Kentucky Method 64-605-06
Revised 5/8/06
Supersedes 64-605-98
Dated 3/98

SPECIFIC GRAVITY AND ABSORPTION OF FINE AGGREGATE

1. SCOPE

1.1. This method covers the determination of bulk specific gravity (saturated surface-dry basis), bulk specific gravity (oven-dry basis), apparent specific gravity, and absorption of fine aggregate.

2. APPARATUS

2.1. Balance – A balance of sufficient capacity, readable to 0.1 gram or better and conforming to the requirements of AASHTO M231.

2.2. Pycnometer – A glass quart mason jar equipped with a threaded pycnometer top. The jar and top shall be threaded such as to provide a water-tight connection.

2.3. Mold – A metal mold in the shape of a cone with dimensions as follows: 40 ± 3 mm inside diameter at the top, 90 ± 3 mm inside diameter at the bottom, and 75 ± 3 mm in height, with the metal having a minimum thickness of 0.8 mm.

2.4. Tamper – A metal tamper weighing 340 ± 15 grams and having a flat circular tamping face 25 ± 3 mm in diameter.

2.5. Sample splitter

2.6. Drying pans

2.7. Oven – An oven capable of maintaining a temperature of 230 ± 9°F.

2.8. Sieve – A No. 200 sieve conforming to AASHTO M92. A larger sieve size may be used to protect the No. 200.

2.9. Gilson SS-28 Vibra Pad

2.10. Fan to provide a gentle current of air. Speed of fan should be slow enough as to not cause loss of fines.

3. DEFINITIONS

3.1. Constant Mass – The sample has reached a constant mass when an additional 30 minutes of drying at the specified temperature causes 0.1 percent or less decrease in mass.

3.2. Saturated Surface-Dry Condition – Proper SSD condition has been achieved when a small amount of material about the diameter of a dime remains standing in the center of the pile after the cone has been removed. See Pictures 1 and 2.

4. SAMPLES

4.1. Obtain field samples in accordance with AASHTO T2.

4.2. Obtain a test portion of approximately 2000 grams of the fine aggregate from the field sample by use of a sample splitter, by quartering, or by miniature stockpile sampling as applicable and in accordance with AASHTO T248.

4.3. Wash the sample over the No. 200 sieve.

4.4. Remove the material from the sieve and oven dry to a constant mass and cool to a comfortable handling temperature.

4.5. Cover the sample with water in a container and soak for 15 to 24 hours.

4.6. Decant excess water over a No. 200 sieve and spread the test portion on a flat, non-absorbent surface exposed to a gently moving current of air. **Stir frequently to secure uniform drying**.

4.7. Hold the mold firmly on a smooth non-absorbent surface with the large diameter down. Fill the mold until overflowing occurs.

4.8. Lightly tamp the surface of the material 25 times with the tamper. Adjust the height and position of the tamper above the sand surface as necessary, so that a drop of 5mm (0.2 in.) is used throughout the tamping process and is distributed over the surface of the aggregate. Do not hit or shake the cone while checking for SSD condition. (During each check of SSD condition, the fan should be off.)

4.9. Remove loose sand from outside the base and lift the mold vertically away from the material. If surface moisture is still present, the fine aggregate will retain the molded shape. Continue drying and stirring and test at frequent intervals until the tamped fine aggregate reaches SSD condition. Proper SSD condition has been achieved when a small amount of material about the diameter of a dime remains standing in the center of the pile after the cone has been removed. See Pictures 1 and 2. If material will not retain molded shape and surface moisture is still visible. SSD determination will be as defined in Subsection 7.2.

4.10. If sample is taken past SSD condition then return to 4.5 and continue the test.

5. PROCEDURE

5.1. Make and record all mass determination to 0.1 gram.

5.2. Immediately introduce 500.0 grams (record as "S") into the jar half filled with water and a second 500.0 gram portion into a pan to be placed into an oven. Fill jar with additional water to approximately 90 percent of capacity. Put the pycnometer top onto the jar and place the jar onto a Gilson SS-28 Vibra Pad for 4 minutes at high setting. Finish filling the pycnometer with water (top off with a bead of water), dry any water from the sides of the pycnometer, and weigh the pycnometer filled with fine aggregate and water to the nearest 0.1 gram. Record as "C".

5.3. Empty and discard all material from the pycnometer and completely fill the pycnometer with water (top off with a bead of water) and weigh the pycnometer filled with water to the nearest 0.1 gram. Record as "B".

5.4. After second portion has been dried to a constant mass and cooled, record this mass to the nearest 0.1 gram. Record as "A".

6. CALCULATIONS

6.1

$$Bulk\ (SSD)\ Specific\ Gravity = \frac{S}{B + S - C}$$

6.2

$$Bulk\ (BOD)\ Oven\ Dry\ Specific\ Gravity = \frac{A}{B + S - C}$$

6.3

$$Apparent\ (APP)\ Specific\ Gravity = \frac{A}{A + B - C}$$

6.4

$$Absorption,\ percent\ (ABS) = \frac{S - A}{A}\ x\ 100$$

Where:

A = Mass of oven dried material.

B = Mass of pycnometer filled to capacity with water.

C = Mass of pycnometer filled to capacity with fine aggregate and water.

S = Mass of saturated surface-dry specimen.

7. PRECAUTIONS

7.1. The water used must be maintained at 73 ± 3°F during the entire test.

7.2. Use the following on materials that will not retain molded shape when surface moisture is still visible after attempting Subsections 4.7 through 4.9:

For reaching the saturated surface-dry condition on materials that will not retain molded shape when surface moisture is still visible, hard-finish paper towels may be used to surface dry the material until the point is just reached where the paper towel does not appear to be picking up moisture from the surfaces of the aggregate particles. A new piece of paper towel will be used for each check of SSD. Ecosoft Paper Towel number 46200 from Baywest is preferable.

8. REPORT

8.1. Report specific gravity to the nearest hundredth.

8.2. Report percent absorption to the nearest tenth of a percent.

8.3. When test results are obtained that fail to meet specification limits, a retest will be performed. The unused field sample is to be tested in the same manner as the original test sample. When the two test results vary considerably, further investigation will be necessary. Investigation may include checking test equipment, reducing field sample to test sample practices, methods of calculations and/or obtaining an additional field sample to test.

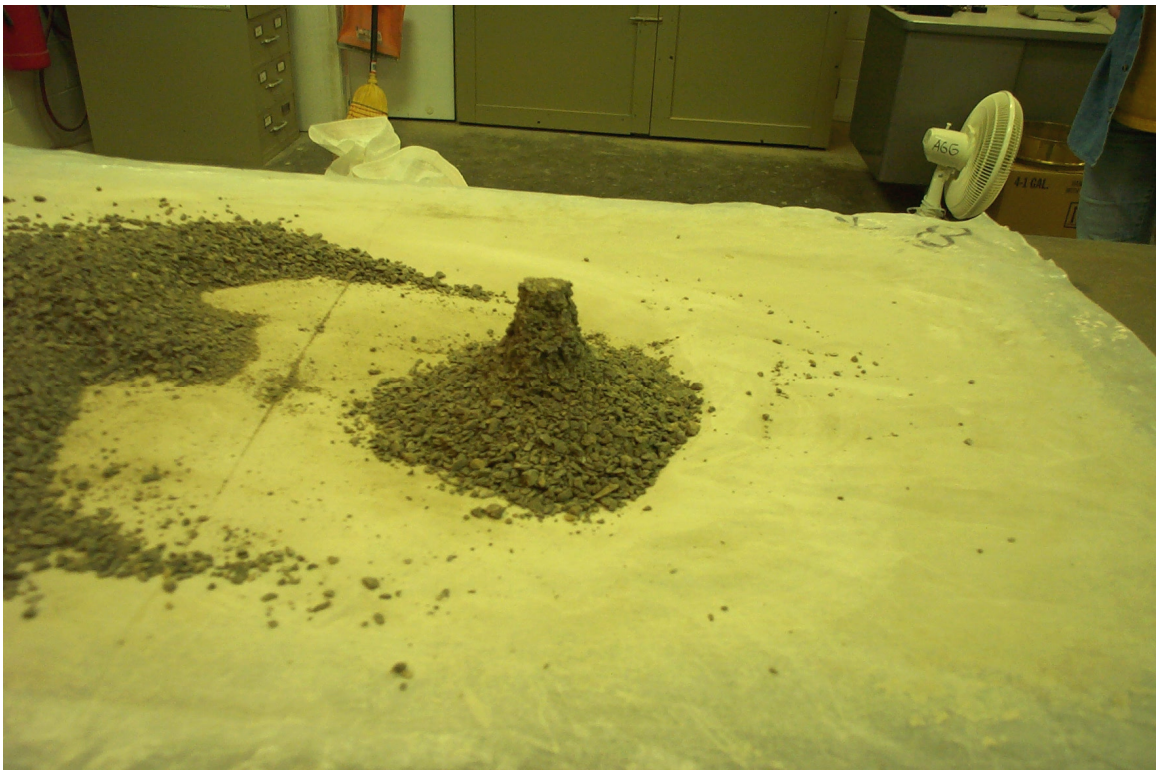
APPROVED _____
Director
DIVISION OF MATERIALS

DATE _____

Kentucky Method 64-605-06
Revised 5/8/06
Supersedes 64-605-98
Dated 3/98

KM60506.doc

Attachments



PICTURE 1

PICTURE 2