

DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
 Transportation Laboratory
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METHOD OF TEST FOR TEMPERATURE OF FRESHLY MIXED 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 G 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 method of test, which is a modification of ASTM C 1064, is used for determining the temperature of freshly mixed portland cement concrete.

B. APPARATUS

1. Container: The container shall be made of nonabsorptive material large enough to provide at least 75 mm of concrete in all directions around the sensor of the temperature-measuring device. Concrete cover must also be at least three times the nominal maximum size of the coarse aggregate.
2. Temperature measuring device: The temperature measuring device shall be capable of accurately measuring the temperature of the freshly mixed concrete to $\pm 0.5^{\circ}\text{C}$ throughout a range of 0°C to 50°C . The temperature-measuring device shall be of sufficient length that it can be immersed at least 75 mm during the test.
3. Reference Temperature Measuring Device: The reference temperature-measuring device shall be readable and accurate to $\pm 0.2^{\circ}\text{C}$ at the verification points specified below. A certificate or report that verifies the accuracy shall be available for review. The certificate or report shall provide

documentation that the reference standard used in the verification is traceable to the National Institute of Standards and Technology (NIST).

C. CALIBRATION OF TEMPERATURE MEASURING DEVICE

1. Each temperature-measuring device used for determining temperature of freshly mixed concrete shall be calibrated annually, or whenever there is a question of accuracy. This calibration shall be performed by comparing the readings of the temperature-measuring device at two temperatures at least 15°C apart.
2. Calibration of the temperature measuring devices may be made in oil or other suitable baths having uniform density if provision is made to:
 - a. Maintain the bath temperature constant within 0.2°C during the testing period.
 - b. Have both the temperature and reference temperature-measuring devices maintained in the bath for a minimum of 5 min before reading temperatures.
 - c. Continuously circulate the bath liquid to provide a uniform temperature.

- d. Slightly tap thermometers containing liquid to avoid adhesion of the liquid to the glass if the temperature exposure is being reduced.

D. SAMPLING CONCRETE

1. The temperature of freshly mixed concrete may be measured in the transporting equipment provided the sensor of the temperature measuring device has at least 75 mm of cover in all directions around it.
2. Temperature of the freshly mixed concrete may be obtained following concrete placement using the forms as the container.
3. If the transporting equipment or placement forms are not used as the container, a sample shall be prepared as follows:
 - a. Immediately prior to sampling the freshly mixed concrete, dampen (with water) the sample container.
 - b. Sample the freshly mixed concrete in accordance with California Test 539, except that composite samples are not required if the only purpose for obtaining the sample is to determine temperature.
 - c. Place the freshly mixed concrete into the container.

E. PROCEDURE

1. Place the temperature-measuring device in the freshly mixed concrete so that the temperature-sensing portion is submerged a minimum of 75 mm.
2. Gently press the concrete around the temperature-measuring device at the surface of the concrete so that the ambient air temperature does not affect the reading
3. Leave the temperature-measuring device in the freshly mixed concrete for a minimum of 2 min or until the

temperature reading stabilizes, then read and record the temperature.

4. Complete the temperature measurement of the freshly mixed concrete within 5 min after obtaining the sample.

F. REPORT

Record the measured temperature of the freshly mixed concrete to the nearest 0.5°C in the daily report or, in the case of concrete cylinders, on form TL 502 under "Remarks".

G. 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 1064
California Test 539**

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(California Test 557 contains 2 pages)