



उत्पाद मैनुअल
आई एस 14333 : 2022 के अनुसार मालप्रवाह पद्धति एवं आद्योगिक रसायन तथा
बही: साव के लिए पोलीईथीलीन पाइप के लिए

दस्तावेज संख्या – पीएम/आईएस 14333/2/दिसंबर 2022

भारतीय मानक ब्यूरो की स्कीम-1 (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
POLYETHYLENE PIPES FOR SEWERAGE AND
INDUSTRIAL CHEMICALS AND EFFLUENT
ACCORDING TO IS 14333 : 2022**

Document No.- PM/ IS 14333/2/Dec 20222

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
मानक भवन, ९, बहादुर शाह ज़फ़र मार्ग
Manak Bhawan, 9, Bahadur Shah Zafar Marg
नई दिल्ली- ११०००२
New Delhi – 110002



PRODUCT MANUAL FOR POLYETHYLENE PIPES FOR SEWERAGE AND INDUSTRIAL CHEMICALS AND EFFLUENT ACCORDING TO IS 14333 : 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.

1.	Product	:	IS 14333 : 2022
	Title	:	Polyethylene Pipes For Sewerage and Industrial Chemicals and Effluent
	No. of Amendments	:	Nil
2.	Sampling Guidelines:		
a)	Raw material	:	Polyethylene resin – Clause 5.2 Carbon Black Master batch – Clause 5.3
b)	Grouping guidelines	:	Please refer ANNEX – A
c)	Sample Size	:	Pipes of length 1 meter x 6 nos
d)	Sampling Guidelines During Operation of Licence	:	Please refer ANNEX – B
3.	List of Test Equipment	:	Please refer ANNEX – C
4.	Scheme of Inspection and Testing	:	Please refer ANNEX – D
5.	Possible tests in a day :		
	Please refer ANNEX – E		
6.	Scope of the Licence :		
	“Licence is granted to use Standard Mark as per IS 14333 : 2022 with the following scope:		
	Name of the product	:	Polyethylene Pipes For Sewerage and Industrial Chemicals and Effluent
	Pipe Designation	:	PE_ PN_ DN_ SDR_

BUREAU OF INDIAN STANDARDS
Manak Bhawan, 9, Bahadur Shah Zafar
Marg, New Delhi – 110002

ANNEX A

Grouping Guidelines

1. Polyethylene Pipes For Sewerage and Industrial Chemicals and Effluent as per IS 14333 : 2022 are classified as follows:

Material Grades	PE 63, PE 80 and PE 100
Standard Dimension Ratio (SDR)	SDR 41, SDR 33, SDR 26, SDR 21, SDR 17, SDR 13.6, SDR 11, SDR 9, SDR 7.4 and SDR 6
Pressure Ratings	PN 2, PN 2.5, PN 3.2, PN 4, PN 5, PN 6, PN 8, PN 10, PN 12.5, PN 16 and PN 20
Sizes (Nominal Diameter)	DN 63 mm to DN 2500 mm

2. Considering the above, Polyethylene Pipes are categorized into following groups for the purpose of GoL/ CSoL:

Material Grade	Pressure Rating Group (PN)			Size Group DN (mm)					
	Group-A	Group-B	Group-C	Group-I	Group-II	Group-III	Group-IV	Group-V	Group-VI
PE 63	PN 2, PN 2.5, PN 3.2, PN 4	PN 5, PN 6, PN 8	-	63 to 110	125 to 180	200 to 500	560 to 1000	1200 to 2000	2250 & 2500
PE 80	PN 2.5, PN 3.2, PN 4	PN 5, PN 6, PN 8, PN 10	PN 12.5, PN 16, PN 20	63 to 110	125 to 180	200 to 500	560 to 1000	1200 to 2000	2250 & 2500
PE 100	PN 3.2, PN 4	PN 5, PN 6, PN 8, PN 10	PN 12.5, PN 16, PN 20	63 to 110	125 to 180	200 to 500	560 to 1000	1200 to 2000	2250 & 2500

3. For considering GoL/CSoL, testing shall be done as follows:

- a) Pipe with highest pressure rating from each pressure rating group (Group-A, Group-B and Group-C) shall be tested to cover pipes of all pressure ratings in that pressure rating group and manufactured from same material grade.
- b) Two pipes from each size group, preferably highest and lowest sizes, shall be tested to cover pipes of all sizes in that size group.
- c) In case of higher sizes for which test facilities are not available in independent laboratory, samples to be drawn for testing in independent laboratory for the following requirements – color (Cl 6.2), longitudinal reversion test (Cl 8.2), carbon black content and dispersion (Cl 8.3), melt flow rate (Cl 8.4), oxidation induction time (Cl 8.5), density (Cl 8.6), tensile strength for butt-fusion (Cl 8.7) and tensile properties (Cl 8.8).

Remaining tests, i.e. geometric characteristics (Cl 7), hydraulic characteristics (48h, 100h, 165h & 1000h) (Cl 8.1) and slow crack growth rate test (500h) (Cl 8.9) may be tested at the factory premise. Special visits to be made at the factory to check conformity of these tests as

per the respective clauses at the end of 48h, 100h, 165h, 500h & 1000h (6 mandays).

4. The Firm shall declare the varieties of Polyethylene 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.
5. During the operation of the Licence, BO shall ensure that all Pressure ratings, Material grades and Sizes covered in the Licence are tested in rotation, to the extent possible.

ANNEX B

Sampling Guidelines During Operation of Licence

- (i) During an operative year of a licence, two Factory Samples and two Market Samples shall be drawn.
- (ii) During Factory Surveillance inspection, sample of the sizes produced by the firm and for which testing facilities are available in independent lab has to be drawn for independent testing.
- (iii) For other sizes for which test facilities are not available in independent laboratory, all possible tests in a day as given in Annex-E are to be carried out on at least one size of the pipe.

ANNEX C**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	Dimensions of pipes (Clause 7)	- Vernier caliper - Travelling microscope - Measuring Tape - PI Tape or Circometer - Ball ended Micrometer - Measuring scale
2	Internal pressure creep rupture test (Clause 8.1)	- Pressure testing apparatus with pressure gauges and timer - Thermostatically controlled water bath - End plugs
3	Reversion test (Clause 8.2)	- Hot air oven - Thermometer - Steel scale /Vernier caliper
	Carbon black content and dispersion (Clause 8.3)	- Furnace to accommodate the combustion tube with digital temperature controller - Combustion boats made of porcelain or silica, having minimum dimensions of 75 mm length, 9 mm width & 8 mm height - Combustion tube made of hard glass of approximately 30 mm diameter and 400 ± 50 mm length - Nitrogen gas Cylinder with flow meter for controlling flow of nitrogen within 1.7 ± 0.3 liters per minute. - Analytical balance or equivalent, capable of weighing to the nearest 0.1 mg - Desiccator, Trichloroethylene & solid carbon dioxide - Fume Hood - Hot plate - Projection Microscope with 100/200 times magnification - Glass Slides

	Melt flow rate (Clause 8.4)	- Melt flow rate Apparatus with digital temperature controller and timer and load of 5 kgf
	Oxidation Induction Time (Clause 8.5)	- As per B-1 of IS 4984
4	Density (Clause 8.6)	- Digital Balance with holding attachment - Distilled water - Butyl Acetate - Hydrometer - Glass beaker of 250 ml capacity - Thermometer - Air conditioner - Heated press (Steam and Electrical)
5	Tensile Strength for Butt-fusion (Clause 8.7) & Tensile Properties (Clause 8.8)	- As per G-2 of IS 4984 - As per H-1 of IS 4984
6	Slow Crack Growth Rate (Clause 8.9)	- As per J-1 of IS 4984

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

ANNEX D**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: 2022.

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 R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
5.2	Polyethylene resin	5.2	IS 14333 IS 7328	S	1	Each consignment	No further testing is required, if accompanied with the test certificate or ISI Marked.
5.3	Master batch	5.3	IS 14333				
6	Colour	6.2		R	All	-	-
7	Geometric Characteristics of Pipes (Visual appearance, Length/Coiling and Dimensions)	7.1 to 7.4	IS 14333 IS 4984	R	Ten	Each controlunit	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	Hydraulic characteristics						
	Internal Pressure Creep Rupture Test of Pipe (at 80 ° C for 48 h)	8.1.1	IS 14333, Annex E of IS 4984	R	One	Once in a week	-
	Internal Pressure Creep Rupture Testof Pipe (at 27 ° C for 100 h)	8.1.1	IS 14333, Annex E of IS 4984	R	Three	Once in a month or whenever there is any change in resin composition or method of	The testing schedule shall be so arrangedthat during period of one year, pipe of the highest size from each pressure rating/SDR and each grade

						manufacture.	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.
8.1	Internal Pressure Creep Rupture Test of Pipe (at 80 ° C for 165 h)	8.1.1	IS 14333, Annex E of IS 4984	S	Three	Once in three months 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/SDR 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.
	Internal Pressure Creep Rupture Test of Pipe (at 80 ° C for 1000 h)	8.1.1	IS 14333, Annex E of IS 4984	S	Three	Once in a year months or whenever there is any change in resin composition or method of manufacture.	
	Internal Pressure Creep Rupture Test of Pipe Joints (at 80 ° C for 48 h)	8.1.2	IS 14333, Annex E of IS 4984	R	Three	Once in a week	-
8.2	Longitudinal Reversion Test	8.2	IS 14333, Annex F of IS 4984	R	One	Each control unit	-
8.3	Carbon Black Content and Dispersion	8.3	IS 14333 IS 2530 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 IS 2530	R	One	Each control unit	The sample shall be composite sample of minimum three

							pipes drawn at regular interval.
8.5	Oxidation Induction Time	8.5	IS 14333, Annex B of IS 4984	R	One	Each control unit	-
8.6	Density	8.6	IS 14333 IS 7328	R	One	Each control unit	The sample shall be composite sample of minimum three pipes drawn at regular interval.
8.7	Tensile Strength for Butt-fusion	8.7	IS 14333, Annex G of IS 4984	S	One	Once in a year or whenever there is any change in resin composition or method of manufacture.	In case of failure of sample, additional sample of same size shall be drawn and tested. The sample shall be accepted, if no further failure is observed. In case of failure, marking shall be stopped and BIS shall be informed about the failure. Corrective actions shall be taken and marking shall be resumed only after satisfactory verification of corrective actions taken by manufacturer by testing of sample.
8.8	Tensile Properties (Yield Strength & Elongation at Break)	8.8	IS 14333, Annex H of IS 4984	R	One	Each control unit	-
8.9	Slow Crack Growth Rate Test	8.9	IS 14333, Annex J of IS 4984	S	One	Once in a year or whenever there is any change in resin composition or method of manufacture.	In case of failure of sample, additional sample of same size shall be drawn and tested. The sample shall be accepted, if no further failure is observed. In case of failure, marking shall be stopped and BIS shall be informed about the failure. Corrective actions shall be taken and marking shall be resumed only after satisfactory

							verification of corrective actions taken by manufacturer by testing of sample.
--	--	--	--	--	--	--	--

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 hisown levels of control in column 3 with proper justification for approval by BO Head.

ANNEX – E

Possible tests in a day

- (i) Colour (Clause 6.2),
- (ii) Dimensions (Clause 7),
- (iii) Reversion test (Clause 8.2)
- (iv) Density and Melt flow rate (Clause 8.4 & 8.6)
- (v) Carbon black content and dispersion (Class 8.5)
- (vi) Oxidation Induction Time (Clause 8.5),
- (vii) Tensile Properties (Clause 8.8),
- (viii) Tensile Strength for Butt-fusion (Clause 8.7)