



**उत्पाद मैनुअल**  
**आई एस 15328:2003 के अनुसार**  
**अप्रकाशित गैर-दबाव पॉलीविनाइल उपयोग के लिए क्लोराइड (पीवीसी-यू)**  
**पाइप: भूमिगत जल निकासी और सीवरेज प्रणाली के लिए**

दस्तावेज संख्या – पी एम/ आई एस 15328/2/जून 2021

*भारतीय मानक ब्यूरो की स्कीम-I (अनुरूपता मूल्यांकन) विनियम, 2018 के तहत यह उत्पाद मैनुअल प्रमाणीकरण के प्रचालन में रीति और पारिश्रिता 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 दस्तावेज का उपयोग किया जा सकता है।*

**PRODUCT MANUAL FOR**  
**UNPLASTICIZED NON-PRESSURE POLYVINYL CHLORIDE**  
**(PVC-U) PIPES FOR USE IN UNDERGROUND DRAINAGE AND**  
**SEWERAGE SYSTEMS ACCORDING TO IS 15328: 2003**

Document No.- PM/ IS 15328/ 2/ June 2021

*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.*

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**PRODUCT MANUAL FOR  
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(PVC-U) PIPES FOR USE IN UNDERGROUND  
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|    |                                                                         |   |                                                                                                                  |
|----|-------------------------------------------------------------------------|---|------------------------------------------------------------------------------------------------------------------|
| 1. | <b>Product</b>                                                          | : | IS 15328 : 2003                                                                                                  |
|    | <b>Title</b>                                                            | : | UNPLASTICIZED NON-PRESSURE POLYVINYL CHLORIDE (PVC-U) PIPES FOR USE IN UNDERGROUND DRAINAGE AND SEWERAGE SYSTEMS |
|    | <b>No. of Amendments</b>                                                | : | 7                                                                                                                |
| 2. | <b>Sampling Guidelines:</b>                                             |   |                                                                                                                  |
| a) | <b>Raw material</b>                                                     | : | Clause 5 of IS 15328 : 2003                                                                                      |
| b) | <b>Grouping guidelines</b>                                              | : | Please refer <a href="#">ANNEX – A</a>                                                                           |
| c) | <b>Sample Size</b>                                                      | : | 1 mtr x 6 nos ( 2 nos with socket ) for all tests                                                                |
| 3. | <b>List of Test Equipment</b>                                           | : | Please refer <a href="#">ANNEX – B</a>                                                                           |
| 4. | <b>Scheme of Inspection and Testing</b>                                 | : | Please refer <a href="#">ANNEX – C</a>                                                                           |
| 5. | <b>Possible tests in a day</b> : Please refer <a href="#">ANNEX – D</a> |   |                                                                                                                  |
| 6. | <b>Scope of the Licence</b> : Please refer <a href="#">ANNEX – E</a>    |   |                                                                                                                  |

**ANNEX A****Grouping Guidelines**

1. PVC-U Pipes as per IS 15328: 2003 are categorized into following groups for the purpose of GoL/CSoL:

- a) ***Based on Size and SN/SDR:***

| SDR/SN<br>Class | Sizes (mm) |           |            |
|-----------------|------------|-----------|------------|
|                 | Group –I   | Group –II | Group –III |
| 51/Class 2      | -          | 160 – 250 | 315 – 630  |
| 41/ Class 4     | -          | 125 – 250 | 315 – 630  |
| 34/ Class 8     | 63 – 90    | 110 – 250 | 315 – 630  |

- b) ***Based on ends of pipe:***

- Plain ended pipes
- Socketed for elastomeric sealing ring jointing
- Socketed for solvent cement jointing

2. For considering GoL/CSoL, testing shall be done as follows:
  - a) Pipe of any size from each size group and SDR/SN class of pipe shall be tested to cover pipes of all sizes in that size group and SDR/SN class of pipe tested.
  - b) Separate pipes for each ends shall be tested. However, if socket ended pipe is tested, plain ended pipe in that size group and SDR/SN class may also be covered.
  - c) If plain ended pipe is covered in the licence and extension of Scope is requested for socket ended pipe, only applicable tests for socket shall be carried out.
3. The Firm shall declare the varieties of Pipes intended to be covered 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***Major test equipment required to test as per the Indian Standard*

| S. No. | Tests used in with Clause Reference                                                        | Test Equipment                                                                                                                                                                                                                                                                                                                                               |
|--------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | Mean Outside Diameter (Clause 6.1.1)                                                       | <ul style="list-style-type: none"> <li>- Pi Tape or flexible tape</li> <li>- Vernier Calipers or outside caliper</li> </ul>                                                                                                                                                                                                                                  |
| 2      | Wall Thickness (Clause 6.1.2)                                                              | <ul style="list-style-type: none"> <li>- Dial Gauge or</li> <li>- Micrometer</li> <li>- Ultrasonic gauge</li> </ul>                                                                                                                                                                                                                                          |
| 3      | Length of pipe (Clause 6.1.3)                                                              | <ul style="list-style-type: none"> <li>- Measuring Tape</li> </ul>                                                                                                                                                                                                                                                                                           |
| 4      | Dimensions of integral sockets and spigot ends and wall thickness of socket (Clause 6.1.4) | <ul style="list-style-type: none"> <li>- Vernier Caliper or Vernier depth gauge</li> <li>- Inside Caliper / bore gauge</li> <li>- Micrometer</li> <li>- Angle protractor</li> </ul>                                                                                                                                                                          |
| 5      | Vicat Softening temperature (Clause 7.3)                                                   | <ul style="list-style-type: none"> <li>- Oil heating Bath equipped with means to raise the temperature at uniform rate of <math>50 \pm 5^{\circ} \text{C/hr.}</math> with suitable stirrer.</li> <li>- Rod with loading plate, load and indenting tips</li> <li>- Micrometer dial gauge</li> <li>- Thermometer or temperature measuring equipment</li> </ul> |
| 6      | Longitudinal reversion (Clause 7.4)                                                        | <ul style="list-style-type: none"> <li>- Thermostatically Control oil bath or hot air oven</li> <li>- Mono-polyethylene glycol, glycerol or mineral oil free from aromatic hydrocarbons</li> <li>- Vernier Calipers</li> <li>- Stop watch</li> </ul>                                                                                                         |
| 7      | Resistance to external blows at $0^{\circ} \text{C}$ (Clause 8.1)                          | <ul style="list-style-type: none"> <li>- Falling Weight testing machine from height 2000 mm</li> <li>- Striker of weight 0.25, 0.50 &amp; 1.00 kg</li> <li>- Digital watch</li> <li>- Liquid bath or freezer for conditioning of samples</li> </ul>                                                                                                          |
| 8      | Ring stiffness (Clause 8.2)                                                                | <ul style="list-style-type: none"> <li>- Compression testing machine</li> <li>- Vernier caliper</li> <li>- Deflection measurement arrangement/dial bore gauge</li> <li>- Force measuring arrangement</li> <li>- Humidity chamber</li> </ul>                                                                                                                  |

|    |                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                      |
|----|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9  | Hydrostatic Pressure Test<br>(Clause 8.3)                                                                      | <ul style="list-style-type: none"> <li>- Hydrostatic pressure testing apparatus with pressuring unit and multiple outlets</li> <li>- Water bath with temperature control</li> <li>- Thermometer</li> <li>- End plugs</li> </ul>                                                                                                                                                                      |
| 10 | Sealing Rings (Clause 9.1)                                                                                     | <ul style="list-style-type: none"> <li>- Vernier caliper</li> <li>- Micrometer</li> <li>- Radius gauge</li> <li>- Shore hardness tester</li> </ul>                                                                                                                                                                                                                                                   |
| 11 | Internal hydrostatic pressure of elastomeric sealing ring joints<br>(Clause 10.1.1)                            | <ul style="list-style-type: none"> <li>- Hydrostatic pressure testing apparatus with pressuring unit (including negative pressure for negative pressure testing) and multiple outlets and timer</li> <li>- Framework with angular deflection arrangement in vertical and horizontal direction.</li> <li>- Air conditioner or temperature controlled water bath</li> <li>- Air conditioner</li> </ul> |
| 12 | Internal negative hydrostatic pressure (Internal vacuum) of Elastomeric sealing ring joints<br>(Clause 10.1.2) |                                                                                                                                                                                                                                                                                                                                                                                                      |
| 13 | Internal hydrostatic pressure for solvent cement joints<br>(Clause 10.2.1)                                     |                                                                                                                                                                                                                                                                                                                                                                                                      |
| 14 | Internal negative hydrostatic pressure (Internal vacuum) of solvent cement joints<br>(Clause 10.2.2)           |                                                                                                                                                                                                                                                                                                                                                                                                      |
| 15 | Effect on water<br>(Clause 7.5)                                                                                | <ul style="list-style-type: none"> <li>- Distilled water</li> <li>- Air conditioner</li> <li>- pH meter</li> <li>- Testing reagent and equipment for determination of cadmium, mercury, lead, tin and other toxic substances.</li> </ul>                                                                                                                                                             |

*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 15328: 2003

**4. CONTROL UNIT** – Pipes of same size and SN/SDR class manufactured from same extrusion compound in one extruder, up to maximum 48 hours, 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<br>R: required (or)<br>S: Sub-contracting permitted | Levels of Control |                      |                                                                                                                                                                                  |
| Cl.          | Requirement                                                                  | Test Methods     |                                                |                                                                                | No. of Sample     | Frequency            | Remarks                                                                                                                                                                          |
|              |                                                                              | Clause           | Reference                                      |                                                                                |                   |                      |                                                                                                                                                                                  |
| 5            | Composition of the material                                                  | 5.1 to 5.3       | IS 15328                                       | S                                                                              | One               | Each consignment     | No testing is required if consignment received is with test certificate.                                                                                                         |
| 6.1.1        | Mean Outer Diameter                                                          | 6.1.1            | IS 12235 (Part1)                               | R                                                                              | Ten               | Each control unit    | –                                                                                                                                                                                |
| 6.1.2        | Wall Thickness                                                               | 6.1.2            | IS 15328 & IS 4985                             | R                                                                              | Ten               | Each control unit    | –                                                                                                                                                                                |
| 6.1.3        | Length of Pipe                                                               | 6.1.3.1          | IS 15328                                       | R                                                                              | Ten               | Each control unit    | –                                                                                                                                                                                |
| 6.1.4        | Dimensions of integral sockets and spigot ends and wall thickness of sockets | 6.1.4<br>6.1.4.1 | IS 15328                                       | R                                                                              | Ten               | Each control unit    | –                                                                                                                                                                                |
| 7            | Physical characteristics                                                     |                  |                                                |                                                                                |                   |                      |                                                                                                                                                                                  |
| 7.1          | Appearance                                                                   | 7.1              | IS 15328                                       | R                                                                              | –                 | Each Pipe            | –                                                                                                                                                                                |
| 7.2          | Colour                                                                       | 7.2              | IS 15328                                       | -                                                                              | –                 | Each Pipe            | –                                                                                                                                                                                |
| 7.3          | Vicat Softening Temperature                                                  | 7.3              | IS 12235 (Part 2)                              | S                                                                              | One               | Once in three months | Additional test is required whenever there is change in raw material or composition of raw material.                                                                             |
| 7.4          | Longitudinal Reversion                                                       |                  | IS 12235 (Part 5/Sec 1)                        | R                                                                              | Three             | Each control unit    | If any sample fails, the batch shall be retested using further six samples, which shall meet the requirements of the Standard. In case of failure the batch shall not be marked. |
| 7.6          | Effect on water                                                              | 7.6              | IS 15328<br>IS 12235 (Pt 4)<br>IS 12235(Pt 10) | S                                                                              | 1                 | Once in six months   | Smallest size pipes produced shall be tested @                                                                                                                                   |

|        |                                                                                                   |                |                                        |   |     |                          |                                                                                                                                                                   |
|--------|---------------------------------------------------------------------------------------------------|----------------|----------------------------------------|---|-----|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8      | <b>MECHANICAL CHARACTERISTICS</b>                                                                 |                |                                        |   |     |                          |                                                                                                                                                                   |
| 8.1    | Resistance to external blows at 0° C                                                              | Annex B        | IS 15328                               | R | One | Each control unit        | –                                                                                                                                                                 |
| 8.2    | Ring Stiffness                                                                                    | 8.2            | IS 15328<br>IS 12235<br>(Part 18)      | R | One | Each control unit        | –                                                                                                                                                                 |
| 8.3    | <b>Resistance to internal Hydrostatic Pressure</b>                                                |                |                                        |   |     |                          |                                                                                                                                                                   |
|        | i) Type test (1000 h at 60° C)                                                                    | 8.3 & Table 6  | IS 15328<br>IS 12235<br>(Part 8/Sec 1) | S | One | Once in three months     | One size for each stiffness shall be tested at least once in a year.                                                                                              |
|        | ii) Acceptance test (1h at 27 ° C)                                                                | 8.3 & Table 6  | IS 15328<br>IS 12235<br>(Part 8/Sec 1) | R | One | Each control unit        | -                                                                                                                                                                 |
| 9.1    | Elastomeric Sealing Rings                                                                         | 9.1            | IS 15328<br>IS 5382                    | S | One | Each consignment         | In case the consignment received is with conformity test certificate, further testing is not required.                                                            |
| 9.2    | Solvent Cement                                                                                    | 9.2            | IS 15328<br>IS 14182                   | S | One | Each consignment         | In case the consignment received is with conformity test certificate, further testing is not required.                                                            |
| 10     | <b>Performance requirements</b>                                                                   |                |                                        |   |     |                          |                                                                                                                                                                   |
| 10.1.1 | Internal hydrostatic pressure test for elastomeric sealing ring joints                            | 10.1.1 Annex D | IS 15328                               | R | One | Every tenth control unit | If any test piece fails, the batch shall be retested using further two samples, which shall pass the test. In case of any failure, the batch shall not be marked. |
| 10.1.2 | Internal negative hydrostatic pressure test (internal vacuum) for elastomeric sealing ring joints | 10.1.2 Annex E | IS 15328                               | R | One | Every tenth control unit |                                                                                                                                                                   |
| 10.2.1 | Internal hydrostatic pressure test for solvent cemented Joints                                    | 10.2.1         | IS 15328                               | R | One | Every tenth control unit |                                                                                                                                                                   |

|        |                                                                                           |        |          |   |     |                          |  |
|--------|-------------------------------------------------------------------------------------------|--------|----------|---|-----|--------------------------|--|
| 10.2.2 | Internal negative hydrostatic pressure test (internal vacuum) for solvent cemented joints | 10.2.2 | IS 15328 | R | One | Every tenth control unit |  |
|--------|-------------------------------------------------------------------------------------------|--------|----------|---|-----|--------------------------|--|

@ Additional sample shall be tested whenever there is a change in formulation/composition. Pipes from each class shall be tested in one year.

Note-1: In case of failure in any of the above tests, twice the number of samples shall be tested for that requirement and control unit shall be accepted only if retested samples pass.

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.

**ANNEX – D**

**Possible tests in a day**

- (i) Dimensions (Clause 6)
- (ii) Appearance (Clause 7.1)
- (iii) Colour (Clause 7.2)
- (iv) Vicat softening temperature (Clause 7.3)
- (v) Longitudinal reversion (Clause 7.4)
- (vi) Resistance to external blows at 0° C (Clause 8.1)
- (vii) Resistance to internal hydrostatic pressure (Acceptance test) (Clause 8.3)
- (viii) Internal hydrostatic pressure test for joints (clause 10.1.1 or 10.2.1)
- (ix) Internal negative hydrostatic pressure test (internal vacuum) for joints (Clause 10.1.2 or 10.2.2)

**ANNEX - E****Scope of the Licence**

|                                                                                           |                                                                                                                      |
|-------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| “Licence is granted to use Standard Mark as per IS 15328 : 2003 with the following scope: |                                                                                                                      |
| Name of the product                                                                       | UNPLASTICIZED NON-PRESSURE POLYVINYL CHLORIDE (PVC-U) PIPES FOR USE IN UNDERGROUND DRAINAGE AND SEWERAGE SYSTEMS     |
| Standard Dimension Ratio (SDR)/<br>Nominal Ring Stiffness (SN)<br>Class/Pipe Series       |                                                                                                                      |
| End of Pipes                                                                              | a) Plain ended pipes<br>b) Socketed for elastomeric sealing ring jointing<br>c) Socketed for solvent cement jointing |
| Size                                                                                      |                                                                                                                      |