8 Testing Equipment

Laboratory

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CHAPTER EIGHT:
TESTING EQUIPMENT

Before entering the Coordinated Testing Phase of the Certified Aggregate Producer Program, the Producer is required to have a suitable laboratory and testing equipment that has been verified to accomplish the program requirements. Laboratories are checked by an INDOT representative before start-up of the Coordinated Testing Phase and periodically to maintain the integrity of certified production.

LABORATORY

GENERAL

Equipment required for the various general procedures:

1) Electronic balance, Class G2, general purpose balance in accordance with **AASHTO M 231**. The balance is required to be readable to 0.1 g and accurate to 0.2 g or 0.1 percent of the test load, whichever is greater, throughout the range of use.

2) Laboratory oven, (optional) capable of maintaining a temperature of 230 ± 9° F, and ample interior volume to handle the anticipated sample load

3) Metal pans for drying and storage

4) Utensils for washing and drying samples, such as trowels, spatulas, etc.

5) Appropriate data sheets, log books, etc.

SAMPLING

Equipment required for **AASHTO T 2** or **ITM 207**:

1) Square-nose shovel

2) Sampling tube for sand

3) Containers, such as 20 gallon buckets, plastic fiber bag, etc. Galvanized bushel tubs work well and will stand up to oven temperatures.

4) Labels of sufficient size to allow for proper identification of samples

SAMPLE REDUCTION

Equipment required for **AASHTO T 248**:

1) Mechanical splitters

2) Buckets

SIEVE ANALYSIS

Equipment required for **AASHTO T 27**:

1) For coarse aggregates, 15 in x 23 in. or 14 in. x 14 in. sieves are recommended with sieve designations 2 in., 1 ½ in., 1 in., 3/4 in., 1/2 in., 3/8 in., No. 4, No. 8 and pan. For fine aggregates, 8 in. round sieves are standard with sieve designations 3/8 in., No. 4, No. 8, No. 16, No. 30, No. 50, No. 100, No. 200, and pan.

2) Mechanical sieve shaker, appropriate model to accommodate sieves

3) Sieve brushes, wire and bristle brushes (note: never use a wire brush on sieves with openings smaller than the openings on a No. 50 sieve)

DECANTATION

Equipment required for **AASHTO T 11**:

1) Sieves, No. 16 and No. 200. The No. 200 sieve is protected from punctures and tears by covering with the No. 16 sieve.

2) Container, size sufficient to hold the sample covered with water and to permit vigorous agitation

3) Wetting agent, such as liquid detergent, etc. Some fine materials, especially limestone dust, require a wetting agent to break the surface tension of the particles. A drop or two of dishwashing liquid is usually sufficient.

4) Decant machine (may be used provided the results are consistent with those obtained using manual operations)

DELETERIOUS AND CHERT

Equipment required for deleterious and chert:

1) Scratch hardness tester

2) Hydrochloric acid and glass plate

TEST EQUIPMENT VERIFICATION

The test equipment is required to be properly verified and maintained within the limits described in the applicable test method. Verification of the test equipment is required prior to beginning testing in the Coordinated Testing Phase. The Producer is required to also verify the equipment at the minimum frequency as follows:

Equipment	Requirement	Min. Freq.	Procedure
Balances	Verification	12 mo.	ITM 910
Mechanical shakers	Check sieving thoroughness	12 mo.	ITM 906
Ovens	Verify temperature settings	6 mo.	ITM 903
Sieves	Check physical thoroughness	6 mo.	ITM 902

LABORATORY SET-UP

Proper organization of the laboratory is required to maximize efficiency and minimize problems and erroneous results. Special consideration to the flow of the work to be done is required. The laboratory should be organized in the direction of this flow. For example, the equipment may be arranged from left to right when conducting sieve analyses as follows:

1) Riffle splitter -- for reduction of incoming samples

2) Oven -- for drying samples after reduction

3) Cooling rack and fan -- for cooling samples when dry (note: make sure that the fan does not blow towards the balance in the weighing area and does not disperse sample fines)

4) Coarse aggregate shaker

5) Fine aggregate shaker

6) Weighing area -- balance should be in an area free from vibration, dust, and air flow

Every laboratory situation is different. Setting up the lab to meet the flow requirements of the most routine tests conducted should be done. Minimizing the need for back-tracking, especially if more than one Technician is working at a time, is beneficial. A little extra time and thought to the set up of the lab significantly increases productivity and decreases turn-around time of test results.