



Designation: D4544 – 20

Standard Practice for Estimating Peat Deposit Thickness¹

This standard is issued under the fixed designation D4544; 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 practice uses a technique of probing to estimate the thickness of surficial peat deposits overlying mineral soil or bedrock.

1.1.1 The resistance to penetration of a pushed or driven rod will increase sharply at the boundary of a peat layer with underlying mineral soil or bedrock. When this abrupt change is measured in a series of probings with an appropriate spacing, the thickness and areal extent of peat can be defined and the volume of peat may be calculated.

1.2 *Units*—The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard. Reporting of test results in units other than SI shall not be regarded as nonconformance with this standard.

1.3 All measured and calculated values shall conform to the guidelines for significant digits and rounding established in Practice D6026.

1.3.1 The procedures used to specify how data are collected/recorded and calculated in the 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 these test methods to consider significant digits used in analysis methods for engineering data.

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

1.5 *This practice offers a set of instructions for performing one or more specific operations. This document cannot replace education or experience and should be used in conjunction*

with professional judgment. Not all aspects of this practice may be applicable in all circumstances. This ASTM standard is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a project's many unique aspects. The word "Standard" in the title of this document means only that the document has been approved through the ASTM consensus process.

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.*

2. Referenced Documents

2.1 *ASTM Standards:*²

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

D4700 Guide for Soil Sampling from the Vadose Zone

D6026 Practice for Using Significant Digits in Geotechnical Data

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of common terms used in this standard, refer to Terminology D653.

4. Summary of Practice

4.1 A graduated, steel rod is aligned vertically over the area of interest and is then pushed or driven into the peat until the rod reaches soil or bedrock. The thickness of the peat layer is then measured, verified, and recorded. This process is repeated in different locations covering the area of interest to assist in determining the thickness and lateral extent of the peat deposit.

¹ This practice 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, 2020. Published May 2020. Originally approved in 1986. Last previous edition approved in 2019 as D4544 – 19. DOI: 10.1520/D4544-20.

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.

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

4.2 Sampling is usually performed at selected locations and may be required to determine the characteristics of the peat.

5. Significance and Use

5.1 This practice is used to determine the thickness and lateral extent of a peat deposit such that, the volume of the peat deposit can be calculated. When the overlying material is peat and the underlying one is soil or bedrock, the depth of change may be interpreted as the thickness of peat.

5.2 This information is useful to peat producers to evaluate the volume of the deposit for planning purposes. It is also useful to peat producers and regulators in evaluating some ecologic functions.

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 assure reliable results. Reliable results depend on many factors; Practice D3740 provides a means of evaluating some of those factors.

6. Interferences

6.1 Penetration of the rod may be prevented by wood pieces in the peat deposit. This issue is usually indicated in variation from point to point, but can also be identified by the presence of woody material at the end of the rod (Note 2). Data variation should be examined and rechecked if this occurrence is suspected.

6.2 The thin and flexible nature of the rods as they are connected together will limit the depths of penetrating and sampling.

NOTE 2—For example, if three points in the same area show depth to peat of 1.0 m, 0.2 m, and 1.0 m. It is likely the 0.2 m reading is suspect and further analysis should occur to confirm the reading.

7. Apparatus

7.1 *Graduated Steel Rods*—The graduated steel rods must have a diameter of 9.5 ± 1.0 -mm and lengths of 1.0- or 1.2-m. It is desirable for the rods to be threaded on each end such that they can be threaded together. The rods are ringed at set, known intervals. A ring with a short threaded end is screwed into the last section and another rod or stick inserted horizontally to facilitate pulling out the rod.

7.2 *Sampler*—A peat borer, piston-type sampler, or similar exploratory type sampler having a head that is threaded into the bottom rod. A peat-borer is a rod with a sample containing device at the bottom. A sample containing section is sealed off by a plate that can pivot around the axle in the middle of the sampler and is fitted with a cutting edge on one side.

NOTE 3—Guide D4700 provides information regarding the different types of samplers.

7.3 *Miscellaneous Items*—Items such as, sample containers with enough capacity to hold the sample and prevent moisture changes, labels, markers, and gloves may be useful.

8. Procedure

8.1 Align the rod vertically, in reference to the ground surface and record the location of the probing and surface

elevation, if known. If water is encountered during the penetration, record the depth it is encountered to the nearest 0.1 m.

8.2 Push or drive the rod into the peat. Add sections of rod as necessary to measure the thickness of the peat deposit. Pushing or driving the rod at a constant rate assists in feeling for interferences.

8.3 Continue pushing/driving the rods until resistance increases sharply. This sharp increase in resistance indicates the rod has reached the boundary between the bottom of the peat and top of the soil or bedrock. It may be possible to hear the scraping of the rod in the underlying mineral soil, especially when the soil is sand. Measure and record the thickness of the peat deposit to the nearest 0.1 m.

8.4 Pull up the rod and verify the resistance change by the presence of mineral material in the threads of the bottom rod.

8.5 Record to the nearest 0.1 m the lateral position of the probing.

8.6 Repeat steps 8.1 – 8.5 as necessary to define the thickness of the peat and its lateral extent.

8.7 *Sampling*—Sampling of the zone of contact of peat with underlying material is usually necessary to verify the interpretations of material change from the rod penetration resistances. Where the peat – soil/bedrock contact zone is of significant thickness, or where the peat is underlain by soft clays or marls, further sampling and testing will be needed. The frequency of sampling is highly dependent upon the physical details of the deposit.

8.7.1 At selected locations, attach the sampler and obtain peat and peat – soil/bedrock contact zone samples. When a piston-type sampler is attached to the bottom rod, the head is pushed down until resistance is met. The rod is then pulled up until the central core catches at the end of the outer cylinder, and the open cylinder is then pushed a little further to obtain soil/bedrock material.

8.7.2 Remove the material from the sampler and describe it. Place the collected material into a container that will preserve the moisture condition of the sample. Label the container with identifying information, such as, project name or number, location of the probe hole, and depth.

9. Report: Test Data Sheet(s)/Form(s)

9.1 The methodology used to specify how data are recorded on the test data sheet(s)/form(s), as given below, is covered in 1.3 and in Practice D6026.

9.2 Record as a minimum the following general information (data):

9.2.1 Identification of the area being evaluated such as, project identification, and name and location of project.

9.2.2 Name(s) of the person(s) performing the work and date(s).

9.3 Record as a minimum the following test information:

9.3.1 The locations penetrated and sampled, including the surface elevations and water levels, where available. Data can be presented on a map or in tabulated form.