METHOD OF TEST FOR THE DETERMINATION OF
THE VOID CONTENT OF PERVIOUS CONCRETE PAVEMENT CORES

1. SCOPE
This method covers the determination of the bulk specific gravity, maximum specific gravity, and void content of hardened pervious concrete pavement using an automatic vacuum sealing method.

2. RELEVANT DOCUMENTS

3. DEFINITIONS
Pervious Concrete Pavement: a rigid concrete pavement with large interconnected voids that allow rapid water flow through the pavement.

4. APPARATUS
4.1 Vacuum Chamber meeting the requirements of ASTM D6752, e.g. Corelok®, manufactured by InstroTek® Inc.;
4.2 Vacuum Measurement Gauge meeting the requirements of ASTM D6752;
4.3 Plastic Bags meeting the requirements of ASTM D6752;
4.4 Balance, of sufficient capacity and capable of measuring to the nearest 0.1 g. It shall also be suitably equipped so as to measure the weight of a specimen suspended in water;
4.5 Water Bath meeting the requirements of ASTM D6752;
4.6 Oven, capable of heating to 105 ± 5°C;
4.7 Thermometer; and
4.8 Cutting knife or scissors.

5. TEST SPECIMENS
5.1 The specimens shall be drilled concrete cores with a minimum diameter of 100 mm and a maximum diameter of 150 mm. The cores should include the entire thickness of the pervious concrete pavement.
5.2 The core ends shall be trimmed square by saw cutting perpendicular to the core axis. Trim 10 mm ± 1 mm from the top of the core. From the bottom of the core, trim the minimum amount of concrete necessary to create a continuous, planar surface free of irregularities. Wash the trimmed core and flush out all residue from the cutting operation.
5.3 If the trimmed specimen is too large to fit into the vacuum chamber, the core may be cut parallel to the trimmed surfaces into sections of approximately equal length. Label the top half of the specimen as A and the bottom half of the specimen as B.
6. **PROCEDURE**

6.1 Follow the procedure given for cores in ASTM D6752 for determining the bulk specific gravity (G_{mb}), with the following exceptions:

6.2 Dry the specimen in an oven at 105 ± 5°C for 24 hours ± 1 hour. Prior to weighing, allow the specimen to cool at room temperature until the surface temperature of the specimen reaches 25°C. 

*Note:* As per ASTM D6752, the mass of the oven dry sealed specimen is calculated by adding the mass of the oven dry specimen and the mass of the bag. This is the value that is used to calculate void content. As a check of the calculated value, weigh the oven dry sealed specimen. The difference between the calculated and measured value should be less than 0.1%.

6.3 Following the recording of mass of the submerged, sealed sample in the water bath and, while the specimen is still submerged, cut the bag open across the top leaving approximately 25 mm intact. Allow water to enter the bag.

6.4 Leave the sample under water and record the mass at 12 minutes. Keep the sample submerged for an additional 3 minutes and record the mass again. Repeat until the change in mass is less than 0.05%. Make sure that the bag does not break the surface of the water or touch the sides of the water tank. Ensure that no air is trapped by the bag.

6.5 Record the mass of the submerged, opened sample. Designate this mass as C.

7. **CALCULATIONS**

7.1 Calculate the bulk specific gravity and the maximum specific gravity of the specimen as follows:

Bulk Specific Gravity,

\[
G_{mb} = \frac{A}{B - E - \frac{D}{F}}
\]

Maximum Specific Gravity,

\[
G_{mm} = \frac{A}{B - C - \frac{D}{F}}
\]

Where:

- \(A\) = initial mass of dry core in air, g (as per ASTM D6752)
- \(B\) = mass of dry, sealed core in air, g (as per ASTM D6752)
- \(C\) = mass of saturated specimen in water, opened seal, g
- \(D\) = mass of plastic bag, in air, g
- \(E\) = mass of sealed core, submerged in water, g (as per ASTM D6752)
- \(F\) = bag volume correction provided by manufacturer (apparent specific gravity of bag material @ 25°C)
7.2 Calculate the void content (percent) of the pervious concrete specimen as follows:

\[
V = \left(1 - \frac{G_{mb}}{G_{mm}}\right) \times 100
\]

8. REPORT

Report the following information:

8.1 Bulk Specific Gravity, \(G_{mb}\), to the nearest 0.001
8.2 Maximum Specific Gravity, \(G_{mm}\), to the nearest 0.001
8.3 Void Content, \(V\), to the nearest 0.01%

*Note*: Where the core was cut in order for it to fit within the vacuum chamber, report the values for each half (A and B), as well as the average value of the results for the entire core sample.

9. PRECISION AND BIAS

Precision and bias criteria for the bulk specific gravity test results are given in ASTM D6752.