



Standard Test Method for Water Resistance of Tape and Adhesives Used as a Box Closure¹

This standard is issued under the fixed designation D 5570; 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 to determine the water resistance of an adhesive or tape as measured by the amount of tape or adhesive dissolved or dispersed in water.

1.2 The values stated in SI units are to be regarded as the standard. The inch-pound units given in parentheses are for information only.

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:

D 644 Test Method for Moisture Content of Paper and Paperboard by Oven Drying²

D 996 Terminology of Packaging and Distribution Environments²

D 1974 Practice for the Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes²

3. Terminology

3.1 Definitions:

3.1.1 General definitions for packaging and distribution environments are found in Terminology D 996.

3.2 Description of Term Specific to This Standard:

3.2.1 *box closure*—the means of securing the flaps or covers of a box so that the box will not accidentally open during normal shipment, handling, and storage.

4. Summary of Test Method

4.1 *Procedure A*—The water resistance of a tape (gummed or pressure sensitive) is measured by immersing the tape in water at least 24 h at $23 \pm 2^\circ\text{C}$ ($73.4 \pm 4^\circ\text{F}$) and determining the percent of tape that is dissolved or dispersed.

4.2 *Procedure B*—The water resistance of an adhesive is measured by coating the adhesive on a paper surface, immers-

ing in water at least 24 h at $23 \pm 2^\circ\text{C}$ ($73.4 \pm 4^\circ\text{F}$), and determining the percent of adhesive that is dissolved or dispersed.

5. Significance and Use

5.1 When a box becomes wet, the performance of the box and its closure are reduced. It is desirable to have box closure methods which retain an ability to keep the box closed when wet. Sealing or reinforcing methods sometimes are useful to improve performance of wet boxes and closures. Water resistance is sometimes a regulatory or contractual requirement.

5.2 A test result indicating that a box closure tape or adhesive is soluble or dispersible in water is an indication that its function will be significantly impaired when wet. A test result which does not indicate solubility or dispersibility does not necessarily ensure that the bonding ability will be satisfactory when wet or that the performance of the box closure will be satisfactory when wet. Package performance testing described in the water resistance section of Practice D 1974 is useful to further investigate the effects of water on package and closure functions.

6. Apparatus and Materials

6.1 *Drying Oven*, capable of maintaining $105 \pm 5^\circ\text{C}$ ($221 \pm 9^\circ\text{F}$) and providing adequate air circulation.

6.2 *Testing Chamber*, capable of keeping samples at $23 \pm 2^\circ\text{C}$ ($73.4 \pm 4^\circ\text{F}$).

6.3 *Balance*, capable of reading the mass of specimens at least to the nearest milligram.

6.4 *Container*, capable of holding at least 1 L of water.

6.5 *Stainless Steel Screen*, or other means of holding test specimens under water and allowing for water to circulate to test specimens.

6.6 *Water*, tap water is usually acceptable. Distilled or deionized water shall be used for referee purposes.

6.7 *Dispensing System*, as required, when adhesives are to be tested.

6.8 *Specimen Marking Device*, such as a pencil or a pen with water resistant ink.

6.9 *Paper or Paperboard*, when adhesives are to be tested, which has the ability to remain intact for at least 24 h of water immersion. The approximate size shall be 250×250 mm (10×10 in.).

¹ This test method is under the jurisdiction of ASTM Committee D-10 on Packaging and is the direct responsibility of Subcommittee D10.27 on Paper and Paperboard.

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² *Annual Book of ASTM Standards*, Vol 15.09.