



उत्पाद मैनुअल
500 kPa (5 बार) तक के अधिकतम परिचालन दबाव वाले आंतरिक गैस ससं
थापनों के लिए मल्टीलेयर (PE-AL-PE) प्लास्टिक पाइपिंग प्रणाली के लिए
आई एस 17544:2022 के अनुसार

PRODUCT MANUAL
MULTILAYER (PE-AL-PE) PLASTIC PIPING SYSTEM FOR INDOOR GAS
INSTALLATIONS WITH A MAXIMUM OPERATING PRESSURE UP TO AND INCLUDING
500 KPA (5 BAR) ACCORDING TO IS 17544:2022

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 17544 : 2022
	शीर्षक Title	:	Multilayer (PE-AL-PE) Plastic Piping System for Indoor Gas Installations with a Maximum Operating Pressure up to and Including 500 KPA (5 Bar)
	संशोधनों की संख्या No. of amendments	:	Nil
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	Please refer to Annex-A 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
b)	समूहीकरण दिशानिर्देश Grouping Guidelines	:	Please refer to Annex-B

c)	नमूने का परिमाण Sample Quantity	:	24 x 1 mtr pipes along with 10 jointed pipes, fittings intended to be tested, Rubber ring (one separate sample shall be drawn for PE compound quality evaluation test as per Cl 5.1.3 of IS 17544:2022 at the time of GoL) 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)
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	Please refer to Annex-C
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	:	Please refer to Annex-D
5.	एक दिन में संभावित परीक्षण Possible tests in a day		
	(i) Dimensions, (ii) Internal Pressure Creep Rupture Test (1 hr), (iii) Strength of Joint Line, (iv) General requirement (Dimension of fittings, Transition Fittings, Rubber rings), (v) Joint Resistance to Crushing, (vi) Impact Resistance of Joints, (vii) Repeated Bending resistance, (viii) Leak Tightness test 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 ready reference 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 17544 : 2022 with the following scope:		
	Name of the product	Multilayer (PE-AL-PE) Plastic Piping System for Indoor Gas Installations with a Maximum Operating Pressure up to and Including 500 KPA (5 Bar)	
	Nominal Pipe Size (mm)		

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

ANNEX- A

Details of Raw Materials

Raw Material	Mode of Establishing Compliance
PE Compound (only compounded material) (Cl 5.1.1 to 5.1.5)	Supplier test certificate as per Clause 5.1.1 to 5.1.5 of IS 17544 : 2022
Aluminium (Cl 5.1.6)	Supplier test certificate/test report from BIS recognized lab/ empanelledlab or any other lab having accreditation as per IS/ISO/IEC 17025 or in house testing/combination thereof, as per Clause 5.1.6 of IS 17544 : 2022
Transition Fittings (Cl 6.4)	Supplier test certificate/test report from BIS recognized lab/ empanelledlab or any other lab having accreditation as per IS/ISO/IEC 17025 or in house testing/combination thereof, as per Clause 6.4 of IS 17544 : 2022
Fittings (Cl 6.1 & 6.2)	Supplier test certificate/test report from BIS recognized lab/ empanelledlab or any other lab having accreditation as per IS/ISO/IEC 17025 or in house testing/combination thereof, as per Clause 6.1 & 6.2 of IS 17544 : 2022
Rubber Rings (Cl 6.5)	Supplier test certificate/test report from BIS recognized lab/ empanelledlab or any other lab having accreditation as per IS/ISO/IEC 17025 or in house testing/combination thereof, as per Clause 6.5 of IS 17544 : 2022

ANNEX B

Grouping Guidelines

1. Multilayer (PE-AL-PE) Plastic Piping System as per IS 17544 : 2022 are categorized are categorized based on the Nominal Pipe Sizes of pipe which are given below:

Nominal Pipe Sizes – 14, 16, 20, 25, 32, 40, 50, 63 & 75

2. Considering the above, the following guidelines have been developed for GoL/CSoL:

Each nominal pipe size shall be tested for all requirements to cover that particular size in the scope of licence.

3. The Firm shall declare the nominal pipe sizes they intend to cover in the Licence.
4. During the operation of the Licence, BO shall ensure that all the sizes covered in the Licence are tested in rotation, to the extent possible.

ANNEX B

List of Test Equipment

(INDICATIVE LIST, FOR GUIDANCE ONLY)

S.N.	Tests used in with Clause Reference	Test Equipment
1.	Dimensions of pipes (Clause 5.4)	a) Vernier caliper b) Micrometer (ball ended) c) Measuring tape Pi tape/ circometer d) Magnifying glass with graduated reticule of Least count 0.10 mm e) Sharp knife/ suitable cutter
2.	Internal Pressure Creep Rupture Test, 5.5.1, Annex D	Water Bath, Hydraulic Pressure Testing Equipment with Pressure Transducer/ display, Timer, appropriate end fittings
3.	Strength of Joint Line 5.5.2, Annex E	Cones with angle 15 degree suitable for carrying out Strength of Joint line of Pipe size, Vernier Calliper, Stop watch
4.	Resistance to slow Crack Growth of outer layer (Cone Test), 5.5.3, Annex F	Thermostatically controlled water bath, core, press or vice, notching device, Surface active solution, Vernier Caliper
5.	Tensile Load, 7.2, Table 7 ii), Annex L	Tensile Testing Machine
6.	Joint Resistance to Crushing, 7.2, Table 7 iii), Annex - M	Tensile Testing Machine, Set of two 150X150 Parallel Plate for Crushing or plate can be a square with 75 mm sides and in that case a force level of 1 kN
7.	Impact Resistance of Joints, 7.2, Table 7 iv), Annex N	Drop Impact Tester with Motion less support arrangement for holding pipe fitting joint, striker of spherical head with a radius of 10 mm and a mass of 5 kg
8.	Repeated Bending resistance, 7.2, Table 7 vi), Annex Q	special dimensioned mandrel, special tool (spring or bending tool)
9.	Leak Tightness test 7.2, Table 7 v), Annex P	Thermostatically controlled water bath, Hydraulic Pressure Testing Equipment with Pressure Transducer/ display, Timer, appropriate end fittings, Digital Pressure Controller on above Testing machine

10.	Long term internal Pressure Test for joint assembly 7.2, , Table 7 i), Annex D	Thermostatically controlled water bath, Hydraulic Pressure Testing Equipment with Pressure Transducer/ display, Timer, appropriate end fittings, Digital Pressure Controller on above Testing machine
11.	Thermal Cycling Resistance	Deep Freezer with Digital temperature controller, Hot air circulated Oven, Pressure Gauge, Zero degree Chamber with digital temperature control and digital timer
12.	Delamination 5.6, Table 5 iii), Annex J	Tensile Testing Machine with cross head speed of 50 mm $\pm$ 5 mm per min having measuring accuracy of 1 N, Rotating Test Rig

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 is : All pipes/coils of the same nominal pipe size manufactured from same batch of material produced in a day shall be considered as 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.

2.1 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.

2.2 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.

2.2.1 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.

2.3 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.

2.3.1 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.

2.4 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 incorporated clearly and legibly on each strength length or coil of pipe provided always that the material so marked conforms to each requirement of the specification. Labels of suitable dimensions as per the Standard should also be attached to each coil/pipe bundles.

3.1 Packing and Marking shall be done as per the Indian Standard.

3.2 Additional instructions as per Clause 9.3 of IS 17544:2022 shall be provided alongwith each consignment.

3.3 Additional Marking requirements: The material shall also be marked with the following additional requirement on the labels attached to each coil/pipe bundles:

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.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
5	PIPES						
5.1	Materials						
5.1.1, 5.1.2, 5.1.4 & 5.1.5	PE Compound (only compounded material is permitted)	5.1.1, 5.1.2, 5.1.4 & 5.1.5	IS 17544	S	One	Each consignment	Further testing is not required, if material received along with test certificate of manufacturer.
5.1.3	PE compound quality evaluation	5.1.3	IS 17544	S	Test certificatate of material compound supplier at the time of GoL. This test shall be conducted once on the multilayer pipe with highest SDRm of the metal layer in order to establish the validity of classification for the material received by the manufacturer and to get qualified for the production of PE-Al-PE multilayer pipes for supply of gaseous fuel.		
5.1.6	Metallic material	5.1.6	IS 17544 IS 737	S	One	Each consignment	Further testing is not required, if material received along with test certificate of manufacturer.
5.2.1	Visual Appearance	5.2.1	IS 17544	R	Firm to have adequate in-process controls to check compliance of this parameter as per the tolerances given in the Indian Standard. However, appropriate records shall be maintained by the manufacturer for evidence of conformity.		
5.2.2	Colour	5.2.2					
5.2.4	Multilayer pipe construction	5.2.4					
5.4	Dimensions of Pipe	5.4					
5.2.3	Pigment Dispersion	5.2.3	IS 17544	R	One	Once in a week for each size produced during the period	
5.5	Mechanical Properties -						
5.5.1	Internal Pressure Creep Rupture Test						

	Internal pressure creep rupture test at 27±2°C for 1h	5.5.1, Annex D	IS 17544	R	One	Each control unit.	-
	Internal pressure creep rupture test at 60±2°C for 10 hr	5.5.1, Annex D	IS 17544	R	One	Once in a week for each size produced during the period	
	Internal pressure creep rupture test at 95±2 °C for 170 hr	5.5.1, Annex D	IS 17544	S	One	Once in three years or whenever there is any change in resin composition or method of manufacture	-
5.5.2	Strength of Joint Line	5.5.2, Annex E	IS 17544	R	One	Each control unit	-
5.5.3	Resistance to slow Crack Growth of outer layer (Cone Test)	5.5.3, Annex F	IS 17544	S	One	Once in three years or whenever there is any change in resin composition or method of manufacture	-
5.6	Physical Properties						
5.6	Resistance to Gas constituents	5.6, Table 5 i), Annex G	IS 17544	S	One	Once in three years or whenever there is any change in resin composition or method of manufacture	-
5.6	Thermal Durability of Outer Layer	5.6, Table 5 ii), Annex H	IS 17544	S	One		
5.6	Delamination	5.6, Table 5 iii), Annex J	IS 17544	S	One		
5.6	Odorant Permeability	5.6, Table 5 iv), Annex K	IS 17544	S	One		
6	FITTINGS						
6.1.1	General requirements	6.1.1	IS 17544	R	Firm to have adequate in-process controls to check compliance of this parameter as per the tolerances given in the Indian Standard. However, appropriate records shall be maintained by the manufacturer for evidence of conformity.		
6.2	Materials	6.2	IS 17544	S	One	Each consignment	Further testing is not required,

6.4	Transition Fittings	6.4	IS 17544	S	One	Each consignment	if material received along with test certificate of manufacturer.
6.5	Rubber rings	6.5	IS 17544	S	One	Each consignment	
7.2	Requirements						
7.2	Tensile Load (1 Hour Test)	7.2, Table 7 ii), Annex L	IS 17544	S	One	Each control unit	-
7.2	Joint Resistance to Crushing	7.2, Table 7 iii), Annex - M	IS 17544	R	One	Each control unit	
7.2	Impact Resistance of Joints	7.2, Table 7 iv), Annex N	IS 17544	R	One	Each control unit	-
7.2	Repeated Bending resistance	7.2, Table 7 vi), Annex Q	IS 17544	R	One	Each control unit	-
7.2	Leak Tightness test	7.2, Table 7 vii), Annex D	IS 17544	R	One	Each control unit	-
7.2	Long term internal Pressure Test for joint assembly	7.2, , Table 7 i), Annex D	IS 17544	S	Three	Once in three years or whenever there is any change in resin composition or method of manufacture	-
7.2	Tensile Load (800hours Test)	7.2, Table 7 ii), Annex L	IS 17544	S	Three		-
7.2	Thermal Cycling Resistance	7.2, Table 7 v), Annex P	IS 17544	S	Three		-