Designation: D653 – 22

Standard Terminology Relating to Soil, Rock, and Contained Fluids[1]

This standard is issued under the fixed designation D653; 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.
These definitions were prepared jointly by the American Society of Civil Engineers and the American Society for Testing and Materials.

1. Scope*

1.1 These definitions apply to many terms found in the Terminology section of standards of ASTM Committee D18.

1.2 This terminology standard defines terms related to soil, rock, and contained fluids found in the various sections of standards under the jurisdiction of ASTM Committee D18.

1.3 Definitions of terms relating to frozen soils are contained in Terminology D7099.

1.4 *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]

C143/C143M Test Method for Slump of Hydraulic-Cement Concrete
C150/C150M Specification for Portland Cement
C802 Practice for Conducting an Interlaboratory Test Program to Determine the Precision of Test Methods for Construction Materials
D558/D558M Test Methods for Moisture-Density (Unit Weight) Relations of Soil-Cement Mixtures
D698 Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))
D854 Test Methods for Specific Gravity of Soil Solids by Water Pycnometer
D1557 Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3))
D1586/D1586M Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils
D1883 Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted Soils
D2166/D2166M Test Method for Unconfined Compressive Strength of Cohesive Soil
D2419 Test Method for Sand Equivalent Value of Soils and Fine Aggregate
D2435/D2435M Test Methods for One-Dimensional Consolidation Properties of Soils Using Incremental Loading
D2487 Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
D2488 Practice for Description and Identification of Soils (Visual-Manual Procedures)
D3282 Practice for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes
D4043 Guide for Selection of Aquifer Test Method in Determining Hydraulic Properties by Well Techniques
D4044/D4044M Test Method for (Field Procedure) for Instantaneous Change in Head (Slug) Tests for Determining Hydraulic Properties of Aquifers
D4050 Test Method for (Field Procedure) for Withdrawal and Injection Well Testing for Determining Hydraulic Properties of Aquifer Systems
D4104/D4104M Practice for (Analytical Procedures) Determining Transmissivity of Nonleaky Confined Aquifers by Overdamped Well Response to Instantaneous Change in Head (Slug Tests)
D4105/D4105M Practice for (Analytical Procedure) for Determining Transmissivity and Storage Coefficient of Nonleaky Confined Aquifers by the Modified Theis Nonequilibrium Method
D4106 Practice for (Analytical Procedure) for Determining Transmissivity and Storage Coefficient of Nonleaky Confined Aquifers by the Theis Nonequilibrium Method
D4186/D4186M Test Method for One-Dimensional Consolidation Properties of Saturated Cohesive Soils Using Controlled-Strain Loading

[1] This terminology is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.93 on Terminology for Soil, Rock and Contained Fluids.

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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**

D4253 Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
D4254 Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
D4318 Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
D4429 Test Method for CBR (California Bearing Ratio) of Soils in Place (Withdrawn 2018)[3]
D4750 Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well (Observation Well) (Withdrawn 2010)[3]
D4943 Test Method for Shrinkage Factors of Cohesive Soils by the Water Submersion Method
D5084 Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
D5088 Practice for Decontamination of Field Equipment Used at Waste Sites
D5092/D5092M Practice for Design and Installation of Groundwater Monitoring Wells
D5269 Test Method for Determining Transmissivity of Nonleaky Confined Aquifers by the Theis Recovery Method
D5270/D5270M Practice for (Analytical Procedures) Determining Transmissivity and Storage Coefficient of Bounded, Nonleaky, Confined Aquifers
D5878 Guides for Using Rock-Mass Classification Systems for Engineering Purposes
D6026 Practice for Using Significant Digits and Data Records in Geotechnical Data
D6028/D6028M Practice for (Analytical Procedure) Determining Hydraulic Properties of a Confined Aquifer Taking into Consideration Storage of Water in Leaky Confining Beds by Modified Hantush Method
D6029/D6029M Practice for (Analytical Procedures) Determining Hydraulic Properties of a Confined Aquifer and a Leaky Confining Bed with Negligible Storage by the Hantush-Jacob Method
D6128 Test Method for Shear Testing of Bulk Solids Using the Jenike Shear Tester
D6312 Guide for Developing Appropriate Statistical Approaches for Groundwater Detection Monitoring Programs at Waste Disposal Facilities
D6429 Guide for Selecting Surface Geophysical Methods
D6910/D6910M Test Method for Marsh Funnel Viscosity of Construction Slurries
D6913/D6913M Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis
D6940/D6940M Practice for Measuring Sifting Segregation Tendencies of Bulk Solids
D6941 Practice for Measuring Fluidization Segregation Tendencies of Powders
D7099 Terminology Relating to Frozen Soil and Rock
D7382 Test Methods for Determination of Maximum Dry Unit Weight of Granular Soils Using a Vibrating Hammer
D7743 Test Method for Measuring the Minimum Fluidization Velocities of Free Flowing Powders (Withdrawn 2021)[3]
D8081 Guide for Theory and Principles for Obtaining Reliable and Accurate Bulk Solids Flow Data Using a Direct Shear Cell
D8198 Specification for Hydraulically Applied 100 % Wood Fiber Mulches
D8297/D8297M Test Method for Determination of Erosion Control Products (ECP) Performance in Protecting Slopes from Sequential Rainfall-Induced Erosion Using a Tilted Bed Slope
D8298/D8298M Test Method for Determination of Erosion Control Products (ECP) Performance in Protecting Slopes from Continuous Rainfall-Induced Erosion Using a Tilted Bed Slope
E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

3. Significance and Use

3.1 Definitions in this standard are to be regarded as the correct ones for terms found in other ASTM standards of Committee D18. Certain terms may be found in more than one standard issued under the jurisdiction of this committee and many of these terms have been placed in this standard.

3.2 Terms that are defined in some textbooks may differ slightly from those in this terminology standard. Definitions in this terminology standard are to be regarded as correct for ASTM usage.

3.3 See Appendix X1 for References.

3.4 Definitions marked with (ISRM) are included for the convenience of the user and were taken directly from the International Society for Rock Mechanics (see X1.3).

3.5 A number of the definitions include symbols. The symbols appear in italics immediately after the name of the term.

3.5.1 No significance should be placed on the order in which the symbols are presented where two or more are given for an individual term.

3.5.2 The symbols presented are examples; therefore, other symbols are acceptable.

3.5.3 See Appendix X2 for ISRM Symbols.

3.6 A number of definitions indicate the units of measurements in brackets and which follow the symbol(s) if given. The applicable units are indicated by italic capital letters, as follows:

D—Dimensionless
F—Force, such as pound-force, ton-force, newton
L—Length, such as inch, foot, millimeter, and meter[4]
M—Mass, such as kilogram, gram
T—Time, such as second, minute

3.6.1 Positive exponents designate multiples in the numerator. Negative exponents designate multiples in the denominator. Degrees of angle are indicated as “degrees.”

[3] The last approved version of this historical standard is referenced on www.astm.org.

[4] In accordance with IEEE/ASTM SI 10, the alternate spelling for meter, liter, and deka, may be metre, litre, and deca.