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IS 14482 (1997): Irrigation Equipment - Polyethylene Micro Tubes for Drip Irrigation [FAD 17: Farm Irrigation and Drainage Systems]



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“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक

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

Indian Standard

**IRRIGATION EQUIPMENT —
POLYETHYLENE MICRO TUBES FOR
DRIP IRRIGATION — SPECIFICATION**

ICS 23.040.20 ; 65.060.35

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**BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002**

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Price Group 1

**AMENDMENT NO. 1 APRIL 2007
TO
IS 14482 : 1997 IRRIGATION EQUIPMENT —
POLYETHYLENE MICRO TUBES
FOR DRIP IRRIGATION —
SPECIFICATION**

(Page 1, clause 5.1, Table 1) — Substitute following for the existing:

**Table 1 Dimensions of Micro Tubes
(Clause 5.1)**

All dimensions in millimetres.

Nominal ID	Wall Thickness		Outer Diameter	
	<i>Min</i>	<i>Max</i>	<i>Min</i>	<i>Max</i>
0.9	1.0	1.1	2.9	3.1
1.0	1.0	1.1	3.0	3.2
1.1	1.1	1.2	3.1	3.4
1.2	1.1	1.2	3.2	3.4

D 17)

Irrigation and Farm Drainage Equipment and System Sectional Committee, FAD 54

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Irrigation and Farm Drainage Equipment and System Sectional Committee, had been approved by the Food and Agriculture Division Council.

The drip irrigation concept is fast becoming popular in India. In earlier days when indigenous made emitters or drippers were not available, micro tubes were exclusively used as emission device. Micro tube is the simplest, cheapest and the forerunner of all type of emitters or drippers. It is a small bore black polyethylene tube and can be classified under long flow path emitters. Even today micro tube still has its place due to its simplicity and low cost. The biggest advantage being the low pressure operation as compared to emitters.

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 : 1960 'Rules for rounding of numerical values (*revised*)'. The number of significant places retained in the rounded off value, should be the same as that of the specified value in this standard.

Indian Standard

IRRIGATION EQUIPMENT — POLYETHYLENE MICRO TUBES FOR DRIP IRRIGATION — SPECIFICATION

1 SCOPE

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

2 REFERENCES

The following standard contains provisions which through reference in this text, constitute provision of this standard. At the time of publication, the edition indicated was valid. The standard is subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated.

IS No.	Title
12786 : 1989	Irrigation equipment — Polyethylene pipe for irrigation laterals

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 rates in the form of drops or continuous flow at emission rates not exceeding 15 l/h at a 10 m water head and one metre 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 l/h of the micro tube at a nominal test pressure and water temperature of $27 \pm 2^\circ\text{C}$ of one metre 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)

All dimensions in millimetres.

Sl No.	Nominal Outside Diameter	Tolerance on Outside Diameter	Wall Thickness		Nominal Inside Diameter
			Min	Max	
(1)	(2)	(3)	(4)	(5)	(6)
i)	3	+ 0.25	1.05	1.1	0.9
ii)	3	+ 0.25	1.0	1.05	1.0
iii)	3	+ 0.25	0.95	1.0	1.1
iv)	3	+ 0.25	0.9	0.95	1.2

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 one metre 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 $27 \pm 2^\circ\text{C}$. The water used shall be filtered through a filter with nominal aperture of 180 to 152 micron (80 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 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:
 - 5 min at 0.4 times maximum working pressure.
 - then another 5 min at 0.8 times maximum working pressure.
 - 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 minutes. 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.

11.2.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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.

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Amendments Issued Since Publication

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