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# Determination of Calcium Carbonate Equivalence of Coquina and Other Soil Samples

## SC T 6

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### 1. Scope

This method covers a procedure for determining the calcium carbonate equivalence of a dried sample.

### 2. Referenced Documents

2.1 SC Standard Specifications for Highway Construction (Edition of 2000), Section 304.04

### 3. Apparatus

- 3.1 Ointment can
- 3.2 Oven maintained at 105-110°C
- 3.3 Desiccator
- 3.4 250-mL Erlenmeyer flask
- 3.5 Balance or electronic scales capable of weighing to two decimal places
- 3.6 25-mL pipette
- 3.7 Infrared hot plate
- 3.8 Steam bath
- 3.9 Weighing spatula
- 3.10 Reagents
  - 3.10.1 Prestandardized 1.0 N HCl (Hydrochloric Acid)
  - 3.10.2 Prestandardized 1.0 N NaOH (Sodium Hydroxide)
  - 3.10.3 Distilled water (reagent water meeting ASTM D 1193 is considered satisfactory)
  - 3.10.4 1% Phenolphthalein solution

### 4. Test Specimens

The sample shall consist of approximately 200 grams of material. Larger samples shall be reduced to this size by the procedures in SC T 3.

### 5. Procedure

- 5.1 The sample should be dried in an open ointment can placed in a 105-110°C oven overnight.
  - 5.2 The sample is allowed to cool for 2-3 hours in a desiccator in the closed ointment can.
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- 5.3 Place 1.00 g weighed to the nearest 0.1 mg into a 250- mL Erlenmeyer flask.
  - 5.4 Add 25 mL of 1.0 N HCl by pipette.
  - 5.5 Swirl the suspension to mix.
  - 5.6 Heat almost to boiling on a hot plate.
  - 5.7 Place flask on a steam bath for 5 to 45 seconds to complete the reaction to dissolve all of the lime that will dissolve with dilute acid.
  - 5.8 Dilute to 100 mL with distilled water.
  - 5.9 Boil for 1 minute.
  - 5.10 Cool sample to room temperature.
  - 5.11 Add 5 drops of 1% phenolphthalein indicator.
  - 5.12 Back titrate with 1.0 N NaOH to a pink color which lasts at least 15 seconds upon mixing while swirling.

## 6. Calculations

- 6.1 Determine the calcium carbonate equivalence of the sample as follows:

$$\% \text{CaCO}_3 \text{ equivalence} = \frac{(V - T) \times 5}{S} \times 100$$

Where: V = mL of HCl originally added  
T = mL of NaOH added  
S = the lime sample weight in grams

## 7. Report

Report the Percent Total Calcium Carbonate Equivalence of the sample to the nearest 0.1 percent. Test results are reported on Lab Form 957.

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