



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	7
2.	Sampling Guidelines	Please see Annex A
a)	Raw material	Raw materials shall conform to requirements as specified in Cl. 4 of IS 12786 : 1989.
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) e) Susceptibility to environmental stress cracking
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.

While considering grant of licence/inclusion of additional varieties, it shall be ensured that complete manufacturing/testing facility is available with manufacturer.

Class of pipe	Samples to be drawn and tested
Class 1, 2 or 3	<ul style="list-style-type: none">1. For GOL/Inclusion in licence samples of the lowest and the highest outside diameter shall be independently tested for all requirements as per IS 12786.2. During factory inspection, the rest of the sizes shall be tested for all requirements possible in a day.

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 essentially 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 12786:1989, & IS 2530:1963	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 ⁰ C		
6	Projection microscope along with microscope slides	200 ± 10 magnification 1±0.1 mm field of view	4.2 of IS 12786:1989 & IS 2530:1963	Carbon black content test
7	Hot plate used along with temperature controller	170°C to 210°C L.C. 1 ⁰ C		
8	Analytical weighing balance	0-5mg LC 1 mg		
9	Graduated glass cylinders	(0-250) ml		
10	Ball ended micrometer/ Digital verniercalliper	LC 0.05 mm	5.1 of IS 12786:1989	Wall thickness
11	Digital verniercalliper	LC 0.05 mm	5.1 & 7.2 of IS 12786:1989	Outside diameter
12	Hydrostatic test kit with 3 stations containing		7.1.2 of IS 12786:1989	Hydraulic characteristics
	a) Pressure indicators - 3 nos	LC 1 kg/cm ²		
	b) Timer - 3 nos	LC 1 hr		
	c) Pressure gauge - 3 nos	0-25 kg/cm ² ; LC 1kg/cm ²		

13	Hydrostatic test kit with pressure gauge – one station & Timer/Stop watch	0-70 kg/cm ² , LC 2kg/cm ² LC 1 min.	7.1.1 of IS 12786: 1989	
14	Water bath with digital temperature controller (thermostatically controlled)	Amb -70°C, LC 1°C	7.1 of IS 12786: 1989	
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: 1989	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: 1989	Tensile test
19	UTM with load indicator and	LC 1 N		
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 12786:1989	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
TO PRODUCT MANUAL FOR IRRIGATION EQUIPMENT - POLYETHYLENE PIPES FOR
IRRIGATION LATERALS
SCHEME OF INSPECTION AND TESTING
FOR
IRRIGATION EQUIPMENT - POLYETHYLENE PIPES FOR IRRIGATION LATERALS
ACCORDING TO IS 12786 : 1989

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 following labelling and marking requirements in addition to the requirements of the Indian Standard shall be mentioned on each packaging:

a) BIS licence CM/L.....

b) BIS Website www.bis.gov.in

4. 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. HYGIENIC CONDITIONS – Wherever applicable, hygienic conditions shall be complied in day to day production and quality control activities. Schedule for each activity for this purpose shall be displayed prominently in the factory premises and records of compliance shall be maintained.

7. 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. A separate record shall be maintained giving information relating to the rejection of the polyethylene pipes which do not conform to the specification and the method of their disposal. Such material shall in no case be stored together with that conforming to the specification.

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 Clause Reference			No. of Sample	Frequency	Remarks
4.2	Carbon Black a) Content b) Dispersion	- -	IS 2530 -do-	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	-do-	-do-	-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

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: The control unit and levels of control as decided by the Bureau are obligatory to which the licensee shall comply with.

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 what 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.