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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Test Method for Rate of Grease Penetration of Flexible Barrier Materials (Rapid Method)¹

This standard is issued under the fixed designation F 119; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method provides standard conditions for determining the rate of grease penetration of flexible barrier materials. Pinholes, which can be measured by a separate test, will increase the rate of grease penetration as determined by this test method.

1.2 *This standard does not purport to address the safety problems 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 Insulation²
- D 618 Practice for Conditioning Plastics and Electrical Insulating Materials for Testing³
- D 1898 Practice for Sampling of Plastics⁴

3. Summary of Test Method

3.1 Flexible barrier materials, uncreased or creased by a standard procedure, are exposed on one side to grease contained in a weighted cotton patch. The time required to show a visual change caused by wetting (reduction in light scattering) of a ground-glass back-up plate is measured.

4. Significance and Use

4.1 This test method is valuable in the development and selection of flexible barrier materials suited for use as grease barriers.

4.2 The test is rapid in comparison with other methods because of the extremely small quantity of oil required for detection (about 6 μ g). The actual time to failure is a multiple of the values obtained by this test method. When permeation is

through an absorbent structure such as kraft paper coated with polyethylene, the failure times will be longer and variable, depending on the variation in porosity and thickness of the structure.

5. Apparatus

5.1 *Backing Plates*, ground-glass, 50 by 50 by 3-mm (2 by 2 by 1/8-in.), very fine grind on one side only.

NOTE 1—The ground-glass backing plates may be prepared from 2 by 2-in. squares of 1/8-in. plate glass by lightly grinding the surface with a silicon carbide abrasive⁵ as follows: Place a piece of plate glass approximately 1ft square on a flat surface. Mix some abrasive and water in small quantities to make a fairly uniform paste. Place one of the 2-in. squares of plate glass face down in the abrasive paste, and rotate it in a figure eight movement with the finger tips using the slightest amount of pressure. When the paste gets too heavy, remove the plate glass square from the bed and wash it to remove all traces of abrasive. Add more water to the thick abrasive paste on the bed. (If necessary, add small amounts of abrasive.) Continue the process until a uniform and light over-all etch is present on the face of the square. When a uniform etch has been obtained, wash the square thoroughly to remove all traces of abrasive and pat dry with lens tissue.

5.2 *Weights*, 50-g, 20 mm (0.75 in.) in diameter at the base.

5.3 *Patches*, rifle cleaning, cotton flannel.

5.4 *Medicine dropper*.

5.5 *Forced-Circulation Oven*, designed to maintain a test temperature of 40 or 60°C within $\pm 1^\circ\text{C}$.

5.6 *Creasing Surface*, consisting of a flat rectangular plate (for example, a piece of machined metal plate about 10 mm thick or a piece of plate glass) with a width at least 75 mm (3 in.) on all sides.

5.7 *Creasing Platen*, consisting of a 5.5-kg (12-lb) square metal bar with 65-mm (2.5-in.) sides and a flat base.

NOTE 2—The developers of this method believe that a standard crease is easier to obtain with a flat platen than with a roller. The weight of the platen was selected to conform to the weight loading per inch of crease in TAPPI T465 sm-52. Creasing of Paper for Water Vapor Permeability Tests.⁶

5.8 *Flat Strip* of wood or metal to give the specimen a

¹ This test method is under the jurisdiction of ASTM Committee F-2 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*, Vols 10.01 and 15.09.

³ *Annual Book of ASTM Standards*, Vol 08.01.

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

⁵ Carborundum No. 1000, manufactured by The Carborundum Co., has been found satisfactory.

⁶ Obtainable from the Technical Association of the Pulp and Paper Industry, Technology Park/Atlanta, P.O. Box 105113, Atlanta, GA 30348.