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**Standard Method of Test for**

**Determining Water-Soluble  
Chloride Ion Content in Soil**

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**AASHTO Designation: T 291-94 (2018)**

**Technical Subcommittee: 1a, Soil and Unbound Recycled  
Materials**

**Release: Group 3 (July)**



**American Association of State Highway and Transportation Officials  
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## Standard Method of Test for

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## 1. SCOPE

- 1.1. This test method describes the procedures for sampling and testing a soil for chloride ion content. This standard is divided into two parts. The first part specifies the procedure for sampling and preparing the sample to size for testing. The second part delineates two test procedures (Methods A or B) for the determination of the water-soluble chloride ion content in soil. Two methods are given as follows:

	Section
Method A: (Mohr Titration Method)	(1 to 7) and (8 to 16)
Method B: (pH/mV Meter Method)	(1 to 7) and (17 to 28)

- 1.2. Method A is based on the Mohr procedure for determining chloride ion with silver nitrate. Method B utilizes a pH/mV meter. By comparing the mV readings to the calibration curve, determine the chloride ion content.

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

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## 2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standards:*

- M 231, Weighing Devices Used in the Testing of Materials
- R 90, Sampling Aggregate Products

- 2.2. *ASTM Standards:*

- D1129, Standard Terminology Relating to Water
- D1193, Standard Specification for Reagent Water
- E11, Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves
- E29, Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

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### 3. TERMINOLOGY

- 3.1. For definitions of terms used in this test method, refer to ASTM D1129.

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## PART I—INITIAL PREPARATION OF TEST SAMPLES

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### 4. SCOPE

- 4.1. This method covers the dry preparation of soil and soil-aggregate samples, as received from the field, for use in determining the chloride content.
- 4.2. The following applies to all specified limits in this standard: For the purpose of determining conformance with these specifications, an observed value or 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.

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### 5. APPARATUS

- 5.1. *Balance*—The balance shall have sufficient capacity, be readable to 0.1 percent of the sample mass, or better, and conform to the requirements of M 231.
- 5.2. *Drying Apparatus*—Any suitable device capable of drying samples at a temperature not exceeding 60°C (140°F).
- 5.3. *Sieves*—A series of sieves of the following sizes: 6.3-mm ( $\frac{1}{4}$ -in.), 4.75-mm (No. 4), 2.00-mm (No. 10) sieve, and a pan. The sieve shall conform to ASTM E11 (Note 1).  
**Note 1**—The sieve sizes that have an opening size of 6.3 mm ( $\frac{1}{4}$  in.) or larger shall conform to the requirements specified in ASTM E11, excluding Column No. 7. This exclusion permits the use of heavier screens in nonstandard frames that are larger than the 203.2 mm (8 in.) round frames.
- 5.4. *Pulverizing Apparatus*—Either a mortar and rubber-covered pestle or any device suitable for breaking up the aggregations of soil particles without reducing the size of the individual grains (Note 2).  
**Note 2**—Other types of apparatus are satisfactory if the aggregations of soil particles are broken up without reducing the size of the individual grains.
- 5.5. *Sample Splitter*—A suitable riffle sampler or sample splitter for proportional splitting of the sample and capable of obtaining representative portions of the sample without appreciable loss of fines. The width of the container used to feed the riffle sampler splitter should be equal to the total combined width of the riffle chutes. Proportional splitting of the sample on a canvas cloth is also permitted.

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### 6. SAMPLE SIZE

- 6.1. The amount of soil material required to perform the individual test is as follows (see R 90):

Test	Approx. Mass (g)	Sieve Size Finer Than:
Chlorides	250	2.00 mm (No. 10)