Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing

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4. Significance and Use

4.1 Material finer than the 75-µm (No. 200) sieve can be separated from larger particles much more efficiently and completely by wet sieving than through the use of dry sieving. Therefore, when accurate determinations of material finer than 75 µm in fine or coarse aggregate are desired, this test method is used on the sample prior to dry sieving in accordance with Test Method C136. The results of this test method are included in the calculation in Test Method C136, and the total amount of material finer than 75 µm by washing, plus that obtained by dry sieving the same sample, is reported with the results of Test Method C136. Usually, the additional amount of material finer than 75 µm obtained in the dry sieving process is a small amount. If it is large, the efficiency of the washing operation should be checked. It could also be an indication of degradation of the aggregate.

4.2 Plain water is adequate to separate the material finer than 75 µm from the coarser material with most aggregates. In some cases, the finer material is adhering to the larger particles, such as some clay coatings and coatings on aggregates that have been extracted from bituminous mixtures. In these cases, the fine material will be separated more readily with a wetting agent in the water.

5. Apparatus and Materials

5.1 *Balance*—A balance or scale readable and accurate to 0.1 g or 0.1 % of the test load, whichever is greater, at any point within the range of use.....

5.2 *Sieves*—A nest of two sieves, the lower being a 75-µm (No. 200) sieve and the upper a 1.18-mm (No. 16) sieve, both conforming to the requirements of Specification E11.....

5.3 *Container*—A pan or vessel of a size sufficient to contain the sample covered with water and to permit vigorous agitation without loss of any part of the sample or water.....

5.4 *Oven*—An oven of sufficient size, capable of maintaining a uniform temperature of 110 ± 5°C..

5.5 *Wetting Agent*—Any dispersing agent, such as liquid dishwashing detergents, that will promote separation of the fine materials.....

NOTE 1—The use of a mechanical apparatus to perform the washing operation is not precluded, provided the results are consistent with those obtained using manual operations. The use of some mechanical washing equipment with some samples may cause degradation of the sample.

6. Sampling

6.1 Sample the aggregate in accordance with Practice D75.....

If the same test sample is to be tested for sieve analysis according to Test Method C136, comply with the applicable requirements of that test method.....

6.2 Thoroughly mix the sample of aggregate to be tested and reduce the quantity to an amount suitable for testing using the applicable methods described in Practice C702.....

If the same test sample is to be tested according to Test Method C136, the minimum mass shall be as described in the applicable sections of that method.....

Otherwise, the mass of the test sample, after drying, shall conform with the following: .....

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Nominal Maximum Size	Minimum Mass, g
4.75 mm (No. 4) or smaller	300
Greater than 4.75 mm (No. 4) to 9.5 mm (3⁄8 in.)	1000
Greater than 9.5 mm (3⁄8 in.) to 19.0 mm (3⁄4 in.)	2500
Greater than 19.0 mm (3⁄4 in.)	5000

7. Selection of Procedure

7.1 Procedure A shall be used, unless otherwise specified by the Specification with which the test results are to be compared, or when directed by the agency for which the work is performed.....

8. Procedure A—Washing with Plain Water

8.1 Dry the test sample in the oven to constant mass at a temperature of 110 ± 5°C. Determine the mass to the nearest 0.1 % of the mass of the test sample.....
8.2 If the applicable specification requires that the amount passing the 75-µm (No. 200) sieve shall be determined on a portion of the sample passing a sieve smaller than the nominal maximum size of the aggregate, separate the sample on the designated sieve and determine the mass of the material passing the designated sieve to 0.1 % of the mass of this portion of the test sample.....
Use this mass as the original dry mass of the test sample in 10.1.....
NOTE 2—Some specifications for aggregates with a nominal maximum size of 50 mm or greater, for example, provide a limit for material passing the 75-µm (No. 200) sieve determined on that portion of the sample passing the 25.0-mm sieve. Such procedures are necessary since it is impractical to wash samples of the size required when the same test sample is to be used for sieve analysis by Test Method C136.
8.3 After drying and determining the mass, place the test sample in the container and add sufficient water to cover it.....
No detergent, dispersing agent, or other substance shall be added to the water.....
Agitate the sample with sufficient vigor to result in complete separation of all particles finer than the 75-µm (No.200) sieve from the coarser particles, and to bring the fine material into suspension.....
Immediately pour the wash water containing the suspended and dissolved solids over the nested sieves, arranged with the coarser sieve on top.....
Take care to avoid, as much as feasible, the decantation of coarser particles of the sample.....
8.4 Add a second charge of water to the sample in the container, agitate, and decant as before....
Repeat this operation until the wash water is clear.....
NOTE 3—If mechanical washing equipment is used, the charging of water, agitating, and decanting may be a continuous operation.
8.5 Return all material retained on the nested sieves by flushing to the washed sample.....
Dry the washed aggregate in the oven to constant mass at a temperature of 110 ± 5°C.....
And determine the mass to the nearest 0.1 % of the original mass of the sample.....
NOTE 4—Following the washing of the sample and flushing any material retained on the 75-µm (No.200) sieve back into the container, no water should be decanted from the container except through the 75µm sieve, to avoid loss of material. Excess water from flushing should be evaporated from the sample in the drying process.

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9. Procedure B—Washing Using Wetting Agent

9.1 Prepare the sample in the same manner as for Procedure A.....

9.2 After drying and determining the mass, place the test sample in the container.....

Add sufficient water to cover the sample, and add wetting agent to the water (Note 5) .....

Agitate the sample with sufficient vigor to result in complete separation of all particles finer than the 75-µm (No. 200) sieve from the coarser particles, and to bring the fine material into suspension.....

Immediately pour the wash water containing the suspended and dissolved solids over the nested sieves, arranged with the coarser sieve on top.....

Take care to avoid, as much as feasible, the decantation of coarser particles of the sample.....

NOTE 5—There should be enough wetting agent to produce a small amount of suds when the sample is agitated. The quantity will depend on the hardness of the water and the quality of the detergent. Excessive suds may overflow the sieves and carry some material with them.

9.3 Add a second charge of water (without wetting agent) to the sample in the container, agitate, and decant as before.....

Repeat this operation until the wash water is clear.....

9.4 Complete the test as for Procedure A.....

10. Calculation

10.1 Calculate the amount of material passing a 75-µm (No.200) sieve by washing as follows: .....

$$A = [(B - C)/B] \times 100 \quad (1)$$

where:

A = percentage of material finer than a 75-µm (No. 200) sieve by washing,

B = original dry mass of sample, g, and

C = dry mass of sample after washing, g.

11. Report

11.1 Report the following information:

11.1.1 Report the percentage of material finer than the 75-µm (No. 200) sieve by washing to the nearest 0.1 %, except if the result is 10 % or more, report the percentage to the nearest whole number....

11.1.2 Include a statement as to which procedure was used.....

Comments