Designation: D 5820 – 95 (Reapproved 2001)ε1

Standard Practice for Pressurized Air Channel Evaluation of Dual Seamed Geomembranes[1]

This standard is issued under the fixed designation D 5820; 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.

ε[1] NOTE—Editorial changes were made in July 2001.

1. Scope

1.1 The 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 D 4437 for geomembrane seams that include an air channel. Practice D 4437 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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 4437 Practice for Determining the Integrity of Field Seams Used in Joining Flexible Polymeric Sheet Geomembranes[2]

D 4439 Terminology for Geosynthetics[2]

D 4491 Test Methods for Water Permeability of Geotextiles by Permittivity[2]

2.2 *Other Standard:*

EPA/530/SW-91/051 Technical Guidance Document: Inspection Techniques for the Fabrication of Geomembrane Field Seams[3]

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 essentially means that no measurable liquid flows through a geosynthetic when tested in accordance with Test Methods D 4491.

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

3.2 For definitions of other terms, see Terminology D 4439.

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 gage is attached to the air space. Air pressure is applied and the gage is monitored for excessive gage 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

[1] This practice 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] *Annual Book of ASTM Standards*, Vol 04.09.

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

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. 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 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 its pressure.

NOTE 1—A sharp, hollow needle attached to a properly functioning pressure gage 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.

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

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

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

NOTE 3—The gage 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 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 gage directly to the air channel.

7.3 Connect an air pump to the pressure gage 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 gage. Following pressure stabilization, observe the air pressure gage 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 gage. Air should rush out and the pressure gage 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.

7.6 If the pressure drop is greater than the maximum allowable value after the test period, check the end seals of the air channel. Reseal these areas if a leak is noticed and then repeat the entire test.

NOTE 4—Leaks around the end seals and air pressure device can usually be located by putting moisture around the suspected area and looking for bubbles.

7.7 If significant changes in geomembrane temperature occur during pressure testing (for example, cloud cover or other shading), a variation in channel pressure may be recorded due to expansion or contraction of the air channel. If an increase or decrease in temperature is suspected of having caused a pressure variation, repeat the test after the geomembrane temperature has stabilized.

7.8 Any dual seam that cannot be successfully tested using this practice should be marked and tested using another nondestructive testing practice when possible.

8. Report

8.1 The report of a pressurized dual seam test is usually given in the form of a completed chart. It should include the following information as a minimum:

8.1.1 Data of test,

8.1.2 Time of test,

8.1.3 Temperature at time of test,

8.1.4 Location of test with respect to panel layout plan,

8.1.5 Stabilized air channel pressure,

8.1.6 Duration of test time,

8.1.7 Gage pressure drop during test,

8.1.8 Outcome of test (pass/fail/retest), and

8.1.9 If fail—remedial action is described in detail.

8.2 A form as shown in Fig. 1 includes the above information and may be used for such reporting.

9. Precision and Bias

9.1 The precision of this test has not been established.

9.2 The threshold value for accepting seam quality is that value agreed upon by all parties overseeing the installation of the project and is thus the source of bias in this procedure.

Installer Company's Name_____ Page __ of __

Project Name_____ Project No. _____ Superintendent_____

SHOP DWG SEAM NO.	FIELD SEAM NO.	SEAM DATE	WELDER AND SEAMER I.D. NO.	TEST DATE	START		END		AIR TEST RESULTS	COMMENTS	REPAIR DATE	WELDER AND GUN I.D. NO.	REPAIR VACUUM TEST NO.	SEAM (INITIAL DATE)
					Pressure (PSI)	Test (MIN)	Pressure (PSI)	Time (MIN)						

FIG. 1 Report Form for Pressurized Air Channel Test for Dual Seamed Geomembranes