



Designation: D2684/D2684M – 24

Standard Test Method for Permeability of Thermoplastic Containers to Packaged Reagents or Proprietary Products¹

This standard is issued under the fixed designation D2684/D2684M; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope*

1.1 This test method covers procedures for determining the permeability of thermoplastic containers to packaged reagents or proprietary products under specified conditions of exposure. The exposures used are intended to simulate the normal and elevated temperature-storage conditions that might be encountered in end-use application.

1.2 This test method is applicable only to those types of containers designed to allow positive, leakproof closure.

1.3 Two procedures are provided:

1.3.1 *Procedure A* is specific to testing only with a standard design container. This procedure provides for determinations of rate of weight loss (or gain) and for calculation of a permeability factor.

1.3.2 *Procedure B* applies to tests of all other container designs. Permeability data by this procedure are expressed only in terms of rate of weight loss (or gain) for the particular container tested.

1.4 *Units*—The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system are not necessarily exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems has the potential to result in non-conformance with the standard.

NOTE 1—There is no known ISO equivalent to this standard.

1.5 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the*

Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 *ASTM Standards:*²

D618 Practice for Conditioning Plastics for Testing

D883 Terminology Relating to Plastics

D4976 Specification for Polyethylene Plastics Molding and Extrusion Materials

D1505 Test Method for Density of Plastics by the Density-Gradient Technique

E145 Specification for Gravity-Convection and Forced-Ventilation Ovens

E456 Terminology Relating to Quality and Statistics

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

E2935 Practice for Evaluating Equivalence of Two Testing Processes

3. Terminology

3.1 *Definitions:*

3.1.1 Terms used in this standard are defined in accordance with Terminology D883, unless otherwise specified. For terms relating to precision and bias and associated issues, the terms used in this standard are defined in accordance with Terminology E456.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *permeability factor, P_t* —the permeability of a given plastic to a given product at temperature t , in degrees Celsius, expressed in units of g·cm/day·m², as determined by Procedure A. The permeability factor under 23°C test conditions, for example, is signified by the notation P_{23} .

3.2.1.1 *Discussion*—Determination of P_t is based on an averaged wall thickness over the entire area of the container and an assumption that permeation rate is inversely proportional to the thickness. Precaution in the extent of allowable

¹ This test method is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.19 on Film, Sheet, and Molded Products.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

*A Summary of Changes section appears at the end of this standard