

TEST METHOD FOR INSOLUBLE RESIDUE IN
CARBONATE AGGREGATES

1. SCOPE:

- 1.1 This test method covers the routine analysis of plus 200 aggregate intended for use in various highway construction projects. This method is a modification of Section 7 of ASTM D 3042 – 03, Standard Test Method for Insoluble Residue in Carbonate Aggregates.
- 1.2 Aggregate samples submitted for qualification and failing field samples of aggregate previously analyzed in accordance with this method, shall be evaluated in accordance with Section 7 of ASTM D 3042 – 03, Standard Test Method for Insoluble Residue in Carbonate Aggregates.

2. APPARATUS:

- 2.1 Sample splitter (1:1 split ratio)
- 2.2 Balance—A balance having a minimum capacity of 15 kg and meeting the requirements of Specification D 4753, Class GP5.
- 2.3 Weighing pan or suitable container capable of holding 150 – 500 g of aggregate.
- 2.4 Heavy walled 2000 ml Pyrex or similar beakers
- 2.5 6 N Hydrochloric Acid (HCl)
- 2.6 Oven, of appropriate size capable of being maintained at $110 \pm 5^{\circ}\text{C}$ ($230 \pm 9^{\circ}\text{F}$).
- 2.7 Stirring rods
- 2.8 Watch glasses, large enough to cover the beaker(s).
- 2.9 Hot plate
- 2.10 Thermometer
- 2.11 Plastic ring & bucket

- 2.12 Sieves, U.S. standard 203.2-mm (8-in.) diameter, conforming to Specification E 11 in the following sizes:

4.75-mm (No. 4)
2.36-mm (No. 8)
1.18-mm (No. 16)
600-• m (No. 30)
300-• m (No. 50)
150-• m (No. 100)
75-• m (No. 200)

- 2.13 Sieve Shaker

3. SAMPLE:

- 3.1 Samples for analysis shall be prepared and supplied through the Aggregate Section.

4. PROCEDURE:

- 4.1 Use the sample splitter, split the sample a minimum of 3 times to obtain a sample of approximately 150 g (500 g if following ASTM D 3042).
- 4.2. Determine and record the weight of the split sample from 4.1 to the nearest 0.001 g.
- 4.3 Carefully transfer the sample to a 2000 ml beaker(s).
- 4.4 Place the beaker(s) under a fume hood.
- 4.5 Slowly add approximately 250 ml of 6 N HCl to the sample and stir until foaming subsides, repeat the addition of 6 N HCl with stirring until a total of 1000 ml of 6 N HCl has been added.
- 4.6 Place the beaker(s) on a hot plate, cover with watch glass(es) and begin heating to 70° – 80•C.
- 4.7 Stir contents periodically during heating cycle.
- 4.8 Allow sample(s) to heat at 70 – 80•C for approximately 1 hour, turn off heat, and allow sample(s) to sit overnight.
- 4.9 Wash the sample(s) over a No. 50 and No. 200 sieve stacked and placed on the plastic ring over a bucket. Rinse the stack until rinse water is clear. Periodically, rub the contents to ensure clay & other non aggregate material is loosened.

- 4.10 Allow the sieves to drain, place the stack on the bottom pan and place in the oven at $110 \pm 5^{\circ}\text{C}$ ($230 \pm 9^{\circ}\text{F}$).
- 4.11 Allow the sieves to dry for a minimum of 3 hours. If needed the sieves may remain in oven longer.
- 4.12 Remove sieves from oven and allow to cool to room temperature.
- 4.13 Carefully transfer, using a brush if needed, the residue of both sieves to the No. 4 sieve nested in the following order:

4.75-mm (No. 4)
2.36-mm (No. 8)
1.18-mm (No. 16)
600- μ m (No. 30)
300- μ m (No. 50)
150- μ m (No. 100)
75- μ m (No. 200)
Pan

- 4.14 Place the sieves in the shaker and shake them for 8 minutes.
- 4.15 Remove the sieves from the shaker and carefully transfer the contents of each sieve to the tared weighing pan (other suitable container), and record the weight of the residue of each pan on worksheet. Place the residue of each pan in a labeled envelope with I.D. number and return with sample to Aggregate Section.
- 4.16 Calculate and record the total amount of residue retained. The percentage of each sieve retained, and the total percentage of the sieves retained.

5. CALCULATION:

- 5.1 Calculate the percentage retained as follows:

$$\text{Percent retained} = (\text{Weight residue per sieve} / \text{Sample Weight}) * 100$$

- 5.2 Add the individual percentages calculated to obtain the total percentage retained.

6. REPORT:

6.1. Total percent residue retained

APPROVED

DIRECTOR
DIVISION OF MATERIALS

DATE

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