



AIR CONTENT OF FRESHLY MIXED CONCRETE BY PRESSURE

SCOPE

This test method describes the procedure for determining the air content of freshly mixed concrete by one form of pressure method.

PROCEDURE

NOTE: Certain coarse aggregates in east central Iowa will cause air meter readings to indicate higher air content than is actually in the concrete. An aggregate correction factor must be applied to correct the air content. The District Materials Engineer will supply the correction factor when using these aggregates. AASHTO T152 requires an aggregate correction factor for all concrete; however, it typically is not large enough for most aggregates to require adjustment.

A. Apparatus

1. Measure bowl and cover assembly: All apparatus used shall incorporate the requirements of AASHTO Designation T-152 Section 4, for a Type B Washington-type meter.
2. Tamping Rod: 5/8 in. (16 mm) diameter, having a hemispherical tip.
3. Scoop
4. Strike-off bar
5. Rubber mallet
6. Rubber syringe or polyethylene unitary wash bottle

B. Test Procedure (For use with Washington-Type Air Meter)

NOTE: It is recommended that a calibration be performed prior to any new pour.

1. Calibration of Apparatus

a. Calibration Canisters (Plug method)

The volume of the calibration canister should be 0.0125 ft³ (354 ml). The effective air volume of the canister depends on the volume of the air meter being calibrated.

Effective Air Volume = $100 \times 0.0125 \text{ ft}^3 / (\text{air meter pot volume})$

Below is the effect air volume for the range of meters in service.

Air Meter Base Volume ft ³	Effective air volume	
	one canister	two canisters
0.245	5.10%	10.2%
0.246	5.10%	10.2%
0.247	5.05%	10.1%
0.248	5.05%	10.1%
0.249	5.00%	10.0%
0.250	5.00%	10.0%
0.251	5.00%	10.0%
0.252	4.95%	9.9%
0.253	4.95%	9.9%
0.254	4.90%	9.8%
0.255	4.90%	9.8%

2. Calibration Plug Procedure

- a. Fill the air meter with water. The water should be about the same temperature as the air temperature.
Note: Many faucets will mix air into the water. This air can be enough to affect the calibration. In this case, the water should be drawn and left to sit for several hours.
 - b. Put the lid on and using a plastic bottle provided or a rubber syringe, inject water through one petcock until all the air is expelled through the opposite petcock. Jar the base to insure removal of all air. Leave petcocks open.
 - c. Stabilize the dial hand at proper initial pressure line by pumping or bleeding off, as needed, while lightly tapping the backside of the dial with the fingers. Inject water through the petcock again to make sure all the air is expelled.
 - d. Close both petcocks and press down on the thumb lever exhausting air into the base. The dial should read 0.0%. If the dial does not read 0.0%, the test should be repeated. If two or more tests are off by the same amount, a new initial pressure line should be established and the test repeated to confirm a 0.0% reading.
 - e. Open the petcocks to relieve the pressure and remove the lid.
 - f. Make sure the calibration canisters have no water inside and that the bottom hole is clear of debris. Place the canister in the water making sure not to release air from the canister. Repeat step b and c. Close both petcocks and press down on the thumb lever exhausting air into the base. The dial should read the effective air volume of the canister (5.0% for air meters with a 0.25 ft³ volume).
 - g. If the dial reading variation is +/- 0.2% or less from the effective air volume, repeat the test using 2 calibration canisters in the pot. If the dial reading variation is +/- 0.2% (+/- 0.25% for dials with 0.5 % graduations) or less from the effective air volume, the air meter is in proper calibration.
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- h. If the dial readings are beyond the tolerance for either or both air volumes, the test should be repeated. If after two or more tests, the variation is the same and beyond the tolerances, the air meter should be returned to the Central Laboratory for adjustment or repair.

See Iowa Test Method 405 for Water Method Calibration

3. Operation of Apparatus (Determination of Air Content of Concrete)

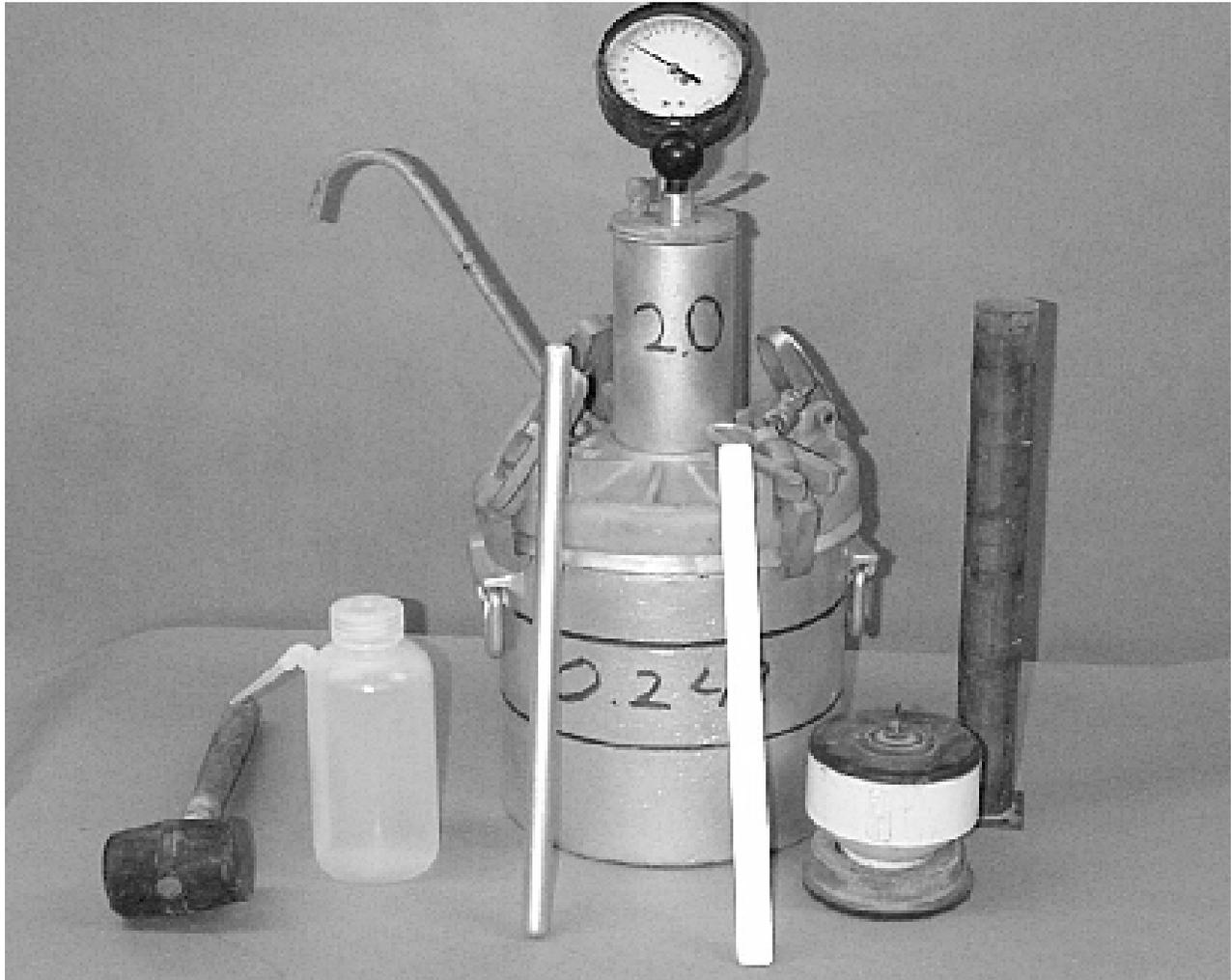
- a. Fill the base with a sample of fresh concrete placing the concrete in the base in three equal layers. Rod each layer twenty-five times with the tamping rod provided with the meter. For slumps less than 1 in. (25mm), the sample may need to be consolidated by internal vibration.
- b. Do not allow the rod to forcibly strike the bottom of the base while rodding the bottom layer. The rod should just penetrate the underlying layer when rodding the upper layers. Care should also be taken to avoid hitting the top edge of the base with the tamping rod.
- c. Tap the sides of the base 10-15 times with a rubber mallet after rodding each layer to close the holes left by the rod.
- d. A clean, smooth surface on the top edge of the base is necessary to insure a tight seal with the cover. Strike off base, level full, with the straight edge furnished. Wipe the top edge of the base clean to insure a tight seal with the cover.
- e. Clamp cover on with petcocks open.
- f. With the built in pump, pump air into the air chamber atop the cover until the pressure indicator points to the proper initial pressure line on the gauge. **NOTE:** The pump stem may need a light coat of oil to slide freely. Too much oil on the stem will fill the pump chamber and block the air valve causing the pump to fail.
- g. Using a rubber syringe, inject water through one petcock until all the air is expelled through the opposite petcock. Jar the base to insure removal of all air. Leave petcocks open. **NOTE:** Use care if injecting water through opposite petcock to not add air bubbles. When jarring the base to remove the air, the base shall not be tilted more than 2 inches (50 mm) from horizontal.

The sequence of Steps f. and g. may be interchanged without adversely effecting the test result.

- h. Stabilize dial hand at the proper initial pressure line by pumping or bleeding off, as needed, while lightly tapping the backside of the dial with the fingers. Inject water through the petcock again to make sure all the air is expelled.
- i. Close both petcocks. Press down on lever to release air into the base. Hold lever down a few seconds lightly tapping the backside of the dial with your fingers until the dial

stabilizes. Observe the dial reading before letting up on the lever. Record the dial reading. Report the air content to the nearest 0.1% for air contents up to 8%, or the nearest 1/2 scale division at 8% or higher air content.

- j. Open petcocks to release pressure, and then remove cover. Empty the concrete from base, clean up base, cover with petcocks left opened.



Air Meter and Calibrating Accessories