

## METHOD B17 T

### THE QUANTITATIVE DETERMINATION OF WATER-SOLUBLE SULPHATES IN SOILS AND AGGREGATES

#### 1 SCOPE

In this method an aliquot of the filtrate obtained in Method B16 is treated with barium chloride and the sulphates gravimetrically determined in the precipitated barium sulphate. The procedure described in SABS Method 850 is followed .

#### 2 APPARATUS

As for SABS Method 850.

#### 3 METHOD

Follow SABS Method 850.

#### 4 CALCULATIONS

Calculate and report the results as in SABS Method 850.

S.A. BUREAU OF STANDARDS

STANDARD METHODS

#### SABS Method 850

#### Water-soluble sulphates content of fine aggregates and of fines in aggregates for base-courses

#### SECTION 1. REAGENTS

**NOTE:** All water used shall be distilled or demineralized.

##### 1.1 Bromine solution.

A saturated solution of bromine in water.

##### 1.2 Hydrochloric acid.

Concentrated (relative density 1,16 at 20 E/20 EC).

##### 1.3 Barium Chloride solution.

Dissolve 10 g of reagent grade barium dihydrate ( $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$ ) in water and dilute to 100 ml .

## SECTION 2. PREPARATION OF TEST SPECIMEN

### 2.1

A solution of water-soluble salts prepared, extracted, and filtered as in SABS Method 849.

## SECTION 3. PROCEDURE

a) By means of a pipette transfer 200 ml of the filtrate to a beaker of capacity about 400 ml . Add 3 ml of the bromine solution and 1 ml of the hydrochloric acid, mix and heat to boiling, and boil until all the bromine has been driven off. Make up the volume of the solution to 200 ml by adding boiling water.

b) By means of a pipette add, drop by drop, 10 ml of the barium chloride solution (pre-warmed) while stirring the contents of the beaker continuously. Boil the contents of the beaker for 2 min, then place the beaker on a water bath for at least 2 h, and stir the contents occasionally. Allow the precipitate to settle overnight.

c) Filter off the precipitate, using a fine textured filter paper<sup>1</sup> and transfer the precipitate quantitatively on to the filter paper with the aid of a jet of warm water from a wash bottle. Wash the filter paper and precipitate with consecutive small volumes of warm water until the filtrate is free from chlorides.

**NOTE:** The presence of chlorides can be detected by putting a drop of silver nitrate solution (5 % (m/v)) into about 10 ml of the filtrate. If chlorides are present a milky suspension will be formed.

d) Place the filter paper and precipitate in an ignited and tared platinum crucible, char the paper slowly (without inflaming), then increase the temperature and maintain it at just under 600 EC until all carbon has burnt off. Finally ignite at a temperature of 800-900 EC for 30 min, cool the crucible in a desiccator to room temperature, and determine the mass of the residue (barium sulphate).

e) Carry out a blank determination by following the procedures described in (a)-(d) above using the same quantities of reagents but omitting the 25 g of test specimen, and correct the mass of the barium sulphate residue accordingly.

## SECTION 4. CALCULATION

4.1 Calculate, as follows, the water-soluble sulphates content of the fine aggregate or the fines (as relevant) :

$$\text{Water-soluble sulphates content} = \frac{A \times 34.3 \times 5}{B \times 2}$$

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<sup>1</sup> Whatmans No 42 or equivalent

(expressed as SO<sub>3</sub>), % (m/m)

where :

A = mass of barium sulphate found in 200 ml of the extract, as corrected, g

B = mass of the specimen taken for extraction, g

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