Designation: D7853 – 13

Standard Test Method for Hydraulic Pullout Resistance of a Geomembrane with Locking Extensions Embedded in Concrete[1]

This standard is issued under the fixed designation D7853; 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 determination of the hydraulic pullout resistance of a geomembrane with locking extensions embedded in concrete by determining the pressure required for locking extensions of the embedded specimen to pullout of the concrete.

1.2 The values stated in SI units are to be regarded as standard. The values given in parentheses are provided for information only and are not considered standard.

1.3 *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]

A1064 Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

C31 Practice for Making and Curing Concrete Test Specimens in the Field

C39 Test Method for Compressive Strength of Cylindrical Concrete Specimens

C94 Specification for Ready-Mixed Concrete

D618 Practice for Conditioning Plastics for Testing

D4439 Terminology for Geosynthetics

D5947 Test Methods for Physical Dimensions of Solid Plastics Specimens

3. Terminology

3.1 Definitions of terms applying to this test method appear in Terminology D4439.

4. Summary of Test Method

4.1 A geomembrane with locking extensions on at least one surface is embedded into concrete. The pullout resistance is determined by measuring the maximum pressure required to initiate pullout of the locking extensions from the concrete. Alternatively, the geomembrane with locking extensions is embedded in concrete and pressurized to a specified pressure to verify whether a minimum level of in-place strength has been attained.

5. Significance and Use

5.1 Due to hydraulic pressure that may be present on some applications, engineers need to understand the capability of these products to resist this pressure. This test allows engineers to compare products and verify pullout strength.

5.2 Hydraulic pullout resistance is a function of locking extension dimensions, locking extension geometry, locking extensions per area, locking extension polymer composition, and the properties of the concrete in which the locking extensions are embedded.

5.3 The data from this test method provides comparative information for rating hydraulic pullout resistance of different geomembranes with locking extensions embedded in concrete. Hydraulic pullout resistance, while partly dependent on locking extension dimensions, has no simple correlation to locking extension dimensions and geometry. Hence, hydraulic pullout resistance cannot be determined with a small sample without potentially producing misleading data to the actual hydraulic pullout resistance of the material. Therefore, the hydraulic pullout resistance is expressed in kPa (lbs/ft^2).

5.4 The apparatus can be circular or square in nature must have a test area of 0.36 m^2 (558 in.^{2}).

5.5 Fig. 1 shows an example of a circular test apparatus that can be used in the performance of this test. The apparatus requires a pressure vessel rated to a minimum 690 kPa (14 410 lbs/ft^2). The vessel test diameter should be a minimum of 677.04 mm (26.655 in.) as shown in Fig. 1.

NOTE 1—Larger vessels may be used but it is up to user to establish correlation to the standard size vessel. The use of a smaller diameter vessel than denoted in standard may contribute to higher pullout resistance due to thickness or stiffness of some products.

[1] This test method is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.01 on Mechanical Properties.

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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.

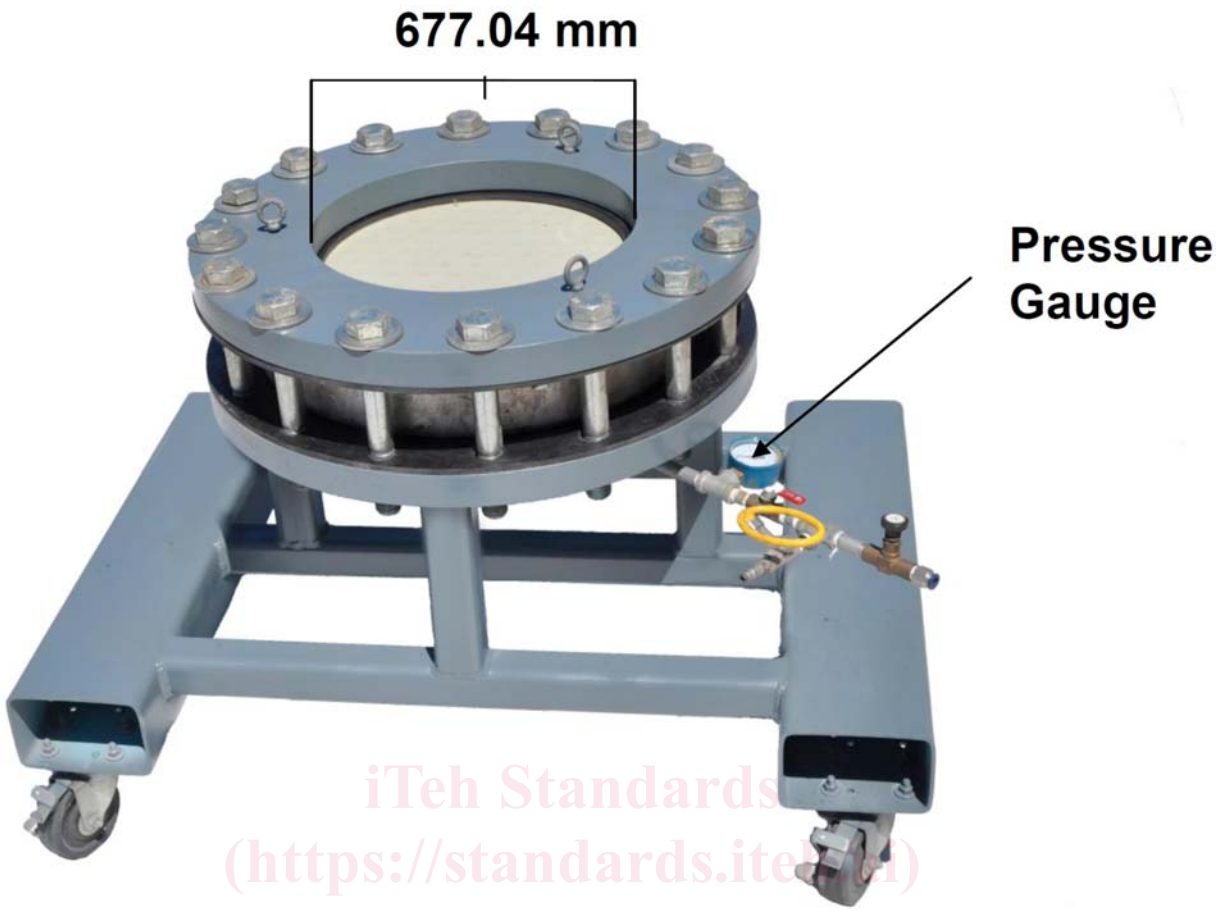

FIG. 1 Picture of Circular test apparatus

5.6 *Test Pedestal*—the base of the testing apparatus which holds the test specimen.

5.7 *Upper Flange*—is the flange that is bolted down on top of specimen to create a seal.

5.8 *Form*—is an aluminum ring used to form test specimen as shown in Fig. 2.

5.9 *Specimen Ring*—the solid ring that is placed around test specimen to contain leakage through the concrete.

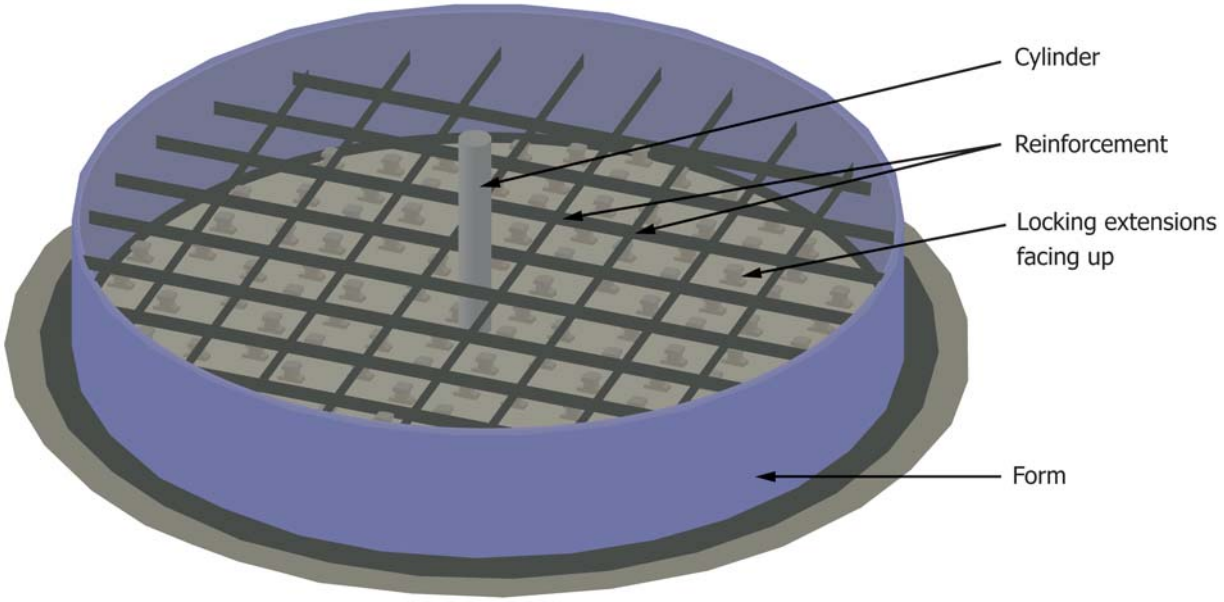

FIG. 2 Bottom of Form with Studs facing up and cylinder spacer