



**उत्पाद मैनुअल**  
**SPECIFICATION FOR HDPE LAMINATED WOVEN LAY FLAT TUBE AND**  
**FITTINGS FOR USE IN RAIN IRRIGATION SYSTEM**

IS 17728:2021 के अनुसार

**PRODUCT MANUAL**  
**FOR SPECIFICATION FOR HDPE LAMINATED WOVEN LAY FLAT TUBE AND FITTINGS FOR**  
**USE IN RAIN IRRIGATION SYSTEM**  
**ACCORDING TO IS 17728:2021**

विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम, 2018 की योजना- I के तहत प्रमाणन के संचालन में अभ्यास और पारदर्शिता के संचालन में पारदर्शिता सुनिश्चित करने के लिए इस उत्पाद मैनुअल का उपयोग सभी क्षेत्रीय / शाखा कार्यालयों और लाइसेंसधारियों द्वारा संदर्भ सामग्री के रूप में किया जाएगा। दस्तावेज़ का उपयोग बीआईएस प्रमाणन लाइसेंस/प्रमाणपत्र प्राप्त करने के इच्छुक संभावित आवेदकों द्वारा भी किया जा सकता है।

*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. | उत्पाद<br>Product                              | : | IS 17728: 2021                                                                                                                                                                                                                     |
|    | शीर्षक<br>Title                                | : | SPECIFICATION FOR HDPE LAMINATED WOVEN LAY<br>FLAT TUBE AND FITTINGS FOR USE IN RAIN<br>IRRIGATION SYSTEM                                                                                                                          |
|    | संशोधनों की संख्या<br>No. of amendments        | : | 0                                                                                                                                                                                                                                  |
| 2. | नमूना दिशानिर्देश<br>Sampling Guidelines       |   |                                                                                                                                                                                                                                    |
|    | a) Sampling during<br>surveillance             | : | Market Samples and Factory Samples drawn during<br>surveillance shall be tested for all possible requirements<br>except Welded Seam Strength after UV Exposure and<br>Retention of breaking strength after UV exposure of 500<br>h |
|    | b) कच्चा माल<br>Raw material                   | : | Please refer Annex-A                                                                                                                                                                                                               |
|    | c) समूहीकरण दिशानिर्देश<br>Grouping Guidelines | : | Please refer Annex-B                                                                                                                                                                                                               |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                          |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| d) | <b>नमूने का आकार<br/>Sample Size</b>                                                                                                                                                                                                                                                                                                                                                                                      | :                                                                                                               | 32mm -Perforated lay flat tube -120 mtr along with fittings<br>40mm -Perforated lay flat tube -135 mtr along with fittings<br>HDPE Tape -500 mtr.<br>HDPE Laminated woven fabric -0.5 mtr x 4 mtr.<br>HDPE Unlaminated Woven fabric – 1 mtr x 1 mtr.<br>Construction of HDPE Laminated woven fabric -1mtr x 1mtr<br>Rain Pipe Lateral I.D.32/40mm {non-Perforated}-30Mtr |
| 3. | <b>परीक्षण उपकरणों की सूची List of Test Equipment</b>                                                                                                                                                                                                                                                                                                                                                                     | :                                                                                                               | Please refer Annex- C                                                                                                                                                                                                                                                                                                                                                    |
| 4. | <b>निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing</b>                                                                                                                                                                                                                                                                                                                                                      | :                                                                                                               | Please refer Annex -D                                                                                                                                                                                                                                                                                                                                                    |
| 5. | <b>एक दिन में संभावित परीक्षण Possible tests in a day</b>                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                          |
|    | Internal Diameter and its Tolerance and Minimum Overlap of Lay Flat Tubes (5.3, 6.1), Perforation/hole on Lay Flat Tube (5.4), Mass, Breaking strength, Elongation at break, Abrasion resistance, Trapezoid tear strength, Puncture strength, (6, Table 2) , Workmanship (6.2), Hydrostatic Burst Pressure Test (Without perforation) (6.3), Length (6.4), Kink Test (6.5), Welded Seam Strength before UV Exposure (6.6) |                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                          |
| 6. | <b>लाइसेंस का दायरा /Scope of the Licence:</b>                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                          |
|    | “Licence is granted to use Standard Mark as per IS 17728:2021 with the following scope:”                                                                                                                                                                                                                                                                                                                                  |                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                          |
|    | Name of the product                                                                                                                                                                                                                                                                                                                                                                                                       | High density polyethylene ( HDPE ) laminated woven lay flat Tube and fittings for use in rain irrigation System |                                                                                                                                                                                                                                                                                                                                                                          |
|    | Sizes                                                                                                                                                                                                                                                                                                                                                                                                                     | 32 mm / 40 mm                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                          |
|    | Range of working pressure (for each size) in kg/cm <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                           | Nominal Working pressure:<br>Maximum Working pressure:<br>Minimum working pressure:                             |                                                                                                                                                                                                                                                                                                                                                                          |
|    | Nominal flowrate in l/h/m                                                                                                                                                                                                                                                                                                                                                                                                 | at nominal, minimum and maximum working pressure                                                                |                                                                                                                                                                                                                                                                                                                                                                          |
|    | Use in mains/submains of rain irrigation systems                                                                                                                                                                                                                                                                                                                                                                          | Suitable/not suitable for Use in mains/submains of rain irrigation systems                                      |                                                                                                                                                                                                                                                                                                                                                                          |
|    | LDPE Liner                                                                                                                                                                                                                                                                                                                                                                                                                | With/Without liner                                                                                              |                                                                                                                                                                                                                                                                                                                                                                          |

**BUREAU OF INDIAN STANDARDS  
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## ANNEX-A

### RAW MATERIAL

1. **HDPE Tapes** -Tapes shall be manufactured from HDPE granules (see IS 6192), which shall be UV stabilized by adding suitable UV stabilizer and/or carbon black. The tape, if manufactured by using carbon black shall contain minimum 2.5 percent of carbon black by mass with satisfactory dispersion when tested as per IS 2530. The width of the tape used in the fabric shall be 2.0 mm minimum and linear density of the tape shall be 77.7 Tex (700 Denier) minimum.
2. **HDPE Fabric**-Lay flat tube for use in rain irrigation system shall be manufactured from suitable HDPE woven fabric. The HDPE woven fabric shall have minimum of 39 tapes/dm in warp and weft direction
3. **Lamination**-The fabric used to manufacture lay flat tubes for use in rain irrigation system shall be laminated with the low density polyethylene (LDPE) or suitable combination of LDPE and linear low density polyethylene (LLDPE) melt of coating grade on each side and the coating shall be UV stabilized by incorporating UV stabilizer and/or carbon black. The film, if manufactured by using carbon black, shall contain minimum 2.5 percent of carbon black by mass with satisfactory dispersion when tested as per IS 2530.
4. **LDPE Liner (if incorporated)**- The LDPE liner shall be manufactured from virgin polyethylene resins which shall be UV stabilized by adding suitable UV stabilizer.

## ANNEX – B

### GROUPING GUIDELINES

IS 17728:2021 classifies laminated woven lay flat tube for use in rain irrigation system into two sizes (nominal diameter): 32 mm and 40 mm.

The standard also prescribes that the manufacturer shall declare for each size of tube:

- i) The range of working pressure i.e. minimum and maximum working pressure at which the perforated lay flat tube operates effectively as well as the nominal working pressure (continuous working pressure, expressed in kg/cm<sup>2</sup> which can be sustained with water at 27 °C.).
- ii) The nominal flowrate at nominal, minimum and maximum working pressure

Accordingly, for the purpose of grant of licence and/or change in scope of licence, the following grouping guidelines shall apply

One sample of the woven lay flat tube of **each size** having the **highest range of working pressure (and highest nominal pressure)** intended to be covered in the scope of licence shall be tested to cover all the varieties of tubes of that size having lower range of working pressure (and nominal pressure).

Further, if it is intended to cover in the scope of the licence that the tubes are suitable for use in mains/submains of rain irrigation systems, the sample(s) as above shall be tested for conformity to IS 16627 as well. (However, those requirements which are identical between IS 16627 and IS 17728 need not be tested twice and conformity to IS 16627 shall be assessed on the basis the test results of samples tested as per IS 17728).

If a sample with LDPE liner is tested, varieties with and without liner can be covered in the licence on that basis.

Scope of licence shall be restricted based on the manufacturing and testing facilities available.

During the operation of licence, samples of each variety covered in the scope of licences shall be drawn in rotation.

## ANNEX C

### LIST OF TEST EQUIPMENTS

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

| <b><u>Sr. No.</u></b> | <b><u>Test Equipment</u></b>                                                                                                                                                                                    | <b><u>Tests used in with Clause Reference</u></b>                          |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| 1                     | Steel Rule / Vernier 0.1mm LC                                                                                                                                                                                   | Tapes – width CI 4.1                                                       |
| 2                     | Weighing Balance 0.1mg accuracy, Drying Oven, Wrap Reel                                                                                                                                                         | Tapes – Linear Density CI 4.1                                              |
| 3                     | Steel Rule / Vernier 0.1mm LC                                                                                                                                                                                   | Fabric – CI 4.2                                                            |
| 4                     | Thickness tester with presser foot capable of exerting a pressure of $2 + 0.01$ kPa                                                                                                                             | Lamination Thickness – CI 5.2                                              |
| 5                     | Steel scale, LC 1 MM / Vernier Callipers LC 0.01 mm                                                                                                                                                             | Overlap – CI 5.3                                                           |
| 6                     | Steel scale, LC 1 mm , Vernier Callipers LC 0.01 mm<br>Conical plug gauge as per internal nominal diameter                                                                                                      | Perforation on Lay flat tube – CI 5.4<br>Internal Diameter – CI 6.1        |
| 7                     | Horizontal flat smooth table<br>Graduated steel scale<br>Balance, LC 0.005 g<br>Conditioning chamber                                                                                                            | Mass – CI 6 , Table 2                                                      |
| 8                     | Tensile testing machine CRE with facility to record/indicate force and separation                                                                                                                               | Breaking Strength before UV exposure CI 6, table 2                         |
| 9                     | Tensile testing machine CRE with facility to record/indicate force and separation                                                                                                                               | Elongation at Break – CI 6 , Table 2                                       |
| 10                    | Universal Tensile Machine UTM CRE, Xenon arc apparatus (Min Level of radiation to $0.5 \text{ W/m}^2$ , 1 nm bandpass at 340nm) , Temperature (LC $1^\circ\text{C}$ and Humidity controller (LC 1 %)            | Retention of breaking strength after UV exposure of 500 h – CI 6, table 2  |
| 11                    | Abrasion tester with indicator and weights                                                                                                                                                                      | Abrasion Resistance - CI 6, Table 2                                        |
| 12                    | Universal Tensile Machine UTM CRE with clamps and trapezoidal template                                                                                                                                          | Trapezoidal tear strength - CI 6, Table 2                                  |
| 13                    | Universal Tensile Machine UTM, CRE<br>Ring clamp attachment internal diameter of $45 + 0.025$ mm<br>Solid steel rod, diameter of $8 + 0.01$ mm having a flat end with a $45^\circ \times 0.8$ mm chamfered edge | Puncture strength - CI 6, Table 2                                          |
| 14                    | Air oven with provision for suspending test specimen and thermometer with accuracy $1^\circ\text{C}$                                                                                                            | Accelerated ageing test for 72 h at $70 + 1^\circ\text{C}$ - CI 6, Table 2 |
| 15                    | Impact device (impact mass 500g) for determination of cold crack temperature with Deep Freezer and thermometer with accuracy $0.5^\circ\text{C}$                                                                | Cold cracking resistance test at $-5^\circ\text{C}$ - CI 6, Table 2        |

|    |                                                                                                                                                                                                                                                                                                                                |                                                                                               |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| 16 | Hydraulic pump<br>Pressure gauge, LC 0.1 kg/cm <sup>2</sup>                                                                                                                                                                                                                                                                    | Hydrostatic burst pressure test<br>CI 6.3                                                     |
| 17 | Measuring Tape                                                                                                                                                                                                                                                                                                                 | Length CI 6.4                                                                                 |
| 18 | Hydraulic pump<br>Pressure gauge, LC 0.1 kg/cm <sup>2</sup><br>Protractor                                                                                                                                                                                                                                                      | Kink test CI 6.5                                                                              |
| 19 | Tensile testing machine CRE with facility to record/indicate force and separation                                                                                                                                                                                                                                              | Welded Seam Strength Before UV exposure CI 6.6                                                |
| 20 | Universal Tensile Machine UTM CRE, Xenon arc apparatus (Min Level of radiation to 0.5 W/m <sup>2</sup> , 1 nm bandpass at 340nm) ,<br>Temperature (LC 1°C and Humidity controller (LC 1 %)                                                                                                                                     | Welded Seam Strength After UV exposure CI 6.7                                                 |
| 21 | Constant Temperature Bath with accuracy 1°C surface active agent of the nonylphenoxy poly (ethyleneoxy) ethanol type, (such as Igepal CO-630 or Antarox CO-630 or equivalent)                                                                                                                                                  | Susceptibility of environmental stress cracking CI 6.8                                        |
| 22 | Collectors, Stopwatch , Pressure gauge LC 0.01 kg/m <sup>2</sup> , Anemometer 0.1 meter/sec, Suitable Test Area Layout flowmeter                                                                                                                                                                                               | Coefficient of distribution uniformity (CDU) and throw as a function of inlet pressure CI 6.9 |
| 23 | Two separate conditioning chambers to maintain temperature at minus (–) 5 °C and 70 °C with accuracy 1 ° C, Water pump<br>For change in hole diameter -Conical needle LC 0.01 mm, Vernier Callipers, 0.01mm<br>For CDU and throw - Collectors, Stopwatch, Pressure gauge LC 0.01 kg/m <sup>2</sup> , Anemometer 0.1 meter/sec, | Temperature Cyclic test for change in hole behavior CI 6.10                                   |
| 24 | Hot water Tank ( LC 1 ° C )<br>Pressurizing Equipment<br>For change in hole diameter -Conical needle LC 0.01 mm, Vernier Callipers, 0.01mm<br>Stopwatch                                                                                                                                                                        | Change in hole behavior at High pressure and High temperature CI 6.11                         |
| 25 | Pressurizing Equipment<br>Water Tank<br>End fittings<br>Stopwatch                                                                                                                                                                                                                                                              | Uniformity of Water Flow Rate 6.12                                                            |
| 26 | Hydraulic Pump, Stop Watch                                                                                                                                                                                                                                                                                                     | Fittings CI 7.2                                                                               |
| 27 | Jointer Pull out tester<br>With 200 N Dead weight compatibility<br>Stopwatch                                                                                                                                                                                                                                                   | Resistance to Pull out of joints between fittings and perforated lay flat tube CI 7.3         |

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

## ANNEX B

### SCHEME OF INSPECTION AND TESTING

1. **LABORATORY-** A laboratory shall be maintained, which shall be suitably equipped (as given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the method given in the specification.

1.1 The manufacturer shall prepare and implement a calibration plan for the test equipment.

2. **TEST RECORD-** 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 stenciled/printed on each box/kit/bag of Rain irrigation system, or printed on the label/sticker applied to it, as the case may be, provided always that the material in each box/kit/bag to which this mark is thus applied, conform to every requirement of the specification.

3.2 The perforated lay flat tube for use in rain irrigation system shall be packed as agreed to between the buyer and the seller. Each bundle of perforated lay flat tube for use in rain irrigation system shall be legibly marked with the following information at one end either with tag or by printing on it

- i) Manufacturer's name, initials or trade mark
- ii) Nominal internal diameter, in mm
- iii) Range of working pressure, in kg/cm<sup>2</sup>
- iv) Water flow rate in l/h/m
- v) Length, in m
- vi) Batch No or Lot No
- vii) Any other information required by the buyer or the law in force
- viii) BIS licence number and "For BIS certification details please visit [www.bis.gov.in](http://www.bis.gov.in)"

3.3 Fittings shall bear clear and permanent markings, including the following particulars;

- i) Manufacturer's name, initials or trade mark
- ii) Size

3.4 The manufacture shall supply detailed instruction for carrying out patching on lay flat tube. If required by the buyer, a patching kit may also be supplied along with the lay flat tubes

5. **CONTROL UNIT-** For the purpose of this scheme, entire quantity of woven lay flat tube of the same size and same range of working pressure shall be taken as one control unit.

6. **LEVELS OF CONTROL :-** The tests as indicate in Table 1 and at the levels of controls in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and records maintained in accordance with paragraph 2 above.

6.1 All the production which conforms to the Indian Standard and covered under the scope of this licence shall be marked with the Standard Mark.

7. **REJECTION** - 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**

| <b>(1)</b>          |                    |                    |                  | <b>(2)</b>                                                                              | <b>(3)</b>               |                              |                                                     |
|---------------------|--------------------|--------------------|------------------|-----------------------------------------------------------------------------------------|--------------------------|------------------------------|-----------------------------------------------------|
| <b>Test Details</b> |                    |                    |                  | <b>Test equipment requirement<br/>R: required (or)<br/>S: Sub-contracting permitted</b> | <b>Levels of Control</b> |                              |                                                     |
| <b>Sr No</b>        | <b>Requirement</b> | <b>Test Method</b> |                  |                                                                                         | <b>No. of Sample</b>     | <b>Frequency</b>             | <b>Remarks</b>                                      |
|                     |                    | <b>Clause</b>      | <b>Reference</b> |                                                                                         |                          |                              |                                                     |
| 1.                  | HDPE Tapes         | Clause 4.1         | IS 17728 :2021   | S                                                                                       | Ten                      | Every four hour production   | Sample from 10 different spindles is to be taken    |
| 2.                  | HDPE Fabric        | Clause 4.2         | IS 17728 :2021   | R                                                                                       | One                      | Every four hour production   | Sample from different circular looms is to be taken |
| 3.                  | Lamination         | Clause 5.1         | IS 17728 :2021   | S                                                                                       | One                      | Every two hour production    |                                                     |
| 4                   | Lamination         | Clause 5.2         | IS 17728 :2021   | R                                                                                       | One                      | Every two hour production    |                                                     |
| 4.                  | Internal Diameter  | Clause 6.1         | IS 17728 :2021   | R                                                                                       | 20                       | Every Two Hour of production |                                                     |

|    |                                                             |            |                              |   |           |                                       |  |
|----|-------------------------------------------------------------|------------|------------------------------|---|-----------|---------------------------------------|--|
| 5. | Overlap                                                     | Clause 5.3 | IS 17728 :2021               | R | 10        | Every Two Hour of production          |  |
| 6. | Perforation hole on Lay flat Tube                           | Clause 5.4 | IS 17728 :2021               | R | 5         | Every four hour of production         |  |
| 7. | Mass                                                        |            | IS 1964                      | R | 5         | Every four hours of production        |  |
| 8. | Breaking Strength, Before UV Exposure                       |            | IS 1969 (Part 1)             | R | 5         | Each Control unit                     |  |
| 9  | Elongation at Break, Percent                                |            | -do-                         | R | 2         | Each Control unit                     |  |
| 10 | Retention of Breaking strength after UV Exposure of 500h,N, | Annex B    | IS 17728 :2021               | S | 2         | Once in Six months                    |  |
| 11 | Abrasion Resistance                                         |            | IS 14714                     | R | 5         | Each Control unit                     |  |
| 12 | Trapezoid Tear Strength, N,                                 |            | IS 14293                     | R | 5         | Each Control unit                     |  |
| 13 | Puncture Strength, N                                        | Annex C    | IS 17728 :2021               | R | 5         | Each Control unit                     |  |
| 14 | Accelerated Ageing Test for 72 h at 70±1°C                  |            | IS 7016 (Part 8) Oven Method | R | 1         | Once in a week                        |  |
| 15 | Cold Cracking Resistance test at -5°C                       | Annex E    | IS 17728 :2021               | R | 2         | Once in a week.                       |  |
| 16 | Workmanship                                                 | Clause 6.2 | IS 17728 :2021               | R | Each roll | Each roll of Perforated Lay flat tube |  |
| 17 | Hydrostatic Burst pressure test (Without Perforation)       | Clause 6.3 | IS 17728 :2021               | R | 1         | Each Control unit                     |  |

|    |                                                                                  |             |                              |   |   |                                         |  |
|----|----------------------------------------------------------------------------------|-------------|------------------------------|---|---|-----------------------------------------|--|
| 18 | Length                                                                           | Clause 6.4  | IS 17728 :2021               | R | 1 | Every four hours of production          |  |
| 19 | Kink Test (Without Perforation)                                                  | Clause 6.5  | IS 17728 :2021               | R | 1 | Each Control unit                       |  |
| 20 | Welded Seam strength before U.V. Exposure                                        |             | IS 1969 (Part 1)             | R | 2 | Each Control unit                       |  |
| 21 | Welded Seam Strength after UV exposure                                           |             | Annex B and IS 1969 (Part 1) | S | 2 | Once in six months                      |  |
| 22 | Susceptibility to Environmental stress cracking                                  | Annex E     | IS 17728 :2021               | R | 1 | Once in a Week                          |  |
| 23 | Coefficient of Distribution Uniformity and Throw as a Function of Inlet pressure | Annex F     | IS 17728 :2021               | S | 1 | Once in a 3 months or change in Pattern |  |
| 24 | Temperature cyclic test for change in Hole behavior                              | Annex G     | IS 17728 :2021               | S | 5 | Once in 3 months                        |  |
| 25 | Change in hole behavior at high pressure and High temperature                    | Annex H     | IS 17728 :2021               | S | 2 | Once in a month                         |  |
| 26 | Uniformity of water flow rate                                                    | Annex J     | IS 17728 :2021               | R | 1 | Once in a Week                          |  |
| 27 | Color                                                                            | Clause 6.13 | IS 17728 :2021               | R | 1 | Each Control unit                       |  |

|    |                                                                               |                 |                |   |   |                                 |  |
|----|-------------------------------------------------------------------------------|-----------------|----------------|---|---|---------------------------------|--|
| 28 | Fittings                                                                      | Clause 7.1, 7.2 | IS 17728 :2021 | R | 1 | Each Control unit with fittings |  |
| 29 | Resistance to pull out of joints between fitting and perforated lay flat tube | Clause 7.3      | IS 17728 :2021 | R | 5 | 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 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.