

**INFORMATION HANDOUT**  
**MATERIALS INFORMATION**

STANDARD TEST METHOD FOR PENETRATION OF CRACK FILLING RESIN BY  
CAPILLARY ACTION

**ROUTE: 03-SAC-99-1.4/22.8**



## **A. SCOPE**

This test method evaluates the vertical rise due to capillary action of a resin in a siliceous media. The test method is applicable to polymer systems intended to fill and seal cracks in concrete surfaces that cure without external energy input.

## **B. APPARATUS**

1. Weighing Devices shall conform to the requirements of ASTM Designations C 1005.
2. Support Stand and Double Buret Clamp, shall have a solid base to reduce vibration. It shall also be adjustable to accommodate various lengths of glass tubes.
3. Reservoirs (2). A reservoir unit with a  $25 \text{ ml} \pm 5 \text{ ml}$  capacity will be used. The reservoir must be a material that the resin will not stick to. A plastic disposable 30 ml beaker will suffice.
4. Syringe, of 3 ml capacity and marked off in 0.1 ml increments.
5. Caliper or other measuring tool that can read to 0.1 mm or smaller.

## **C. MATERIALS**

1. Graded Ottawa Sand, the sand used for making test specimens shall be natural silica sand conforming to the requirements for graded standard sand in ASTM Designation C 778.
2. Glass Tubing (2). 6 mm O.D. must be at least 290 mm in length. The ends will be clean and smoothed using a torch.

## **D. PREPARATION**

All components used in test shall be clean and free of sand. Blow dry compressed air through the tubes to remove any residual moisture.

## **E. PROCEDURE**

1. Fill Glass Tubes:
  - (a) Introduce 5.0 grams of sand into the glass tube. Place a reservoir on the end of the glass tube and invert tube smoothly to allow the sand to fall loosely through the tube. Insert tube into the buret clamp without letting any of the sand escape. When placing each glass tube in buret clamp make sure that the position of each tube is centered in its respective reservoir.
2. Compact Sand in Capillary Tube:
  - (a) Tap the top of each glass tube to compact the sand. Continue with each capillary tube until the height of the sand column remains constant. Avoid misaligning the glass tubes with the center of each reservoir.
3. Apply Resin:
  - (a) Mix 10 to 50 grams of test resin in the proportions recommended by the manufacturer. Draw 2.0 ml of resin into the syringe and wipe off excess. Inject resin directly into the bottom of the reservoir. Repeat procedure for the other glass tube. Complete the mixing and

discharging of the resin into the two reservoirs within 5 minutes of combining all components of the resin.

4. Collect Post-Test Data:

- (a) After 24 hours  $\pm$  1 hour, carefully remove the reservoir from the cured resin disk. Empty the loose sand from each glass tube. Record the height that the resin rose in the glass tube to the nearest 0.1 mm. Record the height of the resin remaining in the reservoir to the nearest 0.1 mm.

## F. CALCULATIONS

Calculate the average rise of the resin as:

$$H_{Avg.} = (H_1 + H_2 - T_1 - T_2) / 2$$

Where:

$H_1, H_2$  = Resin rise in each tube.

$T_1, T_2$  = Resin height in reservoir.

$H_{Avg.}$  = Average rise.

## G. REPORT

1. Name and location of laboratory performing the test.
2. Name of the person responsible for testing and reporting.
3. Sample identification and test identification for each sample.
4. The date of testing.
5. The height the resin rose in each tube.
6. The average rise.

## H. SAFETY AND HEALTH

Prior to sampling, handling materials or testing, Caltrans personnel are required to read Part A (Section 5.0), Part B (5.0,6.0 and 10.0) and Part C (Section 1.0) of Caltrans Laboratory Safety Manual and the Materials Safety Data Sheets (MSDS) for all materials used. Users of this test method do so at their own risk.

## REFERENCES

### ASTM Standards:

1. C 778 Specification for Standard Sand.
2. C1005 Specification for Weights and Weighing Devices for Use in the Physical Testing of Hydraulic Cements.

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(California Test 5XX contains 2 pages)