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.

Designation: D5890 – 19

Standard Test Method for Swell Index of Clay Mineral Component of Geosynthetic Clay Liners[1]

This standard is issued under the fixed designation D5890; 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 covers an index method that enables the evaluation of swelling properties of a clay mineral in reagent water for estimation of its usefulness in geosynthetic clay liners (GCLs). This test method is not applicable for clays with polymers.

1.2 It is adapted from United States Pharmacopeia (USP-NF-XVII) test method for bentonite.

1.3 Powdered clay mineral is tested after drying to constant weight at 105 ± 5 °C; granular clay mineral should be ground to 100 % passing a 150-µm (No. 100) U.S. Standard Sieve with a minimum of 65 % passing a 75-µm (No. 200) U.S. Standard Sieve. The bentonite passing the 150-µm U.S. Standard Sieve is used for testing after drying to constant weight at 105 ± 5 °C.

1.4 The values stated in SI units are to be regarded as standard.

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.* Specific precautionary statements are given in Section 8.

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]

D1193 Specification for Reagent Water

D4643 Test Method for Determination of Water Content of Soil and Rock by Microwave Oven Heating

D4753 Guide for Evaluating, Selecting, and Specifying Balances and Standard Masses for Use in Soil, Rock, and Construction Materials Testing

E1 Specification for ASTM Liquid-in-Glass Thermometers

E145 Specification for Gravity-Convection and Forced-Ventilation Ovens

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

E725 Test Method for Sampling Granular Carriers and Granular Pesticides

2.2 *United States Pharmacopeia Standard:*[3]

USP-NF-XVII Bentonite

3. Terminology

3.1 *Definitions:*

3.1.1 *oven-dried, adj*—the condition of a material that has been heated under prescribed conditions of temperature and humidity until there is no further significant change in its mass.

4. Significance and Use

4.1 Clay mineral is a major functional component of GCL systems that reduces the hydraulic conductivity of industrial, waste, or ground water through the liner.

4.2 Clay mineral quality can vary significantly and affect the hydraulic conductivity of the GCL composite. This test method evaluates a significant property of clay mineral that relates to performance.

5. Atmosphere Conditions

5.1 *Atmospheric Conditions*—The atmospheric conditions of the laboratory performing swell index of clay mineral

[1] This test method is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.04 on Geosynthetic Clay Liners.

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[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.

[3] Available from U.S. Pharmacopeia (USP), 12601 Twinbrook Pkwy., Rockville, MD 20852.

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