
**Namakalna tehnika – Lokalizirano namakanje - Odvajalne naprave,
značilnosti in preskusne metode**

Irrigation techniques - Localised irrigation - Emitting devices, characteristics and
test methods

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Irrigation techniques - Localised irrigation - Emitting devices, characteristics and test methods

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (prEN 15098:2004) has been prepared by Technical Committee CEN/TC 334 “Irrigation techniques”, the secretariat of which is held by AENOR.

This document is currently submitted to the CEN Enquiry.

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1 Scope

This standard specifies the hydraulic and mechanical features necessary for defining the functioning of the emitting devices, whether or not equipped with compensating features, designed for use in localised irrigation systems.

The manner in which the manufacturers shall provide the basic engineering information for the design and use of the localised irrigation systems and the appropriate testing methods for checking and assuring the proper working order thereof are specified.

This standard applies to all the emitting devices listed in EN 13635:2001, 3.1, with the following restrictions:

- Micro-sprinklers, micro-sprayers or micro-jets are dealt with solely as components which aim is to wet a predetermined restricted area
- Porous pipes are not included under this standard as a result of deeming the hydraulic features thereof to differ from the rest of the emitting devices.
- Other devices such as misters, the essential function of which is that of creating a moist atmosphere more than watering as such, are not included.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. [oSIST prEN 15098:2005](https://standards.iteh.ai/catalog/standards/sist/9d2958a5-47ba-4058-93c7-88c9907251/iso-pr-en-15098-2004)

EN 13635:2001, *Irrigation Techniques - Localised irrigation systems - Terminology and data to be supplied by the manufacturer*

ISO 9261:2004 *Agricultural irrigation equipment - Emitters and emitting pipe – Specification and test methods*

ISO 8026 *Agricultural irrigation equipment – Sprayers - General requirements and test methods*

ISO 8796:2004 *Polyethylene PE 32 and PE 40 pipes for irrigation laterals. Susceptibility to environmental stress cracking induced by insert type fittings. Test methods and requirements*

ISO 7-1 *Pipe threads where pressure-tight joints are made on the threads – Part 1: Dimensions, tolerances and designation*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 13635:2001 apply.

4 Classification

For the purposes of the tests to be conducted, the emitting devices which are to be included under this standard are classified as follows

- a) Drip devices

- b) Emitting pipes and tapes
- c) Sprayers
- d) Micro sprinklers

5 General requirements

5.1 Materials

The plastic materials that are exposed to light shall be opaque and UV resistant.

Plastics, rubber and metal parts shall be as much as possible corrosion-resistant, abrasion-resistant and resistant to ageing.

In all cases, to the extent possible, neither algae nor bacteria shall be allowed to build up in the system, and its parts shall withstand waters containing chemicals commonly used in agriculture and wastewater.

The manufacturer shall provide information regarding any restriction.

5.2 Manufacture and assembly

The emitting devices shall have no manufacturing defect whatsoever which might be detrimental to the operating features thereof.

They shall be features providing easy fitting and assembly. All those equipped with removable parts shall be easy to operate manually or using common tools. Should any special tool be required, the manufacturer shall furnish the same. The removable parts of one same type and one same make shall be interchangeable.

5.3 Connections

When polyethylene (PE) pipe is used, in-line emitting devices or insert-type fittings shall not increase the pipe diameter by more than 13%.

In those cases in which threaded connections of emitting devices are used to fit with other standardised elements, the threading shall adhere to the specific international standard, or to ISO 7-1, and the number of thread turns used for the assembly shall be three or more (as specified in ISO 8026).

6 Design feature tests

6.1 Visual Aspects

The new emitting devices as a whole and each one of the parts thereof into which they can be disassembled shall not have any cracks, holes or pores. Nor shall it be admissible for them to have any scratches, any ridges or any other visible manufacturing defect which might lessen their performance, useful life, operation or proper installation.

The check of visual aspects shall be conducted on a minimum of 25 emitting devices selected at random from a batch of at least 500 emitting devices.

6.2 Dimensions

This section applies only to Emitting Pipes. The dimensions of the emitting pipes should be measured according ISO 9261:2004, 7.2 and 9.4.

7 Hydraulic tests

7.1 Uniformity of emission rate

This test shall be performed according to ISO 9261:2004, 9.1.

The test specimens and conditions to perform this test shall be according to ISO 9261:2004, 8.

For multiple emitting devices the mean flow rate and the standard deviation shall be calculated on the basis of all flow rates at each and every one of the separate outlets of the emitting devices comprising the sample.

7.2 Emission rate as a function of inlet pressure

This test shall be performed according to ISO 9261:2004, 9.2.

The test specimens and conditions to perform this test shall be according to ISO 9261:2004, 8.

The standard equation for the emitting device expresses the ratio between the mean flow rate of the sample and the inlet pressure of an emitting device as set out as follows

$$q = k \times p^m$$

where

q is the mean flow rate of the emitting device sample l/h

k is the constant.

p is the inlet pressure

m is the emitting device exponent.

- exponent "m" is calculated according to ISO 9261:2004, 9.3
- constant "k" is calculated according to ISO 9261:2004, 9.3

7.3 Wetted radius

This test applies only to micro-sprinklers and sprayers used in localized irrigation systems. The test shall be conducted with a maximum allowable wind speed lower than 0,5 m/s. The test specimen to perform this test should be taken at random from the sample used to determinate the uniformity of emission rate and the emission rate as a function of inlet pressure.

For the test, collectors are set into place on a level surface every 25 cm along 4 main radii. The main radii are determined by lines running out from the micro-sprinklers or sprayer at 90° angles. The end of each one of these lines shall extend beyond the surface sprayed.

The micro-sprinkler or sprayer shall be set into place at the centre of these radii in the position (up or down) indicated by the manufacturer, and if it is equipped with some bridge device, it shall be oriented to coincide with one of the radii, such that it rises 20 cm above the openings of the collectors or to any other height stipulated by the manufacturer in his field installation instructions.

The collectors shall be cylindrical or cone-shaped and shall have angled walls which should be slanted to a minimum 75° angle from the horizontal plane. The rimless opening shall be higher than 8,5 cm in diameter and shall not be bent out of shape. All of the upper edges of the collectors shall be located on one same horizontal plane.

The sprayer is put into operation for 2 h at the nominal test pressure stabilised at the intake to the apparatus. Next, the amount of water collected inside the collectors is measured, and the precipitation rate is calculated according to the amount of water collected by each rain gage according to following formula

$$P_m = (V \times 10)/2A$$

where

P_m is the precipitation rate (mm/h)

V is the volume of water collected in each collector (cm³)

A is the surface area of the opening of the collector (cm²)

The wetted radius is the distance from the micro-sprinkler or sprayer to the farthest collectors that collect water at a rate of 0,3 mm/h or above are measured. The average wetted radius is equal to the mean of the 8 values obtained.

The average wetted radius shall coincide with the value stated by the manufacturer with a tolerance of ± 10%.

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8 Mechanical tests

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8.1 Tightness and integrity

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The purpose of this test is to determine the tightness of the material in the presence of any possible future rise in pressure in the system, a check being conducted before and after the test to ensure that no leaks, damage or pulling out of the material having undergone the testing has occurred.

This test shall be performed according to ISO 9261:2004, 9.5.1.

A minimum of 25 emitting devices are to be installed following the manufacturer's recommendations. For emitting pipe, this test shall be conducted on a minimum of 5 portions existing of 25 emitting devices and connected by means of in-line fittings.

If the emitting device can be disassembled for cleaning or for the replacement of parts, the test is to be conducted after assembling and disassembling the emitting three consecutive times following the manufacturer's instructions.

8.2 Cracking Due to Environmental Stress

This test applies only to emitting pipes.

8.2.1 Test methods

For emitting pipes with a wall thickness lower than 0,5 mm the test of cracking due to environmental stress shall be carried out according to the bend test procedure described in ISO 8796:2004, 7.

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For emitting pipes with a wall thickness greater or equal than 0,5 mm which are usually connected to each other or to in-line emitting devices by inner fittings the test procedure shall be carried out according the inserted spigot test procedure as specified in ISO 8796:2004, 8.

NOTE Thinner pipes usually use outer fittings that do no induce stress cracking.

The emitting pipe is considered to have passed the test if not more than 10% of the bends tested or of the test specimens (with inserted spigot) have failed.

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