METHOD A5

THE DETERMINATION OF THE PERCENTAGE OF MATERIAL, IN A SOIL SAMPLE,
PASSING A 0,075 mm SIEVE

SCOPE

This method covers the determination of the quantity of material passing a 0,075 mm
sieve, expressed as a percentage of the total material, by washing a sample of prepared
soil fines on a 0.075 mm sieve.

2   APPARATUS

2.1   A balance to weigh up to 200 gram, accurate to 0,1 gram

2.2   A glass beaker or other suitable container, about 500 ml capacity.

2.3   A 0,075 mm sieve, complying with SABS 197.

2.4   A measuring cylinder, 500 ml capacity.

2.5   A glass rod ± 180 mm long.

2.6   A dish or small basin approximately 150 mm in diameter.

2.7   A drying oven, thermostatically controlled and capable of maintaining a temperature
         of 105 - 110 Е C.

3   METHOD

Weigh out 100 gram (50 gram for clayey materials containing a fairly high percentage
of the minus 0,075 mm traction) of the soil tines (i.e. material passing the 0,425mm
sieve) as prepared in accordance with Method A1. Transfer the weighed sample to the
glass beaker and add about 300 m/ ot water. Stir the soil-water mixture well with a
glass rod and leave it to stand for at least two hours.
Pour the suspension onto the 0,075 mm sieve and rinse the beaker with water until all
the soil is transferred trom the beaker to the sieve.
Wash the soil on the sieve thoroughly with water and rub it with the fingers against
the side of the sieve until there is no turther noticeable disintegration of soil
aggregations. All finer particles so produced are also washed through the sieve. The
material retained on the sieve is washed quantitatively into a suitable dish and dried to
constant mass. The oven-dried material is then sieved through the 0,075 mm sieve and
the fraction retained and weighed. Weighing should be done to the nearest 0,1gram
and recorded.

4   CALCULATIONS

The percentage passing the 0,075 mm sieve in the total sample is calculated as
follows:

$$P = Sf\, \frac{(A - B)}{A}$$

where:

P = percentage passing the 0,075 mm sieve in the total material
Sf = percentage soil fines in the total material
A = mass of soil fines used for test, before washing
B = mass of dry material retained on sieve after washing

The results must be calculated and reported to the nearest whole number on Form A1/2 (or a similar form).

5   NOTES

5.1   The amount of material passing the 0,075mm sieve can also be determined by hydrometer (Method A6). Comparative determinations have shown that the method of sieving and washing gives slightly higher values for the percentage passing the 0,075mm sieve. This is because aggregations are disintegrated more effectively. This method is, therefore, considered the more accurate of the two.

5.2   If a soil mortar analysis is required, the coarse sand fraction (2,0 - 0,425 mm)j the fine sand fraction (0,425 - 0,075mm) and the fraction passing the 0,075 mm sieve are expressed as percentages of the soil mortar (i.e. material passing the 2,0mm sieve as determined in Method A1).
The percentages are calculated as follows:
Percentage coarse sand (2,0 mm - 0,425 mm) =

$$\frac{Sm - Sf}{Sm}\, x100$$

Percentage fine sand (0,425 mm - 0,075 mm) =

$$\frac{Sf - P}{Sm}\, x100$$

Percentage material - 0,075 mm =

$$\frac{P}{Sm}\, x100$$

where

Sm = percentage soil mortar as determined in Method A1

Sf = percentage soil fines as determined in Method A1

P = percentage passing the 0,075 mm sieve in the total sample

5.3   The fine sand fraction (0,425 mm - 0,075 mm) can also be subdivided, if required, by sieving the oven-dried material retained on the 0,075 mm sieve through the 0,250 mm and 0,150 mm sieves. The material retained on each of these sieves is then weighed and the quantity expressed as a percentage of the soil mortar (i.e. material passing the 2,0 mm sieve) as follows:

Percentage coarse fine sand (0,425 mm - 0,250 mm) =

$$\frac{W_1 x Sf}{Sm}$$

Percentage medium fine sand (0,250 mm - 0.150mm) =

$$\frac{W_2 x Sf}{Sm}$$

Percentage fine fine sand (0,150 mm - 0,075 mm) =

$$\frac{W_3 x Sf}{Sm}$$

where

W_1 = mass of fraction retained on the 0,250 mm sieve per 100 gram of soil fines
W_2 = mass of fraction retained on the 0,150 mm sieve per 100 gram of soil fines
W_3 = mass of fraction retained on the 0,075 mm sieve per 100 gram of soil fines
Sf = percentage soil fines as determined in Method A1.
Sm = percentage soil mortar as determined in Method A1

REFERENCES

ASTM Designation D422 - 63
AASHTO Designation T88 - 57