**PM/ 13488 /2**
**August 2020**

**PRODUCT MANUAL FOR**
**FOR IRRIGATION EQUIPMENT – EMITTING PIPE SYSTEMS**
**ACCORDING TO IS 13488 : 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 13488 : 2008 |
| | Title | : | IRRIGATION EQUIPMENT – EMITTING PIPE SYSTEMS- SPECIFICATION |
| | No. of Amendments | : | 0 |
| **2.** | **Sampling Guidelines:** | | |
| a) | Raw material | : | Shall comply with Cl. 5 of IS 13488:2008 |
| b) | Grouping guidelines | : | Please refer ANNEX –A |
| c) | Sample Size | : | i) Coil length having at list 30 emitting units base at declared spacing intervals<br>ii) 30 emitting units separately<br>iii) For testing of raw material 1 kg of compounded PE material (Master batch) to be drawn for testing. |
| **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 **13488 : 2008** with the following scope: | | |
| | Name of the product | | **IRRIGATION EQUIPMENT – EMITTING PIPE SYSTEMS** |
| | Uniformity Category | | A/B |
| | Class | | 1/2/3/4 |
| | Type of operation | | Unregulated/Regulated |
| | Nominal Outside diameter (mm) | | 12, 16, 20, 25 |

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## Annex-A
## GROUPING GUIDELINES

1) The Standard covers the following classification of emitting pipes for irrigation laterals:

a. Uniformity categories: Category A (higher uniformity of emission rates and smaller deviations from nominal emission rate) and Category B (Lower uniformity of emission rates and greater deviations from nominal emission rate)
b. Class of pipe (based on working pressure, from lower to higher): Class 1, 2, 3 & 4.
c. Type of Operation: Unregulated & Regulated
d. Nominal Size (based on outside diameter): 12, 16, 20 & 25 mm.

2) For considering grant of licence/inclusion, following grouping may be followed:

a. Uniformity categories: If sample of category A is drawn and tested, both categories A and B may be considered for grant of licence/inclusion
b. Class of pipe (based on working pressure): Sample of each class of pipe which is intended to be considered for grant of licence/inclusion shall be drawn and tested
c. Type of Operation: If sample of Regulated pipe is drawn and tested, both categories Unregulated & Regulated may be considered for grant of licence/inclusion
d. Nominal Size (based on outside diameter): Sample of Pipes of any size preferably the largest size may be drawn and tested for considering grant of licence/ inclusion for all sizes for which manufacturing and testing facilities are available

3) The scope of Licence may be restricted based on the manufacturing and testing capabilities of the manufacturer which shall be verified during next surveillance visit.

4) During operation of licence, samples of each variety covered in the licence shall be drawn by rotation.

**Annex-B**

**LIST OF TEST EQUIPMENTS**

**Major test equipment required to test as per the Indian Standard.**

| S.no. | Test equipment used | Range & LC | Clause no. | Test |
|---|---|---|---|---|
| 1 | Carbon black content tester containing<br>a) Combustion boat (silica/porcelain)<br>b) Combustion tube | 75mm length, 9mm width & 8mm height<br>30 mm dia. & 400 ± 50mm length | 4.2 of IS 1989 | Carbon black content test |
| 2 | Digitally controlled furnace with indicator | (Amb -500°C) min. | | |
| 3 | Gas flow meter fitted with nitrogen gas cylinder | 1.7 ± 0.3 lpm | | |
| 4 | Trichloroethylene | | | |
| 5 | Thermometer | (250°C to 550°C) min. | | |
| 6 | Projection microscope along with microscope slides | 200 ± 10 magnification<br>1±0.1 mm field of view | 4.2 of IS 12786 | Carbon black dispersion test |
| 7 | Hot plate used along with IR sensor | (170°C to 210°C) min. | | |
| 8 | Analytical weighing balance | (0 - 5mg) LC 1 mg min. | | |
| 9 | Graduated glass cylinders | (0-250) ml | | |
| 10 | Ball ended micrometer/ Digital vernier calliper | LC 0.05 mm min. | 8.3 of IS 13488 | Wall thickness |
| 11 | Digital vernier calliper | LC 0.05 mm min. | | Outside diameter |
| 12 | Travelling microscope/Vernier Calliper | LC 0.02 mm min. | | Flow Path |
| 12 | GO-NO GO Gauge | | | Inside diameter |

| | | | | |
|---|---|---|---|---|
| 13 | Test kit containing 75 Micron Filter, Motor for pumping water from storage tank (placed below test equipment), | | 8.1, 8.2 & 8.4 of IS 13488 | Uniformity of Emission Rate |
| 14 | Graduated Measuring Cylinders and Funnels | 25 nos min. | 8.1, 8.2 & 8.4 of IS 13488 | Uniformity of Emission Rate |
| 14 | Pressure Gauge | L.C 0.1 kg/cm$^2$ | 8.1, 8.2 & 8.4 of IS 13488 | Emission rate of emitting unit as a function of Inlet Pressure & |
| | Timer | (0 to 1 hr)<br>LC 1 min<br>min. | | |
| 18 | Water bath with digital temperature controller (thermostatically controlled) | (Amb - 70°C), LC 1°C min. | | |
| 19 | End plugs | | | |
| 20 | Test Kit containing Oven with fan/blower to maintain uniform temperature, | | 8.5 of IS 13488 | Resistance to temperature at elevated temperature |
| 21 | Digital temperature controller | (Amb - 60°C), LC 1°C min. | | |
| 22 | Weight | As per Table 3 | | |
| 23 | Frame containing two clamps for holding test specimen between frame and weight | | 8.6 of IS 13488 | Resistance to Pull out Joints |
| 24 | Weight | As per Table 3 | | |
| 25 | Test kit containing oven with stirrer to maintain uniform temperature, and containing provision for placing 12 samples | | 8.7 of IS 13488 | Susceptibility to environmental stress cracking |
| 26 | Digital temperature controller | (Amb-60°C) LC 1°C | | |

| | | | | |
|---|---|---|---|---|
| | | min. | | |
| 27 | Igepal CO-630/ Antarox CO-630 | | | |
| 31 | Air conditioner | | General Conditioning of samples and maintaining test temperature | |

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

**ANNEX- C**

**SCHEME OF INSPECTION AND TESTING**
**FOR IRRIGATION EQUIPMENT – EMITTING PIPE SYSTEMS**
**ACCORDING TO IS 13488 : 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 equipment.

**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 Schedule of the licence and Licence Number (i.e. CM/L…….) shall be incorporated, and the packing and marking shall be done as per the provisions of the Indian Standard, provided always that the product thus marked conforms to all the requirement of the specification. In addition, details of BIS website shall be marked as follows: "For details of BIS certification please visit www.bis.gov.in"

3.1 In addition, when the standard mark and other specified information are marked by screen printing, the following colour coding scheme shall be followed:

| **Class of pipe** | **Colour** |
|---|---|
| Class 1 | Red |
| Class 2 | Blue |
| Class 3 | Green |
| Class 4 | Yellow |

**4. CONTROL UNIT -** For the purpose of this scheme, pipes of the same designation (as per cl. 9.1 & 9.2 of IS 13488: 2008), manufactured in an eight hour shift or part thereof, from the same machine, using the same extrusion compound, 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.
5.2On the basis of tests and analysis reports, the decision regarding conformity or otherwise of a control unit to a given requirement shall be made.

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. Any rejected material which is potentially resalable shall be deformed in such a manner that it cannot be used for any other purpose. A separate record shall be maintained giving information relating to all such rejections/defective/substandard material of the production not conforming to the requirements of the Specification and the method of its disposal. Such material shall in no case be stored together with that conforming to the Specification. The Standard Mark (if already applied) on rejected material should be defaced.

## TABLE 1
## LEVELS OF CONTROL

| (1) | | | | (2) | (3) | | |
|---|---|---|---|---|---|---|---|
| **Test Details** | | | | **Test equipment requirement R: required (or) S: Sub- Contracting permitted** | **Levels of control** | | |
| **Clause** | **Requirements** | **Test method Cl. Ref.** | **Test method ID** | | **No. of samples** | **Frequency** | **Remarks** |
| 5.1.2 | Material | 5.1 | IS 12786 | S | One | Each consignment | In case test certificate is received with each consignment of raw material, further testing in the factory would not be required. |
| 5.1.2 | Carbon Black | | | | | | |
| | a) content | 10 | IS 2530 | R | 1 | Once a week | |
| | b) Dispersion | 16 | -do- | R | -do- | -do- | |
| 6.1 & Table 1 | Dimension | 8.3.1, 8.3.2 | IS 13488 | R | Both the ends | Each coil length | |
| 6.2 | Fittings | 6.2.1, 6.2.2 | -do- | R | -do- | -do- | |
| 6.3 | General | 6.3 | -do- | R | -do- | Entire Production | |
| 8.1 | Uniformity of emission rate | 8.1 | -do- | R | 1 | Every control unit | |
| 8.2 | Emission rate Emitting unit Function of pressure | 8.2 | -do- | R | -do-* | Once in a week | |
| 8.3.3 | Flow paths in emitting unit | 8.3.3 | IS 13488 | R | 3 | Every two hours | |
| 8.4 | Resistance of Emitting pipe Hydrostatic pressure | 8.4.1, 8.4.2 | -do- | R | 1* | Once in 15 days or whenever there is change in extusion compound, whichever is earlier | |
| 8.5 | Resistance to Tension at Elevated temp | 8.5 | -do- | R | 1* | Once in a week | |
| 8.6 | Resistance to pull out of joint & Emitting pipes | 8.6 | -do- | R | 1 | Each control unit | |
| 8.7 | Resistance of Emitting pipe Environmental | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Stress | | | | | | |
| 8.7.1 | Acceptance test | 8.7.1 | -do- | R | 3 | Each control unit | |
| 8.7.2 | Type test | 8.7.2 | -do- | R | Three samples of each designation (as per cl 9.1 and 9.2) | Once in week | |
| 8.8 | Emitting unit Exponent (For both Regulated & unregulated) | 8.8 | -do- | R | 1* | Once in a week | |

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: * Testing of different class of Pipes shall be made on rotational basis in order to test every class designation (as per cl. 9.1 & 9.2) of Emitting pipe systems covered in the scope of licence in an operative period of a year"

## ANNEX D

## POSSIBLE TESTS IN A DAY

| | **Cl.No.** | **Tests** |
|---|---|---|
| a) | 6.1 & Table 1 | Dimension |
| b) | 6.2 | Fittings |
| c) | 6.3 | General |
| d) | 8.1 | Uniformity of Emission rate |
| e) | 8.2 | Emission rate of Emitting unit as a Function of inlet Pressure |
| f) | 8.3.3 | Flow paths in emitting unit |
| g) | 8.3.4 | Spacing of Emitting units |
| h) | 8.4 | Resistance of Emitting pipe to Hydrostatic pressure |
| i) | 8.5 | Resistance to Tension at Elevated temp |
| j) | 8.6 | Resistance to pull out of joint between fittings & Emitting pipes |
| k) | 8.7 | Resistance of PE Emitting pipe to Environmental Stress cracking (Acceptance test) |
| l) | 8.8 | Emitting unit Exponent (For Both Regulated & unregulated emitting pipes) |