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Agricultural irrigation equipment — Emitters — Specification and test methods

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Foreword

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Agricultural irrigation equipment — Emitters — Specification and test methods

1 Scope

This International Standard specifies mechanical and functional requirements of agricultural irrigation emitters, test methods and the data to be supplied by the manufacturer to permit correct installation and operation in the field.

It applies to emitters, with or without pressure regulation, intended for irrigation; it does not apply to emitters which form an integral part of the pipe during manufacture.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3501:1976, *Assembled joints between fittings and polyethylene (PE) pressure pipes — Test of resistance to pull out*.

ISO 8779:—¹⁾, *Polyethylene (PE) pipes for irrigation laterals — Specifications*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 emitter: Device fitted to an irrigation lateral and intended to emit water in the form of drops or con-

tinuous flow at emission rates not exceeding 15 l/h per outlet, except during flushing.

3.2 in-line emitter: Emitter intended for installation between two lengths of pipe (irrigation lateral).

3.3 on-line emitter: Emitter intended for direct or indirect (e.g. by means of tubing) installation in the wall of the irrigation lateral.

3.4 multiple-outlet emitter: Emitter in which the output flow is divided and directed to several distinctly different locations.

3.5 unregulated [non-compensating] emitter: Emitter of varying emission rate at varying water pressures at emitter inlet.

3.6 regulated [pressure-compensating] emitter: Emitter of relatively constant emission rate at varying water pressures at the emitter inlet within the limits specified by the manufacturer.

3.7 emitter inlet: Point at which water enters the emitter.

3.8 emitter outlet: Opening, or group of all the openings in an emitter, from which water is emitted and directed to one clearly distinguishable location.

3.9 irrigation lateral: Branch supply pipe or tubing fitted with emitters.

3.10 nominal test pressure, p_n : Reference pressure of 100 kPa at the inlet of the unregulated emitter, or any other pressure so designated in manufacturer publications.

3.11 range of working pressures: Range of water pressures at the emitter inlet, between and including the minimum working pressure, p_{min} , and the maximum working pressure, p_{max} , recommended by the emitter manufacturer to ensure proper operation.

1) To be published.

3.12 range of regulation: Range of pressures at the inlet of the regulated emitter in which the emitter discharges water within the range of the emission rates, as specified by the manufacturer.

3.13 nominal emission rate, q_n :

(1) Unregulated emitter: Emission rate, in litres per hour, of the emitter at nominal test pressure and at a water temperature of 23 °C, as specified by the manufacturer.

(2) Regulated emitter: Emission rate, in litres per hour, of the emitter operating in the range of regulation and at a water temperature of 23 °C, as specified by the manufacturer.

(3) Multiple-outlet emitter: Emission rate of each outlet.

4 Classification

Emitters are classified, according to their uniformity of emission rate of regulation, into two uniformity categories.

- a) Uniformity category A: Emitters having higher uniformity of emission rates and smaller deviations from the specified nominal emission rate (and for regulated emitters, better regulation of emission rates).
- b) Uniformity category B: Emitters having lower uniformity of emission rates and greater deviations from the specified nominal emission rate (and for regulated emitters, inferior regulation of emission rates).

NOTE 1 The requirements for each category are defined in 9.1 and 9.2.

5 Marking

Each emitter shall bear clear and permanent markings including the following details:

- a) name of manufacturer or his registered trademark;
- b) nominal emission rate, in litres per hour;
- c) arrow indicating the direction of flow (if important for proper operation).

Nominal emission rate [see b)] may be indicated by the colour of any part of the emitter, or by any other method described in the manufacturer's literature.

6 Construction and materials

6.1 Connections

Emitter connections to the supply shall be as required by the manufacturer, provided that the connection complies with the requirements of this International Standard relating to resistance to internal hydraulic pressure and to pull-out force. The manufacturer shall supply any special tools required for installation.

6.2 Emitter ends

When polyethylene (PE) pipe is used, in-line emitter ends shall not increase the diameter of the polyethylene (PE) pipe by more than 20 %.

NOTE 2 Dimensions of the polyethylene (PE) pipe laterals are specified in ISO 8779.

6.3 Materials

The materials used in emitter construction shall be suitable for use with water, fertilizers and chemicals commonly used in irrigation, including treated sewage water.

The materials shall, insofar as possible, not support the growth of algae and bacteria, nor be of metal which will corrode. Plastics parts of the emitter that are exposed to light shall be opaque and protected against UV degradation.

7 Test specimens and conditions

7.1 Test specimens

Test specimens shall be selected at random by the representative of the test laboratory from a lot of at least 500. The total number of test specimens shall be at least 25. The number of test specimens required for each test is specified in the relevant clause.

7.2 Test conditions

For test purposes, test specimens shall be assembled on a pipe, following the recommendations of the manufacturer as to type of pipe, assembly tools and connection. When polyethylene (PE) pipe is used, the pipe shall comply with the requirements of ISO 8779.

The use of grease or chemicals that may affect the properties of the pipe or the emitters is prohibited when attaching emitters to pipes.