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| Course No. : CE363 | Date of Testing : 21.10.2011 |
| No. And Title of Test : 4(b) Determination of Specific Gravity of Soil Particles | |
| Year and Section : 2011/5 | Lab Group : 3 |
| Surname, Name: | |

**DETERMINATION OF SPECIFIC GRAVITY OF SOIL PARTICLES**

*(b) Method for medium and coarse-grained soils.*

**Object**

The object of this experiment is to determine the specific gravity of the soil particles of medium and coarse-grained soils.

**Apparatus**

1. A pycnometer consisting of a 1-litre glass jar with a brass conical cap, fitted with rubber sealing washer, screwed on top
2. A thermostatically controlled drying oven, capable of maintaining a temperature of 105-110C (75-80C for soils containing gypsum).
3. A balance readable and accurate to 0.5 g
4. A desiccator containing anhydrous silica gel
5. A glass rod about 30 cm long and 6 mm diameter
6. A thermometer to cover the range 0-50C, readable and accurate to 1C
7. A source of vacuum
8. At least 5 litres of water which has been allowed to stand in the laboratory for about 24 hours

**Theory**

Specific gravity is the ratio of density of a material to the density of a reference material which is usually water.

**Procedure**

1. Obtain around 500 g of the air-dried sample by quartering or riffling. Make any stones larger than 40 mm diameter smaller. Dry the sample in oven at 105-110C.
2. Dry the pycnometer and weigh it. Record the weight as .
3. Let the soil cool in desiccator. Remove the cap of the pycnometer and add around 500g of soil into it. Weigh this pycnometer with the cap as .
4. Add water at the room temperature to the soil until the jar is half-full. Mix the content with glass rod in order to remove the air trapped inside. Fill the pycnometer with water. Dry the outside of it. Weigh it and record as .
5. Empty and wash the pycnometer. Fill it with water completely. Dry the outside of it and weigh ().
6. Repeat these steps for another sample of the soil.

**Calculations**

For pycnometer 1

Mass of pycnometer empty (M1) = 114.2 g

Mass of pycnometer + soil (M2) = 155.63 g

Mass of pycnometer + soil + water (M3) (23ºC) = 659.12 g

Mass of pycnometer full of water (M4 ) (20ºC) = 629.42 g

Mass of pycnometer full of water (M4 ) (23ºC) = 629.074 g

Specific gravity of soil particles (Gs) (23ºC) = 3.639 g

k(23ºC) =0.99933

k(Gs) (23ºC) = (Gs) (20ºC) = 3.63 g

**Discussion of Results**

The specific gravity of sample 1 and sample 2 differ more than 1 g, so the results are not correct. The error occurred during the test must be more than acceptable amounts. Therefore the test must be repeated to get accurate results.

**Conclusion**

The specific gravity values obtained from calculations are respectively 3.63 and 2.21. The difference between these values is far more greater than 0.03%. Thus the test must be done again to reach correct values.

**References**

Mirata T. (1980) , Laboratory Instructions for Soil Mechanics Students, METU Press, Ankara (reprinted in 2009)