Designation: D 1411 – 99

Standard Test Methods for Water-Soluble Chlorides Present as Admixtures in Graded Aggregate Road Mixes[1]

This standard is issued under the fixed designation D 1411; 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 These test methods are applicable to the determination of water-soluble calcium, magnesium, and sodium chlorides used as admixtures in the preparation of graded aggregate road materials.

NOTE 1—These test methods assume that the aggregate did not contain significant amounts of the water-soluble chlorides in question before the admixture was added. If significant amounts of these chlorides are known or suspected to be present, the aggregate shall be tested for these constituents according to these test methods and the proper corrections made.

1.2 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 653 Terminology Relating to Soil, Rock, and Contained Fluids[2]

D 1193 Specification for Reagent Water[3]

3. Terminology

3.1 Except as follows in 3.2, all definitions are in accordance with Terminology D 653.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *admixture*—a material other than water, aggregates, hydraulic cement, and fiber reinforcement used as an ingredient and added immediately before or during the mixing of road materials.

4. Significance and Use

4.1 The percentage of calcium chloride, magnesium chloride, and alkali chloride (calculated as sodium chloride) in graded aggregate obtained from aggregate roads or aggregate bases under paved roads is of interest to highway departments using calcium chloride or sodium chloride stabilization. The percentages of calcium chloride or sodium chloride obtained in these test methods are compared with the quantities added to determine whether the road material and stabilizing agent were properly mixed, whether leaching of the stabilizing agent occurred, etc.

5. Purity of Reagents

5.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.[4] Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

5.2 Unless otherwise indicated, reference to water shall be understood to mean distilled water or water of equal purity conforming to Specification D 1193.

6. Preparation of Samples

6.1 Submit samples from the field to the laboratory in sealed containers. For each individual sample, break up any large lumps in a mortar and quarter the sample. Accurately weigh approximately 300 g (dry weight) of a quartered sample and transfer it to a 1-L bottle. Add 479 mL of water, 20 mL of ferric ammonium sulfate (100 g/L) and 1 mL of ammonium hydroxide (sp gr 0.90). Agitate in a shaker overnight or for 12 to 15 h. Filter through fluted filter paper, discarding the first 50 mL and retaining the remainder. Determine calcium, magnesium, and chloride in the clear filtrate.

NOTE 2—The addition of ferric ammonium sulfate and ammonium hydroxide should give complete coagulation of most of the dispersible

[1] These methods are under the jurisdiction of Committee D-18 on Soil and Rock and are the direct responsibility of Subcommittee D18.15 on Stabilization with Admixtures.

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

[3] *Annual Book of ASTM Standards*, Vol 11.01.

[4] "Reagent Chemicals, American Chemical Society Specifications," American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmaceutical Convention, Inc. (USPC), Rockville, MD.

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