INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS AND TESTS

ACCEPTANCE PROCEDURES OF AIR COOLED BLAST FURNACE SLAG FOR LEACHATE DETERMINATION
ITM No. 212-19

1.0 SCOPE.

1.1 This method sets forth the procedure for sampling and testing ACBF slag for determination of leachate from the aggregate.

1.2 Unaged ACBF slag may contain an excessive quantity of calcium sulfide which may leach when inundated with a large volume of water. The leachate may emit hydrogen sulfide gas, and have a greenish-yellow color. When exposed to air, the rate of leaching will diminish with time as the ACBF slag ages. The aging process will allow the calcium sulfide to oxidize to sulfates and carbonates.

1.3 This procedure will apply to all uses of ACBF slag except for use in HMA or PCC.

1.4 This ITM may involve hazardous materials, operations, and equipment and may not address all of the safety problems associated with the use of the test method. The user of the ITM is responsible for establishing appropriate safety and health practices and determining the applicability of regulatory limitations prior to use.

2.0 REFERENCES.

2.1 AASHTO Standards.

E 11 Wire-Cloth Sieves for Testing Purposes
M 231 Weighing Devices Used in the Testing of Materials
R 76 Reducing Samples of Aggregate to Testing Size

2.2 ASTM Standards.

D1193 Reagent Water
E70 pH of Aqueous Solutions with the Glass Electrode
E832 Laboratory Filter Paper
E960 Laboratory Glass Beakers

2.3 ITM Standards.

207 Sampling Stockpiled Aggregates

3.0 TERMINOLOGY. Definitions for terms and abbreviations will be in accordance with the Department's Standard Specification, Section 101.

4.0 SIGNIFICANCE AND USE. This ITM shall be used to evaluate ACBF slag for determination of leachate from the aggregate. The ACBF slag is required to meet the requirements of this test method before use, except when used in HMA or PCC.

5.0 APPARATUS.

5.1 Balance, Class G20, in accordance with AASHTO M 231

5.2 No. 4 sieve, in accordance with AASHTO M 92

5.3 Filter paper, medium grade, in accordance with ASTM E832

5.4 Five-gallon bucket, plastic, with lid

5.5 Funnel

5.6 Glass beaker, 150 mL, in accordance with ASTM E960

5.7 pH meter

5.8 Tamping rod, round, steel, approximately 5/8 in. in diameter, and approximately 24 in. in length

6.0 REAGENTS. Deionized or distilled water, conforming to the requirements of ASTM D1193

7.0 GENERAL REQUIREMENTS.

7.1 Each Aggregate Producer requesting to have ACBF slag tested in accordance with this procedure shall contact the appropriate District Testing Engineer to initiate the approval process.

7.2 Sampling and testing shall be conducted by the Aggregate Producer.

7.3 ACBF slag shall be sampled as the stockpiles are being constructed. Existing stockpiles shall be sampled randomly from the interior of the stockpile.

7.4 Acceptance for use of ACBF slag will be given on each stockpile of approximately 2000 tons. Stockpiles that do not meet the acceptance criteria of this test method may be tested again after 30 days from the test date.

7.5 Stockpile location, stockpile identification, and test results shall be maintained at the ACBF slag source and shall be available for inspection.

8.0 SAMPLING.

8.1 Sampling of aggregates shall be from a small pile in accordance with ITM 207, Section 5.1. Samples shall not be obtained from the surface of the stockpile.

8.2 Each sample shall consist of 80 to 100 lbm of material.

8.3 The test sample shall be obtained by reducing the original sample in accordance with AASHTO R 76 to a sample size of 20 to 25 lbm

9.0 PROCEDURE.

9.1 Place the test sample in a five-gallon bucket, fill with distilled or deioinized water until the sample is covered with at least 1/2 in. and not more than 1 in. of water, and place the lid on the bucket. No additional water shall be added after the test is started. Allow the sample to soak for one day.

9.2 After the one day soaking period, thoroughly stir the sample with the tamping rod and collect a water sample of approximately 100 mL.

9.3 Using a funnel, filter the water sample through the filter paper into a glass beaker.

9.4 Observe the clarity and color of the water.

9.5 Calibrate a pH meter in accordance with the manufacturer's instructions and ASTM E70, and then determine the pH of the water sample to the nearest 0.1 pH unit.

9.6 If the water is not clear and colorless, or the pH is not within 6.0 to 10.5, the material is not acceptable and the test is completed. Upon the completion of the color observation and pH measurement, the 100 mL water sample is discarded.

9.7 If the water is clear and colorless and the pH is within 6.0 to 10.5, then allow the sample to soak for another fourteen days. The bucket shall be covered with the lid and steps 9.2 to 9.6 repeated after three days, seven days, and fifteen days from the initial soaking.

10.0 ACCEPTANCE CRITERIA.

10.1 If after one day, three days, seven days, or fifteen days of soaking, the water is not clear, the material will not be acceptable for use.

10.2 If after one day, three days, seven days, or fifteen days of soaking, the pH is not within 6.0 to 10.5, the material will not be acceptable for use.

10.3 If after fifteen days of soaking, the water is clear and the pH is within 6.0 to 10.5, the material will be acceptable for use.

11.0 REPORT.

11.1 All pH values shall be reported to the nearest 0.1 unit.

11.2 The clarity and color of the water.