



Designation: ~~D2978 – 15~~<sup>ε1</sup> D2978 – 23

## Standard Test Methods ~~Method for~~ Volume of Processed Peat Materials Peat and Peat-Based Growing Media<sup>1</sup>

This standard is issued under the fixed designation D2978; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

<sup>ε1</sup> NOTE – Editorially updated units of measurement statement in April 2018.

### 1. Scope\*

1.1 ~~These test methods cover~~ This test method covers the measurement of the volume of ~~loose and baled processed peat expressed as cubic feet~~ uncompressed (loose) and compressed (baled) peat and peat-based growing media and is used as a quality control measurement to determine if the package contains the labeled amount of material. The results of ~~these test methods are~~ this test method is highly dependent on the experience of the personnel running the procedure.

1.2 ~~There are two test methods, Method A for Loose Peat and Method B for Baled Peat. Method A is used when the material is uncompacted and Method B is used when the material is compacted. This standard is for peat and peat-based growing media only. While it is possible for other types of growing media to use this standard it is outside the scope and the methodology may have to be altered to accommodate a different growing media.~~

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses ~~after inch-pound units are mathematical conversions to SI units that are provided for information only and are not considered standard. Except, that the sieve designations are typically identified using the “alternative” system in accordance with Practice E11, such as 3-in-3 in. and No. 200, instead of the “standard” of 75-mm and 75- $\mu$ m, 75 mm and 75  $\mu$ m,~~ respectively.

1.4 All observed and calculated values shall conform to the guidelines for significant digits and rounding established in Practice [D6026](#).

1.4.1 The procedures used to specify how data are collected/recorded or calculated in this standard are regarded as the industry standard. In addition, they are representative of the significant digits that generally should be retained. The procedures used do not consider material variation, purpose for obtaining the data, special purpose studies, or any considerations for the user's objectives; and it is common practice to increase or reduce significant digits of reported data to be commensurate with these considerations. It is beyond the scope of this standard to consider significant digits used in analysis methods for engineering design.

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

1.6 *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.*

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee [D18](#) on Soil and Rock and is the direct responsibility of Subcommittee [D18.22](#) on Media for Plant Growth. Current edition approved ~~May 1, 2015~~ [July 1, 2023](#). Published ~~June 2015~~ [July 2023](#). Originally approved in 1971. Last previous edition approved in ~~2010~~ [2015](#) as ~~D2978 – 03~~ [D2978 – 15](#)<sup>ε1</sup> (2010). DOI: [10.1520/D2978-15E01](#). DOI: [10.1520/D2978-23](#).

\*A Summary of Changes section appears at the end of this standard

## 2. Referenced Documents

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

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

[D3740 Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction](#)

[D6026 Practice for Using Significant Digits and Data Records in Geotechnical Data](#)

[E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves](#)

## 3. Terminology

### 3.1 Definitions:

3.1.1 For definitions of common technical terms in this standard, refer to Terminology [D653](#).

#### 3.2 Definitions of Terms Specific to This Standard:

3.2.1 *loose peat, n*—uncompacted peat in air-dried, granulated or crumb form.

## 4. Summary of Test Method

4.1 ~~These test methods consist of either measuring the outer dimensions of compacted peat (Method B) or~~ This test method consists of dividing the particles of ~~uncompacted peat (Method A)~~ peat or peat-based growing media by passing them through a ~~½-in. (12.5-mm) sieve and~~ 0.5 in. (12.5 mm) sieve by allowing them to fall into a volume-measuring container. ~~container and if required, measuring the outer dimensions of uncompressed peat.~~

## 5. Significance and Use

5.1 ~~These test methods are~~ This test method is used to quantify the volume of peats ~~peat and peat-based growing media~~ under consideration in commercial transactions to determine if the package contains the labeled quantity. As such, material comes into the test area in an “as sold” condition.

*Note 1*—The quality of the result produced by this standard is dependent on the competence of the personnel performing it, and the suitability of the equipment and facilities used. Agencies that meet the criteria of Practice [D3740](#) are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with Practice [D3740](#) does not in itself ensure reliable results. Reliable results depend on many factors; Practice [D3740](#) provides a means of evaluating some of those factors.

5.2 Peat and peat-based growing media are used by amateur gardeners and professional growers on a volume basis. Failure to follow this standard procedure as written can lead to inaccurate results.

*Note 1*—The quality of the result produced by this standard is dependent on the competence of the personnel performing it, and the suitability of the equipment and facilities used. Agencies that meet the criteria of Practice [D3740](#) are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with Practice [D3740](#) does not in itself ensure reliable results. Reliable results depend on many factors; Practice [D3740](#) provides a means of evaluating some of those factors.

## 6. Apparatus

6.1 ~~Sieve, Sieve—~~½-in. (12.5-mm), ~~A~~ 0.5 in. (12.5 mm) sieve conforming to Specification [E11](#).

6.2 ~~Measuring Container—~~A steel or wood bound container with metal having one of the following sets of inside dimensions: ~~dimensions~~

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

Size (ft <sup>3</sup> )	Measuring Container Dimensions (W × L × H)
1/2	12 × 12 × 12 in. with line scribed at 6 in. from the bottom
3/4	12 × 12 × 12 in. with line scribed at 9 in. from the bottom
1	12 × 12 × 12 in.
2	16 × 16 × 13.5 in.
5	16 × 16 × 33.75 in.

in [Table 1](#):

**6.3 Straight Edge**—At least 20 inches (50.8 cm) in length A stiff metal straightedge of any convenient length but not less than 20 in. (508 mm) and having a thickness of 1/4 in. (6.4 mm).

**6.4 Dimension Measuring Device**—A tape measure, ruler, or similar device with sufficient capacity to measure, without estimation, the baled peat or peat-based growing media and readable to 1-in.-0.5 in. (12.5 mm) or better.

## 7. Procedure

**7.1** A test specimen is considered one intact bag or bale of peat or peat-based growing media. The volume can only be determined once per test specimen. It is not permissible to reuse peat or peat-based growing media for volume determination. It is suggested to have at least 3 test specimens available for use in case something happens to the first or second one and the measurement must be repeated.

**7.2** Obtain the test specimen from an undamaged packaged bale or bag that has no visible signs of tears or openings in the packaging. If the packaging of the bale or bag is torn, do not use the bale or bag for testing.

**7.3** If the compression ratio needs to be known, measure and record the width, length, and height of the bale to the nearest 0.5 in. (12.5 mm). When outside wrappers thicker than 0.75 in. (19.1 mm) are in place, correct the measurements to account for the thickness of the outside wrapper.

**7.4** Select the measuring container most closely corresponding to the amount of volume the label states is contained in the package.

**7.5** Take care not to lose any peat or peat-based growing media during transfer; losing even a small amount affects the volume determination.

**7.6** For either method, use all of the material in the package for testing. Place the 0.5 in. (12.5 mm) sieve at a height of 18 in. (457.2 mm) above the selected measuring container.

**7.7** The volume of the material can only be determined once.

**7.7 Method A: Loose Peat:** Open the package and loosen the peat or peat-based growing media with your hands to break any agglomerations of peat or peat-based growing media, taking care not to lose any peat or peat-based growing media. Place the contents on top of the sieve and sieve the peat or peat-based growing media into the measuring container.

**TABLE 1 Measuring Container Inside Dimensions**

Size (ft <sup>3</sup> )	Measuring Container Inside Dimensions (W × L × H)	Size (L)	Measuring Container Inside Dimensions (W × L × H)
1/2	12 × 12 × 12 in. with line scribed at 6 in. from the bottom	14.2	305 × 305 × 305 mm with line scribed at 152 mm from the bottom
3/4	12 × 12 × 12 in. with line scribed at 9 in. from the bottom	21.2	305 × 305 × 305 mm with line scribed at 229 mm from the bottom
1	12 × 12 × 12 in.	28.3	305 × 305 × 305 mm
2	16 × 16 × 13.5 in.	56.6	406 × 406 × 343 mm
5	16 × 16 × 33.75 in.	141.6	406 × 406 × 857 mm

7.4.1 Place the 1/2-in. (12.5-mm) sieve on top of the selected measuring container.

7.4.2 Open the package and from a height of 2 ft over the sieve and measuring container, pour the contents over the sieve and into the measuring container.

7.4.3 The corners of the measuring container shall be well filled by shaking with a rotary motion at one rotation per second for five seconds without lifting the box from the floor or other surface. When filled and if necessary, level the measuring container off using the straightedge. Measure and record the volume to the nearest 1 ft<sup>3</sup>.

7.8 Add peat or peat-based growing media that is retained on the sieve and cannot be loosened by hand to the measuring container beneath the screen.

7.9 When the measuring container is filled to the top of the container, level off the measuring container using the straightedge, at a 45 degree angle with the leading edge being the smaller portion of the angle as not to compress the test material, to strike off excess peat or peat-based growing media. The excess is to be used to fill the next measuring container and does not require additional sieving. Put the peat or peat-based growing media from the filled box aside in individual pile until all the peat or peat-based growing media have been sieved. Measure and record the volume,  $V_n$  of each full measuring container according to the size of the container.

7.10 *Method B: Baled Peat:* For the last measuring container, level the peat or peat-based growing media inside the measuring container and, if not full, measure the height,  $H$ , of the peat or peat-based growing media to the nearest 0.5 in. (12.5 mm).

7.5.1 Measure and record the width, length, and height of the bale to the nearest 1 in. Measurements shall be corrected for the outside wrappers if the wrappers are thicker than 3/4 in.

7.5.2 Determine the volume of the baled peat by multiplying the width, length, and height ( $W \times L \times H$ ) and record the volume to the nearest 1 ft<sup>3</sup>.

7.5.3 Determine the amount of loose peat in the bale using the 1-ft<sup>3</sup> measuring container and following the procedure in Method A. Measure and record the volume to the nearest 1 ft<sup>3</sup>.

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## 8. Calculation

8.1 Calculations are shown using inch-pound units. Other units are permissible provided appropriate conversion factors are used to maintain consistency of units throughout the calculations, and similar significant digits or resolution, or both are maintained.

8.2 Calculate the total volume of peat or peat-based growing media,  $V_t$ , using the following equation:

$$V_t = \left( \sum_{i=1}^n V_i \right) + V_p \quad (1)$$

where:

- $V_t$  = total volume, nearest 1 ft<sup>3</sup>,
- $V_i$  = volume of full container(s), nearest 1 ft<sup>3</sup>,
- $V_p$  = volume of partial container ( $V_p = (L \times W \times H)/1728$ ), nearest 1 ft<sup>3</sup>,
- $W$  = width of measuring container, nearest 0.5 in.,
- $L$  = length of measuring container, nearest 0.5 in.,
- $H$  = height of measuring container, nearest 0.5 in., and
- $i$  = subscript indicating the quantity of full containers.

8.3 Calculate the volume of the baled peat or peat-based growing media,  $V_b$ , using the following equation:

$$V_b = \frac{(W_b - O_w) \times (L_b - O_w) \times (H_b - O_w)}{1728} \quad (2)$$