1. SCOPE

1.1. Description of Test

This method describes the procedure for determining the air content of freshly mixed concrete from observations of the change in volume with a change in pressure.

2. APPARATUS AND MATERIALS

2.1. Equipment Required

Air entrainment meter - a device incorporating a measuring bowl of sufficiently rigid construction to make a pressure-tight container of accurate volume and suitable to hold a representative sample of concrete. The bowl shall be fitted with a cover to provide an adequately rigid pressure-tight assembly. The volume of the measuring bowl shall be at least .006 cubic metres. A calibration cylinder and adapters shall be provided.

Tamping Rod - round, straight steel rod 16 mm in diameter and 600 mm in length with one end rounded to a hemispherical shape.

Trowel, rubber mallet, strike off bar, scoop, containers, etc.

3. PROCEDURE

3.1. Description of Equipment Preparation

3.1.1. Calibration Check Air Entrainment Meter

Fill meter base with water.

Attach short piece of threaded tubing into the threaded petcock hole on the inside of the meter cover.

Lock cover in place on base. Tube will now be immersed in the water.

Open both petcocks and add water by means of small syringe through threaded petcock until all air is forced out of other petcock.
With petcocks open, pump up air pressure past predetermined initial pressure line and allow air to cool. Stabilize gauge hand at initial pressure line by means of bleed valve if reading high or by pump if reading low.

Close petcocks and press down on lever thus exhausting air into the base. If initial pressure line was correctly selected, gauge will read 0%. If two or more tests show a consistent variation from 0% then change initial pressure line to compensate for the variation.

Screw curved tube into outer end of threaded petcock and fill 354 mL calibration vessel level full of water from the base of meter. This is done by opening petcock and pressing on lever.

Open other petcock to release air to allow water in curbed tube to return into base. There is no 5% air in base.

Leave both petcocks open and pump pressure back to initial pressure line.

Close petcocks and press on lever. Allow gauge to stabilize. Readings should be now 5% on dial.

If consecutive tests show reading to be incorrect, dial reading can be corrected by means of calibration set in face of dial.

When correctly set at 5%, the same procedure can be followed to check results at 10%, 15%, etc.

Remove the water and the short piece of threaded tube from inside the meter cover and the curved tube from the petcock.

3.2. Sample Preparation

A representative sample of concrete will be obtained as per STP 106 - "sampling fresh concrete."

3.3. Test Procedure

Place a representative sample of the concrete in the measuring bowl in three equal layers.

Each layer in the bowl will be rodded 25 times evenly distributed over the cross-section.

In rodding the first layer, the rod will not forcibly strike the bottom of the bowl.
In succeeding layers, the rodding will penetrate only slightly into the next lower layer.

Smartly tap the side of the bowl ten to fifteen times with the mallet after rodding until the cavities left by rodding are levelled out and no large bubbles of air appear on the surface.

Remove the excess concrete by sliding the strike-off bar across the top flange with a sawing motion until the bowl is just level full.

Clean the edges of the bowl and cover.

Clamp the cover tightly in place to form a pressure tight seal with petcocks open.

Inject water with syringe through one petcock until all air is expelled through the opposite petcock.

Lightly tap sides while rolling meter on base and then add more water to expel air.

Pump up air to "initial pressure line" with built-in pump.

Wait a few seconds and stabilize hand on dial at "initial pressure" by pumping up or bleeding with the needle valve, whichever is necessary.

Close both petcocks and press down on "thumb lever" to release the air into the base. Hold down thumb lever for a few seconds, lightly tapping the gauge with the finger, to stabilize the hand on dial.

Read percent of air in concrete on dial.

Open petcocks, remove cover and clean all parts thoroughly.

4. RESULTS AND CALCULATIONS

4.1. Reporting Results

The air content will be reported as percentage by volume of concrete.
5. **ADDED INFORMATION**

5.1. **References**

- ASTM Method C231
- CAN3-A23.2-M77

5.2. **General**

Adequate air (4% - 6%) is essential for durability and especially for resistance to attack from deicing salts.

Run one test for every two truck loads; and again more at the start of the job and less once the control has been established.

Show project, date, time, concrete supplier, air temperature, samples number and other pertinent data for each test.
APPROVAL SHEET

New __ Revision _X_ Date of Previous Document 85-04-01
Effective Date: ___ ___

Description of Revision (Reason for Revision):
Format of test procedure updated.

Review/Implementation Process:
Reviewed by the Materials Section of the Technical Standards and Policies Branch.

Other Manuals/Policies Affected:
Nil

Follow Up/Training Required:
Nil

Comments/Concerns/Implications (Budget/Environment/Stakeholders):

Prepared and Recommended by  D. MacLeod ____________ 93-12-02
Materials Standards Engineer

Approval Recommended by  R.A. Widger ____________  -  -
Senior Materials Engineer

Approval Recommended by A.R. Gerbrandt ____________  -  -
Dir., Technical Standards & Policies Br.

Approved by  D.G. Metz ____________  -  -
Assistant Deputy Minister, Infrastructure

Electronic File Updated  -  -
Update Mailed  -  -