



Designation: D7880/D7880M – 13

# Standard Test Method for Determining Flow Rate of Water and Suspended Solids Retention from a Closed Geosynthetic Bag<sup>1</sup>

This standard is issued under the fixed designation ; 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 is used to determine the flow rate of water and suspended solids through a geosynthetic permeable closed bag used to contain high water content slurry such as dredged material.

1.2 The results for the water and sediment that pass through the geotextile bag are shown as liters of water per time period, and the percent total suspended solids in milligrams per liter or parts per million.

1.3 The flow rate is the average rate of passage of a quantity of solids and water through the bag over a specific time period.

1.4 This test method requires several pieces of specified equipment such as an integrated water sampler, analytical balance, geotextile bag, stand clear PVC pipes, testing frame, and clean containers to collect the decant water and a representative sample of high water content material from the proposed dredge area or slurry source.

1.5 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

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 and health practices and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

[D123 Terminology Relating to Textiles](#)

[D653 Terminology Relating to Soil, Rock, and Contained Fluids](#)

[D4354 Practice for Sampling of Geosynthetics and Rolled Erosion Control Products\(RECPs\) for Testing](#)

[D4439 Terminology for Geosynthetics](#)

## 3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of other terms relating to geosynthetics, refer to Terminology [D4439](#).

3.1.2 For definitions of textile terms, refer to Terminology [D123](#).

3.1.3 For definitions of soil terms, refer to Terminology [D653](#).

3.1.4 *high water content material, n*—a slurry of water and solids exhibiting the properties of a liquid, typically having a percent solids by weight smaller than 50 % (water content greater than 100 %), and the size of the solid particles tend to be very fine grained (<0.064 mm).

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *flow rate, n*—volume of fluid per unit time, expressed as an average, that passes through a geotextile hanging bag.

3.2.2 *geotextile hanging bag, n*—bag, tube, sock, or container designed and fabricated from a single or a combination of layers of permeable geosynthetic to retain finegrained particles such as found in dredged material, for subsequent dewatering of the contained semi fluid materials.

## 4. Summary of Test Method

4.1 A geotextile bag is constructed by sewing one or more layers of geotextiles together to form a closed container with an entry clear PVC pipe providing entry to the bag. The bag will support and contain a measured amount of saturated dredged material or other high water content material.

4.2 The amount of water and sediment that flows through the geotextile container is collected at given time intervals and measured. The amount of sediment passing the geotextile container is determined as the total suspended solids.

4.3 Use material from the designated area to be dredged at the estimated initial percent solids as the actual field conditions, or the source of the high water content material.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee [D35](#) on Geosynthetics and is the direct responsibility of Subcommittee [D35.03](#) on Permeability and Filtration.

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<sup>2</sup> 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.

**5. Significance and Use**

5.1 This test method may be used as an aid to design geotextile container systems that contain fine-grained, high water content slurries such as dredged materials to meet special environmental or operational requirements. This test is often used to demonstrate the efficacy of geotextile dewatering to regulatory agencies in determining the amount of dredged material sediment passing through a geotextile and the flow rate for specific high water content materials.

5.2 The designer can use this test method to assess the quantity of fine-grained dredged material sediment that may pass through the geotextile container into the environment.

5.3 This test method is intended for evaluation of a specific material, as the results will depend on the specific high water content slurry and geotextile evaluated and the location of the geotextile container below or above water. It is recommended that the user or a design representative perform the test because geotextile manufacturers are not typically equipped to handle or test fine-grained slurries.

5.4 This test method provides a means of evaluating geotextile containers with different dredged materials or high water content materials under various conditions. The number of times this test is repeated depends on the users and the test conditions.

5.5 This test method may not simulate site conditions and the user is cautioned to carefully evaluate how the results are applied.

**6. Apparatus**

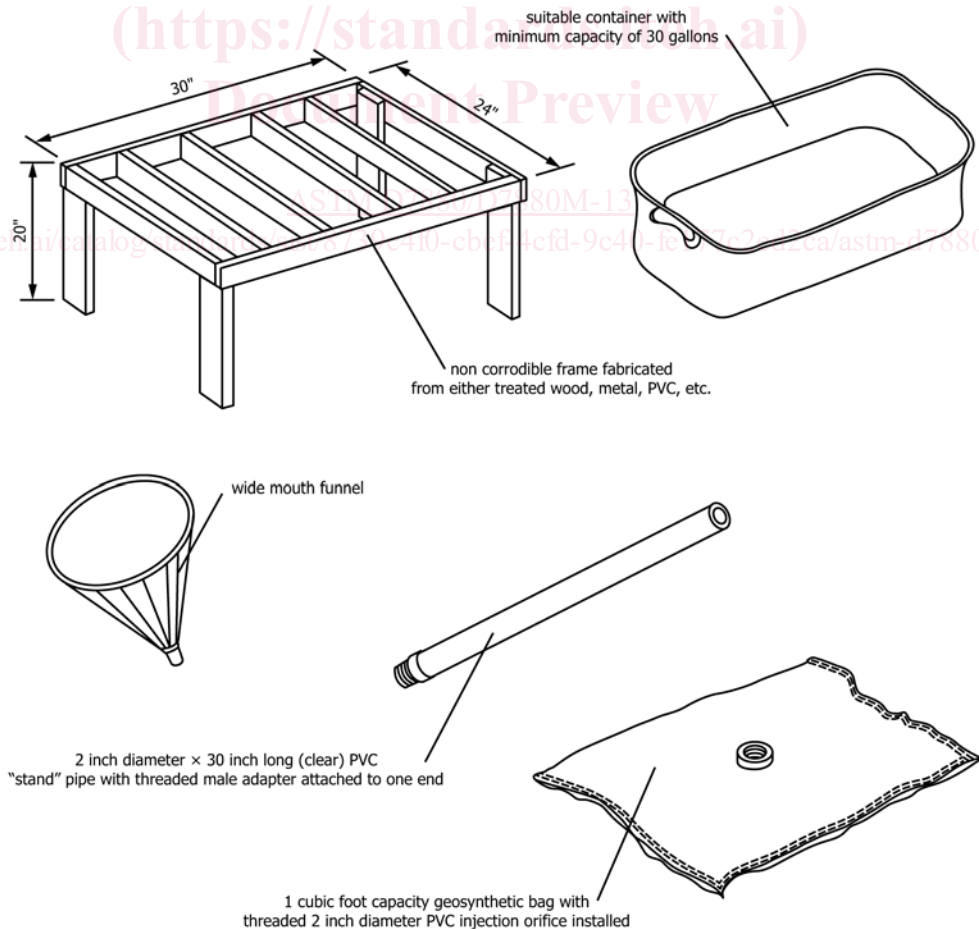
6.1 Frame. Shown in Fig. 1.

6.2 Geosynthetic Bag (container), unfilled bag dimensions shall be approximately 53 cm [21 in.] length × approximately 53 cm [21 in.] width to produce a filled bag capacity of 1 ft<sup>3</sup>. Bag shall have all the sides sawed using the same stitch pattern and seam along the entire edge.

6.2.1 The Geosynthetic Bag (container) shall have a 50.8 mm [2.0 in.] diameter female adaptor coarse threaded PVC flange installed at the top side of the bag. The center of the adapter should be located at the center of the two transversal axis of the bag. Shown in Fig. 1.

6.3 Collection Container approximate capacity filled about 75 L [20 gal], suitable to capture filtrate and proportionately sized to allow placement under the testing frame. Shown in Fig. 1.

6.4 “Stand” Pipe made from 50.8 mm [2.0 in.] diameter and at least 1.10 m [43.30 in.] in length clear PVC or other suitable plastic. “Stand” Pipe shall include a threaded male adapter to facilitate connection the female PVC flange.



**FIG. 1 Test Equipment, Bag and Frame**