



Standard Test Method for Prebored Pressuremeter Testing in Soils¹

This standard is issued under the fixed designation D 4719; 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 pressuremeter testing of soils. A pressuremeter test is an in situ stress-strain test performed on the wall of a borehole using a cylindrical probe that is expanded radially. To obtain viable test results, disturbance to the borehole wall must be minimized.

1.2 This test method includes the procedure for drilling the borehole, inserting the probe, and conducting pressuremeter tests in both granular and cohesive soils, but does not include high pressure testing in rock. Knowledge of the type of soil in which each pressuremeter test is to be made is necessary for assessment of (1) the method of boring or probe placement, or both, (2) the interpretation of the test data, and (3) the reasonableness of the test results.

1.3 This test method does not cover the self-boring pressuremeter, for which the hole is drilled by a mechanical or jetting tool inside the hollow core of the probe. This test method is limited to the pressuremeter which is inserted into predrilled boreholes or, under certain circumstances, is inserted by driving.

1.4 Two alternate testing procedures are provided as follows:

- 1.4.1 *Procedure A*—The Equal Pressure Increment Method.
- 1.4.2 *Procedure B*—The Equal Volume Increment Method.

NOTE 1—A standard for the self-boring pressuremeter is scheduled to be developed separately. Pressuremeter testing in rock may be standardized as an adjunct to this test method.

NOTE 2—Strain-controlled tests also can be performed, whereby the probe volume is increased at a constant rate and corresponding pressures are measured. This method shall be applied only if special requirements must be met and is not covered by this test method. Strain-controlled tests may yield different results than the procedure described in this test method.

1.5 The values stated in SI units are to be regarded as the standard.

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. See Note 6.*

¹ This test method is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D18.02 on Sampling and Related Field Testing for Soil Investigations.

Current edition approved Feb. 10, 2000. Published May 2000. Originally published as D 4719 – 87. Last previous edition D 4719 – 87(1994)¹.

2. Referenced Documents

2.1 ASTM Standards:

- D 1587 Practice for Thin-Walled Tube Sampling of Soils²
- D 2113 Practice for Diamond Core Drilling for Site Investigation²

3. Terminology

3.1 *Definitions*—For definitions of terms in this test method, refer to Terminology D 653.

3.1.1 *limit pressure*, P_l [FL^{-2}], n —the pressure at which the probe volume reaches twice the original soil cavity volume.

3.1.2 *pressuremeter modulus*, E_p [FL^{-2}], n —the modulus calculated from the slope of the pseudo-elastic portion of the corrected pressure-volume curve experiencing little to no creep.

3.1.3 *unload-reload modulus*, E_R [FL^{-2}], n —the modulus calculated from an unload-reload loop.

3.1.3.1 *Discussion*—The unload-reload modulus varies with stress, or strain level, or both, and thus, the modulus values should be reported with the pressure and volume at the start of the unloading, at the bottom of the loop and at the crossover point.

3.2 Abbreviations:

- 3.2.1 *PBP*—prebored pressuremeter test

4. Summary of Test Method

4.1 A pressuremeter cavity is prepared either by drilling a borehole, or by advancing some type of sampler. Under certain circumstances, the pressuremeter probe is driven into place, usually within a casing. The various tools and methods available to prepare the cavity produce different degrees of disturbance. The recommended methods to be used at a site depend on the soil and the conditions met. The proper choice of tools and methods is covered by this test method.

NOTE 3—It is recommended that several drilling techniques be available on the site to determine which method will provide the most suitable test hole.

4.2 The pressuremeter test basically consists of placing an inflatable cylindrical probe in a predrilled hole and expanding this probe while measuring the changes in volume and pressure in the probe. The probe is inflated under equal pressure increments (Procedure A) or equal volume increments (Procedure B) and the test is terminated when yielding in the soil

² *Annual Book of ASTM Standards*, Vol 04.08.

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

