

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

RAPID DETERMINATION OF THE POLISH SUSCEPTIBLE
CARBONATE PARTICLE CONTENT IN AGGREGATES

1.0 PURPOSE

1.1 To establish a rapid testing procedure for determining the approximate percentage, by weight, of polish susceptible carbonate particles in aggregate.

2.0 SCOPE

2.1 This procedure is designed to be used in conjunction with the testing of heterogeneous aggregate such as river gravel.

3.0 APPLICABLE DOCUMENTS

ASTM E-11
ASTM C-702 or AASHTO T-248
MP 700.00.06

4.0 APPARATUS

4.1 A #4 U. S. Standard 203 mm diameter sieve, conforming to ASTM E-11 Specifications.

4.2 Balance or scale, having a capacity of at least 300 grams and a sensitivity of at least 0.1 grams.

4.3 Oven capable of being maintained at $110 \pm 5^{\circ}\text{C}$.

4.4 Containers: an acid resistant 225 X 175 X 51 mm pyrex dish.

4.5 Receiving beaker: 400 or 600 ml pyrex beaker.

- 4.6 Tongs: acid resistant
- 4.7 Hydrochloric Acid: 6N solution
- 4.8 Safety Apparatus (rubber gloves, aprons, respirators, ventilation hood, etc.)
- 4.9 A source of magnification, preferable a microscope of sufficient power, to discern grain sizes as small as 2 mm.
- 5.0 SAMPLE PREPARATION
 - 5.1 Samples shall be representative of the sources from which they are obtained and shall be reduced to an appropriate size by use of a sample splitter or by quartering in accordance with ASTM C-702 or AASHTO T-248.
 - 5.2 Samples shall be sieved and thoroughly washed over a 4.75 mm and dried in an oven to constant weight at $110 \pm 5^{\circ}\text{C}$.
 - 5.3 An oven dry sample, weighing a minimum of 350 grams, shall be used for the test and shall be weighed to the nearest 0.1 gram.
 - 5.3.1 The selection of samples of an exact predetermined weight shall not be attempted.
- 6.0 PROCEDURE
 - 6.1 Under a ventilation hood, pour a quantity of 6N hydrochloric acid to cover the largest piece of aggregate in the sample.
 - 6.2 Place a small number of aggregate particles from the sample into the acid and observe signs of effervescence.
 - 6.3 Immediately remove all pieces of aggregate exhibiting strong signs of effervescence and place in a beaker containing water to stop the acid-carbonate reaction.
 - 6.4 Repeat this process until all particles exhibiting effervescence have been removed from the sample.

- 6.5 Thoroughly wash and oven dry all pieces which exhibited effervescence and discard the remainder of the sample.
- 6.6 Each individual piece of aggregate should be carefully examined under a microscope by a person qualified by education and experience to employ petrographic techniques for the recognition of characteristic properties of rocks and minerals.
- 6.6.1 It is the intent of this test to determine those carbonate particles which would be considered to be polish susceptible and detract from the overall anti-skid properties of the aggregate. Those carbonate particles which exhibit frictional properties by virtue of a coarse grained texture (> 2 mm) should not be counted as polish susceptible. Calcareous sandstone, for example, would not be considered as a carbonate particle because only the matrix would be made up of carbonate material.
- 6.7 After this final separation has been made, weigh the carbonate particles to the nearest 0.1 gram.
- 7.0 CALCULATIONS
- 7.1 Calculate the percentage of carbonate particles as follows:

$$C = \frac{W_1}{W_2} \times 100$$

Where:

C = Percentage of carbonate particles

W_1 = Total weight of carbonate particles

W_2 = Total weight of test sample coarser than a 4.75 mm.



Gary L. Robson, Director
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