Test Procedure for

DETERMINING MOISTURE CONTENT IN FINE AGGREGATE BY THE “SPEEDY” MOISTURE METHOD

TxDOT Designation: Tex-425-A

Effective Date: August 1999

1. SCOPE

1.1 Use this method to determine the moisture content of fine aggregate by chemical reaction using calcium carbide as a reagent. This test method is not a replacement for Tex-103-E, but a supplement when rapid results are required, when testing in field locations, or where an oven is not available for use. Use Tex-103-E to compare for accuracy checks and correction.

1.2 The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.

2. SAFETY HAZARDS

2.1 When combined with water, the calcium carbide reagent produces a highly flammable or explosive acetylene gas.

2.2 Do not carry out testing in confined spaces or near a heat source that can cause combustion.

2.3 Exercise care when releasing the gas from the apparatus to direct it away from the body.

2.4 Do not dispose of or place a significant amount of the calcium carbide reagent where it may contact water because it will produce an explosive gas.

2.5 The operator should wear a dust mask, long-sleeve clothing, gloves, and goggles to keep the reagent from irritating the eyes, respiratory system, or hands and arms.

2.6 Attempts to test excessively wet, fine aggregates or to use the equipment improperly, such as adding water to the testing chamber, could cause pressures to exceed the safe level for the apparatus.
3. APPARATUS

3.1 Calcium carbide pressure tester set.

3.2 Small scoop.

3.3 Brush and cloth, for cleaning incidental items.

3.4 Standard U.S. sieve, 4.75 mm (No. 4).

3.5 Supply of calcium carbide, meeting the manufacturer’s requirements for use in the equipment.

3.6 Apparatus listed in Tex-103-E, for performing comparison tests to make calibration curves.

Note 1—Calibration kits are available from the manufacturers for testing gasket leakage and for calibrating the gauge.

4. SAMPLING

4.1 Sample in accordance with Tex-400-A. Protect the sample from moisture loss prior to beginning the test.

4.2 Specimens should contain only aggregate particles smaller than the 4.75 mm (No. 4) standard sieve size.

5. PROCEDURES

5.1 Obtaining Moisture Content in Fine Aggregate:

5.1.1 Remove the cap from the testing chamber of the apparatus and place the recommended amount of calcium carbide reagent into the chamber. Most equipment built to test 20-g samples requires approximately 22 g of reagent (measured using the supplied scoop, filled three times).

5.1.2 Obtain a test sample of the size recommended for the equipment. Use half of the recommended sample size if the water content of the aggregate is expected to exceed the limits of the gauge on the gas pressure chamber or if it actually reaches or exceeds the gauge limit in any test.

5.1.3 Place the specimen in the testing chamber cap, then, with the apparatus in the horizontal position, insert the cap in the testing chamber and tighten the clamp to seal the cap to the unit.

Note 2—Take care that no calcium carbide contacts the fine aggregate until achieving a complete seal.
5.1.4 Raise the apparatus to the vertical (upright) position so that the contents of the cap fall into the testing chamber. Strike the side of the apparatus with an open hand to be sure that all material falls out of the cap.

5.1.5 Shake the apparatus vigorously with a rotating motion. Periodically check the progress of the needle on the pressure gage dial, allowing time for the needle to stabilize as heat from the chemical reaction is dissipated.

5.1.6 When the pressure gage dial needle stops moving, read the dial while holding the apparatus in the horizontal position.

5.1.6.1 If the dial goes to the limit of the gage, restart the test using a new specimen with a mass half as large as the recommended specimen size.

5.1.6.2 When a half-size specimen is used, multiply the final dial reading by two for use with the calibration curve.

5.1.7 Record the final pressure gauge dial reading and use the appropriate calibration curve to determine the corrected water content in percent of dry mass of fine aggregate and record.

5.1.8 With the cap of the testing chamber pointed away from the operator, slowly release the gas pressure. Empty the chamber and examine the specimen for lumps. If the material is not pulverized completely, repeat the test using a new specimen.

5.1.9 Clean the testing chamber and cap with a brush or cloth and allow the apparatus to cool before performing another test.

5.1.10 Discard specimen.

**Note 3**—Do not reuse specimen for further testing, as it is contaminated with reagent.

**Note 4**—Reversing the placement of materials by placing the fine aggregate specimen in the chamber and the calcium carbide in the cap is also permissible.

5.2 Calibration:

5.2.1 Calibrate the manufacturer-supplied equipment set as a unit.

5.2.2 Develop calibration curves for each equipment set, using the fine aggregate type to be tested and the expected water content range of the fine aggregate. If making tests over a long period on the same fine aggregate, make a new calibration curve periodically, not exceeding 12 months.

5.2.3 Produce calibration curves by selecting several samples representing the range of fine aggregate to be tested and having a relatively wide range of water content. Carefully divide each sample into two specimens by quartering procedures or use of a sample splitter. Taking care not to lose any moisture, test one specimen in accordance with this method without using a calibration curve, and test the other specimen in accordance with Tex-103-E.
5.2.4 Plot the results of the oven-dry water content determination by Tex-103-E from all the selected samples versus the gauge reading from the calcium carbide tester for the corresponding test specimen pair. Plot a “best fit” curve through the points to form a calibration curve for each fine aggregate type.

5.2.5 Make a comparison of this test method with Tex-103-E for a given fine aggregate using the calibration curve.