

**DEPARTMENT OF TRANSPORTATION**  
DIVISION OF ENGINEERING SERVICES  
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## METHOD OF TEST FOR SLUMP OF FRESH PORTLAND CEMENT CONCRETE

**CAUTION:** Prior to handling test materials, performing equipment setups, and/or conducting this method, testers are required to read "**SAFETY AND HEALTH**" in Part F of this method. It is the responsibility of the user of this method to consult and use departmental safety and health practices and determine the applicability of regulatory limitations before any testing is performed.

### A. SCOPE

This test method is intended to provide the user with a procedure to determine the slump of plastic portland cement concrete.

This method is considered applicable to plastic concrete having coarse aggregate up to 37.5 mm in size. If the coarse aggregate is larger than 37.5 mm, the test method is applicable when it is made on the fraction of concrete passing a 37.5 mm sieve, with larger aggregate being removed by wet sieving procedures.

This test method is not considered applicable to non-plastic and non-cohesive concrete.

Concrete having a slump less than 15 mm may not be adequately plastic, and concrete having a slump greater than 230 mm may not be adequately cohesive for this test to have significance. Caution should be exercised in interpreting such results.

### B. APPARATUS

1. Mold - The test specimen shall be formed in a mold made of metal not readily attacked by the cement paste. The metal shall not be thinner than 1.5 mm and, if formed by the spinning process, there shall be no point on the mold at which the thickness is less than 1.15 mm. The mold shall be in the form of the

lateral surface of the frustum of a cone with the base 200 mm in diameter, the top 100 mm in diameter, and the height 300 mm. Individual diameters and heights shall be within 3.0 mm of the prescribed dimensions. The base and the top shall be open and parallel to each other and at right angles to the axis of the cone. The mold shall be provided with foot pieces. The mold shall be constructed without a seam. The interior of the mold shall be relatively smooth and free from projections or dents. A mold that clamps to a nonabsorbent base plate is acceptable provided the clamping arrangement is such that it can be fully released without movement of the mold.

2. Tamping Rod - The tamping rod shall be a round, straight steel rod 16 mm in diameter and approximately 600 mm in length, having the tamping end rounded to a hemispherical tip the diameter of which is 16 mm.

### C. SAMPLE

The sample of concrete from which test specimens are made shall be representative of the entire batch. It shall be obtained in accordance with California Test 539, Method of Sampling Fresh Concrete.

#### D. PROCEDURE

1. Dampen the mold and place it on a flat, moist, nonabsorbent (rigid) surface. The operator standing on the two foot pieces shall hold it firmly in place during filling. Using the sample of concrete obtained, immediately fill the mold in three layers, each approximately one-third the volume of the mold.
2. Rod each layer with 25 strokes of the tamping rod. Uniformly distribute the strokes over the cross section of each layer. For the bottom layer, this will necessitate inclining the rod slightly and making approximately half of the strokes near the perimeter and then progressing with vertical strokes spirally toward the center. Rod the bottom layer throughout its depth. Rod the second layer and the top layer each throughout its depth so that the strokes just penetrate into the underlying layer.
3. In filling and rodding the top layer, heap the concrete above the mold before rodding is started. If the rodding operation results in subsidence of the concrete below the top edge of the mold, add additional concrete to keep an excess of concrete above the top of the mold at all times. After the top layer has been rodded, strike off the surface of the concrete by means of a screening and rolling motion of the tamping rod. Remove concrete from the area surrounding the base of the slump cone to preclude interference with the movement of slumping concrete.
4. Remove the mold immediately from the concrete by raising it carefully in a vertical direction. Raise the mold a distance of 300 mm in  $5 \pm 2$  s by a steady upward lift with no lateral or torsion motion. Complete the entire test from the start of the filling through removal of the mold without interruption and complete it within an elapsed time of 2-½ min.
5. Immediately measure the slump by determining the vertical difference between the top of the mold and the displaced original center of the top surface of the specimen. If a decided falling away or shearing off of concrete from one side or portion of the mass occurs (see Note), disregard the test and make a new test on another portion of the sample.

**Note:** If two consecutive tests on a sample of concrete show a falling away or shearing off of a portion of the concrete from the mass of the specimen, the concrete probably lacks necessary plasticity and cohesiveness for the slump test to be applicable.

#### E. REPORT

Record the slump in terms of millimeters to the nearest 5 mm of subsidence of the specimen during the test.

#### F. SAFETY AND HEALTH

Prior to handling, testing or disposing of any waste materials, testers are required to read: Part A (Section 5.0), Part B (Sections: 5.0, 6.0 and 10.0), and Part C (Section 1.0) of Caltrans Laboratory Safety Manual. Users of this method do so at their own risk.

#### REFERENCES

ASTM Designation C 143  
AASHTO Designation T-119  
California Test 539

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(California Test 556 contains 2 pages)