

SAMPLING FRESHLY MIXED CONCRETE WAQTC TM 2

Scope

This practice covers procedures for obtaining representative samples of fresh concrete delivered to the project site. The practice includes sampling from stationary, paving and truck mixers, and from agitating and non-agitating equipment used to transport central mixed concrete.

This practice also covers the removal of large aggregate particles by wet sieving.

Sampling concrete may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices.

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

Apparatus

- Receptacle: wheelbarrow, bucket or other suitable container that does not alter the properties of the material being sampled
- Sample cover (plastic, canvas, or burlap)
- Shovel
- Cleaning equipment, including scrub brush, rubber gloves, water
- Apparatus for wet sieving, including: a sieve(s), meeting the requirements of FOP for AASHTO T 27/T 11, minimum of 2 ft² (0.19 m²) of sieving area, conveniently arranged and supported so that the sieve can be shaken rapidly by hand.

Procedure

1. Use every precaution in order to obtain samples representative of the true nature and condition of the concrete being placed being careful not to obtain samples from the very first or very last portions of the batch. The size of the sample will be 1.5 times the volume of concrete required for the specified testing, but not less than 0.03 m³ (1 ft³).
2. Dampen the surface of the receptacle just before sampling, empty any excess water.

Note 1: Sampling should normally be performed as the concrete is delivered from the mixer to the conveying vehicle used to transport the concrete to the forms; however, specifications may require other points of sampling, such as at the discharge of a concrete pump.

3. Use one of the following methods to obtain the sample:
 - **Sampling from stationary mixers**

Obtain the sample after a minimum of $1/2 \text{ m}^3$ ($1/2 \text{ yd}^3$) of concrete has been discharged. Perform sampling by passing a receptacle completely through the discharge stream, or by completely diverting the discharge into a receptacle. Take care not to restrict the flow of concrete from the mixer, container, or transportation unit so as to cause segregation. These requirements apply to both tilting and non-tilting mixers.
 - **Sampling from paving mixers**

Obtain the sample after the contents of the paving mixer have been discharged. Obtain increments from at least five different locations in the pile and combine into one test sample. Avoid contamination with subgrade material or prolonged contact with absorptive subgrade. To preclude contamination or absorption by the subgrade, the concrete may be sampled by placing a shallow container on the subgrade and discharging the concrete across the container.
 - **Sampling from revolving drum truck mixers or agitators**

Obtain the sample after a minimum of $1/2 \text{ m}^3$ ($1/2 \text{ yd}^3$) of concrete has been discharged. Obtain sample after all of the water has been added to the mixer. Do not obtain sample from the very first or last portions of the batch discharge. Perform sampling by repeatedly passing a receptacle through the entire discharge stream or by completely diverting the discharge into a receptacle. Regulate the rate of discharge of the batch by the rate of revolution of the drum and not by the size of the gate opening.
 - **Sampling from open-top truck mixers, agitators, non-agitating equipment, or other types of open-top containers**

Obtain the sample by whichever of the procedures described above is most applicable under the given conditions.
 - **Sampling from pump or conveyor placement systems**

Obtain sample after a minimum of $1/2 \text{ m}^3$ ($1/2 \text{ yd}^3$) of concrete has been discharged. Obtain sample after all of the pump slurry has been eliminated. Perform sampling by repeatedly passing a receptacle through the entire discharge system or by completely diverting the discharge into a receptacle. Do not lower the pump arm from the placement position to ground level for ease of sampling, as it may modify the air content of the concrete being sampled. Do not obtain samples from the very first or last portions of the batch discharge.
4. Transport sample to the testing location.
5. Remix with a shovel the minimum amount necessary to ensure uniformity. Protect the sample from direct sunlight, wind, rain, and sources of contamination.

6. Complete test for temperature and start tests for slump and air content within 5 minutes of obtaining the sample. Start molding specimens for strength tests within 15 minutes of obtaining the sample. Complete the test methods as expeditiously as possible.

Wet Sieving

When required due to oversize aggregate, the concrete sample shall be wet sieved, after transporting but prior to remixing, for slump testing, air content testing or molding test specimens, by the following:

1. Place the sieve designated by the test procedure over the dampened receptacle.
2. Pass the concrete over the designated sieve. Do not overload the sieve (one particle thick).
3. Shake or vibrate the sieve until no more material passes the sieve. A horizontal back and forth motion is preferred.
4. Discard oversize material including all adherent mortar.
5. Repeat until sample of sufficient size is obtained. Mortar adhering to the wet-sieving equipment shall be included with the sample.
6. Using a shovel, remix the sample the minimum amount necessary to ensure uniformity.

Note 2: Wet sieving is not allowed for samples being used for density determinations according to the FOP for AASHTO T 121.

Report

- On forms approved by the agency
- Sample ID
- Date
- Time
- Location
- Quantity represented

CONCRETE

WAQTC

WAQTC TM 2 (21)

PERFORMANCE EXAM CHECKLIST

**SAMPLING FRESHLY MIXED CONCRETE
WAQTC TM 2**

Participant Name _____ **Exam Date** _____

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

Procedure Element	Trial 1	Trial 2
1. Receptacle dampened and excess water removed?	_____	_____
2. Obtain a representative sample from drum mixer:		
a. Concrete sampled after 1/2 m ³ (1/2 yd ³) discharged?	_____	_____
b. Receptacle passed through entire discharge stream or discharge stream completely diverted into sampling container?	_____	_____
3. Obtain a representative sample from a paving mixer:		
a. Concrete sampled after all the concrete has been discharged?	_____	_____
b. Material obtained from at least 5 different locations in the pile?	_____	_____
c. Avoid contaminating the sample with sub-grade materials.	_____	_____
4. Obtain a representative sample from a pump:		
a. Concrete sampled after 1/2 m ³ (1/2 yd ³) has been discharged?	_____	_____
b. All the pump slurry is out of the lines?	_____	_____
c. Receptacle passed through entire discharge stream or discharge stream completely diverted into sampling container?	_____	_____
d. Do not lower the pump arm from the placement position.	_____	_____
5. Sample transported to place of testing?	_____	_____
6. Sample combined, or remixed, or both?	_____	_____
7. Protect sample against rapid evaporation and contamination?	_____	_____
8. Minimum size of sample used for strength tests 0.03 m ³ (1ft ³)?	_____	_____
9. Completed temperature test within 5 minutes of obtaining sample?	_____	_____
10. Start tests for slump and air within 5 minutes of obtaining sample?	_____	_____
11. Start molding cylinders within 15 minutes of obtaining sample?	_____	_____

OVER

CONCRETE

WAQTC

WAQTC TM 2 (23)

Procedure Element

Trial 1 Trial 2

12. Wet Sieving:

- a. Required sieve size determined for test method to be performed? _____
- b. Concrete placed on sieve and doesn't overload the sieve? _____
- c. Sieve shaken until no more material passes the sieve? _____
- d. Sieving continued until required testing size obtained? _____
- e. Oversized aggregate discarded? _____
- f. Sample remixed? _____

Comments: First attempt: Pass _____ Fail _____ Second attempt: Pass _____ Fail _____

Examiner Signature _____ WAQTC #: _____

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PERFORMANCE EXAM CHECKLIST (ORAL)

**SAMPLING FRESHLY MIXED CONCRETE
WAQTC TM 2**

Participant Name _____ **Exam Date** _____

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

Procedure Element	Trial 1	Trial 2
1. What is the minimum sample size? a. 0.03 m ³ or 1 ft ³	_____	_____
2. Describe the surface of the receptacle before the sample is introduced into it? a. It must be dampened.	_____	_____
3. Describe how to obtain a representative sample from a drum mixer. a. Sample the concrete after 1/2 m ³ (1/2 yd ³) has been discharged. b. Pass receptacle through entire discharge stream or completely divert discharge stream into sampling container.	_____	_____
4. Describe how to obtain a representative sample from a paving mixer. a. Sample the concrete after all the concrete has been discharged. b. Obtain the increments from at least 5 different locations in the pile. c. Avoid contaminating the sample with sub-grade materials.	_____	_____
5. Describe how to obtain a representative sample from a pump: a. Sample the concrete after 1/2 m ³ (1/2 yd ³) has been discharged. b. Make sure all the pump slurry is out of the lines. c. Pass receptacle through entire discharge stream or completely divert discharge stream into sampling container. d. Do not lower the pump arm from the placement position.	_____	_____
6. After obtaining the sample what must you do? a. Transport to place of testing.	_____	_____
7. What must be done with the sample once you have transported them to the place of testing? a. Combine and remix the sample. b. Protect sample against rapid evaporation and contamination.	_____	_____

OVER

CONCRETE

WAQTC

WAQTC TM 2 (18)

Procedure Element

Trial 1 Trial 2

- 8. What are the two time parameters associated with sampling?
 - a. Complete temperature test and start tests for slump and air within 5 minutes of sample being obtained? _____
 - b. Start molding cylinders within 15 minutes of sample being obtained? _____
- 9. What test methods may require wet sieving?
 - a. Slump, air content, and strength specimens? _____
- 10. The sieve size used for wet sieving is based on?
 - a. The test method to be performed. _____
- 11. How long must you continue wet sieving?
 - a. Until a sample of sufficient size for the test being performed is obtained. _____
- 12. What is done with the oversized aggregate?
 - a. Discard it. _____
- 13. What must be done to the sieved sample before testing?
 - a. Remix. _____

Comments: First attempt: Pass _____ Fail _____ Second attempt: Pass _____ Fail _____

Examiner Signature _____ WAQTC #: _____

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