



Designation: ~~D5820 – 95 (Reapproved 2011)~~ D5820 – 95 (Reapproved 2018)

Standard Practice for Pressurized Air Channel Evaluation of ~~Dual-Seamed~~ Dual-Seamed Geomembranes¹

This standard is issued under the fixed designation D5820; 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 ~~The~~This practice covers a nondestructive evaluation of the continuity of parallel geomembrane seams separated by an unwelded air channel. The unwelded air channel between the two distinct seamed regions is sealed ~~regions is sealed~~ and inflated with air to a predetermined pressure. Long lengths of seam can be evaluated by this practice more quickly than by other common nondestructive tests.

1.2 This practice should not be used as a substitute for destructive testing. Used in conjunction with destructive testing, this method can provide additional information regarding the seams undergoing testing.

1.3 This practice supercedes Practice ~~D4437~~D4437/D4437M for geomembrane seams that include an air channel. Practice ~~D4437~~D4437/D4437M may continue to be used for other types of seams. The user is referred to the referenced standards, or to EPA/530/SW-91/051 for additional information regarding geomembrane seaming techniques and construction quality assurance.

1.4 *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~~ safety, health, and health environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *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:²

~~D4437~~D4437/D4437M Practice for Nondestructive Testing (NDT) for Determining the Integrity of Seams Used in Joining Flexible Polymeric Sheet Geomembranes ASTM D5820-95(2018)

~~D4439~~ Terminology for Geosynthetics standards/sist/fd485fb8-4617-442f-92bf-4157eabeb88a/astm-d5820-952018

~~D4491~~D4491/D4491M Test Methods for Water Permeability of Geotextiles by Permittivity

2.2 ~~Other~~EPA Standard:³

EPA/530/SW-91/051 Technical Guidance Document: Inspection Techniques for the Fabrication of Geomembrane Field Seams

3. Terminology

3.1 Definitions:

3.1.1 *dual seam, n*—a geomembrane seam with two parallel welded zones separated by an unwelded air space.

3.1.2 *Discussion*—The dual seam itself can be made by a number of methods, the most common being the hot wedge technique. Other possible methods include hot air and ultrasonic bonding techniques.

3.1.3 *geomembrane, n*—an essentially impermeable geosynthetic composed of one or more synthetic sheets.

3.1.4 *Discussion*—In geotechnical engineering, ~~impermeable~~ “impermeable” essentially means that no measurable liquid flows through a geosynthetic when tested in accordance with Test Methods ~~D4491~~D4491/D4491M.

3.1.5 *seam, n*—a permanent joining of two or more materials.

¹ This practice is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.10 on Geomembranes. Current edition approved ~~June 1, 2011~~ Feb. 1, 2018. Published ~~July 2011~~ February 2018. Originally approved in 1995. Last previous edition approved in ~~2006~~2011 as D5820 – 95 (2011). (2006). DOI: 40-1520/D5820-95R11-10.1520/D5820-95R18.

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 Available from the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402.

3.2 For definitions of other terms, see Terminology [D4439](#).

4. Summary of Practice

4.1 This practice utilizes a dual seam where an air channel exists between the two welded zones. Both ends of the air channel are sealed and then a pressure gauge is attached to the air space. Air pressure is applied and the gauge is monitored for excessive gauge air pressure drop.

4.2 Air pressures used in this practice are related to the thickness, stiffness, and material type of the geomembrane.

4.3 The minimum monitoring time is recommended to be 2 min following stabilization of the pressure.

4.4 Maximum allowable loss of air pressure varies depending upon thickness, stiffness, and type of material of the geomembrane.

5. Significance and Use

5.1 The increased use of geomembranes as barrier materials to restrict liquid or gas movement, and the common use of ~~dual track~~ dual-track seams in joining these sheets, has created a need for a standard nondestructive test by which the quality of the seams can be assessed for continuity and ~~water tightness~~ watertightness. The test is not intended to provide any indication of the physical strength of the seam.

5.2 This practice recommends an air pressure test within the channel created between ~~dual-seamed~~ dual-seamed tracks whereby the presence of unbonded sections or channels, voids, nonhomogenities, discontinuities, foreign objects, and the like, in the seamed region can be identified.

5.3 This technique is intended for use on seams between geomembrane sheets formulated from the appropriate polymers and compounding ingredients to form a plastic or elastomer sheet material that meets all specified requirements for the end use of the product.

6. Equipment

6.1 *Sealing Equipment*, appropriate to seal the two ends of the air channel.

6.2 A device is necessary to insert air into the open channel and to allow monitoring of its pressure.

NOTE 1—A sharp, hollow needle attached to a properly functioning pressure gauge has been used successfully. Other devices may provide equivalent functions.

6.3 *Air Pump*, either manual or motor driven, capable of generating up to 350 kPa (50 lb/in.²) pressure is necessary. It must be placed on an adequate cushion to preclude damage to the geomembrane. A flexible hose is used to connect the pump to the air pressure device. This hose should have a quick connect on its end for disengagement after pressure is supplied to its desired value, that is, the pump is not to be attached while the air pressure is being monitored. <https://standards.iteh.ai/document/preview/614157eabeb88a/astm-d5820-952018>

6.4 *Knife*, capable of cutting or trimming the liner material.

NOTE 2—A ~~hook-bladed~~ hook-bladed knife is recommended. ~~Straight-bladed~~ Straight-bladed knives may damage the geomembrane by cutting through the material being trimmed and into the underlying geomembrane.

6.5 *Pressure Gauge*, capable of indicating the air pressure in 7 kPa (1 lb/in.²) within the test range.

NOTE 3—The gauge should be calibrated as specified by the manufacturer, or at a frequency of at least once per year.

7. Procedure

7.1 After the ~~dual-track~~ dual-track seam is fabricated and the length of seam that is to be evaluated is determined, seal off the two ends of the continuous air channel.

7.2 Connect the pressure gauge directly to the air channel.

7.3 Connect an air pump to the pressure gauge with a flexible hose via a quick connect and pressurize the air channel to the pressure appropriate for the geomembrane type.

7.4 Remove the flexible hose that connects the air channel to the pressure gauge. Following pressure stabilization, observe the air pressure gauge for the desired test time. The test time should be a minimum of 2 min. Mark the time and pressure of the beginning and end of the test on the geomembrane with a visible marker. The maximum allowable pressure drop may be compared to the maximum allowable value.

7.5 If the pressure does not drop below the maximum allowable value after the specified test period, open the air channel at the end away from the pressure gauge. Air should rush out and the pressure gauge should register an immediate drop in pressure, indicating that the entire length of the seam has been tested. If this does not happen, either the air channel is blocked or the equipment is faulty, and the test is not valid. Attempt to locate the problem and retest the seam in accordance with the project specifications.