



**PRODUCT MANUAL FOR
POLYPROPYLENE-RANDOM COPOLYMER PIPES
FOR HOT AND COLD WATER SUPPLIES
ACCORDING TO IS 15801: 2008**

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 15801:2008
	Title	:	POLYPROPYLENE-RANDOM COPOLYMER PIPES FOR HOT AND COLD WATER SUPPLIES
	No. of Amendments	:	1
2.	Sampling Guidelines:		
a)	Raw material	:	As per clause 6 of IS 15801:2008
b)	Grouping guidelines	:	Please refer ANNEX – A
c)	Sample Size	:	Pipes – 1mtr x 12 Nos Resin – 1 kg
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	:	Please refer ANNEX – D
6.	Scope of the Licence:		
	“Licence is granted to use Standard Mark as per IS 15801:2008 with the following scope:		
	Name of the product	Polypropylene- Random copolymer pipes for hot and cold water supplies	
	Grade of material		
	SDR class		
	Nominal Dimeter (mm)		

ANNEX A**Grouping Guidelines**

1. IS 15801: 2008 covers Polypropylene -Random Copolymer Pipes for Hot and Cold Water Supplies with the following Material Grades, SDR and nominal diameter:
 - a) **Material Grade:** PP-R-P-H-N-10- 35-003/006 or PP-R-P-H-C-10-35-003/006
 - b) **SDR:** 11, 7.4, 6, 5
 - c) **Nominal Diameter (mm):** 16, 20, 25, 32, 40, 50, 63, 75, 90, 110, 125, 140, 160, 180 and 200.
2. Considering the above, Polypropylene- Random copolymer pipes are categorized into the following groups:

Standard Dimension Ratio (SDR)	Nominal Diameter (Size Group)		
	Group-I	Group-II	Group-III
11	DN 20 to DN 40	DN 50 to DN 110	DN 125 to DN 200
7.4	DN 16 to DN 40	DN 50 to DN 110	DN 125 to DN 200
6	DN 16 to DN 40	DN 50 to DN 110	DN 125 to DN 200
5	DN 16 to DN 40	DN 50 to DN 110	DN 125 to DN 180

3. Considering the above following grouping guidelines for GoL/CSoL have been developed:
 - a) For each Material Grade and each SDR of pipes, one pipe from each size group, preferably the highest size, shall be tested for all requirements except Thermal Stability by Hydrostatic Pressure Testing to cover all sizes of pipes in that size group for the particular material grade and SDR tested.
 - b) For each Material Grade and each SDR of pipes, one pipe, preferably the highest size, shall be tested for Thermal stability by Hydrostatic Pressure Testing to cover all pipes of the Material Grade and SDR tested.
4. The Firm shall declare the varieties of Polypropylene- Random copolymer 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.
5. During the operation of the Licence, BO shall ensure that pipes of all varieties covered in the licence are tested in rotation, to the extent possible.

ANNEX B**List of Test Equipment***Major test equipment required to test as per the Indian Standard*

Sl. No.	Tests used in with Clause Reference	Test Equipment
1	Density (Clause 6.2.1, 9.5)	<ul style="list-style-type: none"> - 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 6.2.2, 9.6)	<ul style="list-style-type: none"> - Melt flow rate Apparatus with digital temperature controller and timer and load of 2.16 kgf
3	Influence on water intended for human consumption - Overall migration (Clause 6.6)	<ul style="list-style-type: none"> - Hot Air oven with digital temperature controller - Hot plate with temperature control regulators - Analytical balance or equivalent, capable of weighing to the nearest 0.1 mg - Platinum crucible or silica dish - Desiccator - Glassware & distilled water
4	Dimensions of pipes (Clause 7)	<ul style="list-style-type: none"> - Vernier caliper - Measuring Tape - Pi Tape or Circometer - Ball ended Micrometer - Measuring scale - Temperature controlled Conditioning chamber
5	Hydraulic characteristics -Internal creep rupture test (Clause 9.1) Fusion compatibility (Clause 9.2)	<ul style="list-style-type: none"> - Hydrostatic pressure testing apparatus with pressuring unit, timer and multiple outlets - Thermostatically controlled water bath - Thermometer - End plugs of required sizes
6	Reversion test (Clause 9.3)	<ul style="list-style-type: none"> - Thermostatically controlled oil bath - mono or polyethylene glycol/glycerol or mineral oil. OR - Hot air oven with internal circulation fan
7	Impact Strength (Clause 9.4)	<ul style="list-style-type: none"> - Charpy impact testing machine as per IS 13360 (Part-5/Section-5) - Deep freezer - Vernier calliper - Micrometer
8	Carbon black content and dispersion (Clause 9.7)	<ul style="list-style-type: none"> - Furnace to accommodate the combustion tube with digital temperature controller - Combustion boats made of porcelain or silica, having minimum dimensions of 75 mm length, 9 mm width & 8 mm height

		<ul style="list-style-type: none"> - Combustion tube made of hard glass of approximately 30 mm diameter and 400 ± 50mm length - Nitrogen gas Cylinder with flow meter for controlling flow of nitrogen within 1.7 ± 0.3 liters per minute. - Analytical balance or equivalent, capable of weighing to the nearest 0.1 mg - Desiccator, Trichloroethylene & solid carbon dioxide - Fume Hood - Hot plate - Projection Microscope with 100/200 times magnification - Glass Slides
9	Thermal Stability by Hydrostatic Pressure testing (9.8)	<ul style="list-style-type: none"> - Hydrostatic pressure testing apparatus with pressuring unit and multiple outlets - Water bath (Hot and cold temperature arrangement) with temperature control - Thermometer - End plugs/caps
10	Opacity (Clause 9.9)	<ul style="list-style-type: none"> - Opacity Test Apparatus - Standard sample of opacity 0.2 % <p>or Apparatus for Test Method-2:</p> <ul style="list-style-type: none"> - Source of light (halogen lamp 1000 W), - Photo-electric cell (with filter correction to match eye response), - Adjustable power arc or Incandescent lamp - Diaphragm and optical lens - Digital current meter. - Standard sample of opacity 0.2 %

The above list is indicative only and may not be treated as exhaustive.

ANNEX C**Scheme of Inspection and Testing**

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 – As per the requirement of IS 15801: 2005.

4. CONTROL UNIT – All pipes of same nominal diameter, SDR class manufactured from same raw material compound, extruded continuously under similar condition of manufacturing in a day shall constitute a 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 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

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Recommended Levels of Control		
Clause	Requirement	Test Methods Clause Reference			No. of Sample	Frequency	Remarks
6	Material						
6.1	General	6.1	IS 15801	S	One	Each consignment	A certificate from the manufacturer of raw material to this effect shall be obtained
6.2	Polypropylene-Random copolymer	6.2	IS 15801 IS 10951 IS 10910	S	One	Each consignment	Further testing is not required if accompanied with manufacturer test certificate.
6.2.1	Density	6.2.1	IS 15801 IS 13360 (Part3/Sec1)	R	One	Each consignment	
6.2.2	MFR	6.2.2	IS 15801 IS 13360 (Part4/Sec 1)	R	One	Each consignment	
6.2.3	Colour master batches	6.2.3	IS 15801	S	One	Each consignment	A test certificate may be obtained from the supplier indicating the content of UV stabilizer, anti-oxidants colorants or other additives etc.
6.3	Outer layer (optional)	6.2.3	IS 15801	S	One	Each consignment	A certificate from the supplier about the compatibility of the base resin used for outer layer with the PPR resin/master batch used to produce the pipes shall be obtained.

6.4	Anti-oxidant	6.4	IS 15801	S	One	Each consignment	A certificate from the supplier may be obtained.
6.6	Influence on water intended for Human consumption	6.6	IS 15801 IS 10910 IS 9845	S	Three	Once in six months	Additional sample shall be tested whenever there is change in polymer or master batch or colour composition or method of manufacture. During a period of 12 months, one pipe from each SDR produced shall be tested.
7	Dimensions						
7.1	Outside diameter	7.1, 7.3.1, Table 1	IS 15801	R	Ten	Each control unit	-
7.2	Wall thickness	7.2, 7.3.1, Table 2	IS 15801	R	Ten	Each control unit	-
7.3.2	Ovality	7.3.1, 7.3.2	IS 15801	R	Ten	Each control unit	-
7.4	Length of straight pipes	7.4	IS 15801	R	Ten	Each control unit	-
8	Visual appearance	8	IS 15801	R	All	Each control unit	-
9	Performance requirements						
9.1	Hydraulic Characteristics (Internal creep rupture)						
	Acceptance test At 20°C for 1 h	9.1, Table 3 (i)	IS 15801 IS 12235 (Part 8/Sec1)	R	One	Each control unit	-

	Acceptance test At 95°C for 22 h	9.1, Table 3 (ii)	IS 15801 IS 12235 (Part 8/Sec1)	R	One	Once a week	Higher size of any SDR pipes to be tested
	Type Test At 95°C for 165 h	9.1, Table 3(iii)	IS 15801 IS 12235 (Part 8/Sec1)	R	One	Once a month	Higher size of any SDR pipes to be tested
	Type test At 95°C for 1000 h	9.1, Table 3(iv)	IS 15801 IS 12235 (Part 8/Sec1)	R	one	Once in three months	One size of each SDR pipes to be tested at least once during period of 18 months
9.2	Fusion compatibility	9.2, 9.1, Table 3 (iii)	IS 15801 IS 12235 (Part 8/Sec1)	R	One	Once a month	Higher size of any SDR pipes to be tested
9.3	Reversion test	9.3	IS 15801 IS 12235 (Part-5/Sec 1)	R	Three	Each control unit	In case of failure of any test piece, the batch shall be retested using further six samples which shall be selected at random. All six samples shall meet the requirements. Otherwise the control unit shall not be marked
9.4	Impact Strength	9.4, Annex B	IS 15801 IS 13360 (Part 5/Sec 5)	R	Ten	Each control unit	If more than one specimen fails, the test shall be repeated on further 20 specimens taken from the same pipe. In such cases, the total number of failures from the first and second tests shall be evaluated together for deciding to accept the control unit or reject it.
9.5	Density	9.5	IS 15801 IS 12235 (Part-14)	R	Composite sample of minimum three pipes	Each control unit	
9.6	Melt flow rate	See 6.2.2	Is 15801 IS 13360 (Part 4/Sec 1)	R	Composite sample of minimum three pipes	Each control unit	

9.7	Carbon black content and Dispersion	9.7	IS 15801 IS 2530	R	Composite sample of minimum three pipes	Each control unit	
9.8	Thermal stability by hydrostatic pressure testing	9.8	IS 15801 IS 12235 (Part 8/Sec 1)	S	One	ce in three years	One size for each SDR shall be tested at least once in three years. Type test to be done when there is change in the polymer or master batch or colour composition or method of manufacture
9.9	Opacity	9.9	IS 15801 IS 12235 (Part-3)	S	One (Thinnest wall section)	ce in three months	Tests shall also be done when the formulation is changed. During the period of one year, production from all the machines shall be covered.

Note-1: 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 B.O. Head.

ANNEX D

Possible tests in a day

- (i) Colour (Clause 5)
- (ii) Dimensions of pipes (Clause 7)
- (iii) Visual appearance (Clause 8)
- (iv) Hydrostatic characteristics Acceptance test 1 hour (Clause 9.1)
- (v) Reversion (Clause 9.3)
- (vi) Impact Strength (clause 9.4)
- (vii) Density (Clause 9.5)
- (viii) Melt flow rate (Clause 9.6)
- (ix) Carbon black content and dispersion (Clause 9.7)