



**PRODUCT MANUAL FOR
IRRIGATION EQUIPMENT- SPRINKLER PIPES- PART 2
QUICK COUPLED POLYETHYLENE PIPES & FITTINGS
ACCORDING TO IS 14151 (PART 2) : 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 14151 (Part 2) : 2008
	Title	: Irrigation Equipment- Sprinkler Pipes Part 2 Quick Coupled Polyethylene Pipes & Fittings
	No. of Amendments	: NIL
2.	Sampling Guidelines:	
a)	Raw material	<ul style="list-style-type: none"> i) PE Resin (PE 63 or above) ii) Carbon Black Master batch iii) Anti-oxidants iv) Rework Material v) Metallic/HDPE Couplers vi) Rubber Rings (Ref: Clause 3 and 4.1.1 of IS 14151 (Part 2):2008) : NOTE - With the advancement of technology, natural (unpigmented) resin duly stabilized with anti-oxidants {see clause 4.3 of IS 14151 (Part 1)} the black master batch fulfilling the requirements as laid down in the standard. This will be strictly permitted only in such cases where the facilities of compounding/processing are available with the pipe manufacturer and the material thus produced shall conform to the material designation(s) given in 4.1 of IS 14151(Part 1)
b)	Grouping guidelines	: Please refer Annex – A
c)	Sample Size	: For Grant of Licence under Normal Procedure, the following samples to be drawn: <ul style="list-style-type: none"> i) Raw material compound (mixture of PE resin and master batch) (if firm provides conformity of raw material as per clause 4 of ISS, no raw material sample to be drawn) ii) 1 meter x 3 plain pipes +1meter x 3 sets (male and Female with holding attachments with Sealing rings)

			Routine sample: 1 meter x 3 plain pipes + 1meter x 3 sets (male and female with holding attachments with sealing rings).
3.	List of Test Equipment	:	ANNEX - B
4.	Scheme of Inspection and Testing	:	ANNEX - C
5.	Possible tests in a day :		
	i. Visual defects and finish, ii. Dimensions and tolerances iii. Tensile strength & Elongation iv. Reversion test v. Hydrostatic acceptance test vi. Strength test vii. CBC viii. CBD ix. Melt Flow Rate		
6.	Scope of the Licence :		
	Licence is granted to use Standard Mark as per IS 14151 (Part 2) : 2008 with the following scope:		
	Name of the product	Irrigation Equipment- Sprinkler Pipes- Part 2 Quick Coupled Polyethylene Pipes & Fittings	
	Class	Class of pipes	Maximum Permissible Pipes Working Pressure at 30°C
		Class 1	0.25 MPa
		Class 2	0.32 MPa
		Class 3	0.40 MPa
		Class 4	0.60 MPa
	Size	X mm (Outer Diameter)	

ANNEX A

GROUPING GUIDELINES

Grouping Guidelines for grant of licence and inclusion of new varieties of Quick Coupled Polyethylene Pipes & Fittings as per IS 14151 (Part 2) : 2008 ‘Irrigation Equipment – Sprinkler Pipes - Part 2 Quick Coupled Polyethylene Pipes & Fittings’ has been laid down under CMD note ref: CMD-2/16:14151 (Part 2) dated 19.09.2017.

The guideline is re-iterated as below:

i) One sample of each variety of Quick Coupled Polyethylene Pipes & Fittings from each of the following Groups (preferably higher size) for each class shall be tested for all requirements of the specification, in order to cover the complete range of sizes:

Group I 40mm - 75mm (Nominal Diameter)

Group II 90mm – 140mm (Nominal Diameter)

Group III 160mm – 200mm (Nominal Diameter)

ii) The raw material i.e HDPE Resin along with Carbon Black Masterbatch shall also be tested as per the specification. Firm may submit undertaking as per clause no. 4.3 and 4.4 of IS 14151 (Part 1). Metallic coupler/metallic part of HDPE Coupler i.e holding attachments shall be tested as per the specified IS. However, in case of ISI Marked base metal, no further test is required.

iii) It shall however be ensured and recorded that the applicant/licensee has got complete manufacturing as well as testing facilities for the sizes required to be covered as per the Grouping GUIDELINES.

iv) During the operation of licence, BOs shall also ensure that all sizes/classes covered in the licence are drawn for independent testing on rotation over a period of time.

**ANNEXURE B
TO PRODUCT MANUAL
FOR IRRIGATION EQUIPMENT- SPRINKLER PIPES- PART 2
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LIST OF TESTING EQUIPMENT

Major test equipment required to test as per requirements of Indian Standard.

S.No	Test	Clause of IS	Test Equipments
1	Pipe	3	As per IS :14151 Part.1:1999
i)	Density of composite sample at 27 °C	4.1.1 & 7.5	i) Electrical hot press sample preparation apparatus hydraulic jack along with digital temp.indicator, fitted with pressure gauge ii) Spacer frame iii) Chrome plated sheet iv) n-Butyl acetate v) Room Thermometer vi) Electrical single pan balance vii) Hydrometer viii) Measuring cylinder ix) Beaker x) Nylon wire xi) Platform for weighing
ii)	MFR	4.1.2 & 7.6	i) M.F.I. Test apparatus with digital temp. Controller and digital timer Weight load 5kg ii) Electrical single pan balance iii) Sharp knife (For Sample cutting) iv) Xylene (For piston cleaning)
iii)	Carbon black content	4.2	i) C.B.C test App. With digital temperature controller, Combustion Tube. ii) N ₂ Cylinder with regulator & Gas flow meter iii) Ceramic boats iv) Tong, Poker v) Bubblers vi) CaCl ₂ vii) Trichloroethylene viii) Desiccators ix) Weighing Balance single pan x) Dry Ice box
iv)	Carbon black Dispersion (Material & Pipe)	4.2	i) Hot plate thermostatically Controlled with temp.indicator ii) Microscope iii) Glass slides iv) Tong v) Metal shim

v)	Dimension of pipes		
a)	Outside diameter	5.1..1	Vernier Caliper and Pie Tape
b)	Wall thickness	5.1..1	Micrometer ball ended
c)	Ovality	5.1.2	Vernier Caliper
d)	Squareness	5.1.2	i) Half Round Angle Protector fitted with steel strip for Square ness Test & Right Angle
			ii) Filler Gauge set
	Pipe Length	-	iii)Measuring Tape
vi)	Visual appearance	6.1	Visually
vii)	<u>Hydraulic characteristics</u>	7.1	
a)	Quality test &	7.1.1	i) 1st Hot water bath thermostatically controlled with digital
b)	Acceptance test	7.1.2	temp. indicator with stirrer and hour meter
			ii) Hydrostatics Pressure tester station
			iii)End Plugs
			iv) Haxsaw with Blade
Viii	Reversion test	7.2	i) 1s tHot Air Oven Thermostatically Controlled with Air Circulating Fan and Digital Temp. Indicator
			ii)Vernier Caliper
			iii)Steel Scale
			iv) Wall Clock
			v) Haxsaw with Blade
			vi) Glass Plate
			vii) Telcum Powder
ix	Tensile Test & Elongation	7.3	i)Digital Tensile Testing M/c
			ii) Dumble Die ½ , 1 and 2 Type along with Hydraulic jack
			i)Vernier Caliper
			Micrometer ball ended
			v) Air Conditioner
x	Fusion capability(if pipes joined by fusion) a)Acceptance & Quality Test	7.4	i) 2nd Water bath thermostatically controlled with digital temp. indicator with stirrer and hour meter
			ii) Hydrostatics Pressure tester station
			iii)End Plugs
			vi) Haxsaw with Blade
2	Quick Coupled Male & Female Couplers	4.1	IS:14151(Part-2) : 2008
i.	Metallic couplers	4.1.1.1.2	Shall be as per IS 737 and IS 617 for aluminium alloy and shall be as per IS 513; Part 1:2016 for Steel
ii.	HDPE couplers	4.1.1.2	Test facilities same as per Clause No. 4 of IS:14151(Pt-1)1999

	Wall thickness of HDPE Couplers	4.1.1.2.1	Micrometer ball ended
iii)	Workmanship and appearance	4.1.3	Visually check
iv)	Holding attachment of couplers parts	4.1.4	-
a)	Material of holding attachment	4.1.4(a)	Shall be as per IS 737 and IS 617 for aluminium alloy and shall be as per IS 513; Part 1:2016 for Steel
b)	Strength of Holding Attachment	4.1.4(b)	ii) Automatic Hydrostatics Pressure tester station
			iii) End Plugs
			vi) Hacksaw with Blade
c	Coating Thickness of Holding Attachment		Coating Gauge
v	Rubber Rings	4.1.5	
a)	Shore hardness		Shore Hardness Tester with Standards Shore-A
b)	Accelerated Storage test		i) 2nd Hot Air Oven Thermostatically Controlled with Air Circulating Fan and Digital Temp. Indicator
			ii) Shore Hardness Tester with Standards Shore-A
3	Performance requirement	6	
i)	Leakage Test	6.1.1	i) Hydrostatics Pressure tester
			ii) End Plugs
			iii) Hacksaw with Blade
ii)	Hydraulic Proof Test	6.1.2	i) Hydrostatics Pressure tester
			ii) End Plugs
			iii) Hacksaw with Blade
iii)	Weld ability Test Acceptance & Quality	6.1.3	i) 1st & 2nd Hot water bath thermostatically controlled with digital temp. indicator with stirrer and hour meter
			ii) Hydrostatics Pressure tester
			iii) End Plugs
			vi) Hacksaw with Blade

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

ANNEXURE C

SCHEME OF INSPECTION AND TESTING FOR IRRIGATION EQUIPMENT- SPRINKLER PIPES- PART 2 QUICK COUPLED POLYETHYLENE PIPES & FITTINGS ACCORDING TO IS 14151 (PART 2) : 2008

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 Standard Mark as given in Schedule of the licence shall be marked on each quick coupled pipe and fitting, provided always that the product so marked conforms to every requirements of the specification.

3.1 Marking: Each quick coupled pipe and fitting shall be indelibly marked in English at intervals of not more than 6 m in the pipe section and at a prominent place on the coupler which is visible even after installation by heat embossing or in colour as indicated in clause 8.1.1 of IS 14151 (Part 2). However, if pipe section of the quick coupled pipe already bears permanent marking in accordance with 10.1 of 14151 (Part 10, marking of IS 14151 (Part 2) shall be done on both the male and female coupler sections only. In case of fittings, marking shall be on male end, female end and the plain fitting at a prominent place which is visible even after installation, by heat embossing or in colour as indicated in clause 8.1.1 of IS 14151 (Part 2).

The marking shall also show the following:

- a) Manufacturer's name or trade mark.
- b) Outside diameter
- c) Class of pipe and
- d) Batch number.

The information specified in clause 8.1 of IS 14151 (Part 2) shall be indelibly marked in coupler or heat embossed as indicated at clause 8.1.1 of IS 14151 (Part 2) for different classes of pipes. In addition, the following details shall be marked on each quick coupled pipe and fittings:

- a) BIS Licence No. CM/L _____.
- b) b) BIS website details i.e –“For details of BIS certification please visit www.bis.gov.in”

4. CONTROL UNIT - A control unit is defined as coupler of same size and class manufactured under similar conditions and from one machine using same composition of the materials upto a maximum of eight hours duration.

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 Polyethylene pipes used in Quick Coupled Pipes shall be as per clause 3 of IS 14151(Part 2).

5.2 Quick coupled fittings shall be as per clause 4 of IS 14151(Part 2).

5.2.1 The type of coupler parts shall be designated as per clause 4.1 of IS 14151(Part 2).

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
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			No. of Sample	Frequency	Remarks
		Cl. Ref.	IS				
3	Quick Coupled Pipes	3	IS 14151 Part 2	R	1	Each control unit	If pipes are ISI marked as per IS 14151 Part 1, no further testing is required
4	Quick Coupled Fittings						
4.1	Quick Coupled Male and Female Couplers	4.1	IS 14151 Part 2	R	1	Each control unit	
4.1.1	Material	4.1.1	IS 14151 (Part 1) IS 14151 (Part 2) IS 504 (Part 1 to 12) & (Part 13 to 16) IS 737 or IS 617 IS 1573	R	1	Each control unit	Alternatively test certificate may be obtained with each consignment
4.1.2	Sizes of Coupler Parts	4.1.2	IS 14151 Part 2	R	1	Each control unit	
4.1.3	Workmanship and Appearance	4.1.3	IS 14151 Part 2	R	1	Each control unit	Size of sampling as per Table 4 and criterion for conformity of every control unit as per cl 7.2 of IS 14151 (Part 2)

4.1.4 (a)	Holding attachments and coupler parts	4.1.4 (a)	IS 14151 Part 2	S	1	Each Consignment	TC of Holding attachment from supplier may be accepted if the samples conform as per the specified IS. If sample is ISI mark, no further testing may be required
4.1.4 (b)	Holding attachments and coupler parts	4.1.4(b)	IS 14151 (Part 2)	R	1(5 nos.)	Each control unit	If the sample fails, twice the no shall be tested, in case of any failure, control unit shall be rejected
4.1.5	Rubber Ring	4.1.5	IS 14151 (Part 2)	R	1	Each Consignment	Alternatively test certificate may be obtained with each consignment.
4.2	Quick Coupled Type HDPE Fittings	4.2	IS 14151 (Part 2)	R	1	Each control unit	
4.2.1	Material	4	IS 14151 (Part 1)	R	1	Each control unit	Alternatively test certificate may be obtained with each consignment
4.2.2	Metal parts	4.1.1.1	IS 14151 (Part 2)	S	1	Each Consignment	If the metal Parts is ISI Mark, no further testing required. But, firm may record/maintained the TCs from supplier on each consignment
4.2.3	Insert Valve Coupler	4.2.3	IS 14151 (Part 2) IS 8008 (Part 1 and part 3) IS 8360 (Part 1 to 3)	R	1	Each control unit	
4.2.4	Valve Openers	4.2.4	IS 14151 (Part 2) IS 8008 (Part 1 & Part 2)	R	1	Each control unit	

4.2.5	Sprinkler/Saddle Assembly	4.2.5	IS 14151 (Part 2)	R	1	Each control unit	
4.2.6	Pump Connector	4.2.6	IS 14151 (Part 2) IS 7634 (Part 2) IS 14151 (Part 1) IS 554	R	1	Each control unit	
4.2.7	Flanged Connections	4.2.7	IS 14151 (Part 2)	R	1	Each control unit	
5	Dimensions						
5.1	Dimensions of quick coupled pipes and fittings	5.1	IS 14151 (Part 1) IS 14151 (Part 2) IS 8008 (Part 2 to 6) & (Part 9) IS 8360 (Part 3)	R	1 (5 nos.)	Each control unit	
5.2	Dimensions of quick coupled pump	5.2	IS 14151 Part 2	R	1 (5 nos.)	Each control unit	
5.3	Dimensions of quick coupled sprinkler saddles	5.3	IS 14151 Part 2	R	1 (5 nos.)	Each control unit	
6	Performance Requirements						
6.1	Quick Coupled Pipes & Fittings						Criterion for conformity and sample size shall be as per clause 7.3.2 (Table 5) of IS 14151 (Part 2)
6.1.1	Leakage Test	6.1.1	IS 14151 (Part 2)	R	1	Each control unit	
6.1.2	Hydraulic Proof Test	6.1.2	IS 14151 (Part 2)	R	1	Each control unit	

6.1.3	Weldability Test	6.1.3	IS 14151 (Part 2)	R	1	Each control unit	
6.2	Quick Coupled Fittings	6.1	IS 8008 Part 1	R	1	Each control unit	

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 empaneled 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 to BO Head.

Note 3: All Type test for Fusion Compatibility, Weldability test and Hydraulic Characteristics shall be carried out as and when there is a change in design or material.