SLOVENSKI STANDARD
SIST EN 17098-2:2018

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Polimerni materiali - Zaporne folije za razkuževanje kmetijske in vrtnarske zemlje z zaplinjevanjem - 2. del: Metoda za ugotavljanje prepustnosti folije z uporabo statične tehnike

Plastics - Barrier films for agricultural and horticultural soil disinfection by fumigation - Part 2: Method for film permeability determination using a static technique

Kunststoffe - Sperrschichtfolien zur Desinfektion durch Begasung von Landwirtschafts- und Gartenbauböden - Teil 2: Verfahren zur Bestimmung der Durchlässigkeit einer Folie unter Verwendung einer statischen Technik

Plastiques - Films barrière pour la désinfection par fumigation des sols agricoles et horticoles - Partie 2 : Méthode de détermination de la perméabilité d’un film utilisant une technique statique

Ta slovenski standard je istoveten z: **EN 17098-2:2018**

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65.060.99	Drugi kmetijski stroji in oprema	Other agricultural machines and equipment
83.140.10	Filmi in folije	Films and sheets

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Plastics - Barrier films for agricultural and horticultural soil disinfection by fumigation - Part 2: Method for film permeability determination using a static technique

Plastiques - Films barrière pour la désinfection par fumigation des sols agricoles et horticoles - Partie 2: Méthode de détermination de la perméabilité d'un film utilisant une technique statique

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This European Standard was approved by CEN on 20 November 2017.

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European foreword

This document (EN 17098-2:2018) has been prepared by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by NBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2018, and conflicting national standards shall be withdrawn at the latest by July 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN not be held responsible for identifying any or all such patent rights.

EN 17098, *Plastics — Barrier films for agricultural and horticultural soil disinfection by fumigation*, consists of the following parts:

— *Part 1: Specifications for barrier films*

— *Part 2: Method for determining film permeability using a static technique*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This test method is based on ASTM E2945-14, *Standard Test Method for Film Permeability Determination Using Static Permeability Cells* [1].

The permeability of a thermoplastic film to a gaseous composition depends on the nature of the film, the properties of the chemical constituents of the gaseous composition and environmental conditions. Various values can be used to characterize permeability to a gaseous composition, including flux, diffusion coefficient, and mass transfer coefficient (MTC). Flux and diffusion coefficient depend on the concentration gradient across the film. However, it is recognized that mass transfer coefficient is independent of the concentration gradient and dependent only on the properties of the film and the chemical constituents of the gas, in addition to environmental conditions such as temperature and relative humidity on both sides of the film. It follows that mass transfer coefficient is an appropriate parameter to represent permeability to a specific gaseous composition.

WARNING — Users of this standard should be very familiar with standard laboratory practice. This standard is not intended to cover any safety problems associated with its use, if applicable. It is the user's responsibility to determine appropriate practices in terms of health and safety, and to ensure compliance with the applicable national regulatory requirements.

1 Scope

This document specifies a method for determining the gas permeability of films using a static technique.

This document is applicable to thermoplastic barrier films for agricultural and horticultural soil disinfection using the fumigation technique.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following term and definition apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
permeability
ability of a material to transmit gases and liquids by passage through one surface and out at another surface by diffusion and sorption processes

[SOURCE: EN ISO 472:2013 [2], definition 2.690]

4 Principle

A test specimen is placed in a gas transmission cell so as to form a sealed barrier between two chambers. A gas is introduced into one of the chambers (source chamber) to permeate into the other chamber (receiving chamber). The gas concentrations in the source and receiving chambers are monitored over time by means of gas chromatography. The rate of variation in the concentrations is used to calculate the mass transfer coefficient.

5 Apparatus and equipment

5.1 Transmission cell

The transmission cell comprises a lower chamber (source chamber) and upper chamber (receiving chamber). The inside diameter of each chamber ranges from 120 mm to 150 mm and the height from 40 mm to 60 mm. The chambers are constructed from a stainless steel cylinder and each cylinder is welded at one end to a flat stainless steel plate (see Figure 1). As an alternative, the chambers are made of glass, with the dimensions given above.

In case of chambers made of glass, the exposure of the transmission cell to the direct sun light shall be avoided during testing.

The lower and upper chambers shall each have a connection piece halfway up the chamber, fitted with a septum or epoxy sealed valve for sampling purposes.

The surfaces in contact with the specimen shall be smooth and flat so that gas leakage does not occur.

Gas tightness between the two chambers shall be obtained either by means of a nitrile seal, or by attaching the film onto the two half-cells using epoxy glue.

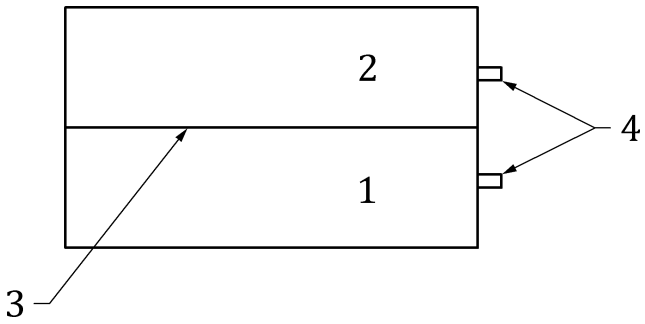
The volume of each chamber shall be measured.

Aluminium adhesive tape may be applied on the outside of the cell to add to gas tightness.

The connection pieces are closed during the test and are used for injecting gas into the chambers and for periodic sampling during the test.

The cell shall include a device for measuring the relative humidity in each chamber.

The chambers of the cell shall be cleaned after each test.



Key

1 source chamber
2 receiving chamber
3 test specimen
4 valve or welded connection piece fitted with a septum

Figure 1 — Typical example of a transmission cell

5.2 Temperature controlled chamber

A temperature controlled chamber is used to maintain a constant temperature in the transmission cell during the test.

5.3 Gas chromatograph

Various types of gas chromatography columns and detectors are available depending on the test gas.

The column type shall be suited to the type of fumigant, and the type of film.

The detector shall be suited to the type of fumigant.

The precision of the detector and of the column should be taken into consideration in the choice of equipment to be used.

The chromatograph shall be calibrated for the given fumigant within its concentration range.

It is necessary to determine the limit of quantification (LOQ) for the fumigant being tested.

Good laboratory practice should be followed as should the instructions for the gas chromatograph.

5.4 VOC-meter

A VOC-meter (volatile organic compound-meter) is used to detect the presence of leaks in the transmission cell.

6 Test specimens

6.1 Test specimens shall be representative of the film, free from wrinkles, folds and pinholes, and of uniform thickness. Test specimens shall be larger than the gas transmission area of the measurement

cell and be capable of being mounted airtight. For a transmission cell with inside diameter 120 mm, cut the test specimens to approximately 150 mm × 150 mm pieces.

6.2 At least three test specimens shall be tested. The number of test specimens may be more than three if otherwise specified or agreed upon by the interested parties.

6.3 Mark the surface of the material in contact with the permeating gas.

NOTE In principle, the test reproduces real application conditions.

7 Conditioning and test atmosphere

7.1 Conditioning

Unless otherwise specified, the specimens shall be conditioned in the same conditions as the test atmosphere (see 7.2), at least 24 h before the start of the test.

Unless otherwise specified, the cell shall be conditioned in the same conditions as the test atmosphere (see 7.2), at least 24 h before the start of the test.

7.2 Test atmosphere

Unless otherwise specified, the test shall be carried out in at least one of the following test conditions:

— Condition 1: Test temperature: (25 ± 2) °C and (95 ± 5) % RH;

— Condition 2: Test temperature: (25 ± 2) °C and (50 ± 10) % RH.

Other test conditions, for example test conditions specified in EN ISO 291 [3], may be chosen by agreement between the interested parties.

8 Test gas

The test gas should be chosen from the following list:

— 1,3-Dichloropropene (CAS number: 542-75-6);

— Dimethyl disulphide (DMDS) (CAS number: 624-92-0);

— Methyl isothiocyanate (MITC) (CAS number: 556-61-6);

— Chloropicrin (PIC) (CAS number: 76-06-2).

This list is not exhaustive and other test gas(es) may be used subject to verifying that the method as described in this document is suited to this gas/these gases.

9 Procedure

9.1 Remove the test specimen from the conditioning atmosphere.

9.2 Place the test specimen on the edge of the lower chamber and examine it for any visible defects, such as folds retained from when it is laid in place.

9.3 Form the tight seal between the two chambers of the transmission cell either by means of a nitrile seal, or by attaching the film onto the two half-cells using epoxy glue.