



PRODUCT MANUAL FOR
Irrigation Equipment - Polyethylene Pipes For Irrigation Laterals
According to IS 12786 : 1989

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 12786 : 1989
	Title	Irrigation Equipment - Polyethylene Pipes For Irrigation Laterals
	No. of amendments	07
2.	Sampling Guidelines	Please see Annex A
a)	Raw material	Raw materials shall conform to requirements as specified in Cl. 4 of IS 12786.
b)	Grouping Guidelines	Please see Annex A
c)	Sample Size	2 No of Coils of 25meter length
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	a) Dimensions (cl.6) b) Internal pressure creep rupture test – Acceptance test (cl.7.1.1) c) Reversion test (cl.7.2) d) Tensile test (cl.7.3)
6.	Scope of the Licence :	
	Name of the product	Irrigation Equipment - Polyethylene Pipes For Irrigation Laterals
	Type	Class of Pipe (based on Working Pressure) :1,2 or 3
	Size	Size (based on Outer Diameter): 12, 16, 20, 25 & 32 mm.

Annex-A
TO PRODUCT MANUAL FOR
IRRIGATION EQUIPMENT - POLYETHYLENE PIPES FOR IRRIGATION LATERALS
ACCORDING TO IS 12786 : 1989

GROUPING GUIDELINES
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- i) The Standard covers the following classification of polyethylene pipes for irrigation laterals:
 - a. Class of pipe (based on working pressure): Class 1, 2 & 3.
 - b. Size (based on outside diameter): 12, 16, 20, 25 & 32 mm.

- ii) Each class of pipe may be considered as one group. Pipes of each class of any size preferably the largest size may be subjected to independent testing for considering grant of licence/ inclusion.

- iii) The Firm shall declare the Class and size 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.

- iv) During operation of licence, BOs shall ensure that all varieties covered in the licence shall be tested in rotation to the extent possible.

Annex-B
TO PRODUCT MANUAL FOR
IRRIGATION EQUIPMENT - POLYETHYLENE PIPES FOR IRRIGATION LATERALS
ACCORDING TO IS 12786 : 1989

List of Test Equipment

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Major test equipments required to test as per requirements of Indian Standard

S.no.	Test equipment used	Range & LC (reqd. as per IS)	Clause no.	Test
1	Carbon black content tester containing a) Combustion boat(silica/porcelain) b) Combustion tube	75mm length, 9mm width & 8mm height 30 mm dia. & 400 ± 50mm length	4.2 of IS 12786 & IS 2530	Carbon black content test
2	Digitally controlled furnace with indicator	(Amb 500°C)minm.		
3	Gas flow meter fitted with nitrogen gas cylinder	1.7 ± 0.3 lpm		
4	Trichloroethylene			
5	Thermometer	250°C to 550°C L.C. 1°C		
6	Projection microscope along with microscope slides	200 ± 10 magnification 1±0.1 mm field of view		
7	Hot plate used along with temperature controller	170°C to 210°C L.C. 1°C		
8	Analytical weighing balance	0-5mg LC 1 mg		
9	Graduated glass cylinders	(0-250) ml		
10	Ball ended micrometer/ Digital vernier calliper	LC 0.05 mm	5.1 of IS 12786	Wall thickness
11	Digital vernier calliper	LC 0.05 mm	5.1 & 7.2 of IS 12786	Outside diameter
12	Hydrostatic test kit with 3 stations containing		7.1.2 of IS 12786	Hydraulic characteristics
	a) Pressure indicators - 3 nos	LC 1 kg/cm ²		
	b) Timer - 3 nos	LC 1 hr		
	c) Pressure gauge - 3 nos	0-25kg/cm ² ; LC 1kg/cm ²		

13	Hydrostatic test kit with pressure gauge – one station & Timer/Stop watch	0-70kg/cm ² , LC 2kg/cm ² LC 1 min.	7.1.1 of IS 12786	
14	Water bath with digital temperature controller (thermostatically controlled)	Amb -70°C, LC 1°C	7.1 of IS 12786	
15	End fittings - 2 sets for each size			
16	Test kit containing oil bath with stirrer to maintain uniform temperature		7.2 of IS 12786	Reversion test
17	Digital temperature controller and support for holding samples horizontally	Amb - 100°C LC 1°C		
18	Steel plates –dumb bell die		7.3 of IS 12786	Tensile test
19	UTM with load indicator and	LC 1N		
20	Length counter	LC 1mm		
21	Test kit containing oven with forced air circulation to maintain uniform temperature, and containing provision for placing 12 samples/ Constant temperature bath		7.4 of IS 12786	Susceptibility to environmental stress cracking
22	Digital temperature controller	Amb-60°C LC 1°C		
23	Undiluted Surface Agent like nonylphenoxy poly(ethoxy) ethanol			
24	Air conditioner		General Conditioning of samples and maintaining test temperature	

ANNEX – C
SCHEME OF INSPECTION AND TESTING

TO PRODUCT MANUAL FOR IRRIGATION EQUIPMENT - POLYETHYLENE PIPES FOR IRRIGATION LATERALS

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 clearly and indelibly marked at intervals of not more than fifteen meters in the form of a transfix label, by screen printing or by hot stamping in such a manner that it does not impart the strength of the pipe in any way, provided always that the pipe to which this mark is thus applied conforms to every requirement of the specification.

3.1 The information specified in 11.1 shall be indelibly marked in colour as indicated below for different classes of pipes or heat embossed:

Class of pipe	Colour
Class 1	Red
Class 2	Blue
Class 3	Green
Class 4	Yellow

3.2 Laser marking may also be used for marking of size and class of pipes. 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”.

3. CONTROL UNIT – All pipes of the same class and same outside diameter, manufactured continuously in a shift from one extrusion compound using one machine shall constitute a control unit (batch).

4.1 On the basis of test results, decision regarding conformity or otherwise of a control unit to a given requirement shall be made.

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 Standards 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
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 12786	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 a) Content b) Dispersion	- -	IS 2530 -do-	R R	One One	Once a week	
5	Dimensions	5.1, 5.1.1, 5.1.2, 5.1.3 & Table 1	IS 12786	R	Both the ends	Every coil length	
6	Visual appearance	6.1	--do--	R	-	Entire production	
7.1	Internal Pressure Creep rupture test (Acceptance test)	Table 2, 7.1.1 & Annex-C	--do--	R	Three Pipes	Each control Unit.	See Note 3 below
7.2	Reversion Test	7.2	--do--	R	-do-	-do-	-do-
7.3	Tensile Test	7.3, 7.3.1, 7.3.2	6 of IS 2530	R	-do-	-do-	-do-
7.4	Susceptibility to Environmental stress cracking	7.4 & Annex-D	IS 12786	R	Three of each class and diameter	Once in a week	-do-
7.1	Internal Pressure Creep rupture Test (Type Test)	7.1.2 & Table 2 Annex-C	--do--	S	Three (of different diameters)	Once a year	See Note-4 below
8	Supply of pipes	8	-do-	R	-	Each coil	
9	Coiling	9	-do-	R	3 pipes	Each control unit	

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: If no defective pipe is found, the control unit shall be declared as passing, if however only one defective pipe is found, three more pipes shall be taken from the same control unit and tested. The control unit shall be considered as passing if not more than one defective is found in cumulative sample (6 pipes), otherwise not.

Note-4: This test shall also be carried out whenever change is made in polymer composition or method of manufacture, or when a new size is to be produced. In a period of 12 months, the production of each class of pipe from all the machines is to be covered.