TM 2

SAMPLING FRESHLY MIXED CONCRETE

FOP FOR WAQTC TM 2

TM 2

SAMPLING FRESHLY MIXED CONCRETE

FOP FOR WAQTC TM 2

SAMPLING FRESHLY MIXED CONCRETE

FOP FOR WAQTC TM 2

01

Significance

Testing fresh concrete in the field begins with obtaining and preparing the sample to be tested. Standardized procedures for obtaining a representative sample from various types of mixing and/or agitating equipment have been established. Specific time limits regarding when tests for temperature, slump, and air content must be started and for when the molding of test specimens must begin are also established.

02

Sampling from truck mixer

03

Technicians must be patient and refrain from obtaining the sample too quickly. Doing so would be a violation of the specifications under which the concrete is being supplied and it may result in a non-representative sample of concrete. If one considers that the specifications may require strength tests to be made only once every 100 to 150 yd^3, the need for a truly representative sample is apparent. The minimum 1 ft^3 sample from which the compressive strength test specimens will be made represents only 0.02 to 0.03 percent of the total quantity of concrete placed. For this reason, every precaution must be taken to obtain a sample that is truly representative of the entire batch and then to protect that sample from the effects of evaporation, contamination, and physical damage.

04

Scope

This method covers procedures for obtaining representative samples of fresh concrete delivered to the project site and on which tests are to be performed to determine compliance with quality requirements of the specifications under which concrete is furnished. The method includes sampling from stationary, paving and truck mixers, and from agitating and non-agitating equipment used to transport central mixed concrete.

This method also covers the procedure for preparing a sample of concrete for further testing where it is necessary to remove aggregate larger than the designated size for the test method being performed. The removal of large aggregate particles is accomplished 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.

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

06 ## Apparatus

Sampling apparatus

- Wheelbarrow
- Cover for wheelbarrow (plastic, canvas, or burlap)
- Buckets
- Shovel
- Cleaning equipment: including scrub brush, rubber gloves, water
- Apparatus for wet sieving including a sieve or sieves conforming to AASHTO M 92 of suitable size and conveniently arranged and supported so that the sieve can be shaken rapidly by hand.

09 ## 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 1 ft^3.

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.

10 • **Sampling from stationary mixers, except paving mixers**

Sample the concrete after a minimum of 1/2 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 sample container. 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 nontilting mixers.

11 • **Sampling from paving mixers**

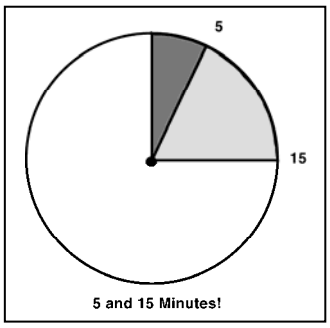
Sample after the contents of the paving mixer have been discharged. Obtain material from at least five different locations in the pile and combine into one test sample. Avoid contamination with subgrade material or prolonged contact with absorptive subgrade. To preclude contamination or absorption by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

12 • **Sampling from revolving drum truck mixers or agitators**

Sample the concrete after a minimum of 1/2 yd^3 of concrete has been discharged. Do not obtain samples until after all of the water has been added to the mixer. Do not obtain samples from the very first or last portions of the batch discharge. Sample by repeatedly passing a receptacle through the entire discharge stream or by completely diverting the discharge into a sample container. 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.

Open-top truck

Sampling at pump discharge



Time from sampling to start of tests

13 • **Sampling from open-top truck mixers, agitators, non-agitating equipment or other types of open-top containers**

14 Sample by whichever of the procedures described above is most applicable under the given conditions.

15 • **Sampling from pump or conveyor placement systems**

16 Sample after a minimum of 1/2 yd^3 of concrete has been discharged. Do not obtain samples until after all of the pump slurry has been eliminated. Sample by repeatedly passing a receptacle through the entire discharge system or by completely diverting the discharge into a sample container. Do not stop and restart the pump or 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.

17 2. Transport samples to the place where fresh concrete tests are to be performed and specimens are to be molded. They shall then be combined and remixed with a shovel the minimum amount necessary to ensure uniformity. Protect the sample from direct sunlight, wind, rain, and sources of contamination.

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

19

20

Wet Sieving

When required, due to over-size 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 dampened sample container.

21

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. Remix the sample with a shovel the minimum amount necessary to ensure uniformity.

22

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

23

Tips!

- Read the specs.
- Start tests within the time specified.
- Organize all the equipment in advance.
- Do not to obtain samples from the very first or very last portions of the batch.

REVIEW QUESTIONS

1. This method covers sampling from five types of mixers or placement systems, four of which are _____, _____, _____, and _____.

2. What is the minimum size of sample to be taken?

3. When sampling from a stationary or revolving drum truck mixer, how must the concrete be sampled during discharge of the batch?

4. The concrete sample must be protected from contamination, _____, _____, and _____.

5. What time limits are specified for testing after obtaining a sample?

PERFORMANCE EXAM CHECKLIST (ORAL)

SAMPLING FRESHLY MIXED CONCRETE
FOP FOR 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) 1.5 times volume of tests performed or minimum of 1 ft^3	_____	_____
2. Describe how to obtain a representative sample from a drum mixer.		
a) Sample the concrete after 1/2 yd^3 has been discharged.	_____	_____
b) Pass receptacle through entire discharge stream or completely divert discharge stream into sampling container.	_____	_____
3. 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 material from at least 5 different locations in the pile.	_____	_____
c) Avoid contaminating the sample with sub grade materials.	_____	_____
4. Describe how to obtain a representative sample from a Pump:		
a) Sample the concrete after 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 stop pump or lower the pump arm from the placement position.	_____	_____
5. After obtaining the sample or samples what must you do?		
a) Transport samples to place of testing.	_____	_____
6. What must be done with the sample or samples once you have transported them to the place of testing?		
a) Combine & remix the sample.	_____	_____
b) Protect sample against rapid evaporation and contamination.	_____	_____
7. What are the two time parameters associated with this test?		
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?	_____	_____
8. What test methods may require wet sieving?		
a) Slump, air content, & strength specimens?	_____	_____
9. The sieve size used for wet sieving is based on?		
a) The test method to be performed.	_____	_____

OVER

Procedure Element	Trial 1	Trial 2
10. How long must you continue wet sieving?		
a) Until a sample of sufficient size for the test being performed is obtained.	_____	_____
11. What is done with the oversized aggregate?		
a) Discard it.	_____	_____
12. What must be done to the sieved sample before testing?		
a) Remix.	_____	_____

Comments: First attempt: Pass ☐ Fail ☐ Second attempt: Pass ☐ Fail ☐

_____

_____

_____

Examiner Signature _____WAQTC #:_____

This checklist is derived, in part, from copyrighted material printed in ACI CP-1, published by the American Concrete Institute.