



Designation: D5778 – 20

Standard Test Method for Electronic Friction Cone and Piezocone Penetration Testing of Soils¹

This standard is issued under the fixed designation D5778; 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 the procedure for determining the resistance of a friction cone or a piezocone as it is advanced into subsurface soils at a steady rate.

1.2 This test method applies to electronic friction cones and does not include hydraulic, pneumatic, or free-fall cones, although many of the procedural requirements herein could apply to those cones. Also, offshore/marine Cone Penetration Testing (CPT) systems may have procedural differences because of the difficulties of testing in those environments (for example, tidal variations, salt water and waves). Field tests using mechanical-type cones are covered elsewhere by Test Method D3441.

1.3 This test method can be used to determine pore water pressures developed during the penetration when using a properly saturated piezocone. Pore water pressure dissipation, after a push, can also be monitored for correlation to time rate of consolidation and permeability.

1.4 Additional sensors, such as inclinometer, seismic (Test Methods D7400), resistivity, electrical conductivity, dielectric, and temperature sensors, may be included in the cone to provide additional information. The use of an inclinometer is recommended since it will provide information on potentially damaging situations during the sounding process.

1.5 CPT data can be used to interpret subsurface stratigraphy, and through use of site specific correlations, they can provide data on engineering properties of soils intended for use in design and construction of earthworks and foundations for structures.

1.6 *Units*—The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard. Reporting of test results in units other than SI shall not be regarded as nonconformance with this test method

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values shall conform to the guidelines for significant digits and rounding established in Practice D6026, unless superseded by this test method.

1.7.1 The procedures used to specify how data are collected/recorded and calculated in the 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 these test methods to consider significant digits used in analysis methods for engineering data.

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

D3441 Test Method for Mechanical Cone Penetration Testing of Soils

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

D6026 Practice for Using Significant Digits in Geotechnical Data

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 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