

## TEMPERATURE OF FRESHLY MIXED PORTLAND CEMENT CONCRETE FOP FOR AASHTO T 309

### Scope

This procedure covers the determination of the temperature of freshly mixed Portland Cement Concrete in accordance with AASHTO T 309-22.

**Warning**—Fresh Hydraulic cementitious mixtures are caustic and may cause chemical burns to skin and tissue upon prolonged exposure.

### Apparatus

- **Container:** Made of non-absorptive material and large enough to cover the sensor with concrete at least 75 mm (3 in.) in all directions; concrete cover must also be a least three times the nominal maximum size of the coarse aggregate.
- **Thermometer:** Capable of measuring the temperature of the concrete throughout the temperature range likely to be encountered, at least  $-18$  to  $50^{\circ}\text{C}$  ( $0$  to  $120^{\circ}\text{F}$ ), and readable to  $\pm 0.5^{\circ}\text{C}$  ( $\pm 1^{\circ}\text{F}$ ) or smaller.

*Note 1:* Thermometer types suitable for use include ASTM E1 mercury thermometer or ASTM E2251 Low Hazard Precision Liquid-in-glass thermometer; ASTM E2877 digital metal stem thermometer; or thermocouple thermometer ASTM E230, Type T Special or IEC 60584 Type T, Class 1.

### Standardization of Thermometer

Each thermometer shall be verified for accuracy annually and whenever there is a question of accuracy. Standardization shall be performed by comparing readings on the thermometer with another calibrated thermometer at two temperatures at least  $15^{\circ}\text{C}$  or  $27^{\circ}\text{F}$  apart.

### Sample Locations and Times

The temperature of freshly mixed concrete may be measured in the transporting equipment, in forms, or in sample containers, provided the sensor of the thermometer has at least 75 mm (3 in.) of concrete cover in all direction around it.

Complete the temperature measurement of the freshly mixed concrete within 5 minutes of obtaining the sample.

**Procedure**

1. Dampen the sample container.
2. Obtain the sample in accordance with the FOP for WAQTC TM 2.
3. Place sensor of the thermometer in the freshly mixed concrete so that it has at least 75 mm (3 in.) of concrete cover in all directions around it.
4. Gently press the concrete in around the sensor of the thermometer at the surface of the concrete so that air cannot reach the sensor.
5. Leave the sensor of the thermometer in the freshly mixed concrete for a minimum of two minutes, or until the temperature reading stabilizes.
6. Complete the temperature measurement of the freshly mixed concrete within 5 minutes of obtaining the sample.
7. Read and record the temperature to the nearest 0.5°C (1°F).

**Report**

- Results on forms approved by the agency
- Sample ID
- Measured temperature of the freshly mixed concrete to the nearest 0.5°C (1°F)

**PERFORMANCE EXAM CHECKLIST**

**TEMPERATURE OF FRESHLY MIXED CONCRETE  
FOP FOR AASHTO T 309**

**Participant Name** \_\_\_\_\_ **Exam Date** \_\_\_\_\_

Record the symbols "P" for passing or "F" for failing on each step of the checklist.

<b>Procedure Element</b>	<b>Trial 1</b>	<b>Trial 2</b>
1. Obtain sample of concrete large enough to provide a minimum of 75 mm (3 in.) of concrete cover around sensor in all directions?	_____	_____
2. Place thermometer in sample with a minimum of 75 mm (3 in.) cover around sensor?	_____	_____
3. Gently press concrete around thermometer?	_____	_____
4. Read temperature after a minimum of 2 minutes or when temperature reading stabilizes?	_____	_____
5. Complete temperature measurement within 5 minutes of obtaining sample?	_____	_____
6. Record temperature to nearest 0.5°C (1°F)?	_____	_____

**Comments:** First attempt: Pass\_\_\_\_\_Fail\_\_\_\_\_ Second attempt: Pass\_\_\_\_\_Fail\_\_\_\_\_

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Examiner Signature \_\_\_\_\_ WAQTC #: \_\_\_\_\_

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CONCRETE

WAQTC

FOP AASHTO T 309 (09)