



Designation: D2937 – 24

Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method¹

This standard is issued under the fixed designation D2937; 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 This test method covers the determination of in-place density of soil near the surface by the drive-cylinder method. The test method involves obtaining an intact soil sample by driving a thin-walled cylinder into the soil and conducting specific measurements and calculations for the determination of in-place density. When determination of in-place density is required at depth, Practice **D1587/D1587M** or **D6519/D6519M** may be used.

1.2 This test method is not recommended for sampling organic or friable soils which may compress during sampling. This test method may not be applicable for soft, organic, highly plastic, noncohesive, saturated or other soils which are easily deformed, compress during sampling, or which may not be retained in the drive cylinder sampler. This test may not be applicable with very hard natural soils or heavily compacted soils that may not be easily penetrated with the drive cylinder sampler. The use of this test method in soils containing an appreciable amount of particles larger than 5 mm ($\frac{3}{16}$ in.) may result in damage to the drive cylinder equipment. Soils containing particles larger than 5 mm ($\frac{3}{16}$ in.) may not yield valid results if voids are created along the wall of the cylinder during driving, or if particles are dislodged from the sample ends during trimming.

1.3 This test method is limited to the procedures necessary for obtaining specimens suitable for determining the in-place density and water content of certain soils. The procedures, precautions, and requirements necessary for selecting locations for obtaining intact samples, suitable for laboratory testing or otherwise determining engineering properties, is beyond the scope of this test method.

1.4 *Units*—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 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.

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Reporting of test results in units other than SI shall not be regarded as nonconformance with this standard.

1.4.1 It is common practice in the engineering/construction profession to concurrently use pounds to represent both a unit of mass (lbm) and a unit 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 has been written using the gravitational 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 recording of density in lbm/ft³ shall not be regarded as nonconformance with this standard.

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

1.5.1 The procedures used to specify how data are collected/recorded or 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 this standard to consider significant digits used in analysis methods for design.

1.6 *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.*

1.7 *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.*

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