



Designation: D7380/D7380M – 21

Standard Test Method for Soil Compaction Determination at Shallow Depths Using 2.3-kg [5-lbm] Dynamic Cone Penetrometer¹

This standard is issued under the fixed designation D7380/D7380M; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope*

1.1 This test method covers the procedure for the determination of the number of drops required for a dynamic cone penetrometer with a 2.3-kg [5-lbm] drop hammer falling 508 mm [20 in.] to penetrate a certain depth in compacted backfill.

1.2 The device is used in the compaction verification of fine- and coarse-grained soils, granular materials, and weak stabilized or modified material used in subgrade, base layers, and backfill compaction in confined cuts and trenches at shallow depth.

1.3 The test method is not applicable to highly stabilized and cemented materials or granular materials containing a large percentage of aggregates greater than 37 mm [1.5 in.].

1.4 The method is dependent upon knowing the field water content and the user having performed calibration tests to determine cone penetration resistance of various compaction levels and water contents.

1.5 *Units*—The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined. Within the text of this standard, SI units appear first followed by the inch-pound [or other non-SI] units in brackets. Reporting of test results in units other than SI shall not be regarded as nonconformance with this standard.

1.6 It is common practice in the engineering profession to concurrently use pounds to represent both a unit of mass [lbm] and a force [lbf]. This implicitly combines two separate systems of units; that is, the absolute system and the gravitational system. This standard has been written using the absolute system of units when dealing with the inch-pound

system. In this system, the pound [lbf] represents a unit of force (weight). However, the use of balances or scales recording pounds of mass [lbm] or the reading of density in lbm/ft³ shall not be regarded as a nonconformance with this standard.

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

1.8 *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.*

1.9 *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

D653 Terminology Relating to Soil, Rock, and Contained Fluids

D698 Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³))

D1556 Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method

D1557 Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³))

D2216 Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

D3740 Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

D4959 Test Method for Determination of Water Content of

¹ This test method is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.08 on Special and Construction Control Tests.

Current edition approved Nov. 1, 2021. Published November 2021. Originally approved in 2008. Last previous edition approved in 2015 as D7380 - 15. DOI: 10.1520/D7380_D7380M-21.

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