



Standard Classification of Peat Samples by Laboratory Testing¹

This standard is issued under the fixed designation D 4427; 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.

This standard has been approved for use by agencies of the Department of Defense.

^{ε1} NOTE—Editorial changes were made in September 2002.

1. Scope *

1.1 This classification is a system for subdividing and assigning nomenclature to peat samples through laboratory tests.

1.2 *This standard does not purport to address all of the safety problems, 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 420 Guide to Site Characterization for Engineering Design and Construction Purposes²
- D 1997 Test Method for Laboratory Determination of the Fiber Content of Peat Samples By Dry Mass²
- D 2944 Test Method of Sampling Processed Peat Materials²
- D 2974 Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils²
- D 2976 Test Method for pH of Peat Materials²
- D 2980 Test Method for Volume Weights, Water-Holding Capacity, and Air Capacity of Water Saturated Peat Materials²
- D 3740 Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction²

3. Terminology

3.1 Definitions:

3.1.1 *peat*—a naturally-occurring highly organic substance derived primarily from plant materials. Peat is distinguished from other organic soil materials by its lower ash content (less than 25 % ash by dry weight (see Test Methods D 2974)), and from other phytogenic material of higher rank (that is, lignite coal) by its lower calorific value on a water saturated basis.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *absorbency*—the maximum amount of moisture (by weight) that can be held by the peat. This is expressed in terms of the water-holding capacity as measured using Test Method D 2980.

3.2.2 *acidity*—this is expressed as the pH of the peat in water as measured using Test Method D 2976.

3.2.3 *ash content*—the percentage by dry weight of material remaining after the oven dry peat is burned, using the methods described in Test Methods D 2974.

3.2.4 *botanical composition*—the dominant plant genus, genera, or informal plant group identified by visual inspection as comprising a portion of the fiber in the peat.

3.2.5 *fiber content*—the dry weight of fibers remaining on a 100 mesh sieve after wet sieving. Fiber content is expressed as a percentage of the original dry weight, using the method described in Test Method D 1997.

4. Significance and Use

4.1 The purpose of this classification is to standardize the naming of peat materials so that the peat-producer can better identify the product and the peat-consumer better select peat materials to meet requirements. This system may also be used for peat resource evaluations, environmental impact reports, and preliminary engineering studies. The parameters selected for use in this classification are ones which have been determined to relate to the agricultural/horticultural, geotechnical, and energy uses of peats.

NOTE 1—The quality of the results 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 D 3740 are generally considered capable of competent and objective testing/sampling/inspection/and the like. Users of this standard are cautioned that compliance with Practice D 3740 does not in itself assure reliable test results. Reliable testing depends on many factors; Practice D 3740 provides a means of evaluating some of those factors.

5. Sample

5.1 Representative samples of the peat should be used. The size and type of sample required is dependent on the tests to be performed and the coarseness and moisture content of the peat. On taking the sample it should be accurately identified and

¹ This classification is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.07 on Identification and Classification of Soils.

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² *Annual Book of ASTM Standards*, Vol 04.08.

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

placed in a sealed container to prevent moisture loss.

6. Basis for Classification

6.1 Fiber Content:

- 6.1.1 *Fibric*—Peat with greater than 67 % fibers.
- 6.1.2 *Hemic*—Peat with between 33 % and 67 % fibers.
- 6.1.3 *Sapric*—Peat with less than 33 % fibers.

NOTE 2—These fiber content categories may be related to the widely used field assessment of the degree of humification (*H*) developed by Von Post.³ *Fibric* corresponds approximately to $H_1 - H_3$, *hemic* to $H_4 - H_6$, and *sapric* to $H_7 - H_{10}$.

6.2 Ash Content (as measured by Test Methods D 2974):

- 6.2.1 *Low Ash*—Peat with less than 5 % ash.
- 6.2.2 *Medium Ash*—Peat with between 5 and 15 % ash.
- 6.2.3 *High Ash*—Peat with more than 15 % ash.

6.3 Acidity (as measured by Test Method D 2976):

- 6.3.1 *Highly Acidic*—Peat with a pH less than 4.5.
- 6.3.2 *Moderately Acidic*—Peat with a pH between 4.5 and 5.5.
- 6.3.3 *Slightly Acidic*—Peat with a pH greater than 5.5 and less than 7.

6.3.4 *Basic*—Peat with a pH equal to or greater than 7.

6.4 Absorbency (as measured by Test Method D 2980):

- 6.4.1 *Extremely Absorbent*—Peat with a water-holding capacity greater than 1500 %.
- 6.4.2 *Highly Absorbent*—Peat with a water-holding capacity between 800 and 1500 %.
- 6.4.3 *Moderately Absorbent*—Peat with a water-holding capacity greater than 300 and less than 800 %.
- 6.4.4 *Slightly Absorbent*—Peat with a water-holding capacity less than or equal to 300 %.

6.5 *Botanical Composition*—If a botanical designation is required, the following rules of naming should be applied:

6.5.1 If a single botanical names, or other botanical designation, is used (for example, *Sphagnum* Peat, *Taxodium* Peat,

Moss Peat, Herbaceous Peat, Woody Peat, etc.), it is required that at least 75 % of the fiber content of that peat be derived from the designated type of plant material.

6.5.2 If more than one botanical designation is used in naming the peat (for example, Reed-Sedge Peat, Bay-Gum Peat, *Myrica-Persea-Salix* Peat, Spruce-Moss-Sedge Peat, etc.), it is required that at least 75 % of the fiber content of that peat be composed of these types of plants as a group. Furthermore, the order of the plant types in the group name should indicate the relative quantity of each type in the peat with the dominant component appearing last.

NOTE 3—For peats with less than 33 % fiber (that is, Sapric) it would be advisable to refrain from using a botanical designation unless a significant portion of the non-fiber can be identified (for example, algal peat).

7. Example of Use of this System

7.1 A peat sample with a fiber content of 55 %, an ash content of 8 %, a pH of 4.7, a water-holding capacity of 1200 %, and with 70 % of its fibers derived from *Sphagnum* and 20 % from *Carex* would be designated a Hemic, Medium Ash, Moderately Acidic, Highly Absorbent, *Carex-Sphagnum* Peat.

8. Precision and Bias

8.1 *Precision*—Due to the nature of the soil or rock materials tested by this method it is either not feasible or too costly at this time to produce multiple specimens which have uniform physical properties. Any variation observed in the data is just as likely to be due to specimen variation as to operator or laboratory testing variation. Subcommittee D18.07 welcomes proposals that would allow for development of a valid precision statement.

8.2 *Bias*—There is no accepted reference value for this test method, therefore, bias cannot be determined.

9. Keywords

9.1 absorbency; acidity; ash content; botanical composition; classification; fiber content; laboratory testing; peat

³ Korpjääkko, E. O., and Woolnough, D. F., "Peatland Survey and Inventory", *Muskeg and the Northern Environment in Canada*, University of Toronto Press, 1977.


SUMMARY OF CHANGES

In accordance with Committee D18 policy, this section identifies the location of changes to this standard since the last edition (D4427-92(1997)) that may impact the use of this standard.

- (1) Added Practice D 3740 to Referenced Documents.
- (2) Added Note 1 to Significance and Use.
- (3) Edit grammar and spacing throughout the entire document.
- (4) Added safety hazard caveat.
- (4) Added Summary of Changes section.

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