Standard Method of Test for

Determination of the Strength of Soil–Lime Mixtures

AASHTO Designation: T 220-66 (2018)

Technical Subcommittee: 1a, Soil and Unbound Recycled Materials

Release: Group 3 (July)

AASHTO

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1. SCOPE

1.1. This method provides for the determination of the unconfined compressive strength of soil–lime stabilization mixtures.

Note 1—Generally, an unconfined compressive strength of 690 kPa (100 psi) is satisfactory for the final course of base construction, and it is desirable that materials for such courses contain a minimum of 50 percent plus 0.425-mm (No. 40) material before treatment. Various soil materials may be treated for subbase, and, in such cases, the minimum suggested unconfined compressive strength is 345 kPa (50 psi).

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

2. REFERENCED DOCUMENTS

2.1. *AASHTO Standards*:

- M 216, Lime for Soil Stabilization
- R 74, Wet Preparation of Disturbed Soil Samples for Test
- T 88, Particle Size Analysis of Soils
- T 89, Determining the Liquid Limit of Soils
- T 90, Determining the Plastic Limit and Plasticity Index of Soils

2.2. *ASTM Standards*:

- D2216, Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- E4, Standard Practices for Force Verification of Testing Machines
- E11, Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves

3. APPARATUS

3.1. *Automatic Tamper*—A compaction device with base plate to hold 152 mm (6 in.) ID forming molds, equipped with 4.54-kg (10-lb) ram and adjustable height of fall. Ram fall is 457 mm (18 in.). The striking face of the ram is a 40-degree segment of a circle of 76-mm (3-in.) radius. Automatic tamper shall be furnished an extra base plate to hold the forming mold during specimen top finishing.

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3.2. *Compaction Mold with Removable Collar*—Mold is 152 mm (6 in.) ID and 215 mm ($8^1/_2$ in.) high.

3.3. *Measuring Device for Specimen Height*—A micrometer dial assembly with a standard set of spacer blocks.

3.4. *Scale*, rated 18.1-kg (40-lb) capacity, sensitive to 0.0005 kg (0.001 lb).

3.5. *Press*, hydraulic, to extrude specimens from mold.

3.6. *Drying Oven*, controlled from 60 ± 5°C (140 ± 9°F) to 110 ± 5°C (230 ± 9°F).

3.7. *A Supply of Metal Pans*, wide and shallow, for mixing and drying materials, and a supply of rectangular stainless steel pans approximately 230 by 400 by 60 mm (9 by 16 by $2^1/_4$ in.) deep, equipped with porous spacer plates.

3.8. *Circular Porous Stones,* slightly less than 152 mm (6 in.) in diameter and 51 mm (2 in.) high.

3.9. *Axial Cells*, lightweight stainless steel cylinders, 171 mm ($6^3/_4$ in.) ID and 305 mm (12 in.) high, fitted with standard air valve and straight, tubular rubber membrane 152 mm (6 in.) in diameter.

3.10. *Vacuum Pump*, 20 to 35 L/min (0.70 to 1.25 cfm), or aspirator.

3.11. *Air Compressor*, 4.7 to 7.1 L/s (10 to 15 cfm) with 230-L (60-gal) storage tank and controls, pressure regulators, gauges, and valves.

3.12. *Moist Room*, equipped with shelves and a constant pressure supply of air.

3.13. *Micrometer Dial Gauge*, calibrated to 0.02 mm (0.001 in.) with support to measure deflection of specimen.

3.14. *A supply of 2.27- and 4.54-kg (5- and 10-lb) Lead Surcharge Weights*.

3.15. *Calibrated Proving Ring or Other Continuous Force Measuring Device*, according to ASTM E4, except that an error of plus or minus 2 percent is allowed.

3.16. *Circumference Measuring Device*—A specially made metal tape measure.

3.17. *Screw Jack Press and Assembly* or other suitable testing press, with dial housing and two loading blocks.

3.18. *Sieves* with square openings of the following sizes conforming to ASTM E11: 75-, 53-, 50-, 45-, 31.5-, 22.4-, 16.0-, 12.5-, 9.5-, 4.75-, 2.00-, 0.850-, and 0.425-mm (3.0-, 2.12-, 2.00-, 1.75-, 1.25-, $^7/_8$-, $^5/_8$-, $^1/_2$-, $^3/_8$-in., No. 4, No. 10, No. 20, and No. 40) sieves.

3.19. *Mechanical Pulverizer* with adjustable clearance rotating plate.

3.20. *Mechanical Sieve Shaker*—A laboratory size [0.014 m^3 ($^1/_2$ ft^3)] sieve shaker, convenient but not absolutely necessary, used for separating material for recombining specimens.

3.21. *A Supply of Small Tools and Accessories* such as wedgewood mortar and pestle, rubber-covered pestle, rawhide hammer, spatulas, trowels, level, scoops, siphon tubes, sample containers, cardboard cartons, 510-by-510-mm (20-by-20-in.) filter papers, etc.

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