



Designation: D 4219 – 93a

Standard Test Method for Unconfined Compressive Strength Index of Chemical- Grouted Soils¹

This standard is issued under the fixed designation D 4219; 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 determination of the short-term unconfined compressive strength index of chemically grouted soils, using strain-controlled application of test load.

1.2 The values stated in inch-pound units are to be regarded as standard.

1.3 *This standard does not purport to address all of the safety problems, 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 422 Method for Particle-Size Analysis of Soils²

D 2166 Test Methods for Unconfined Compressive Strength of Cohesive Soil²

D 3740 Practice for Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction²

D 4320 Test Method for Laboratory Preparation of Chemically Grouted Soil Specimens for Obtaining Design Strength Parameters²

E 4 Practices for Load Verification of Testing Machines³

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *chemical grout*—any grouting material characterized by being a pure solution; for example, no particles in suspension.

3.1.2 *curing conditions*—the environment, particularly temperature and humidity, and state of confinement at which a specimen is stored during the time interval between fabrication and testing.

3.1.3 *unconfined compressive strength*—the load per unit area at which an unconfined cylindrical specimen of soil will

fail in a simple compressive test. Failure is defined as the maximum load attained per unit area, or the load per unit area at 20 % strain, whichever occurs first.

4. Summary of Test Method

4.1 A cylindrical specimen of chemically grouted soil is subjected to a (approximate) constant rate of compressive strain until it fails.

5. Significance and Use

5.1 The purpose of this test method is to obtain values for comparison with other test values to verify uniformity of materials or the effects of controllable variables, in grout-soil compositions.

5.2 This test method is similar, in principle, to Test Methods D 2166, but is not intended for determination of strength parameters to be used in design. Such values are more properly obtained from long-term triaxial tests.

6. Apparatus

6.1 *Compression Device*—The compression testing machine may be of any type having sufficient capacity and control to provide the rate of loading prescribed in 8.4. It shall conform to the requirements of Section 15 of Practices E 4.

6.1.1 *Bearing Surfaces*—The testing machine shall be equipped with two steel bearing blocks having a Rockwell hardness of not less than 55 HRC. One of the blocks shall be spherically seated and normally will bear on the upper surface of the specimen. The other bearing block may be either a plain rigid block or spherically seated block on which the specimen will rest. The bearing faces shall not depart from a plane by more than 0.0004 in. (0.010 mm) when the blocks are new, and shall be maintained within a permissible variation of 0.001 in. (0.02 mm). The center of the sphere for the spherically seated block shall coincide with the center of the bearing face of the specimen. The movable portion of the bearing block shall be held closely in the spherical seat, but the design shall be such that the bearing face can be rotated and tilted through small angles in any direction.

6.1.2 *Deformation Indicator*, shall be a dial indicator graduated to 0.001 in. (0.02 mm) and having a travel range of at least 20 % of the length of the test specimen.

NOTE 1—For true strain measurements, particularly on stiff specimens,

¹ This method is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.15 on Stabilization With Admixtures.

Current edition approved Sept. 15, 1993. Published December 1993. Originally published as D 4219 – 83. Last previous edition D 4219 – 93.

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

³ *Annual Book of ASTM Standards*, Vol 03.01.