2):2021 as mentioned at Annex-E shall be complied with.

4. CONTROL UNIT – All cisterns of same discharge capacity and water efficiency rating produced in one day shall constitute a control unit.

5. LEVELS OF CONTROL - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

5.1 All the production which conforms to the Indian Standard and covered by the licence should be marked with Standard Mark.

6. REJECTIONS – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

TABLE 1

(1)				(2)	(3)		
Test Details				**Test equipment requirement** R: required (or) S: Sub-contracting permitted	**Levels of Control**		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
4	Material (except for floats and float valves)	4 Table 1	IS 7231	S	1	Each consignment	No further testing is required if accompanied with the Test Certificate or ISI marked
5	**CONSTRUCTION**						
5.1.1	Exposed Cistern	5.1.1	IS 7231	R	5% of the control unit	Each control unit	In case any cistern fails in any of these requirements, further 10% of cisterns shall be drawn and tested for the requirements. The day's production shall be marked if all samples pass.
5.1.2	Cover	5.1.2	IS 7231	R			
5.1.3	Flush pipe and flush pipe connection to cistern	5.1.3	IS 7231	R			
5.1.4	Inlet and overflow holes	5.1.4	IS 7231	R			
5.1.5	Float valves	5.1.5	IS 7231 IS 12234 IS 13049	Float valves shall confirm to IS 12234 (Diaphragm Type-Plastic Body)/ IS 13049 (Plastic Equilibrium) and Polyethylene Float shall confirm to IS 9762. In case float valves and floats are manufactured by the firm in the same premises, the tests as indicated in Table 2/ Table 3/ Table 4 (as applicable) shall be carried out on whole production of float valves used in cisterns. In case floats are purchased from outside, no further testing is required if received with test certificate or ISI marked. In case float valves are purchased from outside please see Note 1.			
4	Floats	Table 1	IS 9762				
5.1.6	Operating mechanism (Push-Knob)	5.1.6	IS 7231	R	5% of the	Each control	In case any cistern fails in any of these requirements, further 10% of cisterns shall
5.1.7	Overflow pipe	5.1.7	IS 7231	R			

5.2	Concealed Cistern: (i)Construction (ii)Flush Pipe (iii)Operating mechanism	5.2.1 5.2.2 5.2.3	IS 7231	R	control unit	unit	be drawn and tested for the requirements. The day's production shall be marked if all samples pass.
6	Finish	6	IS 7231	-	Each cistern	-	-
	Opacity	6	IS 7231 IS 12235 (Part 3)	S	One sample each from cistern and cover	Once in six months	Additional sample shall be tested whenever there is any change in raw material mix or source of supply of raw material for these components.
7	**OPERATIONAL AND PERFORMANCE REQUIREMENTS**						
7.1	Flushing arrangement	7.1	IS 7231	R	5% of the control unit	Each control unit	In case any cistern fails in any of these requirements further 10% of cisterns shall be drawn and tested for all the requirements. The day's production shall be marked if all the samples pass.
7.2	Working water level	7.2	IS 7231	R			
7.3	Freedom from Leakage	7.3	IS 7231	R			
7.4	Reduced water level	7.4	IS 7231	R			
7.5	Discharge capacity	7.5 9.1	IS 7231	R			
7.6	Discharge rate	7.6 9.2	IS 7231	R			
8	**SPECIAL REQUIREMENTS**						
8.1	Distortion Resistance test	8.1 Annex-B	IS 7231	R	Four Cisterns	Each Control Unit	From each day's production, two samples during the starting of production, one at the mid and one at the end of production shall be tested. In case any cistern fails in any of these requirements further twice the No. of cisterns shall be drawn and tested for all the requirements. The day's production shall be marked if all the samples pass.
8.2	Dead load test	8.2 Annex-B	IS 7231	R			
8.3	Front thrust test	8.3 Annex-C	IS 7231	R			
8.4	Impact test	8.4 Annex-D	IS 7231	R			

9.3	Endurance test	9.3	IS 7231	S	One	Once in a year	This is type test and shall be conducted whenever there are changes in design or materials or manufacturing process or construction. Even if no change is envisaged, this test shall be done once in a year. (BIS shall be informed for re-verification in case of such changes)
13	Additional tests for Water efficiency [as per IS 17650 (Part 1)]						
	Surface Wash test	4.7.1	IS 17650 (Part 1)	S	One	Once in six months	-
	Granule and ball test	4.7.2	IS 17650 (Part 1)				
	Bean and Sausage test	4.7.3	IS 17650 (Part 1)				
	Drain line transport characterization test	4.7.4	IS 17650 (Part 1)				
	Overflow test for gravity flush tanks	4.7.5	IS 17650 (Part 1)				

Note 1: Float valve

a) In case float valves are purchased from outside, no further testing is required if the valves are ISI marked.

b) In case the purchased float valves are not ISI marked, then the licensee shall ensure that these valves are made from the material as specified. Five percent of the valves from each batch of valves received shall be tested for all tests (except ant-siphonage, endurance and deflection test) ensuring conformity to IS 12234/IS 13049. In case of any failure the batch shall be rejected.

- For IS 12234 valves, Antisiphonage test shall be conducted on one sample from every batch procured and endurance test shall be conducted once in six months and whenever there is change of source.

- For IS 13049 valves, Antisiphonage test shall be conducted on one sample from every batch procured, deflection test for assembly and endurance test shall be conducted once in a month and whenever there is change of source.

- For flush pipe, lever, chain over-flow pipe, bolts and nuts the firm shall maintain test certificates or test them inhouse for ensuring conformity to the requirements of the specification.

Note-2: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-3: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval by BO Head.

TABLE 2

PLASTIC EQUILIBRIUM FLOAT VALVES FOR COLD WATER SERVICES AS PER IS 12234 : 1988

(1)				(2)	(3)		
Test Details				**Test equipment requirement** R: required (or) S: Sub-contracting permitted	**Levels of Control**		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
4	Material	4.1 and 4.2	IS 12234	S	–	Each Consignment	Evidence shall be produced that the material used is as per Table 1 of IS 12234. Record shall also be maintained for rework material (if used).
5	Manufacture and workmanship (visual)	5.1	IS 12234	-	Each valve	–	–
6	Construction	6.1 to 6.3 and 6.5 to 6.10	IS 12234	R	Each valve	–	–
6.4	Dimensions	6.4	IS 12234	R	One	Each Control unit.	–
7.1.1	Hydraulic test	7.1.1	IS 12234	R	One	Each Control unit.	–
7.1.2	Shut Off Test	7.1.2	IS 12234	R	One	Each Control unit.	–
7.2	Anti Siphonage test	Appendix A	IS 12234	S	One	Once in a month (Type test)	–
7.3	Flow Test	Appendix B	IS 12234	R	One	Each Control unit	–
7.4	Endurance test	Appendix C	IS 12234	S	One	Once in six months (Type test)	–

NOTE: For purpose of these tests, 50 valves or part thereof continuously manufactured shall constitute a control unit. Each valve shall be suitably marked with control unit number to trace back to the test records in addition to markings as per clause 9 of IS 12234.

TABLE 3

DIAPHRAGM TYPE (PLASTIC BODY) FLOAT OPERATED VALVES FOR COLD WATER SERVICES AS PER IS 13049:1991

(1)				(2)	(3)		
Test Details				**Test equipment requirement** R: required (or) S: Sub-contracting permitted	**Levels of Control**		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
5	Material	5.1, 5.2, 5.3 and 6.2	IS13049	**S**	–	Each consignment	Evidence shall be produced that the material used is as per Table-1 of IS13049. Records shall also be maintained for rework material (if used).
6	Manufacture and workmanship	6.1	IS13049	R	Each valve	–	In case of any failure, those not conforming shall be rejected.
7	Construction	7.1 to 7.4	IS13049	-	Each valve	–	–
7.2	Seat and Body	7.2.3	IS13049	R	Two	Each control unit	In case of any failure, the control unit shall be rejected.
7.5.1	Floats	7.5.1 8.1 to 8.4	IS13049 IS 9762	R	One	Each control unit/Each consignment	No testing necessary if floats carry Standard Mark.
7.5.3	Deflection test for float Arm and Assembly.	Annex B	IS13049	R	One	Once in a month or every 1000 valves manufactured from the same material and of same consignment whichever is earlier.	In case of any failure, corrective actions be taken & test repeated before accepting valves.

8	**Performance Tests**						
8.1	Hydraulic test.	8.1	IS13049	R	Two	Each control unit	In case of any failure, control unit shall be considered as defective and rejected.
8.2	Shut Off Test	Annex C	IS13049	R	Two	Each control unit	
8.4	Flow test	Annex E	IS13049	R	Two	Each control unit	
8.6	Hydraulic Pressure on Discharge Arrangements.	Annex G	IS13049	R	Two	Each control unit	In case of failure, corrective actions shall be taken and performance tests shall also be repeated before accepting valves.
8.3	Anti Siphonage test.	Annex D	IS13049	S	One	Once in a Month (Type test)	
8.5	Endurance test*	Annex F	IS13049	S	One		

Endurance test shall also be conducted whenever there is a change in material, construction or manufacturing process.

NOTE : For purpose of these tests, 50 valves/floats or part thereof of same type continuously manufactured from same material shall constitute a control unit. Each valves/float shall be suitably marked with control unit number to trace back the test records, in addition to markings as per clause 10 of IS 13049.

TABLE 4

POLYETHYLENE FLOATS (SPHERICAL) FOR FLOAT VALVES AS PER IS 9762: 1994

(1)				(2)	(3)		
Test Details				**Test equipment requirement R: required (or) S: Sub-contracting permitted**	**Levels of Control**		
Cl.	**Requirement**	**Test Method**			**No. of Sample**	**Frequency**	**Remarks**
		Clause	**Reference**				
4	Material	4	IS 9672 IS 7328	S	One	Each Consignment	No further testing is required if received with test certificate or ISI marked.
6	**Dimensions**						
6.1	Diameter of float	6.1, Table 1	IS 9762	R	One	One-hour production from each machine	-
6.2	Wall Thickness	6.2.1, Table 1	IS 9762	R	One	One-hour production from each machine	-
	Wall thickness of boss – Thickness of metal inserted	6.2.2, 7.1, 7.3, Table 1	IS 9762	R	Thirteen	Each control unit	Thirteen samples of each size from each consignment during each shift shall be checked for its conformity before releasing the material for actual production.
7	Manufacture and Workmanship	7.1	IS 9762	R	All floats	-	-
8.1	Leakage and Water Absorption Tests	8.1, Annex-A	IS 9762	R	One	Each Control Unit	-
8.2	Deflection Test	8.2, Annex-B	IS 9762	R	One	Each Control Unit	-
8.3	Impact Test	8.3	IS 9762	R	One	Each Control Unit	-
8.4	Boss Test	8.4, Annex-C	IS 9762	R	One	Each Control Unit	-

Note: Control unit for the product is defined as all floats of same designation i.e nominal size and pressure application manufactured under similar conditions of manufacturing in one shift.

ANNEX- D

POSSIBLE TESTS IN A DAY

1. Construction (Clause 5)

2. Finish (Clause 6)

3. Operational and performance requirements (Clause 7)

    a) Flushing arrangement (Clause 7.1)
    b) Working water level (Clause 7.2)
    c) Freedom from self siphonage (Clause 7.3)
    d) Reduced water level (Clause 7.4)
    e) Discharge capacity (Clause 7.5)
    f) Discharge rate (Clause 7.6)

4. Special requirements (Clause 8)

    a) Distortion resistance test (Clause 8.1)
    b) Dead load test (Clause 8.2)
    c) Front thrust test (Clause 8.3)
    d) Impact test (Clause 8.4)

5. Supply condition (Clause 11)

ANNEX-E

Ref: CMD-III/CED-Plumbing Products

Subject: Labelling & Marking Requirements for Water Efficiency Rating of Plumbing Products – Sanitaryware & Sanitary Fittings as per IS 17650 (Part 1):2021 & IS 17650 (Part 2):2021

1. This has reference to the conformity assessment of Plumbing products - Sanitaryware & Sanitary Fittings. In this regard, two new Indian Standards have been published for water efficiency requirements of plumbing products:

a) **IS 17650 (Part 1) : 2021** Water Efficient Plumbing Products — Requirements : Part 1 Sanitaryware

b) **IS 17650 (Part 2) : 2021** Water Efficient Plumbing Products — Requirements : Part 2 Sanitary Fittings

2. The above two new standards on water efficient plumbing products cover additional requirements to be met by respective plumbing products to qualify for water efficiency rating based on water consumption; the criteria for being rated as 1 Star, 2 Stars or 3 Stars based on water consumption; and labelling requirements. Further, as per the above Indian Standards, in order to qualify for water efficiency rating, the products must conform to the respective product Standards, i.e. Sanitaryware-IS 2556 (Part 6), IS 2556 (Part 8), IS 774, IS 7231 and Sanitary Fittings- IS 8931. These Standards specify water efficiency as an additional requirement which is to be complied as per IS 17650 (Part 1):2021 or IS 17650 (Part 2):2021, as the case may be.

3. In case a manufacturer opts for the additional requirement for water efficiency, then water efficiency rating label of plumbing products as given in IS 17650 (Part 1):2021 or IS 17650 (Part 2):2021 is required, in addition to the marking requirements laid down in the product Standards. Licence shall be granted under the respective plumbing Product Standards and in case a manufacturer opts for the additional requirement for water efficiency, the same shall be included in the scope of licence.

4. For water efficient plumbing products, the water efficiency rating label shall be pasted with water proof sticker having water rating label along with the BIS Standard Mark for the product (for which the licence is granted) on each appliance/ sanitaryware/ sanitary fittings. The carton containing the product shall also be pasted with a sticker as above.

5. IS 17650 (Part 1):2021 or IS 17650 (Part 2):2021 have depicted the marking requirements of the label which is only typical in nature. Based on this, labelling and marking requirements of water efficiency rating labels for water efficient sanitaryware and sanitary fittings have been designed which

are enclosed at Annex-E(1). Dimensions and color scheme of water efficiency rating label are enclosed at Annex-E(2).

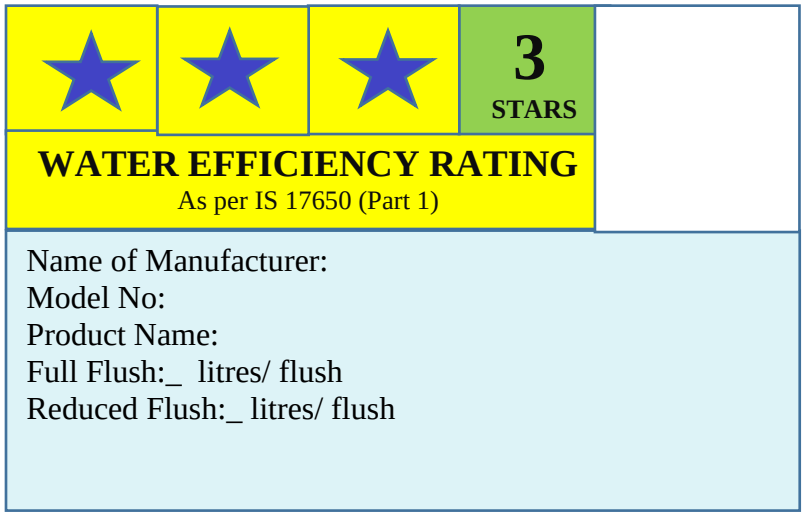
6. The label shall be reproduced in full. The label shall be faithfully reproduced, and all text shall be readable with normal or corrected vision. The dimensions of the label can be proportionately reduced or enlarged with respect to the size of the plumbing product, but should be prominently visible. The label shall be prominent and visible when the product is profiled, displayed, promoted, marketed, sold or supplied at any point in the supply chain.

7. It may be noted that IS 17650 (Part 1):2021 and IS 17650 (Part 2):2021 as standalone Standards are not certifiable. Licence shall not be granted to a manufacturer in standalone as per IS 17650 (Part 1):2021 or IS 17650 (Part 2):2021 only.

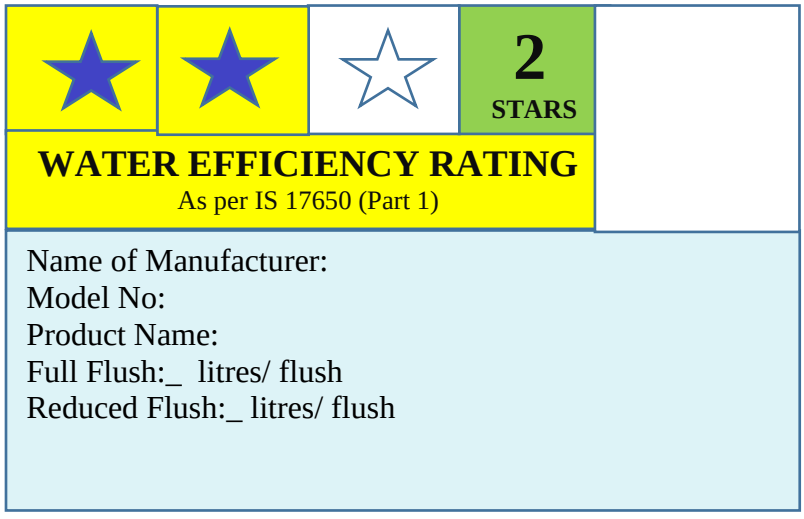
ANNEX-E(1)

A) WATER EFFICIENT SANITARYWARE (Water Closet/ Squatting Pan/ Flushing Cistern/ Flush Valve)

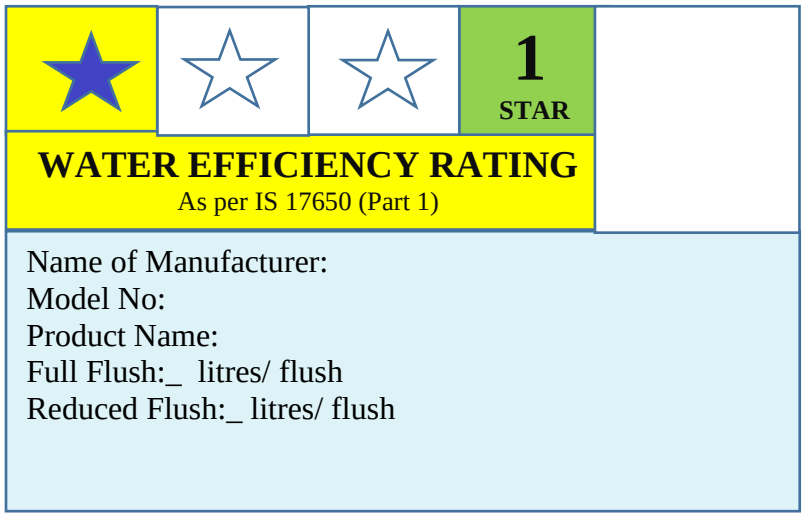
(i) 3 STARS –



(ii) 2 STARS –

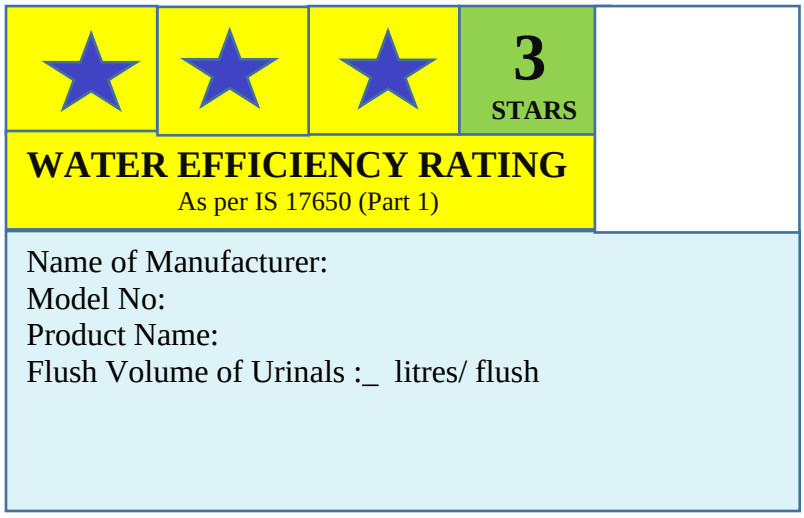


(iii) 1 STAR –

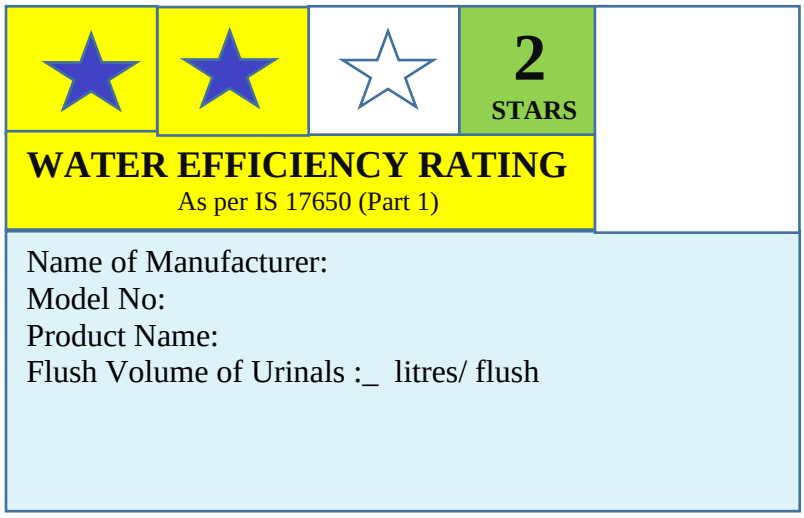


A) WATER EFFICIENT SANITARYWARE (URINALS)

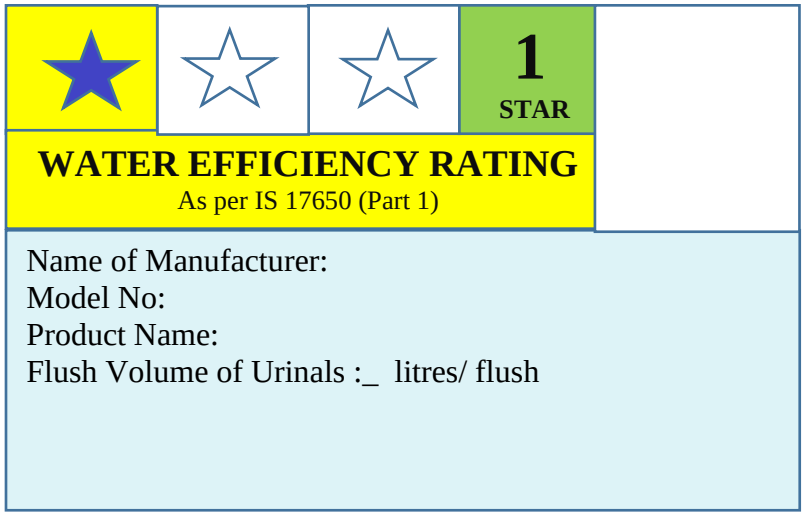
(i) 3 STARS –



(ii) 2 STARS –



(iii) 1 STAR –

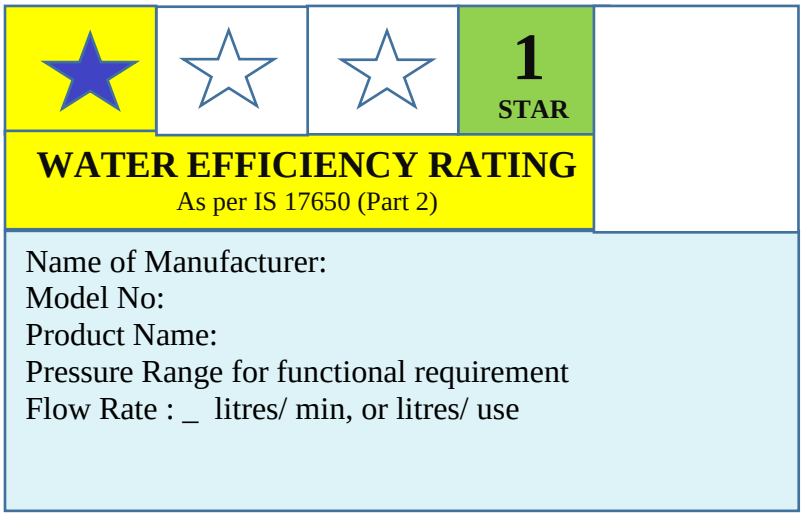


B) WATER EFFICIENT SANITARY FITTINGS

(i) 3 STARS –

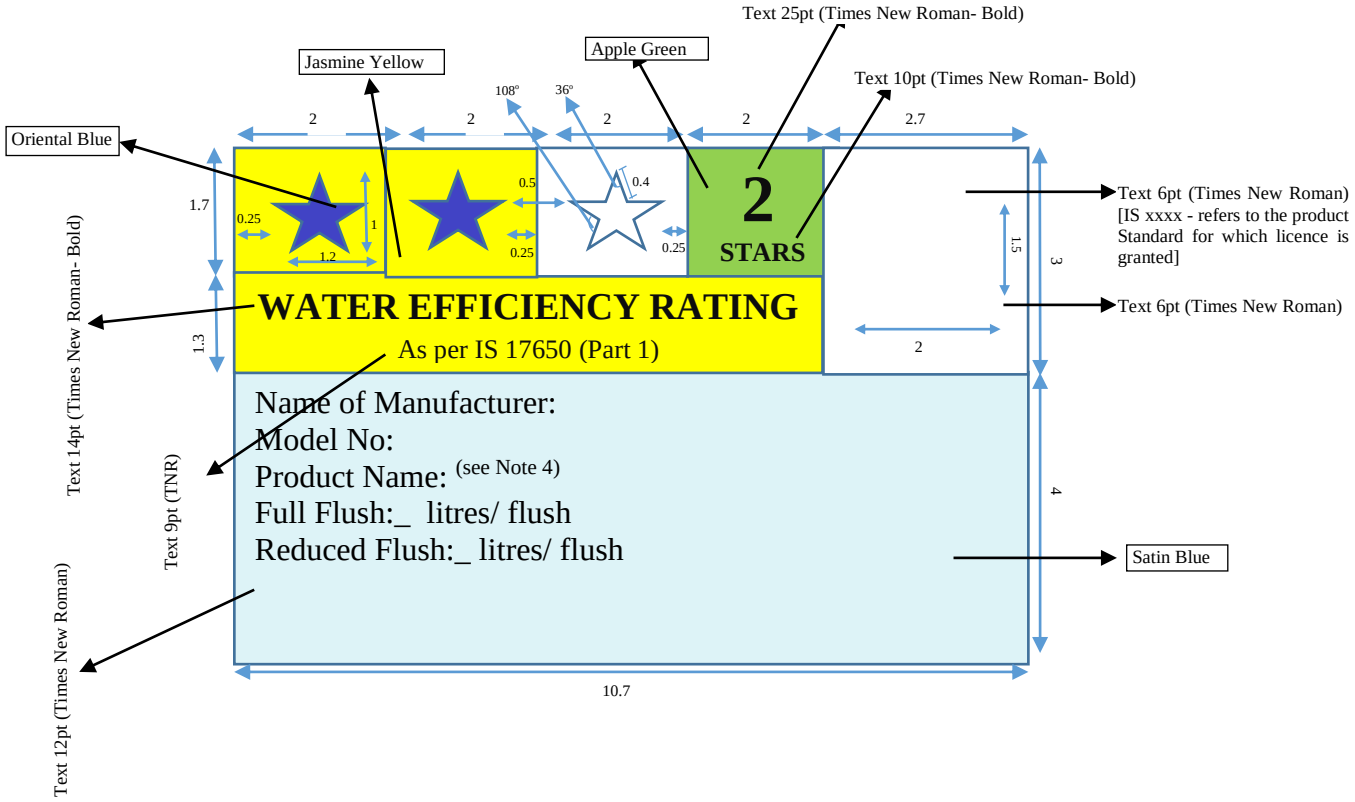
(ii) 2 STARS –

(i) 1 STAR –


1
STAR
WATER EFFICIENCY RATING
As per IS 17650 (Part 2)
Name of Manufacturer:
Model No:
Product Name:
Pressure Range for functional requirement
Flow Rate : _ litres/ min, or litres/ use

ANNEX-E(2)

DIMENSIONS AND COLOR SCHEME OF WATER EFFICIENCY RATING LABEL



Note: (1) All dimensions are in cm & all letters are in black colour
(2) The font sizes are typical in nature.
(3) The dimensions of the label can be proportionately reduced or enlarged with respect to the size of the plumbing product, but should be prominently visible.
(4) Indicate the exact name of the products such as Washdown water closet, Close-coupled waster closet, One-piece water closet, One-piece syphonic water closet, Universal water closet, Washdown Wall Mounted water closet, Squatting pan, Integrated squatting pan, Plastic flushing cistern, Ceramic flushing cistern and Flush valves

Colour Scheme for Logo:

a) Satin Blue - Shade No 177 of IS 5

b) Apple Green - Shade No 281 of IS 5

c) Jasmine Yellow – Shade No 397 of IS 5

d) Oriental Blue - Shade No 174 of IS 5