



उत्पाद मैनुअल
गैर-दबाव जल नीकासी और सीवरेज के लिए संरचित-दीवार प्लास्टिक पाइपिंग पद्धतियां : भाग 2 –
गैर-चिकनी बाहरी सतह के साथ पाइप और फिटिंगे, टाइप – बी,
आई एस 16098 (भाग 2):2013 के अनुसार

PRODUCT MANUAL FOR
STRUCTURED-WALL PLASTICS PIPING SYSTEMS FOR NON- PRESSURE
DRAINAGE AND SEWERAGE — PIPES AND FITTINGS WITH NON-SMOOTH
EXTERNAL SURFACE, TYPE B ACCORDING TO IS 16098 (PART 2): 2013

विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो) अनुरूपता मूल्यांकन (विनियम, 2018 की योजना -I के तहत प्रमाणन के संचालन में एकरूपता और पारदर्शिता के लिए इस उत्पाद मैनुअल का उपयोग सभी क्षेत्रीय / शाखा कार्यालयों और लाइसेंसधारियों द्वारा संदर्भ सामग्री के रूप में किया जाएगा। दस्तावेज़ का उपयोग बीआईएस प्रमाणन प्राप्त करने के इच्छुक संभावित आवेदकों द्वारा भी किया जा सकता है।

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure uniformity 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.

1.	मानक संख्या IS No.	:	IS 16098 (Part 2): 2013
	शीर्षक Title	:	Structured-Wall Plastics Piping System for Non-Pressure Drainage and Sewerage – Pipes and Fittings with Non-Smooth External Surface – Type B
	संशोधनों की संख्या No. of amendments	:	3
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	• Polyethylene (PE) shall confirm to Clause 5.1, Table 1 and 2 of IS 16098 (Part 2): 2013 • Polypropylene (PP) shall confirm to Clause 5.1, Table 3 and 4 of IS 16098 (Part 2): 2013 • Elastomeric Sealing Rings shall confirm to Clause 8.3 of IS 16098 (Part 2) : 2013 and IS 5282 Note: This section indicates the requirements for raw material (if specified in the IS) for which compliance is to be established during Grant of Licence/Change in Scope of Licence/ Factory Surveillance
b)	समूहीकरण दिशानिर्देश Grouping Guidelines	:	Please refer to Annex-A

c)	नमूने का परिमाण Sample Quantity	:	Pipes - 1 m x 9 Nos and Material (PE/PP) Granules – 1 kg Note: This section indicates the quantity of the sample of the product and/or the raw material (if applicable), required to be sent to the laboratory for testing, for the purpose of Grant of Licence/Change in Scope of Licence/ Factory Surveillance (incase of market surveillance, effort may be made to procure therequired quantity of product sample, as far as possible since raw material sample may not be available in market)
d)	परीक्षण अनुरोध में घोषित किए जाने वाले पैरामीटर Parameters to be Declared in Test Request	-	Same as the scope of licence
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	Please refer to Annex-B
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	:	Please refer to Annex-C
5.	एक दिन में संभावित परीक्षण Possible tests in a day		
	(i)Dimension of Pipes and Fittings (Clause 6. 3), (ii) Visual appearance, Finish and Colour of Finished Pipes (Clause 7.1), (iii) Resistance to Heating (Clause 7.2), (iv) Effect of Heating (Clause 7.3), (v) Ring Stiffness (Clause 8.1.1), (vi) Impact Strength (Clause 8.1.1), (vii) Ring Flexibility (Clause 8.1), (vii) Mechanical Strength or flexibility (Clause 8.2.1) Note: This section is for the guidance of BIS Certification Officers/Technical Auditors of BIS Authorized Outside Surveillance Agencies (OSAs) during factory inspection to provide readyreference regarding the tests which can be witnessed during the inspection in the factory by the officer/auditor.		
6.	लाइसेंस का दायरा /Scope of the Licence:		
	Licence is granted to use Standard Mark as per IS 16098 (Part 2): 2013 with the following scope:		
	Name of the product	Structured Wall Plastics Piping Systems for Non-pressure Drainage and Sewerage- Pipes and fittings with Non-Smooth External Surface Type B.	
	Pipe/Fittings:		
	Material class		
	Stiffness Class (SN)	Nominal Stiffness Class (SN)	
	Sizes (DN/ID)	Nominal Inside Diameter (DN)	
	Type of fittings		

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ANNEX-A

Grouping Guidelines

1. IS 16098 (Part 2) :2013 covers Structured-Wall Plastics Piping Systems for Non-pressure Drainage and Sewerage – Pipes and Fittings with Non- Smooth External Surface, Type B which are categorized as given below:

Material	Polyethylene (PE)/ Polypropylene (PP)
Sizes of pipes and fittings (DN/ID)	75, 100, 125, 135, 150, 170, 200, 225, 250, 300, 400, 500, 600, 800, 1000, 1200 (Other nominal sizes falling within the range are also permitted)
Stiffness class for pipes/ fittings	SN 2, SN 4, SN 8, SN 16
Types of fittings	• Injection moulded fittings (Clause 6.3.5.2) • Fabricated fittings (Clause 6.3.5.3) • Rotational moulded fittings (Clause 6.3.5.4)
	• Bends, swept and unswept angle • Couplers • Reducers • Branches and reducing branches, swept and unswept entry • Plugs • Other designs of fittings, including all sockets and all spigots

2. The sizes/stiffness class of pipes and fittings are grouped as given below:

Group	SN (Nominal stiffness class)	Size
Group 1	SN 4 / SN8 / SN 16	DN $\leq$ 500
Group 2	SN2 / SN4 / SN8 / SN16	DN > 500

3. Considering the above, following grouping guidelines is developed for GoL/CSoL:
 - a) One sample of pipe/fitting of any size from each type with highest SN class from each material category, from each group shall be tested for all requirements to cover pipes/fittings of that type for all the sizes covered in that group and all stiffness class upto and including the stiffness class tested.
 - b) Fitting manufactured by different method of manufacturing shall be treated as separate variety.
4. The Firm shall declare the varieties they intend to cover 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 the types and sizes covered in the Licence are tested in rotation, to the extent possible.

ANNEX-B

List of Test Equipment

(INDICATIVE LIST, FOR GUIDANCE ONLY)

Sl No	Test used with clause reference	Test equipment
1	Base density (Clause 5. 1, Table 1 and 3)	- Digital Balance with holding attachment - Distilled water - Butyl Acetate - Hydrometer - Glass beaker of 250ml capacity - Thermometer - Air conditioner - Heated press (Steam or Electrical)
2	Melt Flow rate (Clause 5.1, Table 1 and 3)	- Melt flow rate apparatus with digital temperature controller and timer and load of 5 kgf
3	Thermal stability (Oxidization Index Test OIT) (Clause 5.1, Table 1 and 3)	- DSC Instrument - Crucibles - Thermal stability Apparatus with - Flow meter - Oxygen Gas (99.55 %), - Nitrogen Gas (99.99%) - Gas selector switch and regulators for switching between oxygen and nitrogen during test - Micro meter
4	Resistance to Internal pressure, 165 h (Clause 5.1, Table 2 and 4)	- Hydrostatic pressure testing apparatus with pressuring unit, timer and multiple outlets - Thermostatically controlled water bath - Thermometer - End plugs of required sizes
5	Resistance to Internal Pressure, 1000 h (Clause 5.1, Table 2 and 4)	
6	Dimensions of Pipes and Fittings (Clause 6.3 and 6.4)	- Vernier calliper - Pi tape, - Inside vernier calliper - Ball end micrometer - Measuring tape - Angle protractor
7	Resistance to heating, Oven test, (Clause 7.2, Table 6)	- Hot air oven - Micrometer
8	Resistance to heating, Oven test, (Clause 7.2, Table 7)	
9	Effect of Heating (Clause 7.3, Table 8 and 9)	- Hot air oven /Oil bath - Stop watch
10	Ring Stiffness, Impact Strength and Ring flexibility (Clause 8.1,	- Compression testing machine with ring stiffness testing arrangement

	Table 10)	- Inside vernier calliper - Angle protector - Air conditioner
11	Creep Ratio (Clause 8.1, Table 10)	- Compressing loading machine - Inside vernier calliper - Stop watch - Micrometer
12	Stiffness and Impact Test (Clause 8.2, Table 10)	- Compression testing machine with ring stiffness testing arrangement - Inside vernier calliper - Angle protector - Air conditioner - Deep freezer
13	Mechanical strength or Flexibility (Clause 8.2, Table 10)	- Anchorages to hold samples - Load application arrangement with load indicator and load gauge - Displacement measurement arrangement - Air conditioner - Thermometer
14	Tightness of Elastomeric Sealing Ring joint, (Clause 9, Table 12)	- Hydrostatic pressure testing apparatus with vacuum pressuring unit, timer and multiple outlets - Thermostatically controlled water bath - Thermometer - End plugs of required sizes - Stop Watch
15	Water Tightness, (Clause 9, Table 12)	- Hydrostatic pressure testing apparatus with pressuring unit, timer and multiple outlets - Thermostatically controlled water bath - Thermometer - End plugs of required sizes
16	Resistance to combined temperature cycling and loading (Clause 9, Table 12)	- Gravel filled box [Refer Annex G of IS 16098 (Part 2): 2013] - Compressive testing machine - Cold and Hot water supply unit

ANNEX C

SCHEME OF INSPECTION AND TESTING

1. QUALITY ASSURANCE PLAN

1.1 It is expected that manufacturers (licensees/applicants) will implement a Quality Assurance Plan i.e. a plan of regular testing and in-process controls, designed to ensure that the product bearing the Standard Mark conforms to all requirements of the Indian Standard.

1.2 The manufacturers shall define a Quality Assurance Plan defining the control unit (i.e. lot/batch etc.) and the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and submit the same to BIS Branch Office for information. The manufacturer shall comply with the same and maintain test records in accordance with para 2.4.

1.3 RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT:

1.3.1 For the guidance of manufacturers, the recommended definition of control unit:

For Pipe: All pipes of same size and stiffness class manufactured from same compound mix continuously under similar condition of manufacturing for maximum period upto 48 hours shall constitute a control unit.

For Fittings: All fittings of same size, type and stiffness manufactured from same compound mix under similar condition of manufacturing for maximum period upto 48 hours shall constitute a control unit.

1.3.2 For the guidance of manufacturers in preparing the Quality Assurance Plan, recommended levels of control are given in **Table 1**.

1.3.3 The manufacturer shall ensure inspection and testing as per the Quality Assurance Plan submitted by them on the whole production of the factory which is covered by this plan. Alternatively, the manufacturer has the option of adherence to the quality plan as per levels of control recommended in column 3 of Table 1.

1.4 However, all manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard.

2 ENSURING COMPLIANCE THROUGH TESTING- It is expected that manufacturers (licensees/applicants) will establish a suitably equipped and staffed in house laboratory (In house testing facility) for testing at least those parameters of the Indian Standard which require routine testing for ensuring quality of the product. This includes in-process controls as may be defined and put in place by the manufacturer and testing parameters/requirements which can only be performed in the factory.

2.3 For the guidance of manufacturers, Table 1 giving the recommended levels of control is given below. Column 2 of Table 1 indicates routine tests where test equipment is required in house as “R” or other tests which can be subcontracted as “S”. Subcontracting is permitted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.4 For MSME manufacturers, the requirement of maintaining a laboratory/in-house testing facility for routine tests (indicated as “R” in Column 2 of Table 1) is also optional.

2.4.2 MSME manufacturers may utilize common cluster based facilities as per guidelines for the utilization of cluster based test facilities by MSMEs or the provisions of Sharing of testing facilities or get testing done from BIS recognized/empaneled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.5 Large Scale manufacturers shall maintain an in-house laboratory equipped at least with test facilities for routine tests (indicated as “R” in Column 2 of Table 1), where different tests given in the specification shall be carried out in accordance with the method given in the specification. They shall also implement a calibration plan for the in-house test equipment.

2.5.2 Alternatively, in lieu of an in-house laboratory, large scale manufacturers can also utilize the provisions of Sharing of testing facilities as per the Guidelines for Grant of Licence available on BIS website www.bis.gov.in. (Under Conformity Assessment>Product Certification Process). Even for subcontracted tests, provisions for sharing of testing facilities can be utilized.

2.6 TEST RECORDS- The manufacturers maintaining an in-house laboratory or utilizing common cluster based facilities or shared test facilities shall maintain test records for the tests carried out to establish conformity. For the tests being subcontracted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025, test reports issued by the laboratories shall be available for inspection by BIS.

3 PACKING AND MARKING - The Standard Mark as given in the Schedule of the licence shall be legibly marked on each pipe/fitting, provided always that the product so marked conforms to all requirements of the specification.

3.3 Marking shall be done as per Clause 11 of IS 16098 (Part 2):2013.

3.4 **Additional Marking requirements:** Each pipe/fitting or its package shall also be marked with the following detail:

a) “For BIS certification details please visit www.bis.gov.in”

4 REJECTION - All the production which conforms to the Indian Standard and covered under the scope of this licence shall be marked with the Standard Mark. 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
(ONLY FOR GUIDANCE PURPOSE)

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl	Requirements	Test Methods			No. of Samples	Frequency	Remarks
		Clause	Reference				
5	Composition of the Material						
5.1	Material (PE) in granules form						Further testing is not required if accompanied with manufacturers test certificate.
	(i) Base Density (ii) Melt flow rate	5.1, Table 1 [sl no i & ii]	IS 16098 (Part 2) IS 7320 IS 2530	S	One	Each consignment	
	(iii) Thermal stability (Oxidation induction test, OIT)	5.1, Table 1 [sl no iii], Annex-C	IS 16098 (Part 2)	S	One	Once in three months for each grade of raw material received	
5.1	Material (PP) in granules form						Further testing is not required if accompanied with manufacturers test certificate.
	(i) Melt flow rate	5.2, Table 3 [sl no i]	IS 16098 (Part 2) IS 2530	S	One	Once a year for each variety received	
	(ii) Thermal stability (Oxidation induction test, OIT)	5.2, Table 3 [sl no ii] Annex-C	IS 16098 (Part 2)	S	One		

5.1	Material (PE) in pipe form						
	(i) Resistance to internal pressure, 165 h	5.1, Table 2 [sl no i]	IS 16098 (Part 2) IS 12235 (Part 8/ Sec1)	S	One	Each consignment	Further testing is not required if accompanied with manufacturers test certificate.
	(ii) Resistance to internal pressure, 1000 h	5.1, Table 2 [sl no ii]	IS 16098 (Part 2) IS 12235 (Part 8/ Sec1)	S	One	Once in three months for each grade of raw material received	
5.1	Material (PP) in pipe form						
	(i) Resistance to internal pressure, 165 h	5.1, Table 4 [sl no i]	IS 16098 (Part 2) IS 12235 (Part 8/ Sec1)	S	One	Once in a year for each variety	Further testing is not required if accompanied with manufacturers test certificate.
	(ii) Resistance to internal pressure, 1000 h	5.1, Table 4 [sl no ii]	IS 16098 (Part 2) IS 12235 (Part 8/ Sec1)	S	One		
6.3	Dimensions of Pipes	6.3, Table 5	IS 16098 (Part 2)	R	1	Once in four hours	-
7	Physical characteristics for pipes and fittings						
7.1	Appearance	7.1	IS 16098 (Part 2)	R	Each pipe	-	-
7.1.1	Colour of finished pipes	7.1.1	IS 16098 (Part 2)	-	Each pipe	-	-
7.2	Resistance to Heating (PE pipes)	7.2, Table 6	IS 16098 (Part 2) IS 12235 (Part 6)	R	One	Each Control Unit	-
7.2	Resistance to Heating (PP pipes)	7.2, Table 7	IS 16098 (Part 2) IS 12235 (Part 6)	R	One	Each Control Unit	-
7.3	Effect of heating (PE injection moulded components)	7.3, Table 8 Annex D	IS 16098 (Part 2)	R	One	Each Control Unit	-

7.3	Effect of heating (PP injection moulded components)	7.3, Table 9 Annex D	IS 16098 (Part 2)	R	One	Each Control Unit	-
8	Mechanical characteristics						
8.1	Mechanical characteristics of pipes						
8.1.1	Ring Stiffness	8.1.1, Table 10 [sl no i] Annex C	IS 16098 (Part 2) IS 16098 (Part 1) IS 12235 (Part 9)	R	One	Each control unit	-
8.1.1	Impact Strength	8.1.1, Table 10 [sl no ii] Annex C	IS 16098 (Part 2) IS 16098 (Part 1) IS 12235 (Part 9)	R	One	Each Control Unit	-
8.1.1	Ring Flexibility	8.1.1, Table 10 [sl no iii] Annex D	IS 16098 (Part 2) IS 16098 (Part 1)	R	One	Each Control Unit	-
8.1.2	Creep Ratio	8.1.1, Table 10 [sl no iv] Annex E	IS 16098 (Part 2) IS 16098 (Part 1)	S	One	Once a year for each variety	The test is also to be carried out if there is any change in composition. One size for each class of pipe shall be tested at least once in three year.
8.2	Mechanical characteristics of fittings						
8.2.1	Stiffness	8.2.1, Table 11 [sl no i] Annex C	IS 16098 (Part 2) IS 16098 (Part 1)	R	One	Each Control Unit	-
8.2.1,	Impact Strength	8.2.1, 8.2.2 Table 10 [sl no ii]	IS 16098 (Part 2)	R	1	Each control unit	-
8.2.1	Mechanical strength or flexibility	8.2.1, Table 10 [sl no i] Annex E	IS 16098 (Part 2) IS 16098 (Part 1)	R	1	Each Control Unit	-

8.3	Joints	8.3	IS 16098 (Part 2)	-	All	-	-
	Elastomeric sealing rings	8.3	IS 16098 (Part 2) IS 5382	S	One	Each consignment	Further testing is not required if received with manufacturers test certificate or ISI mark.
9	Performance requirements						
9	Tightness of Elastomeric Sealing Rings	9, Table 12 [sl no i]	IS 16098 (Part 2) IS 12235 (Part 8/ Sec 2 and Sec 3)	S	One	Once a year for each variety	Same for PP or PE
9	Water Tightness	9, Table 12 [sl no ii] Annex-F	IS 16098 (Part 2)	S	One	Once a year for each variety	Same for PP or PE
9	Resistance to combined temperature cycling and External Loading	9, Table 12 [sl no iii] Annex-G	IS 16098 (Part 2)	S	One	Once a year for each variety	Same for PP or PE