



Designation: D558/D558M – 19

Standard Test Methods for Moisture-Density (Unit Weight) Relations of Soil-Cement Mixtures¹

This standard is issued under the fixed designation D558/D558M; 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 relationship between the water content and the density of soil-cement mixtures when compacted before cement hydration as prescribed.

1.2 A 0.0333-ft³ [944-cm³] mold and a 5.50-lbf [24.5-N or mass of 2.5-kg] rammer dropped from a height of 12.0 in. [30.5 cm] are used and two methods, depending on soil gradation, are covered, as follows:

Test Method A, using soil material passing a No. 4 [4.75-mm] sieve. This method shall be used when 100 % of the soil sample passes the No. 4 [4.75-mm] sieve

Sections

8

Test Method B, using soil material passing a 3/4-in. [19.0-mm] sieve. This method shall be used when part of the soil sample is retained on the No. 4 [4.75-mm] sieve. This test method may be used only on materials with 30 % or less retained on the 3/4-in. [19.0-mm] sieve

9

1.3 *Units*—The values stated in inch-pound units or SI units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

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

1.3.2 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. 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/ft³ 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.

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 should generally 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 this standard to consider significant digits used in analysis methods for the 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.*

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

C150/C150M Specification for Portland Cement

C595/C595M Specification for Blended Hydraulic Cements

D559/D559M Test Methods for Wetting and Drying Compacted Soil-Cement Mixtures

¹ These test methods are under the jurisdiction of ASTM Committee D18 on Soil and Rock and are the direct responsibility of Subcommittee D18.15 on Stabilization With Admixtures.

Current edition approved Dec. 1, 2019. Published January 2020. Originally approved in 1938. Last previous edition approved in 2011 as D558–11. DOI: 10.1520/D0558_D0558M-19.

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