



Designation: D6252/D6252M – 98 (Reapproved 2019)

Standard Test Method for Peel Adhesion of Pressure-Sensitive Label Stocks at a 90° Angle¹

This standard is issued under the fixed designation D6252/D6252M; 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 the measurement of the peel adhesion of pressure-sensitive label stocks. This test method gives a measure of the adherence to a standard steel substrate or to other surfaces of interest for a pressure-sensitive label stock.

1.2 This test method provides a means of assessing the uniformity of the adhesion of a given type of pressure-sensitive label stock. The assessment may be within a sheet or roll, between sheets or rolls, or between production lots.

1.3 Variations in the label stock facestock and adhesive can affect the response; therefore, this test method cannot be used to pinpoint the specific cause(s) of nonuniformity.

1.4 This test method may not be appropriate to test label stocks having either stiff backings or backings showing a high stretch at low forces. These characteristics could result in a high variability of the test response, which 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 the 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 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.

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2. Referenced Documents

2.1 ASTM Standards:²

A666 Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar

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*—Definitions of terms used in this test method are in accordance with Terminology D996.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *pressure-sensitive label stock, n*—the combination of facestock (face material), pressure-sensitive adhesive, and release liner.

4. Summary of Test Method

4.1 A strip of label stock is applied to a standard test panel, or other surface of interest, with controlled pressure. The label stock is peeled from the panel at 90° angle at a specified rate, during which time the force required to effect peeling is measured.

NOTE 1—The pressure-sensitive adhesive (psa) is permanently tacky and instantly adheres to the surface for which the label stock is designed. A psa label stock also can be defined as a self-adhering label stock.

5. Significance and Use

5.1 This test method is a tool for quality assurance use. Given a pressure-sensitive label stock and a requirement in terms of the minimum or maximum peel adhesion value

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.

expected for this label stock, the data from the test can be used in conjunction with acceptance criteria.

5.2 This test method can show the relative bond strength of a given label stock to one or more surfaces of varied material and texture as compared to the standard stainless steel panel. Substitution of panels representative of the proposed substrates for the standard stainless steel panel would be acceptable for this procedure.

6. Apparatus

6.1 *Specimen Cutter*³—The specimen cutter shall hold two single-edged razor blades in parallel planes, a precise distance apart, to form a cutter of exact specimen width.

NOTE 2—A 25.4-mm or 1-in. cutter shall consist of a 25.4-mm or 1-in. thick by 200-mm or 8-in. length of aluminum bar stock 25.4 mm or 1 in. wide. The edges for about 125 mm or 5 in. from one end shall be slightly rounded to form a handle. The width of the bar for 75 mm or 3 in. from the opposite end shall be narrowed to exactly 25.4 mm or 1 in. minus the thickness of a single-edged razor blade (one of 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 0.74 Rad or 45° angle to expose the cutting edge at one end of the blades.

6.2 *Dispensing System for Solvents*—Use plastic wash bottles.

6.3 *Panel*³—A 50 by 125-mm no less than 1.1-mm thickness or a 2 by 5-in. panel no less than 0.043-in. thickness stainless steel 302 or 304 in accordance with Specification **A666** having a bright-annealed finish. The surface roughness height shall be 50 ± 5 -nm or 2.0 ± 0.2 - μ m. arithmetical average deviation from the mean line. Panels showing stains, discoloration, or numerous scratches are not acceptable.

6.4 *Roller*³, mechanically-operated.

6.4.1 A steel roller 85 ± 2.5 mm or 3.25 ± 0.1 in. in diameter and 45 ± 1.5 mm or 1.75 ± 0.05 in. in width, covered by rubber approximately 6.5 mm or 0.25 in. in thickness, having a Shore Scale A durometer hardness of 80 ± 5 . The surface shall be a true cylinder void of any convex or concave deviations. The mass of the roller shall be 2040 ± 45 g or 4.5 \pm 0.1 lb.

6.4.2 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 ± 0.2 mm/s or 12.0 ± 0.5 in./min.

NOTE 3—A simple check to determine if the rubber surface is a true cylinder is to wrap the roller in a very thin paper (onion skin) and drag it across a flat glass surface 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.

6.5 *Adhesion Tester*—A constant-rate-of-extension (CRE) tension-type instrument shall be used. The instrument shall have a means for rigidly holding a test panel or a test panel fixture and another means for holding one end of the label stock specimen both having centers on one line. The instrument shall produce movement between the two points described above such that a 90° angle is maintained between label stock specimen and the test panel throughout the test. The

extension shall be at a uniform rate of 5.0 ± 0.2 mm/s or 12 ± 0.5 in./min. The force measuring system shall be calibrated to an accuracy of 0.5 % of full scale. The lowest required full scale range is 0–550 g or 0–20 oz. Above the 0–20 oz range, full scale for any test shall be such that the mean test value falls within 20 % of the scale maximum. An autographic device for recording peel force shall be provided. Capability of intergrating areas under the peel force recordings shall be optional.

7. Reagents and Materials

7.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.⁴ Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

7.2 Solvents:

7.2.1 *Diacetone Alcohol*, non-residual, technical grade or better.

7.2.2 One of the following:

7.2.2.1 *Acetone*.

7.2.2.2 *Ethyl Acetate*.

7.2.2.3 *Isopropyl Alcohol (IPA)*.

7.2.2.4 *Methyl Alcohol, (95 %)*.

7.2.2.5 *Methyl Ethyl Ketone (MEK)*.

7.2.2.6 *Methyl Isobutyl Ketone (MIBK)*.

7.2.2.7 *n-Heptane*.

7.2.3 Where toxicity and flammability requirements are paramount, a mixture of n-heptane and a fluorinated hydrocarbon, such as refrigerant, may meet the requirements. Normally, cleaning procedures, including use of the solvents in 7.2, cannot be used on porous or solvent-sensitive materials.

7.3 *Cleaning Material*, absorbent, either surgical gauze or tissue. To be suitable, materials must be lint-free during use, absorbent, contain no additives that are soluble in the solvents listed in 7.2, and be made without contaminants.

8. Sampling

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

9. Test Specimen

9.1 The specimens shall be no greater than 25.4 mm or 1 in. in width nor less than 12.7 mm or ½ in. wide. A tolerance of ± 0.4 mm or $\pm 1/64$ in. shall be allowed. The length shall be approximately 150 mm or 6 in.

9.2 If samples are in roll form, discard, at least three but not more than six, outer wraps of label stock from the sample roll before taking the specimen for testing.

³ Available from Chemsultants International, 9349 Hamilton Drive, Haisley Commercial Park, Mentor, OH 44061–1118.

⁴ “Reagent Chemicals, American Chemical Society Specifications,” American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see “Reagent Chemicals and Standards,” by J. Rosin, D. Van Nostrand Co., Inc., New York, NY, and the “United States Pharmacopoeia”.