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## SMG-01: DETERMINATION OF PARTICLE DENSITY (SMALL PYKNOMETER METHOD)

Reference Standard: BS 1377-2: 1990: 8

### INTRODUCTION

Specific gravity is the ratio of the mass unit volume of soil at a stated temperature to the mass of the same volume of gas-free distilled water at a stated temperature. The specific gravity of a soil  $s$  used in the phase relationship of air, water, and solids in a given volume of the soil. The small pycnometer method is suitable for soils consisting of particles finer than 2 mm. Larger particles may be ground down to smaller than this size before testing.

### DATA PROCESSING

- 1) Calculate the average results if they differ by no more than  $0.03 \text{ Mg/m}^3$ .
- 2) Specific gravity, (in  $\text{Mg/m}^3$ ) 
$$Gs = \frac{w_2 - w_1}{(w_4 - w_1) - (w_3 - w_2)}$$

### OBJECTIVE

To determine specific gravity of soils consisting of clay, silt and sand-sized particles finer than 2 mm..

### APPARATUS

List out equipment and apparatus use in the experiment complete with figures.

### PROCEDURES

- 1) Clean the density bottle and stopper. Dry, and weight the bottle with the stopper.
- 2) Take some soils from sample that has been oven dried at temperature of  $105 - 110^\circ\text{C}$ . Allow them to cool inside the desiccators.
- 3) Take about 5 – 10g sample of soil that passes through BS 2mm sieve and transfer the specimen to the density bottle. Weight the bottle, contents and stopper.
- 4) Add distilled water no more half of the density bottle. Place the bottle and content (without stopper) in the vacuum desiccators.
- 5) Leave the bottle in the desiccators for at least one hour or continue until no further loss of air is apparent.
- 6) Then shake the bottle carefully. Add in distilled water to make it full. Wipe dry the surface of the bottle. Then leave for about an hour in a room temperature.
- 7) Place the stopper. Wipe dry the surface of the bottle and weight it together with its content and stopper.
- 8) Then remove soil and water from the bottle. Clean the bottle and refill it with water only until full. Leave it for about one hour, topping up the water if necessary. Place the stopper and wipe dry the surface. Weight the bottle, stopper and its content (water).

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- 9) Repeat test at least twice for the same soil sample.
- 10) If the results differ by more than  $0.03 \text{ Mg/m}^3$ , repeat the test.



**DATASHEET**

Soil type: \_\_\_\_\_

Sample No.: \_\_\_\_\_

Depth Excavated: \_\_\_\_\_

Date: \_\_\_\_\_

TEST NO.	1	2	3	4
Density bottle No.				
Weight of density bottle g				
Weight of bottle + Stopper ( $W_1$ ) g				
Weight of bottle + Stopper + Dry soil ( $W_2$ ) g				
Weight of bottle + Stopper + Soil + Water ( $W_3$ ) g				
Weight of bottle + Stopper + Water ( $W_4$ ) g				
Weight of dry soil ( $W_2 - W_1$ ) g				
Weight of water ( $W_4 - W_1$ ) g				
Weight of soil + Water ( $W_3 - W_2$ ) g				
Specific gravity				
Average specific gravity				