PRODUCT MANUAL
FOR IRRIGATION EQUIPMENT – ROTATING SPRINKLER PART 1 (DESIGN AND OPERATIONAL REQUIREMENTS) ACCORDING TO IS 12232 (PART 1) : 1996

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 12232 (Part 1) : 1996
	Title	:	Irrigation Equipment – Rotating Sprinkler Part 1 (Design and Operational Requirements)
	No. of amendments	:	01
2.	**Sampling Guidelines:**		
a)	**Raw material**	**:**	No specific requirements
b)	**Grouping Guidelines**	**:**	NA (No varieties for the product mentioned in IS)
c)	**Sample Size**	**:**	6 Nos. {Sampling shall be done as per clause 5.1 of IS 12232 (Pt 1), for Type test, test specimens shall be taken at random from a quantity of at least 20 sprinklers}.
3.	**List of Test Equipment**	**:**	Please refer Annex – A
4.	**Scheme of Inspection and Testing**	**:**	Please refer Annex - B
5.	**Possible tests in a day:**		
	i. Threaded Connection ii. Performance Requirements iii. Test of Construction & Part iv. Test for resistance of threaded connections v. Test for resistance to hydrostatic pressure at ambient temperature vi. Test for resistance to hydrostatic pressure at high temperature (for sprinkler made of metal).		
6.	**Scope of the License:**		
	Licence shall be granted with the following scope as per IS 12232 (Part 1) : 1996 with the following scope.		
	Name of the product	Irrigation Equipment – Rotating Sprinkler	

ANNEX – A

**TO PRODUCT MANUAL
FOR IRRIGATION EQUIPMENT – ROTATING SPRINKLER PART 1 (DESIGN AND OPERATIONAL REQUIREMENTS)
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LIST OF TEST EQUIPMENTS

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

Sr. No.	Test Equipment	Tests used in with Clause Reference
1.	Thread Gauges of adequate size	Threaded connections Cl 4.3
2.	Setup for Sprinkler operation (including water supply connection/source, electric motor/pump with water filter mesh & adequate space to perform the test), Pressure Gauge (Required range more than the declared maximum pressure).	Performance requirements Cl 4.4
3.	Torque wrench (Capable for Torque of 5 N-m, 50 N-m and 100 N-m).	Test of resistance of threaded connections Cl 6.2
4.	Step up to induce pressure with Pressure Gauge (Required range more than twice of the declared maximum pressure), Nozzle Plugs, Stop Watch (graduated in divisions of 0.1s) and Thermometer LC 1^{o}C (for lab temperature).	Test of resistance to hydrostatic pressure at ambient temperature Cl 6.3
5.	Thermostatic Hot Water bath, Set up to induce pressure with Pressure Gauge (Required range more than twice of the declared maximum pressure), Nozzle Plugs, Stop Watch.	Test of resistance to hydrostatic pressure at high temperature Cl 6.4
6.	Setup for Sprinkler operation (including water supply connection/source, electric motor/pump with water filter mesh & adequate space to perform the test), Pressure Gauge (Required range more than the declared maximum pressure), Water Collection Jars, Torque wrench, Nozzle Plugs, Stop watch.	Test of water tightness Cl 6.5
7.	Setup for Sprinkler operation (including water supply connection/source, electric motor/pump with water filter mesh & adequate space to perform the test), Stop watch (graduated in divisions of 0.1s).	Test of uniformity of rotation speed Cl 7.1
8.	Setup for Sprinkler operation (including water supply connection/source, electric motor/pump with water filter mesh & adequate space to perform the test), Flow meter	Test of uniformity of flowrate Cl 7.2
9.	Setup for Sprinkler operation (includes water supply connection/source, electric motor/pump with water filter mesh & adequate space to perform the test), Water Collecting Jars, Stop watch (graduated in divisions of 0.1s).	Test of distribution characteristics Cl 7.3
10.	Setup for Sprinkler operation (including water supply connection/source, electric motor/pump with water filter mesh & adequate closed space to perform the test), Water Collecting Jars, Stop watch (graduated in divisions of 0.1s), Anemometer	Test of effective diameter of coverage Cl 7.4

11.	Setup for Sprinkler operation (including water supply connection/source, electric motor/pump with water filter mesh & adequate closed space to perform the test), Trajectory Height measuring device	Test of trajectory height (for sprinklers with low trajectory angle) Cl 7.5
12.	Thermostatic Hot Water Bath, Angle protector, Setup for Sprinkler operation (including water supply connection/source, electric motor/pump with water filter mesh & adequate space to perform the test).	Test for range of effective pressure Cl 7.6
13.	Setup for Sprinkler operation (including water supply connection/source, electric motor/pump with water filter mesh & adequate space to perform the test) and test equipments mentioned above at sl. No. 4 and 7 to 10.	Durability test Cl 8.0
NOTE- Accuracy of measuring devices required as follows; 1) Pressure = + 2% 2) Flowrate = + 1%		

List above is indicative only and may not be taken as exhaustive.

ANNEX – B

**SCHEME OF INSPECTION AND TESTING
FOR PRODUCT MANUAL
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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. PACKING AND MARKING – The Standard Mark, as given in the Schedule of the licence, shall be stamped on the body of the sprinkler, provided always that the sprinkler to which this mark is thus applied, conform to every requirement of the specification.

3.1 The rotating sprinklers shall be packed so as to avoid damage in transit. Marking on the sprinkler and nozzle shall be done as per clause 9 of IS 12232 (Part 1). In addition, the following details shall be mentioned on each Sprinkler legibly and indelibly:

a) BIS Licence No. CM/L_____.
b) BIS website details i.e – "For details of BIS certification please visit www.bis.gov.in".

4. CONTROL UNIT –For the purpose of this scheme, the entire quantity of one type of the rotating sprinklers having same design and material, assembled in a shift/day, shall constitute a control unit.

5. MATERIALS - Materials used in the assembly of sprinkler shall be according to clause 4.1 of IS 12232 (Part 1). Necessary controls shall be exercised to ensure conformity and proper records maintained.

6. 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.

6.1 All the production which conforms to the Indian Standards and covered by the licence should be marked with Standard Mark.

7. 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 Method Cl. Ref.**	**Test Method IS**		**No. of Sample**	**Frequency**	**Remarks**
4.2	Construction and workmanship	4.2.1, 4.2.2 & 4.2.3	IS 12232 (Part 1)	R	Three	Each control unit	
4.3	Threaded Connection	4.3	IS 12232 (Part 1) IS 554	R	-do-	-do-	
4.4	Performance Requirements	4.4.1 & 4.4.2	IS 12232 (Part 1)	R	-do-	-do-	
6.1	Test of Construction & Parts	6.1	IS 12232 (Part 1)	R	-do-	-do-	Adequate inspection shall be maintained to ensure conformity
6.2	Test for resistance of threaded connections	6.2.1 & 6.2.2	IS 12232 (Part 1)	R	-do-	-do-	In case of leakage observed from body of the Sprinkler, the sprinkler body shall be discarded. Any leak observed from assembly, the same shall be reassembled and test again.
6.3	Test for resistance to hydrostatic pressure at ambient temperature	6.3.1 6.3.2	IS 12232 (Part 1)	R	-do-	-do-	
6.4	Test for resistance to hydrostatic pressure at high temperature	6.4.1 6.4.2	IS 12232 (Part 1)	S	-do-	Once in a month	-do-
6.5	Test of Water tightness	6.5.1 6.5.2	IS 12232 (Part 1)	R	-do-	Once in a week	

7.1	Test for Uniformity of rotation speed	7.1.1 7.1.2 7.1.3	IS 12232 (Part 1)	R	-do-	Each Control Unit	In case of failure, samples from three consecutive control units shall be tested. The original frequency to be restored only if these three samples pass.
7.2	Test for Uniformity of flow rate	7.2.1 Cl 5.3, Table 2 7.2.2	IS 12232 (Part 1) IS 2500(Part 2)	R	-do-	Once in a week	-do-
7.3	Test for distribution characteristics	7.3 7.3.1 7.3.2	IS 12232 (Part 1) IS 12239 (Part 2)	R	Two	-do-	-do-
7.4	Test for effective diameter of coverage	7.4.1 & 7.4.2	IS 12232 (Part 1)	S	-do-	Once in a month	-do-
7.5	Test of Trajectory height for sprinklers with low trajectory angle	7.5.1 & 7.5.2	IS 12232 (Part 1)	S	-do-	-do-	-do-
7.6	Test of range of effective pressure	7.6.1 & 7.6.2	IS 12232 (Part 1)	S	-do-	-do-	-do-
8.0	Durability Tests	8.1 to 8.6	IS 12232 (Part 1) IS 12239 (Part 2)	S	-do-	Once in a year	-do-

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 of BO Head.