

METHOD OF TEST FOR MICROSCOPICAL DETERMINATION OF AIR VOID SYSTEM PARAMETERS IN HARDENED CONCRETE

1. SCOPE

This method covers apparatus and procedures to determine the air-void system parameters in hardened concrete.

2. RELEVANT DOCUMENTS

- 2.1 LS-100 Method for Rounding-Off of Test Data and Other Numbers
- 2.2 ASTM C457-08 Standard Test Method for Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete

3. PROCEDURE

3.1 Receiving

After arrival at the laboratory and prior to specimen preparation, the specimens shall be measured and their dimensions recorded. When a specimen length is less than 200 mm, the laboratory staff shall notify the requestor of the test and obtain confirmation that the specimen dimensions meet applicable requirements before proceeding with specimen preparation and testing. Specimens that do not meet the requirements shall not be tested.

3.2 Cutting

Cores that are longer than 200 mm with uneven bottom edges may be trimmed to 200 mm. Top ends of cores shall not be trimmed.

Prior to testing, specimens shall be cut into two halves. Specimens that are 100 mm in diameter shall be cut lengthwise into two halves. Cores that are 150 mm in diameter shall be cut parallel to the concrete surface at approximately 20 mm from the surface. If the 100 mm diameter cores contain steel reinforcement or other embedded material, they shall be cut lengthwise into two parts with no steel reinforcement in the surfaces to be tested.

Once the specimen is split, the field identification markings shall be transferred to both halves of the specimen, and the same laboratory identification number marked on both halves of the specimen, with the half to be submitted to the ministry clearly labelled "Audit".

3.3 Shipping of Audit Specimens

The audit half AVS specimens shall be delivered to the following address:

Ontario Ministry of Transportation
Room 15, Building C
1201 Wilson Avenue
Downsview, ON M3M 1J8
Attention: Head, Concrete Section

3.4 Testing

Procedures of ASTM C457 shall be followed, except as noted in this test method.

The magnification employed shall be 100 to 125 times. The entire cut surface of the specimen shall be tested.

3.5 Calculation

Use the following equation to calculate the spacing factor:

If p/A is less than or equal to 4.342

$$\bar{L} = \frac{S_p \cdot I}{4N}$$

If p/A is greater than 4.342

$$\bar{L} = \frac{3I \cdot S_a}{4N} \left[1.4 \left(1 + \frac{S_p}{S_a} \right)^{1/3} - 1 \right]$$

Note 1: These equations are based on the equations in ASTM C457. These equations use the data recorded on the counters directly to avoid rounding the numbers in subsequent steps.

4. REPORTING

The air content shall be reported to the nearest 0.1%, and the spacing factor shall be reported the nearest 0.001 mm. Rounding off of test data shall be done according to LS-100.

The report shall include:

- 4.1 Total area tested;
- 4.2 Total traverse length;
- 4.3 Total number of stops;
- 4.4 Air content;
- 4.5 Void frequency;
- 4.6 Paste content;
- 4.7 Paste-air ratio;
- 4.8 Average chord length;
- 4.9 Specific surface;
- 4.10 Spacing factor;
- 4.11 Dimensions of tested specimen
- 4.12 Name of operator;
- 4.13 Name and signature of laboratory staff who reviewed the test report;

- 4.14 Date of testing; and
- 4.15 Contract number.