



Standard Test Method for Performing the Flat Plate Dilatometer¹

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1. Scope

1.1 This test method describes an in-situ penetration plus expansion test. The test is initiated by forcing the steel, flat plate, dilatometer blade², with its sharp cutting edge, into a soil. Each test consists of an increment of penetration, generally vertical, followed by the expansion of a flat, circular, metallic membrane into the surrounding soil. The test provides information about the soil's in-situ stratigraphy, stress, strength, compressibility, and pore-water pressure for use in the design of earthworks and foundations.

1.2 This method includes specific requirements for the preliminary reduction of dilatometer test data. It does not specify how to assess or use soil properties for engineering design.

1.3 This method applies best to those sands, silts, clays, and organic soils that can be readily penetrated with the dilatometer blade, preferably using static push (see 4.2). Test results for soils containing primarily gravel-sized particles and larger may not be useful without additional research.

1.4 This method is not applicable to soils that cannot be penetrated by the dilatometer² blade without causing significant damage to the blade or its membrane.

1.5 The American Society for Testing and Materials takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- D 653 Terminology Relating to Soil, Rock and Contained Fluids³
- D 1586 Test Method for Penetration Test and Split-Barrel Sampling of Soils³
- D 2435 Test Method for One-Dimensional Consolidation Properties of Soil³
- D 3441 Test Method for Mechanical Cone Penetration Tests of Soil³
- D 3740 Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction³
- D 5778 Test Method for Performing Electronic Friction Cone and Piezocone Penetration of Soils⁴

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *A-pressure*—the gage gas pressure against the inside of the membrane when the center of the membrane has lifted above its support and moved laterally 0.05-mm (tolerance +0.02, -0.00 mm) into the soil surrounding the blade.

3.1.2 *B-pressure*—the gage gas pressure against the inside of the membrane when the center of the membrane has lifted above its support and moved laterally 1.10-mm (± 0.03 mm) into the soil surrounding the blade.

3.1.3 *C-pressure*—The gage gas pressure against the inside of the membrane when the center of the membrane returns to the A-pressure position during a controlled, gradual deflation following the B-pressure.

3.1.4 *DMT*—abbreviation for the flat plate dilatometer test as described herein.

3.1.5 *DMT sounding*—the entire sequence of dilatometer tests and results along a vertical line of penetration in the soil.

3.1.6 *DMT test*—the complete procedure of penetration, membrane inflation and then deflation for a single test depth using the flat plate dilatometer.

3.1.7 ΔA —the gage gas pressure inside the membrane (corrected for Z_m) required to overcome the stiffness of the membrane and move it inward to a center-expansion of 0.05 mm (a negative gage or suction pressure, but recorded as

¹ This test method is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.02 on Sampling and Related Field Testing for Soil Evaluations.

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² The dilatometer is covered by a patent held by Dr. Silvano Marchetti, Via Bracciano 38, 00189, Roma, Italy. Interested parties are invited to submit information regarding the identification of acceptable alternatives to this patented item to the Committee on Standards, ASTM Headquarters, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. Your comments will receive careful consideration at the meeting of the responsible technical committee, which you may attend.

³ Annual Book of ASTM Standards, Vol 04.08.

⁴ Annual Book of ASTM Standards, Vol 04.09.