



Designation: D6683 – 19

Standard Test Method for Measuring Bulk Density Values of Powders and Other Bulk Solids as Function of Compressive Stress¹

This standard is issued under the fixed designation D6683; 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.

1. Scope*

1.1 This test method covers an apparatus and procedure for determining a range of bulk densities of powders and other bulk solids as a function of compressive stress.

1.2 This test method should be performed in the laboratory under controlled conditions of temperature and humidity.

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

1.3.1 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 engineering design.

1.4 *Units*—The values stated in SI units are to be regarded as standard. No other units of measure are included in this standard.

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.*

¹ This test method is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.24 on Characterization and Handling of Powders and Bulk Solids.

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2. Referenced Documents

2.1 ASTM Standards:²

D653 Terminology Relating to Soil, Rock, and Contained Fluids

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

D4753 Guide for Evaluating, Selecting, and Specifying Balances and Standard Masses for Use in Soil, Rock, and Construction Materials Testing

D6026 Practice for Using Significant Digits in Geotechnical Data

3. Terminology

3.1 *Definitions*—For common definitions of terms in this standard, refer to Terminology D653.

3.2 Symbols:

3.2.1 A_{cup} —inside cross-sectional area of density cup, m^2 .

3.2.2 AM_{max} —calculated value of maximum applied mass, kg.

3.2.3 D_{cup} —inside diameter of density cup, m.

3.2.4 EH_{max} —maximum effective head to be applied to material in density cup, m.

3.2.5 M_{mat} —mass of material in density cup, kg.

3.2.6 V_i —calculated volume of material in density cup at i^{th} consolidation step, m^3 .

3.2.7 $(\rho_b)_{approx}$ —approximate value of material's bulk density used in calculation of maximum applied mass, kg/m^3 .

3.2.8 $(\rho_b)_i$ —calculated bulk density value at i^{th} consolidation step, kg/m^3 .

3.2.9 $(\rho_b)_{initial}$ —calculated initial bulk density value, kg/m^3 .

3.2.10 σ_i —calculated compressive stress at i^{th} consolidation step, N/m^2 .

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