



**PRODUCT MANUAL FOR
GLASS FIBRE REINFORCED PLASTICS (GRP) PIPES, JOINTS
AND FITTINGS FOR USE FOR POTABLE WATER SUPPLY
ACCORDING TO IS 12709: 1994**

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 12709: 1994
	Title	:	Glass Fibre Reinforced Plastics (GRP) Pipes, Joints and Fittings for Use for Potable Water Supply
	No. of Amendments	:	5
2.	Sampling Guidelines:		
a)	Raw material	:	1. Resin - Clause 6.1 of IS 12709 : 1994 and IS 6746 2. Glass Fibre Reinforcement – Clause 6.2 of IS 12709 : 1994 and IS 11273, IS 11320 or IS 11551 3. Aggregates – Clause 6.3.1 of IS 12709: 1994 4. Filler - Clause 6.3.2 of IS 12709: 1994 5. Additives - Clause 6.3.3 of IS 12709: 1994
b)	Grouping guidelines	:	Please refer Annex A
c)	Sample Size	:	Qty – 6 Nos x 1 mtr – for all tests except type test For Type test - 19 Nos x 1 m
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:		
	All tests except Long term hydrostatic design pressure test (Clause15) and Potability of water test (Clause 16) shall be carried out in factory as the licence is operated on factory testing basis.		
6.	Scope of the Licence	:	Please refer Annex D

ANNEX A**Grouping Guideline**

1. IS 12709: 1994 covers Glass Fibre Reinforced Plastics (GRP) Pipes, Joints and Fittings for Use for Potable Water Supply which are classified as given below:

- a) Based on Pressure class:

Pressure class (PN)	PN 3	PN 6	PN 9	PN 12	PN 15
Working pressure (kPa)	300	600	900	1200	1500

- b) Based on Stiffness class:

Stiffness class (SN)	A	B	C	D
Pipe stiffness value (kPa)	62	124	240	496

- c) Based on Size Designation and nominal diameter:

Nominal Diameter (DN)	200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1400, 1600, 1800, 2000, 2200, 2400, 2600, 2800 and 3000 mm
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Nominal diameters covered are further grouped as under:

Group	Nominal Diameter (DN) mm
1	200 mm to 450 mm DN
2	500 mm to 1000 mm DN
3	1100 mm to 2000 mm DN
4	2200 to 3000 mm DN

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

- a) One sample of pipe of any size, preferably highest, from each group and each pressure class and stiffness class shall be tested for all requirements except Long term hydrostatic design pressure test (Clause 15) and Potability test (Clause 16) (which are type tests) to covers pipes of all sizes in that group for the pressure class and stiffness class tested.
- b) Long term hydrostatic design pressure test (Clause 15) by method A and the Potability of water test (Clause 16) (which are type tests) shall be conducted on a sample of pipe of any size, pressure class and stiffness class at the time of grant of licence. If manufacturer has evidence that the hydrostatic design basis has already been established for a nominally similar pipe using the same manufacturing process, the manufacture needs to conduct only the requalification test as described in Method B, else full type testing as described in Method A (Clause F-4 of IS 12709: 1994) shall be performed.

- c) The requalification test by Method B and Potability test shall be conducted once in every three years. The LTHS test by Method A shall also be conducted whenever a significant change is made in the design, composition or process of manufacturing.
 - d) The raw material shall be tested as per Clause 6 of IS 12709 :1994 to cover all the stiffness classes with declaration, if any.
3. 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.
4. During the operation of the Licence, BO shall ensure that all the 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	Dimensions (Clause 7)	<ul style="list-style-type: none"> - Vernier Calliper - Steel scale - Steel Rule - Measuring Tape - Right angle - Magnetic spirit level - Steel tape - Dial gauge with stand - Mandrel or trunnions stand for rotating pipes on it
2	Workmanship (Clause 9)	<ul style="list-style-type: none"> - Vernier caliper - Depth gauge/Dial gauge
3	Pipe stiffness (Clause 10.1)	<ul style="list-style-type: none"> - Compression testing machine with arrangement to hold the sample between two plates and applying vertical load at specified rate. - Stopwatch - Dial gauge or arrangement for measurement of deflection of sample during the test.
4	Soundness (Clause 12.2.2)	<ul style="list-style-type: none"> - Hydrostatic test apparatus capable to apply pressure at uniform specified rate with timer - End caps of suitable size and design - Stop watch
5	Longitudinal strength (Clause13)	<ul style="list-style-type: none"> - Tensile testing machine with details as per clause D- 2.2 of IS 12709 ; 1994 - Beam load strength testing machine to apply load on pipe at two points as per clause D-1 of IS 12709 : 1994
6	Hoop tensile strength (Clause 14)	<ul style="list-style-type: none"> - Hoop tensile testing apparatus as per clause E-2 of IS 12709 : 1994

7	Long term hydrostatic design pressure test (Clause 14)	<ul style="list-style-type: none">- Arrangement for long term hydrostatic strength test (LTHS) as per Annex-F of IS 12709 : 1994
8	Potability of water (Clause16)	<ul style="list-style-type: none">- Hot air Oven with temperature controller- Glassware- Extractant as per clause 16.1.1.1 and clause 16.1.1.2- pH meter- Crucible- Weighing balance- Spectrophotometer- Syringe- Mice

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

ANNEX C

Scheme and 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 12709: 1994.

4. CONTROL UNIT – 100 pipe lengths or part thereof of the same size, pressure class and stiffness class produced under similar conditions of manufacture 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	Levels of Control		
Cl	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
6.1	Resin	6.1	IS 12709 IS 6746	S	One	Each batch received	Further testing is not required if material received is with test certificate or ISI marked.
6.2	Glass Fibre Reinforced	6.2	IS 12709 IS 11320 IS11273 IS11551	S	One	Each batch received	Further testing is not required if material received is with test certificate or ISI marked.
6.3.1	Aggregates	6.3.1	IS 12709	S	One	Each batch	Each batch of aggregates received shall be checked for size requirements.
6.3.2	Fillers	6.3.2	IS 12709	S	One	Each batch	Each batch of fillers received shall be checked for size requirements.
6.3.3	Additives	6.3.3	IS 12709	S	One	Each consignment	Record of additives used along with their certificate of conformity may be maintained
7.1	Diameter	7.1, A-1.1 Table 1, Table 2,	IS 12709	R	Each pipe	-	-
7.2	Length	7.2, A-2.1	IS 12709	R	Each pipe	-	-
7.3	Out of squareness	7.3, A-3.1	IS 12709	R	Each pipe	-	-
7.4	Wall thickness	7.4, A-4.1	IS 12709	R	Each pipe	-	-

9.1	Workmanship	9.1	IS 12709	R	Each pipe	-	-
10.1	Pipe Stiffness	10.1, Annex B	IS 12709	R	One	Each control unit	-
12.2	Soundness	12.2, Annex C	IS 12709	R	One	Each control unit	For the pipes of nominal of diameter above 1400 mm, the frequency of soundness test shall be agreed between manufacturer and purchaser
13	Longitudinal Strength	13, Annex D	IS 12709	R	One	Each control unit	-
14	Hoop Tensile Strength	14, Annex E	IS 12709	R	One	Each control unit	-
TYPE TEST							
15	Long Term Hydrostatic Design Pressure test	15, Annex F	IS 12709	R	One	Once in three year	In case of any significant change in design, composition or process of manufacturer, type test shall be carried out. If no change is envisaged type test shall be carried out at least once in three years. In case of failure of sample in type test, marking shall be stopped under intimation to BIS. Marking to be resumed only if fresh sample tested after corrective actions passes in the type test.
16	Potability of water	16.1 to 16.9	IS 12709	S	One	Once in three year	

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 BO Head

ANNEX D**Scope of the License**

“Licence is granted to use Standard Mark as per IS 12709:1994 with the following scope:	
Name of the product	Glass Fibre Reinforced Plastics (GRP) Pipes, Joints and Fittings for Use for Portable Water Supply
Nominal Diameter (DN)	
Stiffness Class (SN)	
Pressure Class (PN)	