

**DEPARTMENT OF TRANSPORTATION**  
**ENGINEERING SERVICE CENTER**  
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## METHOD OF TESTING SOILS AND WATERS FOR CHLORIDE CONTENT

**CAUTION:** Prior to handling test materials, performing equipment setups, and/or conducting this method, testers are required to read **"SAFETY AND HEALTH"** in Part 3 of this method. It is the responsibility of the user of this method to consult and use departmental safety and health practices and determine the applicability of regulatory limitations before any testing is performed.

### OVERVIEW

This method describes test procedures for determination of chloride content of waters and water-soluble chloride content of soils. This test method is divided into the following:

- Part 1. Chloride Content of Waters
- Part 2. Chloride Content of Soils

- 3. Nitric acid, HNO<sub>3</sub>, concentrated
- 4. Pipets: 25-mL
- 5. Beakers: 250-mL
- 6. Erlenmeyer flasks: 500-mL

### PART 1. CHLORIDE CONTENT OF WATERS

#### A. SCOPE

This method is used to determine the chloride content of waters.

#### B. REAGENTS AND MATERIALS

Unless otherwise indicated, all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.

1. Standard Silver Nitrate Titrant, 0.0141N: Dissolve 2.395 g of AgNO<sub>3</sub> in distilled water and dilute to 1000 mL. Standardize the sample against a NaCl solution. 1.00 mL = 500 µg Cl<sup>-</sup>. Store the sample in a brown bottle.
2. Standard Sodium Chloride, 0.0141N: Dissolve 824.0 mg of NaCl (dried at 140°C) in distilled water and dilute to 1000 mL; 1.00 mL = 500 µg Cl<sup>-</sup>.

#### C. TEST PROCEDURE

1. Pipet 25 mL of water into a 250-mL beaker and add a magnetic stir bar.
2. Dilute the sample to approximately the 150-mL mark with deionized water.
3. Add 0.5 mL of concentrated HNO<sub>3</sub> acid to the sample.
4. Set the titrator instrument to the desired parameters by following the manufacturer's instructions.
5. Titrate the sample with silver nitrate solution. If the titration is over 25 mL, take a smaller sample so as to keep the titration under this value.
6. Calculation:

$$\text{mg Cl}^{-}/\text{L} = \frac{(A-B) \times N \times 35.453}{\text{mL of sample}}$$

Where:

A = mL of  $\text{AgNO}_3$

B = mL of the blank, and

N = normality of the titrant

## **PART 2. CHLORIDE CONTENT OF SOILS**

### **A. SCOPE**

This method describes the test procedure for determining the water soluble chloride content of soils.

### **B. REAGENTS AND MATERIALS**

Refer to Part 1 for these items.

### **C. TEST PROCEDURE**

1. Weigh 100 g of soil into a 500-mL Erlenmeyer flask. Add 300 mL of distilled water. Place a stopper on the flask and shake the flask vigorously for 15 min. Centrifuge the sample, filter the sample, or let the sample settle overnight.
2. Titrate a 25-mL aliquot for chlorides as described in Part 1, Section C.
3. The calculation of chlorides in the soil is the same as in Step 6 for water, except multiply mg Cl/L by three to compensate for the 3:1 extraction of water to soil.

## **PART 3. SAFETY AND HEALTH**

Prior to handling, testing or disposing of any of waste materials, testers are required to read: Part A (Section 5.0), Part B (Sections: 5.0, 6.0, 10.0 and 12.0) and Part C (Section 1.0) of Caltrans Laboratory Safety Manual. These sections pertain to requirements for general safety principles, standard operating procedures, protective apparel, disposal of materials and how to handle spills, accidents, emergencies, etc. Users of this method do so at their own risk.

### **REFERENCE:**

None

End of Text (California Test 422 contains 2 pages)