ASAE S553 DEC2000 (R2017)
Collapsible Emitting Hose (Drip Tape) — Specifications and Performance Testing

American Society of Agricultural and Biological Engineers

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Collapsible Emitting Hose (Drip Tape) — Specifications and Performance Testing

Developed by the ASAE Microirrigation Committee; approved by the Soil and Water Division Standards Committee; adopted by ASAE December 2000; approved as an American National Standard March 2001; reaffirmation extended two years February 2006; reaffirmed by ASABE and ANSI February 2008; reaffirmed by ASABE December 2012, withdrawn as an ANSI March 2013, reaffirmed ASABE November 2017.

Keywords: Collapsible, Drip, Emitter, Irrigation, Microirrigation

1 Purpose and scope

1.1 This Standard specifies testing methods, performance requirements, and data to be supplied by the manufacturer for collapsible emitting hose products with discrete emission points along their lengths, commonly referred to as “drip tape,” and herein referred to as “collapsible emitting hose.”

1.2 This Standard applies to collapsible emitting hose intended for irrigation of which the emitters form an integral or permanently attached part. It does not apply to tubing which is porous along its entire length.

1.3 This Standard applies to specifications and performance testing for newly manufactured collapsible emitting hose products.

1.4 While it is recognized that resistance to emitter plugging is an important consideration in the selection and comparison of collapsible emitting hose products, emitter plugging is not covered in this standard because a repeatable test representative of the variety of field conditions encountered in typical applications is not available.

2 Normative references

The following standards 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 the standards indicated below. Standards organizations maintain registers of currently valid standards.

ASAE EP405.1 DEC99, Design and Installation of Microirrigation Systems

ASAE EP458 DEC99, Field Evaluation of Microirrigation Systems

ASAE S526.1 MAR95, Soil and Water Terminology

ASTM D638, Standard Test Method for Tensile Properties of Plastics

ASTM D1603, Standard Test Method for Carbon Black in Olefin Plastics

ASTM D1693, Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics

ASTM D3895, Standard Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry

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ASTM D4329, Standard Practice for Operating Light and Water Apparatus (Fluorescent UV and Condensation Type) for Exposure of Plastics

ASTM D5397, Standard Test Method for Evaluation of Environmental Stress Crack Resistance of Polyoelfin Geomembranes Using Notched Constant Tensile Load Test

ASTM D5596, Standard Practice for Microscopical Examination of Pigment Dispersion in Plastic Compounds

3 Definitions

3.1 collapsible emitting hose: Continuous hose or tubing which discharges water at discrete points along its length through flow regulating passageways formed into or attached onto the hose; and having a sufficiently thin wall to permit collapsing when not under pressure. (To be balloted by SW-03 for inclusion in ASAE S526.1).

3.2 emitter: Refer to ASAE S526.1.

3.3 emitter discharge exponent, x: The quantity that defines the discharge rate vs. pressure relationship for an emitter in the discharge equation

$$q = K \bullet P^x$$

where:

> P is pressure, q is emitter discharge rate and K is a constant. (To be balloted by SW-03 for inclusion in ASAE S526.1).

3.4 emitter spacing: Distance between consecutive emitter outlets along the length of the collapsible emitting hose. (To be balloted by SW-03 for inclusion in ASAE S526.1).

3.5 inside diameter, *d*: Specified, unpressurized inside diameter of the collapsible emitting hose. See clause 3.10 - nominal inside diameter, d_n.

3.6 nominal test temperature, T_n: The water temperature at which all tests will be carried out.

3.7 maximum working temperature, T_{max}: Maximum working water temperature recommended by manufacturer to insure proper operation at all points in the range of working pressures (3.12).

3.8 nominal emitting hose discharge rate, Q_n : Emission rate per unit length of the collapsible emitting hose with nominal test pressure at the inlets of the emitters and water temperature of T_n .

3.9 nominal emitter discharge rate, q_n: Emission rate of a single emitter at nominal test pressure and water temperature T_n.

3.10 nominal inside diameter d_n: Convenient numerical designation used to indicate the nominal size of the collapsible emitting hose and the standard fittings it is to be used with.

3.11 nominal test pressure, p_n: Nominal pressure associated with nominal emitter discharge rate as designated by the manufacturer.

3.12 range of working pressures: Range of water pressures at the inlet of the emitter, including the minimum working pressure, p_{min} , and the maximum working pressure, p_{max} , recommended by the collapsible emitting hose manufacturer to insure proper operation.

3.13 temperature flow rate index, i_T: Emitter discharge rate at temperature T divided by the emitter discharge rate at temperature T_n.

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4 Data provided by manufacturer

4.1 Marking. When the collapsible emitting hose is supplied in coils, each coil shall carry an attached label or tag bearing the following clear, legible information.

4.1.1 Name and address of manufacturer;

4.1.2 Designation and catalog number;

4.1.3 Nominal inside diameter;

4.1.4 Minimum coil length;

4.1.5 Manufacturing identification code;

4.1.6 Nominal wall thickness;

4.1.7 Nominal emitter spacing;

4.1.8 Nominal emitting hose discharge rate;

4.1.9 Nominal operating pressure;

4.1.10 Maximum shaft diameter for installation. (The diameter of the largest shaft that the reel can be mounted on during installation.)

4.1.11 Reference to this Standard;

4.1.12 Warranty.

4.2 Additional information. The manufacturer shall make available catalogs or information sheets that include the following data:

4.2.1 Instruction sheets for proper installation and operation of collapsible emitting hose;

4.2.2 Limitations of collapsible emitting hose use;

4.2.3 Filtration requirements;

4.2.4 Nominal operating pressure and operating pressure range, including p_{min}, p_{max}, and p_n;

4.2.5 Maximum recommended operating temperature;

4.2.6 Results of the tests specified in this Standard.

4.2.7 A list of known compatible and incompatible fertilizer and chemical materials typically applied through drip irrigation systems.

5 Construction

5.1 General. The collapsible emitting hose shall have no manufacturing defects that may impair performance.

5.2 Dimensions. The manufacturer shall specify the inside diameter and wall thickness of the collapsible emitting hose, and the actual dimensions shall comply with those declared by the manufacturer as stipulated in clause 8.1 of this Standard.

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