



Designation: D5375/D5375M – 98 (Reapproved 2019)

Standard Test Methods for Liner Removal at High Speeds from Pressure-Sensitive Label Stock¹

This standard is issued under the fixed designation D5375/D5375M; 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 These test methods cover the measurement of the adherence of the release liner to the adhesive of a pressure-sensitive adhesive label.

1.2 These test methods provide means of assessing the uniformity of the adhesion to the liner of a given type of pressure-sensitive label. The assessment may be within a sheet or roll between sheets or rolls or between production lots.

1.3 Variation in the label backing, liner, liner release coating, adhesive, and adhesive coating weight, affect the response. Therefore, these methods cannot be used to pinpoint the specific cause(s) of nonuniformity.

1.4 These test methods may not be appropriate to test labels having either relatively stiff backings or stiff liners, or backings showing high stretch at low forces. These characteristics will result in a high variability of the test response that is not a true indication of the real nature of the adhesive bond.

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

1.6 *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.*

1.7 *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.*

¹ These test methods are under the jurisdiction of ASTM Committee D10 on Packaging and are the direct responsibility of Subcommittee D10.14 on Tape and Labels.

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2. Referenced Documents

2.1 *ASTM Standards:*²

D996 Terminology of Packaging and Distribution Environments

D3715/D3715M Practice for Quality Assurance of Pressure-Sensitive Tapes

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

E122 Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process

3. Terminology

3.1 *Definitions:*

3.1.1 General definitions for packaging and distribution environments are in accordance with Terminology D996.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *pressure-sensitive label*—the combination of face material, pressure-sensitive adhesive, and liner.

3.2.1.1 *Discussion*—The adhesive is permanently tacky and instantly adheres to whatever surface the label is designed for. Also, defined as a self-adhering label.

4. Summary of Test Methods

4.1 *Test Method A*—The label stock is adhered to a rigid platform with double-coated tape with the liner side up. The liner is peeled from the adhesive at a specific rate. The liner is peeled back over itself at 180° angle.

4.2 *Test Method B*—The label stock is adhered to a rigid platform with double-coated tape with the liner side up. The liner is peeled from the adhesive at a specified rate. The liner is peeled from the label stock at an angle of 90° to the stock.

5. Significance and Use

5.1 These test methods are a tool for development and quality assurance use. Given a specific pressure-sensitive label and liner and a requirement in terms of the minimum for

² 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.

maximum peel value expected for this liner removal from the label, the data from the test can be used in conjunction with acceptance criteria.

6. Apparatus

6.1 *Specimen Cutter*—The specimen cutter shall hold two single-edged razor blades in parallel planes, a precise distance apart, to form a cutter of exact specimen widths. Two cutters, 12.7 and 25.4-mm or 0.5 and 1-in. cutting width, shall be available. (See Fig. 1.)

NOTE 1—The 12.7-mm or 0.5 in. cutter shall consist of a 0.5 in. thick by 200 mm or 8 in. length of aluminum bar stock 12.7-mm or 0.5 in. wide. The edges for about 125 mm or 5 in. from one end shall be rounded slightly to form a handle. The width of the bar for 75 mm or 3 in. from the opposite end shall be narrowed to exactly 12.7 mm or 0.500 in. minus the thickness of a single razor blade (one or two used as cutting edges). The razor blades shall be held in position using side plates. The end of the cutter shall be cut away at a 45° angle to expose the cutting edge at one end of the blades. The edges shall be separated by 12.7 mm \pm 0.127 mm or 0.500 \pm 0.005 in. A 25.4-mm or 1 in. cutter shall follow the same description, except that the barstock width shall be 25.4 mm or 1 in. and shall be narrowed to exactly 25.4 mm or 1.00 in. minus the thickness of a single razor blade.

6.2 *Roller*,³ mechanically operated:

6.2.1 A steel roller, 82 \pm 2.5 mm or 3.25 \pm 0.1 in. in diameter and 35 \pm 1.5 mm or 1.75 \pm 0.05 in. in width, covered with rubber approximately 6.35 mm or 0.25 in. in thickness, having a Shore Scale A durometer hardness of 80 \pm 5. The surface of the roller shall be a true cylinder void of any concave or convex deviations. The mass of the roller shall be 2040 \pm 45 g or 4.5 \pm 0.1 lb.

6.2.2 No part of the apparatus shall increase the mass of the roller during use. The roller shall move mechanically at the rate of 5.0 \pm 0.2 mm/s or 12.0 \pm 0.5 in./min.

NOTE 2—A simple check to determine if the rubber surface is cylindrical is to wrap the roller in a very thin paper (onion skin) 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.

6.3 *Adhesion Tester*⁴—An adhesion tester that has a movable platform or clamp for holding the test panel specimen and a means of moving the panel parallel with the direction of the stressing clamp so that the specimen is held either in the same plane or perpendicular to the stressing clamp and moved at a uniform rate of 467 \pm 0.2 mm/s or 300 in./min away from the clamp and a visual readout or an autographic device for recording the load. Calibration should be performed as in the manufacturers instructions in the operating manual.

7. Sampling

7.1 Sampling shall be in accordance with Practice D3715/D3715M for rolls and Practice E122 for sheet stock.

7.2 Use a minimum of five samples for development. This is common practice to use a minimum of five specimens taken from several rolls or sheets, among several production runs of label stock. Strong conclusions about a specific property cannot be based on test results of a single unit of product.

8. Test Specimens

8.1 The specimen shall be 25.4 mm or 1 in. wide. A tolerance of 0.40 mm or \pm 1/64 in. shall be allowed. The length shall be approximately 150 mm or 6 in.

8.2 If the samples are in a roll form discard at least three but no more than six outer wraps of label from the sample roll before taking the specimen for testing.

8.3 Remove one specimen, minimum length of 150 mm or 6 in. per sample roll or sample sheet.

8.4 When the label stock is wider than 25.4 mm or 1 in. specimens of the widest specified width are to be cut from the center strip removed from the roll or sheet.

9. Conditioning

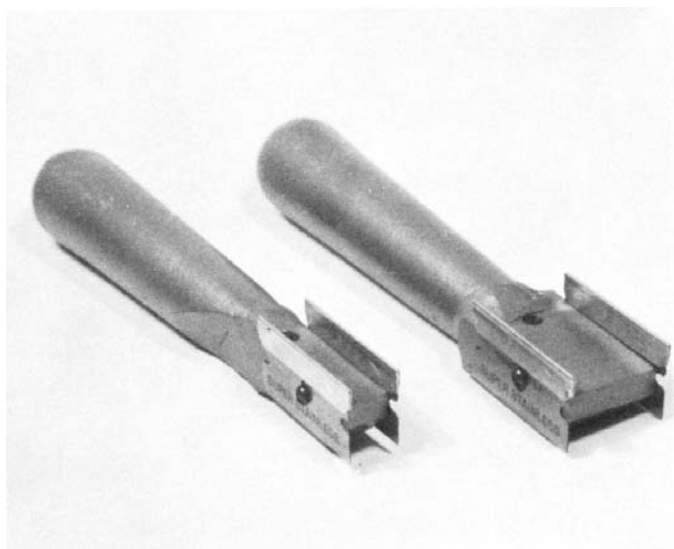
9.1 Condition the sample roles in the standard conditioning atmosphere as described in Practice D4332 for a period of not less than 24 h. Test at these conditions. If other conditions described within Practice D4332 are used add that information to the report.

10. Procedure

10.1 *Test Method A—180° Liner Removal at High Speed* (See Fig. 2):

10.1.1 Apply a strip of double-coated tape, as wide as the specimen, the full length of the platform. Remove the liner from the double-coated tape. Superimpose 127 mm or 5 in. of one end of the specimen, backing side down, against the double-coated tape on the platform. Make two passes with the mechanical roller. Separate the liner from the label at the free

⁴ One source for an adhesion tester is the TLMI Release and Adhesion Tester available from Testing Machines, Inc., Amityville, NY.



SPECIMEN CUTTER
FIG. 1 Specimen Cutter