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BUREAU OF INDIAN STANDARDS
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भारतीय मानक *मसौदा*

सिंचाई उपस्कर — ड्रिप सिंचाई के लिए पॉलीएथिलीन माइक्रो ट्यूब — विशिष्टि

(आइ एस 14482 का पहला पुनरीक्षण)

Draft **Indian Standard**

IRRIGATION EQUIPMENT — POLYETHYLENE MICRO TUBES FOR DRIP IRRIGATION — SPECIFICATION

(First Revision of IS 14482)

ICS **65.060.35**

Farm Irrigation And Drainage Systems Sectional Committee, FAD 17	Last date for Comments: **5 March 2025**

FOREWORD

(Formal clauses will be added later)

The drip irrigation technology has gained popularity in India. In the past, when locally manufactured emitters or drippers were not available, microtubes were exclusively used as emission devices. Microtubes represent the simplest and most cost-effective precursor to all modern types of emitters or drippers. These are small-bore, black polyethylene tubes and can be classified under long-flow-path emitters. Micro tubes still are used in drip irrigation due to its simplicity and low cost.-Their primary advantage lies in their ability to operate at lower pressure compared to other emitters, making them a practical and economical choice for many farmers.

This standard covering the requirements of polyethylene microtubes was first published in 1997. The first revision of the standard has been undertaken to incorporate necessary editorial changes and to bring it out in the latest style and format of Indian Standards. References to Indian Standards wherever applicable have also been updated.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’.The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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IRRIGATION EQUIPMENT — POLYETHYLENE MICRO TUBES FOR DRIP IRRIGATION — SPECIFICATION

(First Revision of IS 14482)

1 SCOPE

This standard prescribes the requirements and methods of tests for polyethylene micro tubes of inside diameter 0.9 mm to 1.2 mm for drip irrigation system.

2 REFERENCES

The standards given below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

IS No.	*Title*
IS 12786 : 2024	Irrigation equipment — Polyethylene pipes for irrigation laterals — Specification *(first revision)*

3 DEFINITIONS

For the purpose of this standard, the following definitions shall apply.

3.1 Polyethylene Micro Tube

A small-bore black polyethylene tube fitted to an irrigation lateral and intended to emit water at an unregulated rate in the form of drops or continuous flow at emission rates not exceeding 15 1/h at a 10 m water head and 1 m long micro tube.

NOTE — The micro tube utilizes a long flow path for pressure dissipation. The flow rates can be adjusted by either reducing or extending the length of the micro tube or by changing the internal diameter of the micro tube.

3.2 Nominal Emission Rate

Emission rate in 1/h of the micro tube at a nominal test pressure and water temperature of (27 ± 2) °C of 1 m length of micro tube.

3.3 Nominal Test Pressure (P_n)

Reference pressure of 100 kPa at the inlet of the unregulated micro tube; or any other pressure so designated in the manufacturer's publications.

3.4 Range of Working Pressure

Range of water pressure at the micro tube inlet, between and including the minimum working pressure, P_{min}, and the maximum working pressure, P_{max}, recommended by the micro tube manufacturer to ensure proper operation.

4 MATERIAL

Extrusion compound conforming to **4** of IS 12786 shall be used for the manufacturing of micro tubes.

5 DIMENSIONS OF MICRO TUBES

5.1 The outside diameter and wall thickness of the micro tubes shall be as given in Table 1. The nominal inside diameter given in Table 1 is for guidance only.

5.1.1 The outside diameter of a micro tube shall be the average of two measurements taken at 90° round the pipe.

5.1.2 The resulting dimensions shall be expressed to the nearest 0.05 mm.

Table 1 Dimensions of Micro Tubes
(*Clause* **5.1.2**)
All dimensions in millimeters

Sl No.	**Nominal Inside Diameter**	**Wall Thickness**		**Outer Diameter**	
		Min	*Max*	*Min*	*Max*
(1)	(2)	(3)	(4)	(5)	(6)
i)	0.9	1.0	1.1	2.9	3.1
ii)	1.0	1.0	1.1	3.0	3.2
iii)	1.1	1.1	1.2	3.1	3.3
iv)	1.2	1.1	1.2	3.2	3.4

6 VISUAL APPEARANCE

The internal and external surfaces of the micro tube shall be smooth, clean and free from groovings and other defect. The ends shall be clearly cut and shall be square with axis of the pipe. Slight shallow longitudinal grooves or irregularities in the wall thickness shall be permissible provided the wall thickness remains within the permissible limits.

7 TEST SPECIMENS AND CONDITIONS

7.1 Test Specimen

Each specimen of micro tube shall be of minimum 1 m length. Test specimens shall be selected at random by the representative of the test laboratory from a batch of at least 100 m micro tube. The total number of test specimens shall be at least 25.

7.2 Test Conditions

For test purpose, test specimens shall be assembled on a polyethylene lateral pipe following the recommendations of the manufacturers as to type of pipe, assembly tools and connection. When polyethylene lateral pipe is used, the pipe shall comply with the requirements of IS 12786. The use of

grease or chemicals that may affect the properties of the pipe or the micro tube is prohibited when attaching micro tubes to the pipes.

All the tests shall be carried out at a water temperature of (27 ± 2) °C. The water used shall be filtered through a filter with nominal aperture of 180 micron to 152 micron (80 mesh to 100 mesh) or as recommended by the manufacturer.

8 PERFORMANCES REQUIREMENTS

Micro tubes shall conform to the performance requirements as given in **7.2**, **7.3** and **7.4** of IS 12786 except that in the test procedure for tensile test the complete section of the micro tube to be tested in place of dumbbell test specimen as specified in **7.3** of IS 12786.

9 RESISTANCE TO HYDROSTATIC PRESSURE

9.1 Connect one end of the micro tube pipe assembly to a source of hydraulic pressure and plug the other end of the assembly. Perform the test on at least five samples of micro tubes connected to a lateral. The micro tube should be inserted 10 mm to 20 mm inside the lateral.

9.2 Carry out the test in the following two steps.

a) Test the water tightness of the assembly as follows:

Increase and maintain the pressure in three steps:

i) 5 min at 0.4 times maximum working pressure;
ii) then another 5 min at 0.8 times maximum working pressure;
iii) then 60 min at 1.2 times maximum working pressure.

No leakage shall occur through the micro tube or their connections to the pipe, except at the outlet of micro tube discharge.

b) Immediately after completion of stage (a), raise the pressure to twice the maximum working pressure and maintain for 5 min. The micro tubes shall withstand the test pressure without suffering damage and without pulling out from the assembly.

10 SUPPLY OF MICRO TUBES

The micro tubes shall be supplied in coils of nominal lengths 100 m and 200 m unless otherwise agreed to between the purchaser and the supplier. Each coil shall contain not less than one specified nominal length.

11 MARKING

11.1 Due to miniature size of micro tube, it is not possible to mark it suitably. Therefore, the coil of micro tube should be placed inside a plastic pouch with following information printed on it:

a) Manufacturer's name or trade-mark,
b) Outside diameter (nominal),
c) Inside diameter (nominal),
d) Batch number, and

e) Pipe material PE 25.

11.2 BIS Certification Mark

Each packet may also be marked with the Standard Mark.

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

12 DATA TO BE SUPPLIED BY THE MANUFACTURER

The manufacturer shall make available to the user, together with the micro tube, catalog or information sheets that include the following data:

a) Catalog no. of irrigation micro tube;
b) Types of pipes suitable for use with the micro tube and their dimensions;
c) Type of connection of micro tube to pipe;
d) Minimum and maximum length of micro tube;
e) A chart showing discharge of micro tube at various lengths at various pressure heads;
f) Range of working pressures;
g) Instruction for cleaning and replacement of micro tube;
h) Instruction of micro tube assembly on pipe;
j) Instruction for preventing clogging in micro tubes;
k) Limitation of micro tube use (fertilizers, chemicals, etc.);
m) Filtration requirement; and
n) Maintenance and storage requirements.