



Designation: D7272 – 06

Standard Test Method for Determining the Integrity of Seams Used in Joining Geomembranes by Pre-manufactured Taped Methods¹

This standard is issued under the fixed designation D7272; 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 describes destructive quality control and/or quality assurance tests to determine the integrity of seams produced using taped seaming methods. This test method presents the procedures used for determining the quality of taped seams subjected to both peel and shear tests. These test procedures are intended for non-reinforced and reinforced geomembranes.

1.2 The types of tape seaming techniques used to construct geomembrane seams include the following.

1.2.1 *Inseam Tape*—This technique requires the membrane to be overlapped a minimum distance. The top sheet is folded back and both the bottom sheet and the top sheet are primed with an adhesive primer. The primer is allowed to flash-off. The tape adhesive is applied to the bottom sheet so that a minimum of the tape will extend out from under the top sheet when laid over the tape. The top sheet is allowed to lay flat over the tape and the release paper is removed by pulling it at a 45 to 90 degree angle, keeping the release paper flat to the surface of the bottom sheet. The seam area is then rolled with a silicone sleeved roller.

1.2.2 *Cover Strip Tape*—This technique requires the membrane to be overlapped a minimum distance. An area either side of the seam edge is primed. The primer is allowed to flash-off. The cover strip is applied with the adhesive side down centered over the top sheet edge while removing the release paper as it proceeds along centered over the edge of the top sheet. The cover strip is then rolled with a silicone sleeved roller.

1.3 For nondestructive test methods, see Practice D4437.

1.4 This test method is applicable for seaming processes that use tape adhesive as a seaming mechanism.

1.5 Subsequent decisions as to seam acceptance criteria are made according to the site-specific contract plans, specifications, and contractor quality control/contractor quality assurance (CQC/CQA) documents.

1.6 In case of a material specific test method, this test method shall take precedence.

1.7 *Hazardous Materials*—Always consult the proper material safety data sheets for any hazardous material used for the proper ventilation and protection. The use of the oven in these test methods, in this practice, may accelerate fume production from the test specimen.

1.8 The values stated in both inch-pound and SI units are to be regarded separately as the standard. Values in parentheses are for information only.

1.9 *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:²

- D413 Test Methods for Rubber Property—Adhesion to Flexible Substrate
- D638 Test Method for Tensile Properties of Plastics
- D653 Terminology Relating to Soil, Rock, and Contained Fluids
- D882 Test Method for Tensile Properties of Thin Plastic Sheeting
- D4437 Practice for Non-destructive Testing (NDT) for Determining the Integrity of Seams Used in Joining Flexible Polymeric Sheet Geomembranes
- D4439 Terminology for Geosynthetics
- D5199 Test Method for Measuring the Nominal Thickness of Geosynthetics
- D5994 Test Method for Measuring Core Thickness of Textured Geomembrane

¹ This test method is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.10 on Geomembranes.

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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.

3. Terminology

3.1 *Definitions*—For definitions of other geosynthetic terms used in this method, refer to Terminology [D4439](#). For definitions of soil terms, refer to Terminology [D653](#).

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *tape adhesive, n*—solid strip of prefabricated or manufactured adhesive factory laminated to a release paper used to join two polymer sheets.

3.2.2 *tape adhesive seam, n*—adhesive-based tape placed between two polymer sheet materials forming a surface bond.

3.2.3 *cover strip adhesive, n*—solid strip of prefabricated or manufactured adhesive factory laminated to layer of polymer sheet material factory laminated to a release paper used to join two polymer sheets.

3.2.4 *cover strip adhesive seam, n*—adhesive-based laminated tape placed over two overlapping polymer sheet materials forming a surface bond.

4. Significance and Use

4.1 *Significance*—With the increased use of geomembranes as a barrier material to restrict liquid migration from one location to another, a need has been created for a standard test method to evaluate the quality of geomembrane seams produced by tape methods. In the case of geomembranes, it has become evident that geomembrane seams can exhibit separation in the field under certain conditions. This is an index type test method used for quality assurance and quality control purposes, it is also intended to provide the quality engineer with sufficient seam peel and shear data to evaluate seam quality.

4.2 *Use*—Recording and reporting data such as separation that occurs during the peel test and elongation during the shear test, will allow the quality assurance engineer to take measures necessary to ensure the repair of inferior seams during construction, and therefore, minimize the potential for seam separation while in service. The acceptable value of adhesion measured will, of course, vary from product to product as a result of different formulations and types of products. However, once a product is established, minimum values of separation force can be determined and agreed to by producer and consumer and both can monitor the installation to assure maintenance of the agreed-upon minimum value.

5. Apparatus

5.1 Tensile instrumentation shall meet the requirements outlined in Test Method [D638](#) or [D882](#).

5.2 A testing machine of the constant-rate-of-cross head movement type comprising essentially of the following:

5.2.1 *Fixed Member*—A fixed or essentially stationary member carrying one grip.

5.2.2 *Movable Member*—A movable member carrying a second grip.

5.2.3 *Grips*—Grips for holding the test specimen between the fixed member and the movable member and minimizes both slippage and uneven stress distribution. The grips shall be self-aligning so that they shall be attached to the fixed and movable member, respectively, in such a manner that they will move freely into alignment as soon as any load is applied, so

that the long axis of the test specimen will coincide with the direction of the applied pull through the center line of the grip assembly. Grip faces shall be 25 mm (1 in.) wide and a minimum of 25 mm (1 in.) in length. Smooth surfaces, fine serrated or coarse serrated grip faces, use the grips that have all been found to be suitable for testing, depending on type of geomembrane seams that are being tested.

NOTE 1—Grips lined with thin rubber, crocus-cloth or pressure sensitive tape as well as file-faced or serrated grips have been successfully used for many materials. The choice of grip surface will depend on the material tested, thickness, etc.

5.2.4 *Drive Mechanism*—A drive mechanism for imparting to the movable member in uniform, controlled velocity with respect to the stationary member. Unless otherwise specified in the material specification, the mechanism shall be capable of and adjusted so that the movable member shall have a uniform speed of 50 mm/min, (2 in./min), 300 mm/min (12 in./min), and 500 mm/min (20 in./min).

5.2.5 *Load Indicator*—A suitable load-indicating mechanism capable of showing the total tensile load carried by the test specimen when held by the grips. This mechanism shall be essentially free of inertia lag at the specified rate of testing and shall indicate the load with an accuracy of $\pm 1\%$ of the indicated value or better.

5.2.6 *Extension Indicator (Extensometer) (If Employed)*—A suitable instrument shall be used for determining the distance between two designated points within the gage length of the test specimen as the specimen is stretched and shall conform to requirements specified in Test Method [D638](#).

6. Sampling and Specimen Preparation

6.1 *Trial Seam Sample*—A representative seam from each seaming crew, fabricated from the same sheet material, and using the seaming methods as those recommended by the geomembrane fabricator manufacturer, shall be used for this method.

6.1.1 *Destructive Seam Sample*—Alternatively, cut a portion of the fabricated seam from the installed liner or a daily test seam sample in accordance with the project specifications. It is recommended that the cutout sample be 0.3 m (1 ft) wide and 0.45 m (1.5 ft) in length with the seam centered in the middle of the seam.

6.1.2 *Specimen Preparation*—Five specimens shall be cut from the submittal sample for each the Peel and Shear test. The specimens for the Peel test shall be cut using a calibrated die, 25 ± 3 mm (nominal 1 ± 0.125 in.) wide by 150 ± 3 mm (nominal 6 ± 0.125 in.) long die. The Specimens for the Shear test shall be die cut using a calibrated die, 25 ± 3 mm (nominal 1 ± 0.125 in.) wide by 2 inches greater than the width of the seam. Specimens shall be such that the die is centered over the sample seam, perpendicular to the centerline of the seam. Peel and shear specimens shall be cut as shown in [Fig. 1](#).

6.1.3 *Conditioning*—Samples should be conditioned for 24 hours in a standard laboratory environment that conforms to the requirements for testing geosynthetics as stated in Terminology [D4439](#). Long sample conditioning times typically are not possible for most applications that require daily seam