



Designation: D 4531 – 86 (Reapproved 2002)

## Standard Test Methods for Bulk Density of Peat and Peat Products<sup>1</sup>

This standard is issued under the fixed designation D 4531; 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 approval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 These test methods cover the determination of the bulk density of both peat in its natural state and peat products (Note 1). These test methods consist of defining a volume of peat and determining the mass of that specific volume. The difference in the respective methods is in the procedures employed to determine the peat volume.

NOTE 1—Test Method D 2978 is used for specifying the volume represented by a quantity of loose processed peat or the volume of a peat bale.

1.2 *Method A*—This method, the core method, covers the determination of the bulk density of an undisturbed core of peat taken with a piston sampler or other suitable core sampler (Sections 6 and 7).

1.3 *Method B*—This method, the paraffin wax method, covers the determination of the bulk density of undisturbed clods or irregular pieces of wet peat and compressed peat products (Sections 8 and 9).

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 2974 Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils<sup>2</sup>

D 2978 Test Method for Volume of Processed Peat Materials<sup>2</sup>

### 3. Terminology

#### 3.1 Definitions:

3.1.1 *bulk density*,  $\rho$ —total mass (solids plus water) per unit of total volume of a peat at a given moisture condition.

3.1.2 *dry density*,  $\rho_d$ —mass of dry organic and mineral matter per unit of total volume of a peat at a given moisture condition.

NOTE 2—In many peat science applications and publications, the term defined here as “dry density” in accordance with common geotechnical engineering usage is referred to as “bulk density”. Care is necessary to distinguish which definition is being used when such a term is encountered.

### 4. Significance and Use

4.1 These test methods provide uniform procedures for determining the bulk density of in situ peat and processed peat products. The bulk density is of use in the calculation of in situ stresses for engineering analysis and in quantifying the amount of material present when considering peat as a resource. In the latter case, it is necessary to consider the moisture condition for which the bulk density was determined; a more useful parameter to consider may well be the dry density,  $\rho_d$ .

### 5. Apparatus

5.1 *Drying Oven*—A thermostatically controlled drying oven maintained at a temperature of  $105 \pm 5^\circ\text{C}$ .

5.2 *Balances*—Balances sensitive to 0.01 g for samples less than 100 g, sensitive to 0.1 g for samples between 100 g and 1000 g, or sensitive to 1 g for samples over 1000 g.

5.3 *Moisture Content Containers*—Suitable containers for laboratory moisture content determinations.

5.4 *Plastic Sample Bags or Sampling Jars*.

5.5 *Sampler*—Piston sampler or other suitable coring device which will give a reasonably undisturbed cylindrical sample.

NOTE 3—Samples taken with the Macaulay type peat sampler are semicylindrical in shape and relatively undisturbed. They may also be used in this method of determination.

5.6 *Sharp Knife*—An electric knife or barber’s razor will be best for laboratory work.

5.7 *Paraffin Wax*, maintained at a temperature between 60 and 70°C, for use in Method B only.

5.8 *Graduated Cylinder*, for use in Method B only.

### METHOD A—CORE METHOD

### 6. Procedure

6.1 Take a representative reasonably undisturbed core of peat with a piston sampler or other coring device.

6.2 With a sharp knife, cut specimens of no less than 50 mm in length from the various layers included in the core. Measure and record the specimen length to the nearest millimetre.

<sup>1</sup> These test methods are under the jurisdiction of ASTM Committee D18 on Soil and Rock and are the direct responsibility of Subcommittee D18.22 on Soil as a Medium for Plant Growth.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 04.08.