



## PRODUCT MANUAL FOR HIGH DENSITY POLYETHYLENE PIPES FOR SEWERAGE ACCORDING TO IS 14333 : 1996

*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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|----|--|--|---|
| 1. | <b>Product</b>   | :  | IS 14333 : 1996   |
|    | <b>Title</b>   | :  | HIGH DENSITY POLYETHYLENE PIPES FOR SEWERAGE                              |
|    | <b>No. of Amendments</b>   | :  | 4   |
| 2. | <b>Sampling Guidelines:</b>  |  |   |
| a) | <b>Raw material</b>  | :  | High density polyethylene resin – Clause 5.1<br>Master batch – Clause A-1 |
| b) | <b>Grouping guidelines</b>   | :  | Please refer <a href="#">ANNEX – A</a>                                    |
| c) | <b>Sample Size</b>   | :  | Pipes of length 1 meter x 6 nos   |
| 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>   |  |   |
|    | (i) Colour (Clause 4)<br>(ii) Dimensions of pipes (Clause 6)<br>(iii) Reversion test (Clause 8.2)<br>(iv) Density and Melt flow rate (Clause 8.3 & 8.4)<br>(v) Carbon black content and dispersion (Class 8.5) |  |   |
| 6. | <b>Scope of the Licence :</b>  |  |   |
|    | “Licence is granted to use Standard Mark as per IS 14333 : 1996 with the following scope:  |  |   |
|    | Name of the product  | HIGH DENSITY POLYETHYLENE PIPES FOR SEWERAGE |   |
|    | Grade of material  |  |   |
|    | Pressure rating (PN)   |  |   |
|    | Nominal diameter (DN)  |  |   |

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

1. High Density Polyethylene Pipes for Sewerage as per IS 14333: 1996 are classified based on Nominal Size, Pressure Rating and Grade of Material as given below:

| Material Grade | Pressure Rating Group (PN) |           |           | Size Group (DN) (mm) |            |             |
|----------------|----------------------------|-----------|-----------|----------------------|------------|-------------|
|                | Low                        | Medium    | High      | Group –I             | Group –II  | Group –III  |
| PE 63          | 2.5 & 4                    | 6, 8 & 10 | 12.5 & 16 | 63 to 180            | 200 to 500 | 560 to 1000 |
| PE 80          | 2.5 & 4                    | 6, 8 & 10 | 12.5 & 16 | 63 to 180            | 200 to 500 | 560 to 1000 |
| PE 100         | 2.5 & 4                    | 6, 8 & 10 | 12.5 & 16 | 63 to 180            | 200 to 500 | 560 to 1000 |

2. In order to cover all pipes in a specified category as above, following shall be followed:
- PE resin of any grade shall be tested to cover all the grades of resin. However declaration related to master batch and other grades of PE resin shall be obtained for all other grades.
  - Pipe with highest pressure rating from each pressure rating group (Low, Medium and High) shall be tested to cover pipes of all pressure ratings in that pressure rating group and manufactured from same material grades.
  - Two pipes from each size group (preferably highest and lowest) shall be tested to cover pipes of all sizes in that size group.
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***Major test equipment required to test as per the Indian Standard*

| <b>S. No.</b> | <b>Tests used in with Clause Reference</b>        | <b>Test Equipment</b>  |
|---------------|---|--|
| 1             | Dimensions of pipes (Clause 6.1 to 6.5)           | <ul style="list-style-type: none"> <li>- Vernier caliper</li> <li>- Travelling microscope</li> <li>- Measuring Tape</li> <li>- PI Tape or Circometer</li> <li>- Ball ended Micrometer</li> <li>- Measuring scale</li> </ul>  |
| 2             | Internal pressure creep rupture test (Clause 8.1) | <ul style="list-style-type: none"> <li>- Pressure testing apparatus with pressure gauges and timer</li> <li>- Thermostatically controlled water bath</li> <li>- End plugs</li> </ul>   |
| 3             | Reversion test (Clause 8.2)                       | <ul style="list-style-type: none"> <li>- Hot air oven</li> <li>- Thermometer</li> <li>- Steel scale /Vernier caliper</li> </ul>  |
| 4             | Density (Clause 8.3)                              | <ul style="list-style-type: none"> <li>- Digital Balance with holding attachment</li> <li>- Distilled water</li> <li>- Butyl Acetate</li> <li>- Hydrometer</li> <li>- Glass beaker of 250 ml capacity</li> <li>- Thermometer</li> <li>- Air conditioner</li> <li>- Heated press (Steam and Electrical)</li> </ul>  |
| 5             | Melt flow rate (Clause 8.4)                       | <ul style="list-style-type: none"> <li>- Melt flow rate Apparatus with digital temperature controller and timer and load of 5 kgf</li> </ul>   |
| 6             | Carbon black content and dispersion (Clause 8.5)  | <ul style="list-style-type: none"> <li>- Furnace to accommodate the combustion tube with digital temperature controller</li> <li>- Combustion boats made of porcelain or silica, having minimum dimensions of 75 mm length, 9 mm width &amp; 8 mm height</li> <li>- Combustion tube made of hard glass of approximately 30 mm diameter and 400 ± 50 mm length</li> <li>- Nitrogen gas Cylinder with flow meter for controlling flow of nitrogen within 1.7 ± 0.3 liters per minute.</li> </ul> |

|  |  |  |
|--|--|--|
|  |  | <ul style="list-style-type: none"><li>- Analytical balance or equivalent, capable of weighing to the nearest 0.1 mg</li><li>- Desiccator, Trichloroethylene &amp; solid carbon dioxide</li><li>- Fume Hood</li><li>- Hot plate</li><li>- Projection Microscope with 100/200 times magnification</li><li>- Glass Slides</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 14333: 1996

**4. CONTROL UNIT** – Pipes of same designation from a continuous extrusion run of one machine manufactured from same batch of raw material upto maximum of 48 h duration shall constitute one 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.

**5.2** Storage, handling, laying and jointing of pipes shall be as per IS 7634 (Part 2):2012.

**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                      |  |                   |                   |   |
| 4            | Colour                            | 4                     | IS 14333                       | -  | Each pipe         | -                 | -   |
| 5            | Material                          | 5.1 to 5.2<br>Annex-A | IS 14333<br>IS 7328<br>IS 2530 | S  | 1                 | Each consignment  | #   |
| 6            | Dimensions of pipes               | 6.1 to 6.5<br>Annex-A | IS 14333                       | R  | 10 %              | Each control unit | Samples shall be selected at random to cover entire production evenly as far as possible. In case failure of sample in any requirement, double the initial sample shall selected and tested, control unit shall be rejected in case of failure of retested samples. |
| 7            | Visual appearance                 | 7                     | IS 14333                       | -  | Each pipe or coil | -                 | -   |
|              | Maximum out of square of pipe end |                       |                                | R  | 10 %              | Each control unit | Samples shall be selected at random to cover entire production evenly as far as possible. In case failure of sample in any requirement, double the initial sample shall selected and tested, control unit shall be rejected in case of failure of retested samples. |

|     |                                  |                  |                     |   |       |  |   |
|-----|----------------------------------|------------------|---------------------|---|-------|--|---|
| 8.1 | <b>Hydraulic characteristics</b> |                  |                     |   |       |  |   |
|     | Acceptance test                  | 8.1<br>Annex-B   | IS 14333            | R | One   | Each control unit  | -   |
|     | Type test                        | 8.1<br>Annex-B   | IS 14333            | R | Three | Once in three month or whenever there is any change in resin composition or method of manufacture. | The testing schedule shall be so arranged that during period of two years, pipe of the highest size of each pressure rating and each grade manufactured during the period shall be tested. In case of failure marking shall be stopped immediately and BIS shall be informed about failure. Corrective actions shall be taken and marking shall be resumed only after satisfactory testing of additional three samples. |
| 8.2 | Reversion test                   | 8.2<br>Annex – C | IS 14333            | R | One   | Each control unit  | -   |
| 8.3 | Density                          | 8.3<br>Annex-A   | IS 14333<br>IS 7328 | R | One   | Each control unit  | The sample shall be composite sample of minimum three pipes drawn at regular interval.  |
| 8.4 | Melt flow rate                   | 8.4              | IS 14333<br>IS 2530 | R | One   | Each control unit  |   |
| 8.5 | Carbon black and dispersion      | 8.5              | IS 14333<br>IS 2530 | R | One   | Each control unit  |   |

# No further testing is required if accompanied with the Test Certificate or ISI marked.

Note-1: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-2: 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.