WSDOT Test Method T 610

Method of Test for the Capillary Rise of Soil

1. SCOPE

   a. This test method describes the capillary rise test which determines the susceptibility of soil to damage by frost. The soil sample, closing the top of a glass tube, is subjected to the pull of an increasing head of water which compresses the soil and reduces its moisture content until air is forced through the soil by a maximum head which is termed the capillary rise.

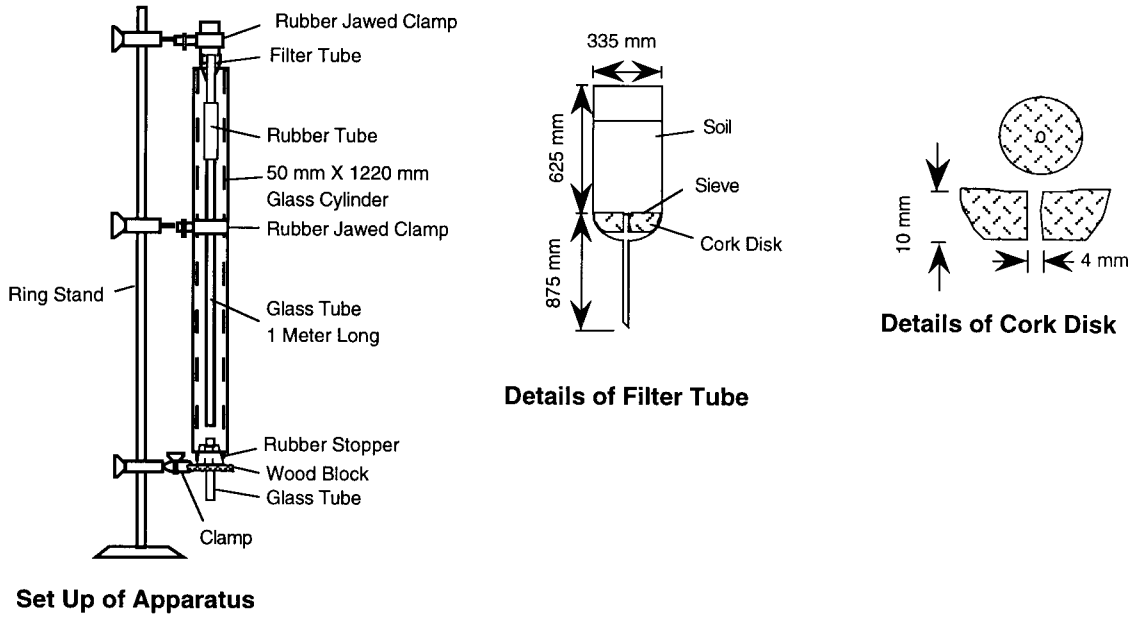
2. EQUIPMENT

   a. Capillary Apparatus — The capillary apparatus shall conform to the details shown in Figure 1 and shall consist of the following components:

      (1) Glass Filter Tube — A glass filter tube, as detailed in Figure 1, fitted with a cork disk shaped to fit the shoulder of the tube and having a 1.57 in. (40 mm) diameter hole in the center. A disk of No. 200 (0.075 mm) sieve is placed above the cork disk to retain the soil particles

      (2) Glass Tube — A glass extension tube, 3.3 ft. (1000 mm) in length, and the same diameter as the lower part of the filter tube, connected to the filter tube by means of a short piece of rubber tubing.

      (3) Glass Cylinder — A glass cylinder, 2 in. (50 mm) in diameter and 4 ft. (1220 mm) long, fitted with a single hole rubber stopper with a short piece of glass tubing, and a rubber hose about 3 ft. (1 m) long with a clamp or other device for controlling the inlet-outlet flow of water.



Capillary Apparatus
Figure 1

3. PROCEDURE

   a. Assemble the equipment as shown in Figure 1.

   b. Select from the material passing the No. 10 (2 mm) sieve a 200-g sample. Select from this 200-g sample a portion large enough to fill the filler tube, without tamping, to a height of 1.57 in. (40 mm).

   c. Admit water into the jacket through the bottom tube until it is filled to a level slightly above the top of the soil in the filter tube and allow to stand for five minutes.

   d. After five minutes, lower the water until it is level with the bottom of the cork disk. Allow the excess water to drain from the soil

   e. After the excess water has drained from the soil, allow the water level in the jacket to drop slowly 2 in. (50 mm) every five minutes until the water in the filter tube breaks.

4. CALCULATIONS

   a. The distance, in inches, between the top of the water in the jacket and the top of the soil when the water column in the tube breaks is reported as the capillary rise.

5. REPORTS

   a. All test results will be reported to the Soils Engineer.