



उत्पाद मैनुअल
तत्प और अतत्प पेय जल वितरण व्तिस्था के ललए क्लोररन्कृत पॉलीविनाइल
क्लोराइड (सीवपविसी) पाइप, आई एस 15778 : 2007 के अनुसार

PRODUCT MANUAL FOR
CHLORINATED POLYVINYL CHLORIDE (CPVC) PIPES FOR POTABLE
HOT AND COLD WATER DISTRIBUTION SUPPLIES
ACCORDING TO IS 15778 : 2007

विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो) अनुरूपता मूल्यांकन (विनियम, 2018 की योजना -I के तहत प्रमाणन के संचालन में एकरूपता और पारदर्शिता के लिए इस उत्पाद मैनुअल का उपयोग सभी क्षेत्रीय / शाखा कार्यालयों और लाइसेंसधारियों द्वारा संदर्भ सामग्री के रूप में किया जाएगा। दस्तावेज़ का उपयोग बीआईएस प्रमाणन प्राप्त करने के इच्छुक संभावित आवेदकों द्वारा भी किया जा सकता है।

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure uniformity 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.

1.	मानक संख्या IS No.	: IS 15778 : 2007
	शीर्षक Title	: Chlorinated Polyvinyl Chloride (CPVC) Pipes for Potable Hot and Cold Water Distribution Supplies
	संशोधनों की संख्या No. of amendments	: 5
2.	नमूना दिशानिर्देश Sampling Guidelines	
a)	कच्चा माल Raw material	- Resin shall confirm to Clause 6.2 of IS 15778. - The CPVC compound shall meet the requirement of IS 15225 & Clause 6.3 of IS 15778. Note: This section indicates the requirements for raw material (if specified in the IS) for which compliance is to be established during Grant of Licence/Change in Scope of Licence/ Factory Surveillance
b)	समूहीकरण दिशानिर्देश Grouping Guidelines	: Please refer to Annex-A
c)	नमूने का परिमाण Sample Quantity	CPVC pipe - 1 m x 12 nos CPVC resin (if used) – 1 kg CPVC compound – 5 kg

		CPVC pipe – 30 cm x 12 nos CPVC elbows of angle 90° - 5 nos CPVC double sockets(couplers) of same outside dia as the pipe section–8 nos with 100 gm solvent for jointing. Note: This section indicates the quantity of the sample of the product and/or the raw material (if applicable), required to be sent to the laboratory for testing, for the purpose of Grant of Licence/Change in Scope of Licence/Factory Surveillance (incase of market surveillance, effort may be made to procure therequired quantity of product sample, as far as possible since raw material sample may not be available in market)	for Clause 6.3.2
d)	परीक्षण अनुरोध में घोषित किए जाने वाले पैरामीटर Parameters to be Declared in Test Request	- Same as the scope of licence	
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	Please refer to Annex-B
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	:	Please refer to Annex-C
5.	एक दिन में संभावित परीक्षण Possible tests in a day		
	(i)Dimensions of pipes (Clause 7), (ii) Pipe ends (Clause 8), (iii) Visual appearance (Clause 9.1), (iv) Opacity (Clause 9.2), (v) Reversion test (Clause 9.4), (vi) Vicat softening temperature (Clause 9.5), (vii) Density (Clause 9.6), (vii) Hydrostatic characteristics (Acceptance test) {Clause 10.1, Table 3[Sl No.(i)]}, (viii) Resistance to external blows at 0 °C (Clause 10.3), (ix) Flattening test (Clause 10.4), (x) Tensile strength (Clause 10.5) Note: This section is for the guidance of BIS Certification Officers/Technical Auditors of BIS Authorized Outside Surveillance Agencies (OSAs) during factory inspection to provide readyreference regarding the tests which can be witnessed during the inspection in the factory by the officer/auditor.		
6.	लाइसेंस का दायरा /Scope of the Licence:		
	Licence is granted to use Standard Mark as per IS 15778 : 2007 with the following scope:		
	Name of the product	Chlorinated Polyvinyl Chloride (CPVC) Pipes for Potable Hot and Cold Water Distribution Supplies	
	Pressure class	Class1 / Class 2/ Class 3	
	SDR Classification	SDR 11 /SDR 13.5 / SDR 17	
	Nominal Size		

ANNEX-A

Grouping Guidelines

1. CPVC pipes for potable hot and cold water distribution supplies as per IS 15778 : 2007 are classified as follows:

Pressure Class	SDR	Size (DN)
1	11	15 -50
2	13.5	15- 50
3	17	65 -150

2. Considering the above, grouping guidelines as given below shall be followed for GoL/CSoL:
 - a) CPVC Pipe of highest size from each Pressure Class/SDR Designation shall be tested for all requirements (except Thermal Stability by Hydrostatic Pressure Testing - clause 10.2) to cover all sizes of pipes of the particular Pressure Class/SDR tested.
 - b) CPVC Pipe of any Pressure Class/SDR Designation, preferably the highest size, shall also be tested for Thermal Stability by Hydrostatic Pressure Testing while processing the case for GoL/CSoL.
3. The Firm shall declare the varieties of Pipes they intend to cover in the Licence. The Scope of Licence may be restricted based on the Manufacturing and Testing capabilities 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

(INDICATIVE LIST, FOR GUIDANCE ONLY)

S. No.	Tests used in with Clause Reference	Test Equipment
1	Chlorine content of CPVC resin (Clause 6.2.1)	- Drying Oven - Digital Balance - Equipment for Volhard Titration or Potentiometric Titration - Combustion Bomb } for combustion in - Nickel crucible } bomb technique - Safety oven - Round or Flat bottom Flask with platinum wire and stopper - Filter Paper free from halogen and ash - Beaker 250 ml - Silver nitrate - Nitric acid - Sodium peroxide - Starch - Sucrose or ethylene glycol
2	Chlorine content of CPVC compound (Clause 6.3.1)	
3	Verification of the Malfunction Temperature , T_{mal} (Clause 6.3.2)	- Pressure pump - Pressure gauge - Heating device - Thermometer - Stop watch
4	Density (Clause 6.3.3)	- Hot press - Balance - Pan straddle - Pycnometer - Liquid bath with immersion liquid - Density balance
5	Dimensions of pipes (Clause 7)	- Dial Gauge Method or - Micrometer - Ultrasonic gauge - Vernier Calipers or outside caliper - Pi Tape or flexible tape - Tape

6	Pipe ends (Clause 8)	- Angle protractor -
7	Opacity (Clause 9.2)	- Opacity Test Apparatus - Standard sample of opacity 0.2 % or Apparatus for Test Method-2 - Source of light (halogen lamp 1000 W), - Photo-electric cell (with filter correction to match eye response), - Adjustable power arc or Incandescent lamp - Diaphragm and optical lens - Digital current meter. - Standard sample of opacity 0.2 %
8	Effect on water (Clause 9.3)	- Distilled water - Air conditioner - pH meter - Testing reagent and equipment for determination of cadmium, mercury, lead, tin and other toxic substances.
9	Reversion test (Clause 9.4)	- Thermostatically Control oil bath/ Hot air oven - Mono-polyethylene glycol, glycerol or mineral oil free from aromatic hydrocarbons - Vernier Calipers - Stop watch
10	Vicat Softening temperature (Clause 9.5)	- Oil heating Bath equipped with means to raise the temperature at uniform rate of $50 \pm 5^\circ \text{C/hr.}$ with suitable stirrer. - Rod with loading plate, load and indenting tips - Micrometer dial gauge - Thermometer or temperature measuring equipment
11	Density (Clause 9.6)	- Balance - Thermometer - Demineralized water - Beaker - Corrosion resistant wire
12	Hydrostatic characteristics (Clause 10.1)	- Hydrostatic pressure testing apparatus with pressuring unit and multiple outlets - Water bath (Hot and cold temperature arrangement) with temperature control - Thermometer - End plugs/caps
13	Thermal stability by hydrostatic pressure testing (Clause 10.2)	

14	Resistance to external blows at 0°C (Clause 10.3)	- Falling Weight testing machine from height 2000 mm - Striker of weight 0.25, 0.50 & 1.00 kg - Digital watch - Liquid bath or freezer for conditioning of samples
15	Flattening test (Clause 10.4)	- Compression testing machine - Loading plates - Deformation/Deflection indicator - Vernier calliper - Internal diameter gauge/bore gauge
16	Tensile Strength (Clause 10.5)	- Tensile Testing machine - Dumb bell die along with Hydraulic jack - Micrometer Ball ended - Air Conditioner

ANNEX C

SCHEME OF INSPECTION AND TESTING

1. QUALITY ASSURANCE PLAN

1.1 It is expected that manufacturers (licensees/applicants) will implement a Quality Assurance Plan i.e. a plan of regular testing and in-process controls, designed to ensure that the product bearing the Standard Mark conforms to all requirements of the Indian Standard.

1.2 The manufacturers shall define a Quality Assurance Plan defining the control unit (i.e. lot/batch etc.) and the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and submit the same to BIS Branch Office for information. The manufacturer shall comply with the same and maintain test records in accordance with para 2.4.

1.3 RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT:

1.3.1 For the guidance of manufacturers, the recommended definition of control unit: All CPVC pipes of one size and Pressure class/SDR designation manufactured as a continuous extrusion run from one extrusion compound up to a maximum of forty-eight hours duration shall constitute a control unit.

1.3.2 For the guidance of manufacturers in preparing the Quality Assurance Plan, recommended levels of control are given in **Table 1**.

1.3.3 The manufacturer shall ensure inspection and testing as per the Quality Assurance Plan submitted by them on the whole production of the factory which is covered by this plan. Alternatively, the manufacturer has the option of adherence to the quality plan as per levels of control recommended in column 3 of Table 1.

1.4 However, all manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard.

2 ENSURING COMPLIANCE THROUGH TESTING- It is expected that manufacturers (licensees/applicants) will establish a suitably equipped and staffed in house laboratory (In house testing facility) for testing at least those parameters of the Indian Standard which require routine testing for ensuring quality of the product. This includes in-process controls as may be defined and put in place by the manufacturer and testing parameters/requirements which can only be performed in the factory.

2.3 For the guidance of manufacturers, Table 1 giving the recommended levels of control is given below. Column 2 of Table 1 indicates routine tests where test equipment is required in house as “R” or other tests which can be subcontracted as “S”. Subcontracting is permitted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.4 For MSME manufacturers, the requirement of maintaining a laboratory/in-house testing facility for routine tests (indicated as “R” in Column 2 of Table 1) is also optional.

2.4.2 MSME manufacturers may utilize common cluster based facilities as per guidelines for the utilization of cluster based test facilities by MSMEs or the provisions of Sharing of testing facilities or get testing done from BIS recognized/empaneled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.5 Large Scale manufacturers shall maintain an in-house laboratory equipped at least with test facilities for routine tests (indicated as “R” in Column 2 of Table 1), where different tests given in the specification shall be carried out in accordance with the method given in the specification. They shall also implement a calibration plan for the in-house test equipment.

2.5.2 Alternatively, in lieu of an in-house laboratory, large scale manufacturers can also utilize the provisions of Sharing of testing facilities as per the Guidelines for Grant of Licence available on BIS website www.bis.gov.in. (Under Conformity Assessment>Product Certification Process). Even for subcontracted tests, provisions for sharing of testing facilities can be utilized.

2.6 TEST RECORDS- The manufacturers maintaining an in-house laboratory or utilizing common cluster based facilities or shared test facilities shall maintain test records for the tests carried out to establish conformity. For the tests being subcontracted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025, test reports issued by the laboratories shall be available for inspection by BIS.

3 PACKING AND MARKING - The Standard Mark as given in the Schedule of the licence shall be clearly and indelibly marked in ink/paint or hot embossed on white base at intervals of not more than 3m on each pipe, provided always that the product so marked conforms to all requirements of the specification.

3.3 Marking shall be done as per Clause 12 of IS 15778:2007.

3.4 **Additional Marking requirements:** Each pipe/package shall also be marked with the following detail:

a) “For BIS certification details please visit www.bis.gov.in”

4 REJECTION - All the production which conforms to the Indian Standard and covered under the scope of this licence shall be marked with the Standard Mark. 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
(ONLY FOR GUIDANCE PURPOSE)

(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				
6	COMPOSITION						
6.2.1	Chloride Content	6.2.1	Annex B IS 15778	S	One	Each consignment	No further testing is required if consignment received is with the test certificate. (See Note -1)
6.3	Compound Properties	6.3	IS 15778 IS 15225	S	One	Once in three months for same source and composition of compound received or whenever there is change in the composition of the compound or change of source of resin used in compound when compounding is done inhouse.	
6.3.1	Chloride content	6.3.1	Annex B IS 15778	S	One	Each consignment of CPVC compound received or if CPVC compound is manufactured inhouse, then for each lot of compound manufactured or whenever there is change in source of CPVC compound/CPVC resin	
6.3.2	Verification of the Malfunction Temperature, <i>T</i> _{mal}	6.3.2	Annex C IS 15778	S	One	Once in three months or whenever there is change in composition of compound or source of CPVC resin or compound.	
6.3.3	Density	6.3.3	IS 13360 (Part3/ Sec1)	S	One	Each consignment of CPVC compound received or if CPVC compound is manufactured inhouse, then for each lot of compound manufactured or whenever there is change in source of CPVC compound/ CPVC resin.	

7	Dimensions a) Diameter b) Diameter at any point c) Wall thickness d) Effective length (Le)	7.1 7.1.1 7.1.2 7.1.3.1	IS 15778 IS 12235 (Part 1) IS 15778	R	10	Each Control unit	See Note -2
8	Pipe Ends	8	IS 15778	R	10	Each Control unit	See Note -2
9	PHYSICAL AND CHEMICAL CHARACTERISTICS						
9.1	Visual Appearance	9.1	IS 15778	-	Each Pipe	-	-
9.2	Opacity	9.2	IS 15778 IS 12235 (Part 3)	S	Two (Thinnest Wall sections)	Once in a three months	Test shall be carried out whenever composition of compounding material or source of compound or resin or method of manufacturing is changed. In an operative year, production from all the machines may be covered to the extent possible.
9.3	Effect on water	9.3 10.3	IS 15778 IS 4985	S	Three	Once in six months	
9.4	Reversion test	9.4	IS 15778 IS 12235 (Part 5/ Sec 1 & Sec 2)	R	Three	Each Control Unit	See Note -2
9.5	Vicat Softening temperature	9.5	IS 15778 IS 12235 (Part 2)	S	Two	Once in three months	—
9.6	Density	9.6	IS 15778 IS 12235 (Part 14)	R	Two	Each Control unit	—

10	MECHANICAL PROPERTIES						
10.1	Hydrostatic Characteristics						
a)	Acceptance Test (20 ⁰ C for 1 h)	10.1 Table 3 [SI No. (i)]	IS 15778 IS 12235 (Part 8/Sec 1)	R	One	Each Control unit	—
b)	Type Test (95 ⁰ C for 165 h and 95 ⁰ C for 1000 h)	10.1 Table 3 [SI No (ii) & (iii)]	IS 15778 IS 12235 (Part 8/Sec 1)	S	One	Once in three months	One size for each class of pipe shall be tested at least once in an operative year.
10.2	Thermal stability by hydrostatic pressure testing (95 ⁰ C for 8760 h)	10.1 Table 3 [SI No. (iv)]	IS 15778 IS 12235 (Part 8/Sec 1)	S	One	Once in three years	This test shall be carried out whenever there is change in composition in raw material/source of raw material or introduction of any additional size of pipe.
10.3	Resistance to external blow at 0 ⁰ C	10.3	IS 15778 IS 4985	R	One	Each Control unit	—
10.4	Flattening Test	10.4	IS 15778 IS 12235 (Part 19)	R	One	Each Control unit	—
10.5	Tensile Strength	10.5	IS 15778 IS 12235 (Part 13)	R	One	Each Control unit	—

Note - 1: Pipe manufacturer shall obtain a test certificate for each batch of raw material along with consignment indicating conformity to requirements as per clause 6.1, clause 6.2 and clause 6.3 of IS 15778: 2007. In case a test certificate is not received, a sample shall be tested for its conformity as specified in Table 1.

Note -2: In case of failure, twice the number of samples shall be tested for that requirement from the same control unit. In case of any further failure, the entire control unit shall be rejected.