



Designation: D854 – 23

Standard Test Methods for Specific Gravity of Soil Solids by the Water Displacement Method¹

This standard is issued under the fixed designation D854; 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.

1. Scope*

1.1 These test methods cover the determination of the specific gravity of soil solids that pass the $\frac{3}{8}$ -in. (9.5-mm) or smaller sieve by means of the water displacement method. When the total sample contains larger particles, it is separated into a coarser and finer portion using a $\frac{3}{8}$ -in. (9.5-mm) or No. 4 (4.75-mm) or finer sieve. Separation on the No. 4 sieve is the referee method. Test Method C127 shall be used to obtain the specific gravity of the coarser portion. The D854 test methods shall be used to obtain the specific gravity of the finer portion. The total sample specific gravity is computed from the two portions as described in 12.5.

1.1.1 These test methods do not apply to solids which can be altered by these methods, contaminated with a substance that prohibits the use of these methods, or are highly organic, such as fibrous matter which floats in water (see Note 1).

NOTE 1—Test Method D5550 may be used to determine the specific gravity of soil solids having solids, which readily dissolve in water or float in water, or where it is impracticable to use water.

1.2 This standard provides two methods for performing the specific gravity test. The method to be used shall be specified by the requesting authority, except when testing the types of soils listed in 1.2.1.

1.2.1 *Method A—Procedure for Moist Specimens*, described in 11.1. This procedure is the preferred method. Method A shall be used for organic soils; highly plastic, fine-grained soils; tropical soils; and soils containing halloysite.

1.2.2 *Method B—Procedure for Oven-Dry Specimens*, described in 11.2. This procedure requires less time and may be used for clean sands.

1.3 *Units*—The values stated in SI units are to be regarded as standard, except the sieve designations. The sieve designations are identified using the “alternative” system in accordance with Practice E11, such as 3-in. and No. 200, instead of

the “standard” designation of 75-mm and 75- μ m, respectively. Reporting of test results in units other than SI shall not be regarded as non-conformance with this test method. The use of balances or scales recording pounds of mass (lbm) shall not be regarded as nonconformance with this standard.

1.4 All observed and calculated values shall conform to the guidelines for significant digits and rounding established in Practice D6026, unless superseded by this test method.

1.4.1 The procedures used to specify how data are collected/recorded and calculated in this 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 design.

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. Glassware under vacuum has the potential for implosion. Proper personal protective equipment shall be used at all times. See 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

¹ This standard is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.03 on Texture, Plasticity and Density Characteristics of Soils.

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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.

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