



## Designation: ~~D2860/D2860M – 04 (Reapproved 2010)~~ D2860/D2860M – 17

# Standard Test Method for Adhesion of Pressure-Sensitive Tape to Fiberboard at 90° Angle and Constant Stress<sup>1</sup>

This standard is issued under the fixed designation D2860/D2860M; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

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

## 1. Scope

1.1 This test method covers the determination of the property of adhesion of pressure-sensitive tape to a fiber-board surface. The user of this test method has the option of choosing the paper surface for the test. The test surface may be the standard linerboard, another linerboard (or paper) of individual interest, or a specific fiberboard.

1.2 The values stated in either SI or inch-pound units are to be regarded separately as standard. The values stated in each system are not exact equivalents; therefore, each system must be used independently, without combining values in any way.

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.*

1.4 *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:*<sup>2</sup>

D996 Terminology of Packaging and Distribution Environments

D2904 Practice for Interlaboratory Testing of a Textile Test Method that Produces Normally Distributed Data (Withdrawn 2008)<sup>3</sup>

D2906 Practice for Statements on Precision and Bias for Textiles (Withdrawn 2008)<sup>3</sup>

D4332 Practice for Conditioning Containers, Packages, or Packaging Components for Testing

## 3. Terminology

3.1 *Definitions*—Terminology found in Terminology D996 shall apply.

## 4. Summary of Test Method

4.1 *Procedure A*—The pressure-sensitive tape is mounted on a rigid panel. The adhesive side is exposed. A strip of linerboard, which represents the fiberboard, is placed against the tape adhesive with controlled pressure. The area of contact is specified. The panel is mounted in a horizontal position. A specified mass is fastened to one end of the linerboard. The mass acts to peel the linerboard away from the adhesive at an angle of 90°. The time required to peel the linerboard from the tape is measured.

4.2 *Procedure B*—In this procedure, the fiberboard or the linerboard representing it is adhered to a rigid panel and the tape peeled from it. In all other respects, the procedure is the same as Procedure A.

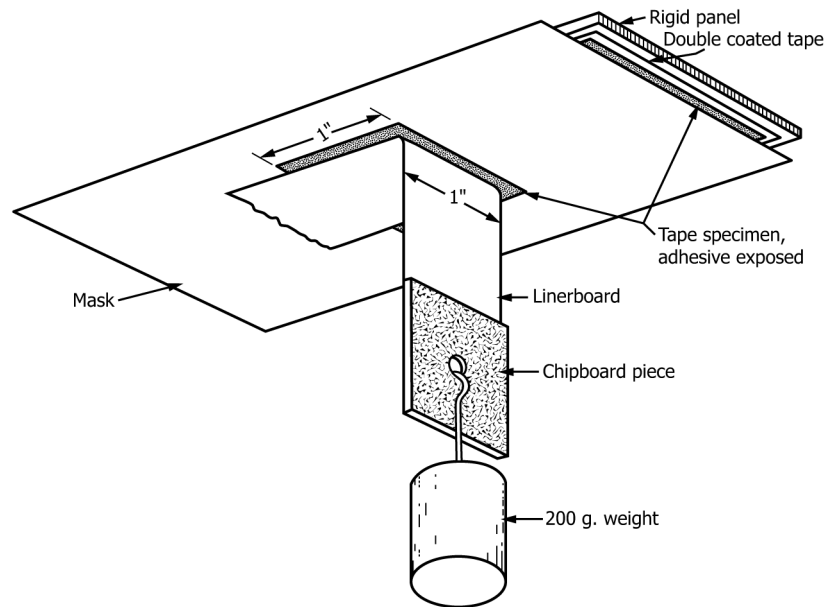
## 5. Significance and Use

5.1 This test method is designed to show the adhesion of a pressure-sensitive tape to fiberboard when the tape is under a constant stress. Test data from this test method for some types of packaging tape relates to tape performance on fiberboard box closure.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D10 on Packaging and is the direct responsibility of Subcommittee D10.14 on Tape and Labels. Current edition approved April 1, 2010; May 1, 2017. Published May 2010; July 2017. Originally approved in 1970. Last previous edition approved in 2004; 2010 as ~~D2860/D2860M – 04~~ D2860/D2860M – 04 (2010). DOI: 10.1520/D2860\_D2860M-04R10.10.1520/D2860\_D2860M-17.

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

<sup>3</sup> The last approved version of this historical standard is referenced on www.astm.org.



NOTE 1—Fix panel securely in a horizontal plane.

FIG. 1 Test Assembly for Procedure A

5.2 Procedure A should be used when comparing tapes to an established requirement. The requirement may be established using either the standard linerboard or another linerboard representing a specific fiberboard.

5.3 Procedure B should be used to rank tapes as to their ability to adhere to fiberboard.

## 6. Apparatus and Materials

6.1 *Tape*, pressure-sensitive, double-coated, 48-mm [2-in.] width. The tape shall exhibit sufficient adhesion to the panel and test specimen or fiberboard to avoid the failures cited in 10.1.9 and 10.2.14.

6.2 *Panel*—Any steel piece at least 50 by 125 mm [2 by 5 in.] and no less than 1.1 mm [0.043 in.] thick, having one face (2 by 5 in.) that does not deviate from a plane by more than 0.050 mm [0.002 in.].

6.3 *Stop Watch*.

6.4 *Razor Blade*, single-edge.

6.5 *Mask*—Any paper no more than 0.050 mm [0.002 in.] thick formed to a rectangle approximately 125 by 60 mm [5 by 2.5 in.] with a rectangular hole exactly  $24 \pm 0.25$  [1.0  $\pm$  0.01] by 32 mm [1.25 in.] centered in the piece. The 24-mm [1-in.] hole dimension shall be in the 125-mm [5-in.] direction (see Fig. 1 and Fig. 2).

6.6 *Cutter*, for preparing fiberboard or linerboard and tape specimens.

6.7 *Paperboard Piece*, approximately 25 by 25 mm [1 by 1 in.], for reinforcement.

NOTE 1—Chipboard pads constructed from 0.030-in. thick fiberboard are typically used.

6.8 *Paper Punch*, single-hole.

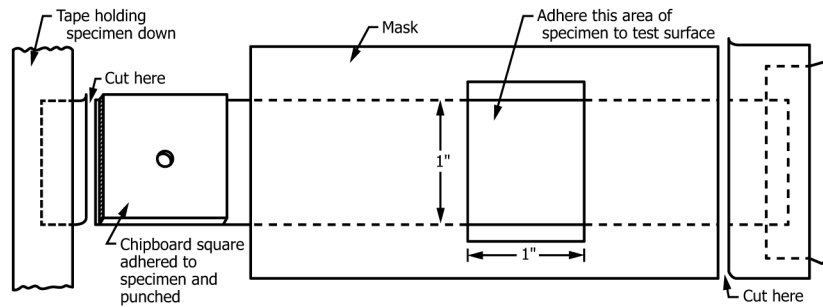
6.9 *Fiberboard or Linerboard Surface*,<sup>4</sup> against which the test is made.

6.9.1 For Procedure A, cut a rectangle exactly  $24 \pm 0.25$  mm [1.0  $\pm$  0.01 in.] wide by at least 125 mm [5 in.] in length, from the linerboard representing the fiberboard on which the tape will be used. The long dimension shall lie at a right angle to the machine direction of the linerboard. Reinforce one end of the strip with a chipboard piece adhered with double-coated tape. Punch a hole at the center of the reinforcement.

6.9.2 For Procedure B, cut a rectangle, preferably 125 by 50 mm [5 by 2 in.], but no less than 50 by 50 mm [2 by 2 in.], from the fiberboard on which the tape will be used (or linerboard representing it). The long test dimension shall lie at a right angle to the machine direction of the linerboard.

6.9.3 For either procedure, prepare the linerboard or fiberboard in advance of testing and mark it to show which side to use. When comparing one roll of tape to another or one lot of tape to another, the linerboard or fiberboard should be from a single lot.

<sup>4</sup> The linerboard accepted as the standard test surface, Standard Reference Material 1810A, is available from the Office of Standard Reference Materials, National Institute of Standards and Technology, Washington, DC 20234.



**FIG. 2 Preparation of Specimen for Procedure B**

6.10 *Steel Roller*,  $82.5 \pm 2.5$  mm [ $3.25 \pm 0.1$  in.] in diameter and  $45 \pm 1.5$  mm [ $1.75 \pm 0.05$  in.] in width, covered with rubber approximately 6 mm [0.25 in.] in thickness having a Shore A durometer hardness of  $80 \pm 5$ . The surface shall be a true cylinder void of any convex or concave deviations. The mass of the roller shall be  $2040 \pm 45$  g [ $4.5 \pm 0.1$  lb]. The mass of the handle shall not add to the mass of the roller during use.

NOTE 2—A simple check to determine if the rubber surface is cylindrical is to wrap the roller in a very thin paper (onionskin) and drag it across a flat glass plate on which is placed a carbon paper, face up. The carbon rubs off onto the thin paper wrapper to reveal high spots or hollows on the rubber surface.

6.11 *Test Stand*, to support the panel securely in a horizontal plane during the test period.

6.12 *Mass*,  $200 \pm 0.2$  g, with a hook.

6.13 *Timing System*, for measuring test time in minutes.

6.14 *Paper*, clean, unprinted, and without a coating of any kind, for use in adhering linerboard or fiberboard to the panel (Procedure B).

## 7. Sampling

7.1 Sampling shall be in accordance with Practice [D4332](#).

## 8. Test Specimens

8.1 A roll or rolls of tape for testing must be at least 36 mm [1.5 in.] in width.

8.2 Unwind and discard at least three, but no more than six, outer wraps from the sample roll before taking specimens for testing.

8.3 Test five specimens from each roll of tape.

## 9. Conditioning

9.1 Condition sample rolls of tape and linerboard or fiberboard in the standard conditioning atmosphere as described in Practice [D4332](#) for a period of not less than 24 h. Test at these conditions.

## 10. Procedure

### 10.1 Procedure A:

10.1.1 Adhere the double-coated tape to the panel with firm finger pressure and remove the liner.

10.1.2 Lightly sand the backing of the test tape on the roll for approximately 250 mm [10 in.] with 300-grit sandpaper to remove the easy unwind treatment. Start timing with the stop watch. Immediately unwind 300 to 450 mm [12 to 18 in.] of tape from a freely rotating roll at a rate of 500 to 750 mm [20 to 30 in.]/s.

10.1.3 Center the sanded area of this strip, adhesive side up, on the panel, aligning the long edges parallel with the panel long edges. Trim it to the panel dimensions. Do not allow any object to contact the adhesive.

10.1.4 Place a mask at the center of the specimen so that the 24-mm [1-in.] dimension of the hole in the mask lies parallel to the long dimension of the specimen edges (see [Fig. 1](#)). Rub against the mask to assure that the tape specimen is well adhered to the double-coated tape on the panel. Avoid touching the adhesive.

10.1.5 At  $90 \pm 5$  s, position the linerboard strip (end opposite the hole) to span the mask and enter it lengthwise on the specimen adhesive. Ensure that the correct side of the linerboard is placed against the specimen adhesive. Do not apply any finger pressure to the specimen. Continue timing.

10.1.6 Roll the linerboard against the specimen lengthwise twice each way at a rate of  $10 \pm 0.5$  mm/s [ $24 \pm 0.5$  in./min] using the rubber-covered roller.

10.1.7 Immediately set the panel, specimen side down, into the test stand, assuring that it will remain in a horizontal plane throughout the test.