



**PRODUCT MANUAL FOR
(IRRIGATION EQUIPMENT- SPRINKLER PIPES- PART 1: POLYETHYLENE PIPES)
ACCORDING TO IS 14151 PART 1 : 1999**

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 14151 (Part 1) : 1999
	Title	:	Irrigation Equipment- Sprinkler Pipes- Part 1: Polyethylene Pipes
	No. of amendments	:	04
2.	Sampling Guidelines		
a)	Raw material	:	i) PE Resin (PE 63 or above) ii) Carbon Black iii) Anti-oxidants iv) Reworked Material {Ref: Cl. 4 of IS 14151 (Pt 1):1999}
b)	Grouping Guidelines	:	Please refer Annex – A
c)	Sample Size	:	For Grant of licence under Normal Procedure, the following samples to be drawn: i) Raw material compound (mixture of PE resin and master batch) (if firm provides conformity of raw material as per Cl No. 4 of ISS, no raw material sample to be drawn) ii) 1m X 6 no of Pipes Routine sample: 1m X 6 no of pipes
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 :		
	Dimensions Visual Appearance Hydraulic characteristics Reversion test		

	Tensile test and Elongation Fusion compatibility test Supply length of pipe CBC CBD Melt Flow Rate											
6.	Scope of the Licence :											
	Licence is granted to use Standard Mark as per IS 14151 (Part 1):1999 with the following scope:											
	Name of the product	Irrigation Equipment- Sprinkler Pipes Part 1 Polyethylene Pipes										
	Class	<table border="1"> <thead> <tr> <th>Class of pipes</th> <th>Maximum Permissible Pipes Working Pressure at 30°C</th> </tr> </thead> <tbody> <tr> <td>Class 1</td> <td>0.25 MPa</td> </tr> <tr> <td>Class 2</td> <td>0.32 MPa</td> </tr> <tr> <td>Class 3</td> <td>0.40 MPa</td> </tr> <tr> <td>Class 4</td> <td>0.60 MPa</td> </tr> </tbody> </table>	Class of pipes	Maximum Permissible Pipes Working Pressure at 30°C	Class 1	0.25 MPa	Class 2	0.32 MPa	Class 3	0.40 MPa	Class 4	0.60 MPa
Class of pipes	Maximum Permissible Pipes Working Pressure at 30°C											
Class 1	0.25 MPa											
Class 2	0.32 MPa											
Class 3	0.40 MPa											
Class 4	0.60 MPa											
	Size (Outside Diameter)	X mm (Outer Diameter)										

ANNEXURE A

**TO PRODUCT MANUAL
FOR (IRRIGATION EQUIPMENT- SPRINKLER PIPES- PART 1: POLYETHYLENE
PIPES)
ACCORDING TO IS 14151 PART 1 : 1999**

GROUPING GUIDELINES

Grouping Guidelines for grant of licence and inclusion of new varieties of Polyethylene Pipes as per IS 14151 (Part 1) :1999 ‘Irrigation Equipment – Sprinkler Pipes - Part 1 Polyethylene Pipes has been laid down under CMD note ref: CMD-2/16:14151 (Part 1) dt: 19.09.2017.

The guideline is re-iterated as below:

i) One sample of each variety of Polyethylene Pipes from each of the following Groups (preferably higher size) for each class shall be tested for all requirements of the specification, in order to cover the complete range of sizes:

Group I 40mm - 75mm (Nominal Diameter)

Group II 90mm – 140mm (Nominal Diameter)

Group III 160mm – 200mm (Nominal Diameter)

ii) The raw material i.e. HDPE Resin along with Carbon Black Masterbatch shall also be tested as per the specification. Firm may submit undertaking as per clause no. 4.3 and 4.4 of IS 14151 (Part 1).

iii) It shall however be ensured and recorded that the applicant/licensee has got complete manufacturing as well as testing facilities for the sizes required to be covered as per the Grouping guidelines.

iv) During the operation of licence, BOs shall also ensure that all sizes/classes covered in the licence are drawn for independent testing on rotation over a period of time.

ANNEXURE B
TO PRODUCT MANUAL FOR
(IRRIGATION EQUIPMENT- SPRINKLER PIPES- PART 1 POLYETHYLENE PIPES)
ACCORDING TO IS 14151 PART 1:1999

LIST OF TEST EQUIPMENT

Major test equipment required to test as per requirements of Indian Standard.

S. No.	Test Equipment	Tests used in with clause reference
1	i) Electrical hot press sample preparation apparatus hydraulic jack along with digital temp. indicator, fitted with pressure gauge ii) Spacer frame iii) Chrome plated sheet iv) n-Butyl acetate v) Room Thermometer vi) Electrical single pan balance vii) Hydrometer viii) Measuring cylinder ix) Beaker x) Nylon wire xi) Platform for weighing	Density of composite sample Cl. 4.1.1 and 7.5
2	i) M.F.I. Test apparatus with digital temp. Controller and digital timer Weight load 5kg ii) Electrical single pan balance iii) Sharp knife (For Sample cutting) /sample cutter iv) Xylene (For piston cleaning)	Melt flow rate Cl. 4.1 and 7.6
3	i) C.B.C test App. With digital temperature controller, Combustion Tube. ii) N2 Cylinder with regulator & Gas flow meter iii) Ceramic boats iv) Tong, Poker v) Bubblers vi) CaCL ₂ vii) Trichloroethylene viii) Desiccators ix) Weighing Balance single pan x) Dry Ice box	Carbon black content Cl. 4.2
4	i) Hot plate thermostatically Controlled with temp.indicator ii) Microscope iii) Glass slides iv) Tong v) Metal shim	Carbon black dispersion Cl. 4.2
5		Dimensions of pipe Cl. 5

	Vernier Caliper and Pie Tape	a) Outside diameter Cl. 5.1.1
	Micrometer ball ended	b) Wall thickness Cl. 5.1.1
	Vernier Caliper	c) Ovality Cl. 5.1.2
	i) Half Round Angle Protector fitted with steel strip for Square ness Test & Right Angle ii) Filler Gauge set iii)Measuring Tape	d) Squareness Cl. 5.1.2 Pipe length
6	Visually	Visual appearance Cl. 6
7	i) 1st Hot water bath thermostatically controlled with digital temp. indicator with stirrer and hour meter ii) Hydrostatics Pressure tester station iii)End Plugs iv) Haxsaw with Blade	Hydraulic characteristics Cl. 7.1
8	i) 1 st Hot Air Oven Thermostatically Controlled with Air Circulating Fan and Digital Temp. Indicator ii)Vernier Caliper iii)Steel Scale iv) Wall Clock v) Haxsaw with Blade vi) Glass Plate vii) Telcum Powder	Reversion test Cl. 7.2
9	i)Digital Tensile Testing M/c ii) Dumbell Die ½, 1 and 2 Type along with Hydraulic jack iii)Vernier Caliper Micrometer ball ended iv) Air Conditioner	Tensile test and Elongation Cl. 7.3
10	i) 2nd Water bath thermostatically controlled with digital temp. indicator with stirrer and hour meter ii) Hydrostatics Pressure tester station iii) End Plugs iv) Haxsaw with Blade	Fusion compatibility Cl. 7.4
11.	Heated press-Steam or Electrical, Analytical balance, Butyl Acetate –lab grade, Thermometer, Hydrometer, Beaker-250 ml.	Density Cl 7.5 (Annex A of IS 7328)
12.	Extrusion plastometer consisting of Cylinder, Piston, Removable load on top of the piston, Heater, Temperature measuring device, two roll mixing mill.	Melt flow rate Cl 7.6 (Cl 7 of IS 2530)

List above is only indicative and may not be taken as exhaustive.

ANNEXURE C

SCHEME OF INSPECTION AND TESTING

FOR IRRIGATION EQUIPMENT- SPRINKLER PIPES- PART 1 POLYETHYLENE PIPES ACCORDING TO IS 14151 PART 1 : 1999

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 equipments.

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

3. LABELLING AND MARKING – The Standard Mark, as given in the Schedule of the licence, shall be applied by heat embossing or in colour (as specified in Cl. 10.1.1 of IS 14151 (Part 1) by screen printing/engraving provided always that the pipe to which this mark is thus applied, conform to every requirement of the specification. In case the mark is applied by engraving, it shall be applied in such a manner that it does not impair the strength and dimensional requirement of the pipe in any way.

3.1 Marking – Each pipe shall be indelibly marked in English at intervals of not more than 6 m by heat embossing or in colour as indicated in 10.1.1 of IS 14151 (Part 1). The marking shall show the following:

- a) Manufacturer's name or trade-mark
- b) Outside diameter,
- c) Class of pipe and
- d) Batch number.

The information specified in clause 10.1 of IS 14151 (Part 1) shall be indelibly marked in colour or heat embossed as indicated under clause 10.1.1 of IS 14151 (Part 1). In addition, the following details shall be mentioned on each pipe legibly and indelibly:

- a) BIS Licence No. CM/L. _____
- b) BIS website details i.e –“For details of BIS certification please visit www.bis.gov.in”.

4. CONTROL UNIT: For the purpose of this scheme, total quantity of pipes of same size and class manufactured under similar conditions and from one machine using same composition of the materials, up to a maximum of eight hours duration shall constitute a control unit.

4.1 The percentage of anti- oxidant in the base resin and addition of reworked material shall be as per Cl 4.3 and 4.4 of IS 14151 (Pt 1):1999. Appropriate records shall be maintained to indicate the amount of these materials used in the manufacture of every 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 this license shall be marked with certification Mark of the Bureau.

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
LEVELS OF CONTROL

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or)S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods Cl. Ref.	Test Method IS		No. of Sample	Frequency	Remarks
4.1	Material	4.1	IS 14151 (Pt 1)	S	One	Each consignment	In case of test certificate is received with each consignment of raw material, further testing in the factory would not be necessary
4.2	Carbon black content	10	IS 2530	R	One sample	Each day	Composite sample from 3 pieces selected from a day production shall be tested. Non-confirming batches shall not be covered under ISI mark.
-do-	Carbon black dispersion	16	-do-	R	-do-	-do-	-do-
5	Dimension	5.1, 5.1.1 & 5.1.2	IS 14151 (Pt 1)	R	One sample for every hour of production		Samples shall be drawn at regular interval
6	Visual	5.2	-do-	R	Each pipe		
7.1	Hydraulic characteristics	7.1					
7.1.1	a) Acceptance test	Annex-A	IS 14151 (Pt 1)	R	3 pieces of each class #	Once in a week	If no defective is found, the control unit shall be declared as passing. However, if only one defective is found the control unit may be considered as failing and the control unit shall be rejected
7.1.2 to 7.1.5	b) Quality test	-do-	-do-	S	3 pieces	Once in a year **	In case of failure the same number of samples shall be tested again. No failure shall be permissible in this test

7.2	Reversion test	7.2	-do-	R	3 pieces of each class [#]	Once in a week	do
7.3	Tensile test	7.3	-do-	R	3*	-do-	-do-
7.4	Fusion compatibility test						If no defective is found, the control unit shall be declared as passing. However, if only one defective is found the control unit may be considered as failing and the control unit shall be rejected
7.4.1 & 7.4.2	a) Acceptance test b) Quality test	7.4 and Annex-A	IS 14151 (Pt 1) -do-	R S	3 pieces of each class # -do-	Once in a week Once in a year **	In case of failure the same number of samples shall be tested again. No failure shall be permissible in this test
7.5	Density	Annex A	IS 7328	R	3 Pipes	Once in a week	If no defective is found, the control unit shall be declared as passing. However, if only one defective is found the control unit may be considered as failing and the control unit shall be rejected
7.6	Melt flow rate	7	IS 2530	R	3 pipes of each class and size	-do-	-do-

Note-1: Whether test equipment is required or sub-contracting is permitted in column 2 shall be decided by the Bureau and shall be mandatory. 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.

Note-3: [#] Effort shall be made to cover each size of PE Sprinkler pipes during an operative period of one year.

* Number of test specimen in Cl 7.3.2 of IS 14151 (Pt 1):1999 shall be used.

** This test shall be carried out on each size of each class produced in a year and on change of polymer composition, or change in method of manufacture or whenever new sizes are produced.