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: D4318 – 17$^{\varepsilon 1}$

Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils[1]

This standard is issued under the fixed designation D4318; 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 U.S. Department of Defense.

ε[1] NOTE—Editorially updated units of measurement statement in April 2018.

1. Scope*

1.1 These test methods cover the determination of the liquid limit, plastic limit, and the plasticity index of soils as defined in Section 3 on Terminology.

1.2 Two procedures for preparing test specimens are provided as follows: *Specimen Preparation Procedure 1 (Wet Preparation)*, as described in 11.1 and *Specimen Preparation Procedure 2 (Dry Preparation)*, as described in 11.2. The specimen preparation procedure to be used shall be specified by the requesting authority. If no specimen preparation procedure is specified, use the wet preparation procedure. (See Section 6, Interferences.)

1.3 Two methods for determining the liquid limit are provided as follows: *Liquid Limit Method A (Multipoint Method)*, as described in Sections 12 and 13, and *Liquid Limit Method B (One-Point Method)*, as described in Sections 14 and 15. The method to be used shall be specified by the requesting authority. If no method is specified, use Method A. (See Section 6, Interferences.)

1.4 The plastic limit test, *Method for Plastic Limit*, is performed on material prepared for the liquid limit test. When determining the plastic limit, two procedures for rolling portions of the test specimen are provided as follows: *Plastic Limit Rolling Procedure 1 (Hand Rolling)*, and *Plastic Limit Rolling Procedure 2 (Using the Rolling Device)*.

1.5 The liquid limit and plastic limit of soils (along with the shrinkage limit) are often collectively referred to as the Atterberg limits. These limits distinguished the boundaries of the several consistency states of plastic soils.

1.6 The plasticity index, *Method for Plasticity Index*, is calculated using results from liquid limit and plastic limit testing.

1.7 The methods described herein are performed only on that portion of a soil that passes the 425-µm (No. 40) sieve. Therefore, the relative contribution of this portion of the soil to the properties of the sample as a whole must be considered when using these methods to evaluate the properties of a soil.

1.8 The values stated in SI units are to be regarded as standard. The values given in parentheses after SI units are provided for information only and are not considered standard.

1.8.1 The converted inch-pound units use the gravitational system of units. In this system, the pound (lbf) represents a unit of force (weight), while the unit for mass is slugs. The converted slug unit is not given, unless dynamic (F = ma) calculations are involved.

1.8.2 It is common practice in the engineering/construction profession to concurrently use pounds to represent both a unit of mass (lbm) and of force (lbf). This implicitly combines two separate systems of units; that is, the absolute system and the gravitational system. It is scientifically undesirable to combine the use of two separate sets of inch-pound units within a single standard. As stated, this standard includes the gravitational system of inch-pound units and does not use/present the slug unit for mass. However, the use of balances or scales recording pounds of mass (lbm) or recording density in lbm/ft^3 shall not be regarded as nonconformance with this standard.

1.8.3 The "alternative" sieve size designations listed in Specification E11 for the 425-µm and 2.00-mm sieves are given in parentheses following the "standard" designations, that is, 425-µm (No. 40) and 2.00-mm (No. 10).

1.8.4 The standard units for the resilience tester covered in Annex A1 are inch-pound, not SI. The SI values given in Fig. A1.1 are for information only.

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

1.9.1 For purposes of comparing a measured or calculated value(s) with specified limits, the measured or calculated value(s) shall be rounded to the nearest decimal or significant digits in the specified limits.

1.9.2 The procedures used to specify how data are collected/recorded or calculated, in this standard are regarded as the

[1] These test methods are under the jurisdiction of ASTM Committee D18 on Soil and Rock and are the direct responsibility of Subcommittee D18.03 on Texture, Plasticity and Density Characteristics of Soils.

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

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