PROCEDURES FOR CALIBRATION OF VOLUMETRIC AIR METERS

A. PURPOSE

The intent of these procedures is to provide instruction to the appropriate personnel for the calibration of volumetric air meters for entrained air in fresh concrete for accurate, uniform results.

B. APPARATUS REQUIRED

1. Complete Volumetric Air Meter Assembly.

2. Rubber Syringe.

3. Scale with capacity of 20 pounds (9 kg) and readable to .01 pound (1 g).

4. Required amount of water needed to perform calibration at room temperature.

5. 1 ft. x 1 ft. x .5 in. (300 mm x 300 mm x 12.5 mm) glass plate.

6. Small amount of pump grease.

C. PROCEDURE

1. Weigh the measuring bowl when empty with the glass plate placed on the bowl.

2. Place a thin film of pump grease on rim of the measuring bowl.

3. Fill the measuring bowl with water.

4. Screed off the excess water with the glass. Make sure no air bubbles are entrapped.

5. Weigh the measuring bowl, glass and water.

6. Subtract the weight of the measuring bowl and glass from the weight of the measuring bowl, glass and water.

7. Divide the weight of water in the measuring bowl by the unit weight of water at the same temperature (see Table 3 of AASHTO T 19).

8. The volume of the top section of the meter should be at least 20% greater than the volume of the bowl. Determine the weight of water at 70 °F needed to fill the volume of the assembled apparatus to the zero gradation mark. Fill the assembled apparatus to a predetermined air content gradation. The quantity of water added shall equal the air content gradation to within ± 0.1% volume percent of the bowl. Repeat this procedure for three more gradations.

9. Weigh the measuring cup empty.

10. Weigh the measuring cup and water.

11. Subtract the weight of the measuring cup from the weight of the measuring cap and water.

12. Divide the weight of the water in the measuring cup by the unit weight of water at that temperature.

D. TOLERANCE

All equipment shall meet the specified tolerances indicated by test methods T 196.

EQUIPMENT VERIFICATION RECORD

Verified By: _____ Date: _____

Equipment: Volumetric Air Meter _____ Location (Lab): _____

Identification No.: _____ Verification Frequency: 3 months_____

Previous Verification Date: _____ Next Due Date: _____

Verification Equipment Used: Scale (20 lb [9 kg] capacity); required amount of water at room temperature and
      70ºF; 1' X 1' X .5" (300 mm x 300 mm x 12.5 mm) glass plate; rubber syringe

Verification Procedure: (In-house) OMR-CVP-22 / AASHTO T 196

T 196 4.1

| | | ### T 196 4.3 | |

T 196 4.1

Weight of bowl and water   ____ lbs./g   Weight of cup and water   ____ lbs./g

Weight of bowl   ____ lbs./g   Weight of cup   ____ lbs./g

Weight of water (w)   ____ lbs./g   Weight of water (w)   ____ lbs./g

Temperature of water   _____ ºF   Temperature of water = 70 ºF

Unit wt. of water (W) @ __ºF = __lbs./ft³ (kg/m³)   Unit wt. of water (W) @ 70 ºF = 62.301 lbs./ft³ (997.97 kg/m³)

Bowl volume (V) = $\dfrac{w}{W} = \dfrac{\text{lbs.}}{\text{lbs./ft}^3} =$ _____ ft³   Cup volume (V) = $\dfrac{w}{W}$ ft³
(English)

Bowl volume (V) = $\dfrac{w}{W} = \dfrac{\text{kg}}{\text{Kg/m}^3} =$ _____ m³   Cup volume (V) = $\dfrac{w}{W}$ m³
(Metric)

T 196 4.2

Gradation (%)   Water Added (lbs. [kg])

(1) _____   _____

(2) _____   _____

(3) _____   _____

Temperature of water = 70 ºF

Unit weight of water (W) at 70 ºF = 62.301 lbs./ft³ (997.97)

$\dfrac{\text{Water Added (w)}}{\text{Unit weight of water (W)}} = \dfrac{\text{lbs.}}{\text{lbs./ft}^3} =$ ft³ (V)

$\dfrac{\text{Water Added (w)}}{\text{Unit weight of water (W)}} = \dfrac{\text{kg}}{\text{kg/m}^3} =$ m³ (V)

$\dfrac{V}{2}$ X 100 = % (P) (1) _____ (2) _____ (3) _____
V

Does P = % Gradation?   _____

           _____