1. SCOPE

1.1. Description of Test

This method describes the procedure for determining the sand equivalent of granular material.

1.2. Application of Test

The purpose of this test method is to indicate, under standard conditions, the relative proportions of clay-like or plastic fines and dusts in granular material and fine aggregates that pass the 5.00 mm sieve. A minimum sand equivalent value may be specified to limit the permissible quantity of clay-like fines in an aggregate. The test may also be used for determining changes in the quality of aggregates during production or placement.

1.3. Units of Measure

The sand equivalent is expressed as a percentage of sand to clay content.

2. APPARATUS AND MATERIALS

2.1. Equipment Required

Graduated cylinder, weighted foot and irrigator tube all constructed in accordance with Figure 206-5.

Siphon assembly including a 4.5 L bottle fitted with a siphon, pinch cock and rubber tubing, placed on a shelf 914 mm ± 25 mm above the working surface.

Measuring tin approximately 57.0 mm in diameter and capacity of 85 ± 5 ml.

Clock or watch reading in minutes and seconds.

Sieve 5.00 mm Canadian Metric with pan.

Stove or hot plate
Miscellaneous supplies such as suitable pan, spatula, brush, trowel and rubber stopper to fit the graduated cylinder.
2.2. **Materials Required**

Stock Solution. Prepare the stock solution by dissolving 454 g of anhydrous calcium chloride in 1900 ml of distilled water. Cool, filter and add 1640 ml of USP glycerin. Add 45 ml of formaldehyde and 220 ml of distilled water and mix thoroughly.

Work Solution. Prepare working solution by placing 106 ml of stock solution in the 4.5 litre bottle and fill with tap or distilled water. Use the graduated cylinder to measure the required 106 ml of stock solution by filling to the 135 mm mark. Thoroughly mix the working solution by shaking the bottle.

2.3. **Samples To Be Tested**

Select a 1000 g representative sample to be tested and dampen.

2.4. **Data Required**

Sample information such as contract number, pit file or land location, date sampled, operation that aggregate is used for, sample number and control section.

3. **PROCEDURE**

3.1. **Equipment Preparation**

Ensure that the graduated cylinder with weighted foot and irrigator tube are constructed in accordance with Figure 206-5.

Ensure that the siphon assembly including the 4.5 L bottle fitted with a siphon, pinch cock and rubber tubing is placed on a shelf 914 mm $\pm$ 25 mm above the working surface.

3.2. **Sample Preparation**

Screen sample on the 5.00 sieve by hand sieving.

Materials retained on the sieve is dried on the stove at approximately 120° C and rubbed between the hands. Then rescreened on the 5.00 mm sieve.

Combine the rescreened material with the original material and mix thoroughly.
Carefully obtain test sample by quartering the combined material passing the 5.00 mm sieve. The test sample will consist of sufficient material to fill the measuring tin to a slightly rounded level above the brim after tapping.

3.3. **Test Procedure**

Start siphon and add working solution to a depth of 100 mm in the graduated cylinder.

Pour sample into the cylinder and tap firmly to dislodge any air bubbles and aid in wetting the sample.

Leave the wetted sample undisturbed for 10 minutes ± 1 minute.

Shake the stoppered cylinder vigorously from side to side in a horizontal linear motion. Agitation will consist of 90 cycles in about 30 seconds using a throw of approximately 230 mm ± 25 mm and a cycle will consist of a complete back and forth motion. Set the cylinder upright and remove the stopper.

Insert the irrigator tube and start the flow, rinsing the material from the cylinder walls as the tube is lowered. Flush the fine material into suspension by gentle stabbing and twisting of the irrigation tube to the bottom of the cylinder. Raise the irrigator tube slowly and adjust the flow to the 381 mm level of the cylinder.

Allow the cylinder and contents to stand undisturbed for 20 minutes ± 15 seconds.

Record the "clay reading" from the cylinder gradations and if the reading lies between gradations record the higher gradation.

Lower the weighted foot in the cylinder until it comes to rest on the sand. Twist the rod slightly until one of the centering screws can be seen.

Record the centre of the screw as the "sand reading" and if the reading lies between gradations record the higher gradation.
4. **RESULTS AND CALCULATIONS**

4.1. **Collection of Test Results**

Record the test data directly on Form EPS-70.

4.2. **Calculations**

Calculate the sand equivalent using the following formula, record to the nearest whole number.

\[
\text{Sand Equivalent} = \frac{\text{Sand Reading}}{\text{Clay Reading}} \times 100
\]

4.3. **Reporting Results**

Results should be reported on Form EPS-70.

5. **CALIBRATIONS, CORRECTIONS, REPEATABILITY**

5.1. **Equipment Calibration**

Ensure that equipment is clean and in good operating order. Sometimes it may be necessary to remove fungus growth from the working solution container and from the inside of the flexible tubing and irrigator tube. Follow the cleaning procedures as outlined in ASTM Designation D2419, Sand Equivalent Value of Soils and Fine Aggregate.

Ensure that the holes in the tip of the irrigator tube are free of sand.

Perform the test at a location free from vibration.

5.2. **Tolerances and Repeatability**

As outlined in ASTM Designation D2419, Sand Equivalent Value of Soils and Fine Aggregate.

5.3. **Sources of Error**

Unclean equipment or excessive vibration at test location.
6. **ADDED INFORMATION**

6.1. **References**


6.2. **Sample Retention**

There is no further use of the sample required.

6.3. **WHMIS**

Stock Solution and Working Solution should be labelled properly.