MALAYSIAN STANDARD

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TEST METHOD FOR WATER VAPOR TRANSMISSION RATE THROUGH PLASTICS FILM AND SHEETING USING A MODULATED INFRARED SENSOR

ICS: 83.140.10

Descriptors: plastics, water vapour, tramsmission rate, plastics film, plastics sheeting, modulated infrared sensor

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Committee representation

The Plastics and Plastics Products Industry Standards Committee (ISC J) under whose authority this Malaysian Standard was adopted, comprises representatives from the following organisations:

Department of Standards Malaysia
Federation of Malaysian Manufacturers
Institut Kimia Malaysia
Jabatan Kerja Raya
Lembaga Getah Malaysia
Malaysian Petrochemical Association
Malaysian Plastics Manufacturers Association
Ministry of Domestic Trade and Consumer Affairs
Ministry of Health Malaysia
Ministry of International Trade and Industry Malaysia
Plastics and Rubber Institute of Malaysia
SIRIM Berhad (Plastics and Ceramics Programme)
SIRIM QAS International Sdn Bhd (Product Certification Section)
The Institution of Engineers, Malaysia
Universiti Kebangsaan Malaysia
Universiti Sains Malaysia
Universiti Teknologi Malaysia

The Technical Committee on Plastics Products which supervised the development of this Malaysian Standard was managed by the Malaysian Plastics Manufacturers Association in its capacity as an authorised Standards-Writing Organisation and consists of representatives from the following organisations:

B & Z Plastics Industry Sdn Bhd
Federation of Malaysian Manufacturers
Guppy Plastics Industries Sdn Bhd
Institut Kimia Malaysia
Malaysia Packaging Industry Bhd
Malaysian Plastics Manufacturers Association (Secretariat)
Malaysian Petrochemical Association
Persatuan Perubatan Malaysia
SIRIM Berhad (Plastics and Ceramics Programme)
SIRIM Berhad (Standards Management Department)
The Institution of Engineers, Malaysia
Universiti Kebangsaan Malaysia

The Working Group on Plastics Films and Lamination which recommends adoption of the ASTM Standard consists of representatives from the following organisations:

Advanced Packaging Technology (M) Sdn Bhd
Chong Wah Plastics Sdn Bhd
ExxonMobil Chemical (M) Sdn Bhd
Great Wall Plastic Industries Bhd
Malaysia Packaging Industry Bhd
Malaysian Plastics Manufacturers Association (Secretariat)
Packaging Research Centre
Polyethylene (M) Sdn Bhd
Polymal Corporation Sdn Bhd

FOREWORD

The adoption of the ASTM Standard as a Malaysian Standard was recommended by the Working Group on Plastics Films and Lamination under the authority of the Plastics and Plastics Products Industry Standards Committee. Development of this standard was carried out by the Malaysian Plastics Manufacturers Association which is the Standards-Writing Organisation (SWO) appointed by SIRIM Berhad to develop standards for plastics products.

This Malaysian Standard is identical to ASTM F 1249-01, *Standard test method for water vapor transmission rate through plastic film and sheeting using a modulated infrared sensor*, published by the ASTM International.

Compliance with a Malaysian Standard does not of itself confer immunity from legal obligations.

Designation: F 1249–01

Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor[1]

This standard is issued under the fixed designation F 1249; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers a procedure for determining the rate of water vapor transmission through flexible barrier materials. The method is applicable to sheets and films up to 3 mm (0.1 in.) in thickness, consisting of single or multilayer synthetic or natural polymers and foils, including coated materials. It provides for the determination of (*1*) water vapor transmission rate (WVTR), (*2*) the permeance of the film to water vapor, and (*3*) for homogeneous materials, water vapor permeability coefficient.

NOTE 1—Values for water vapor permeance and water vapor permeability must be used with caution. The inverse relationship of WVTR to thickness and the direct relationship of WVTR to the partial pressure differential of water vapor may not always apply.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 374 Test Methods for Thickness of Solid Electrical Insulation[2]
D 1898 Practice for Sampling of Plastics[3]
D 4204 Practice for Preparing Plastic Film Specimens for a Round-Robin Study[4]
E 96 Test Methods for Water Vapor Transmission of Materials[5]
E 104 Practice for Maintaining Constant Relative Humidity by Means of Aqueous Solutions[6]

3. Terminology

3.1 *Definitions:*

3.1.1 *water vapor permeability coefficient*—the product of the permeance and the thickness of the film. The permeability is meaningful only for homogeneous materials, in which case it is a property characteristic of bulk material.

3.1.1.1 *Discussion*-This quantity should not be used unless the relationship between thickness and permeance has been verified in tests using several thicknesses of the material. An accepted unit of permeability is the metric perm centimeter, or 1 g/m^2 per day per mm Hg·cm of thickness. The SI unit is the mol/m^2·s·Pa·mm. The test conditions (see 3.1) must be stated.

3.1.2 *water vapor permeance*—the ratio of a barrier's WVTR to the vapor pressure difference between the two surfaces.

3.1.2.1 *Discussion*-An accepted unit of permeance is the metric perm, or 1 g/m^2 per day per mm Hg. The SI unit is the mol/m^2·s·Pa. Since the permeance of a specimen is generally a function of relative humidity and temperature, the test conditions must be stated.

3.1.3 *water vapor transmission rate (WVTR)*—the time rate of water vapor flow normal to the surfaces, under steady-state conditions, per unit area.

3.1.3.1 *Discussion*-An accepted unit of WVTR is g/m^2 per day. The test conditions of relative humidity and temperature where the humidity is the difference in relative humidity across the specimens, must be stated.

[1] This test method is under the jurisdiction of ASTM Committee F02 on Flexible Barrier Materials and is the direct responsibility of Subcommittee F02.30 on Test Methods.

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[2] *Annual Book of ASTM Standards*, Vol 10.01.

[3] Discontinued, see *1997 Annual Book of ASTM Standards*, Vol 08.01.

[4] *Annual Book of ASTM Standards*, Vol 08.02.

[5] *Annual Book of ASTM Standards*, Vol 04.06.

[6] *Annual Book of ASTM Standards*, Vol 11.03.