Designation: C1580 – 09

Standard Test Method for Water-Soluble Sulfate in Soil[1]

This standard is issued under the fixed designation C1580; 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 is for the determination of water-soluble sulfate in soils.

1.2 This test method was developed for concentrations of water-soluble sulfate in soils between 0.02 and 3.33 % sulfate by mass.

1.3 This test method does not determine sulfur in any form except as sulfate.

1.4 Some governing bodies regulate the movement of soils from one area to another. It is up to the sampler and laboratory to comply with all regulations.

1.5 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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 to determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C114 Test Methods for Chemical Analysis of Hydraulic Cement

D1193 Specification for Reagent Water

E60 Practice for Analysis of Metals, Ores, and Related Materials by Molecular Absorption Spectrometry

E275 Practice for Describing and Measuring Performance of Ultraviolet and Visible Spectrophotometers

3. Significance and Use

3.1 This test method can be used to determine if soils could have an adverse reaction with hydraulic cement concrete.

4. Apparatus

4.1 *Photometer*—One of the following, given in order of preference:

4.1.1 Nephelometer or turbidimeter,

4.1.2 Spectrophotometer for use at 420 nm with light path of 4 to 5 cm, and

4.1.3 Filter photometer with a violet filter having a maximum near 420 nm and a light path of 4 to 5 cm. Filter photometers and photometric practices prescribed in this test method shall conform to Practice E60; spectrophotometer practices shall conform to Practice E275.

4.2 *Stopwatch*, readable to 0.1 minutes.

4.3 *Measuring Spoon*, capacity 0.2 to 0.3 mL.

4.4 *Drying oven*, capable of continuously heating at 110 ± 5 °C.

4.5 *Balance*, shall be capable of reproducing results within 0.0002 g with an accuracy of ±0.0002 g. Direct-reading balances shall have a sensitivity not exceeding 0.0001 g. Conventional two-pan balances shall have a maximum sensibility reciprocal of 0.0003 g. Any rapid weighing device that may be provided, such as a chain, damped motion, or heavy riders, shall not increase the basic inaccuracy by more than 0.0001 g at any reading and with any load within the rated capacity of the balance.

4.6 *Stirrer*, magnetic variable speed, with a TFE-fluorocarbon coated magnetic stirring rod or an overhead stirrer with a propeller.

5. Reagents and Materials

5.1 *Purity of Reagents*—All reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society.[3]

5.2 *Purity of Water*—Unless otherwise indicated, reference to water shall be understood to mean reagent water conforming to Specification D1193, Type I. Other reagent water types (See Note 1) may be used, provided it is first ascertained that the

[1] This test method is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee on C09.69 Miscellaneous Tests.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

[3] *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.**