
Standard Method of Test for Determination of Lime Content in Lime-Treated Soils by Titration

AASHTO Designation: T 232-90 (2022)

Technically Revised: 1990

Reviewed but Not Updated: 2022

Editorially Revised: 2021

Technical Subcommittee: 3a, Cement, Lime, and Concrete Materials



**American Association of State Highway and Transportation Officials
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1. SCOPE

- 1.1. A method of test is described for determining the percentage of lime in soils or aggregates that have been treated with hydrated lime. It is based on the continuous neutralization of an aqueous solution from the lime-treated specimen for a specified time period. This is accomplished by adding sufficient acid to just neutralize the lime that is continuously being dissolved during the test. The amount of acid used is directly proportional to the lime content of the specimen.
- 1.2. The following applies to all specified limits in this standard: For the purpose of determining conformance with these specifications, an observed value or a calculated value shall be rounded off “to the nearest unit” in the last right-hand place of figures used in expressing the limiting value, in accordance with [ASTM E29](#). (This test has a statement pertaining to significant figures.) (No statistical data are available.)
- 1.3. The values stated in SI units are to be regarded as the standard.
- 1.4. Refer to 29 CFR 1910.1200 for regulatory information for chemicals.
- 1.5. *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety concerns associated with its use. It is the responsibility of the user of the standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*
- 1.6. *The quality of the results produced by this standard are dependent on the competence of the personnel performing the procedure and the capability, calibration, and maintenance of the equipment used. Agencies that meet the criteria of [R 18](#) are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with [R 18](#) alone does not completely assure reliable results. Reliable results depend on many factors; following the suggestions of [R 18](#) or some similar acceptable guideline provides a means of evaluating and controlling some of those factors.*

2. REFERENCED DOCUMENTS

- 2.1. AASHTO Standards:
 - [M 231](#), Weighing Devices Used in the Testing of Materials
 - [R 18](#), Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories

- 2.2. *ASTM Standards:*
- [E11](#), Standard Specification for Wire-Cloth Sieves for Testing Purposes
 - [E29](#), Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
- 2.3. *Federal Standard:*
- Fed. Std. No. 29, CFR 1910.1200 OSHA Hazard Communication Standard; see also Permissible Exposure Limits—Annotated Tables, available at <https://www.osha.gov/dsg/annotated-pels/>

3. APPARATUS

- 3.1. A 100-mL titrating buret or other device permitting slow, easily controlled addition of acid, with stand and clamp.
- 3.2. Ten 1.9-L (2-qt) wide-mouth polyethylene containers (white).
- 3.3. Two 18.9-L (5-gal) plastic carboys, equipped with siphons, neoprene or tygon tubing, hose clamps, etc., for dispensing acid-working solution and water.
- 3.4. Glass (or plastic) dropping bottle.
- 3.5. *Four Stirring Rods*—Of stainless steel or other suitable material.
- 3.6. *Sieves*—37.5- and 9.5-mm sieves conforming to the requirements of [ASTM E11](#). (See Note 1.)
Note 1—Although sieves in 203-mm (8-in.) frames are satisfactory, a 9.5-mm sieve in 305-mm (12-in.) frame may be more suitable for separating the field samples (Sections 5.4 and 8.3).
- 3.7. *Balances*—The balances shall conform to [M 231](#), Class G 5 and Class G 2.
- 3.8. *Four Plastic Beakers*—Having a minimum capacity of 500 mL.
- 3.9. A 200-mL glass beaker.
- 3.10. Four 50-mL graduates.
- 3.11. *Fluorescent Light*—One 915 mm (36 in.) long, or two 457 mm (18 in.) long.

4. REAGENTS

- 4.1. *Hydrochloric Acid (HCl) (Approximately 3 Normal)*—Pour approximately 11.4 L (3 gal) of water into an 18.9-L (5-gal) plastic carboy. Pour the contents of two full standard 2.7-kg (6-lb) bottles of concentrated reagent grade HCl in the carboy. Stir or mix the solution vigorously for about 1 min. Add tap water as necessary to bring the total volume of water and acid to 18.9 L (5 gal), and then stir or mix the solution vigorously for another minute. Allow the acid solution to stand overnight, and then remix it once again prior to using. Remix the acid solution once a week during use and also before using if the acid solution has been in storage for more than 1 week.
- 4.2. *Phenolphthalein Indicator Solution (1 Percent Solution)*—Dissolve 5 g of phenolphthalein (U.S.P.) in 250 mL of 95 percent ethyl alcohol. Dilute with 250 mL of distilled water.