



Standard Test Method for Determination of Leaks in Flexible Packaging by Bubble Emission¹

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1. Scope

1.1 This test method covers the determination of gross leaks in flexible packaging containing a headspace gas. Test sensitivity is limited to 1×10^{-5} atm cm³/s (1×10^{-6} Pa m³/s).

1.2 Small leaks may not be detected by this procedure. Viscoelastic effects on the products, or entrapped air, become significant and prevent passage through small openings. Positive pressure inside the pouch after the vacuum is drawn may force the product to plug small leaks. The size of the leak that can be detected is dependent upon the products contained, the nature of the packaging material, and the test parameters selected.

1.3 *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:

E 425 Terminology Relating to Leak Testing²

E 515 Test Method for Leaks Using Bubble Emission Techniques²

F 98 Practices for Determining Hermeticity of Electron Devices by a Bubble Test³

3. Terminology

3.1 Definition:

3.1.1 *leak*—any opening in a flexible package that, contrary to intention, either allows the contents to escape or substances to enter.

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5. Apparatus

5.1 *Vacuum Chamber*—Any transparent container capable of withstanding approximately one atmosphere pressure differ-

ential, fitted with a vacuum-tight cover. A vacuum gage, an inlet tube from a source of vacuum, and an outlet tube to the atmosphere shall be connected to the chamber cover. The inlet and outlet tubes shall be equipped with hand valves. Attached to the underside of the cover shall be a transparent plate that will closely approximate the inside dimensions of the container and be such a distance from the top of the container that when it is two-thirds filled with fluid, the attached plate will be positioned 1 in. (25 mm) under the fluid.

6. Materials

6.1 *Immersion Fluids*—Use an immersion fluid which does not degrade the package being tested. Fluids with a low surface tension are generally more sensitive. Examples include water, water treated with a wetting agent, denatured alcohol, and mineral oil. Other possible fluids are listed in Test Method E 515 and Practices F 98.

7. Sampling

7.1 The number of specimens used in the test sample may be varied according to the nature of the product, its cost, its size, and whether the specimens are taken from a production line in a normal packaging operation, or are few in number, or are to be used only for purposes of comparative evaluation of procedures or materials.

8. Test Specimen

8.1 *Flexible Package*, with or without its intended contents.

9. Conditioning

9.1 The test sample and test fluid shall be at equilibrium with normal room temperature.

10. Procedure

10.1 Submerge the specimen in fluid contained in the vessel within the vacuum chamber. The uppermost surface of the specimen shall be covered by not less than 1 in. (25 mm) of fluid.

NOTE 1—Two or more small packages may be tested at the same time, provided that they are placed in such a manner that all parts of every package under test can be observed for leakage during the test.

10.2 Set the cover on the vacuum chamber, close the outlet valve, and turn on the vacuum so that the gage rises slowly (approximately 1 in. Hg/s) to a selected vacuum level. The

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² Discontinued; see 1990 Annual Book of ASTM Standards, Vol 03.03.

³ Discontinued; see 1991 Annual Book of ASTM Standards, Vol 10.04.