

ASTM C172

Standard Practice for Sampling Freshly Mixed Concrete

**Understanding ASTM International Test Procedures
for Cement and Concrete - Staying Up to Standard**

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Outline

- ▶ Scope
- ▶ Significance and Use
- ▶ General Requirements
- ▶ Procedure
- ▶ Understand Limitations of Procedure
- ▶ Sampling Time Line



Related Procedures

- ▶ ASTM E111 – Specification for Woven Wire Test Sieve Cloth and Test Sieves
- ▶ ASTM C685 – Specification for Concrete Made by Volumetric Batching and Continuous Mixing

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Scope

- ▶ This practice addresses procedures for obtaining a representative sample of fresh concrete in the field.
- ▶ This practice also addresses procedures for removing aggregate, larger than a designated size, from the sampled concrete.
 - this procedure is known as wet sieving

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Significance and Use

- ▶ This practice provides standard requirements and procedures for sampling concrete in the field.
- ▶ Details related to testing the sampled concrete are provided in other standard practices and test methods.

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General Requirements: Sampling

- ▶ The time between obtaining the first and final portions of the composite sample shall not exceed 15 min.
- ▶ After obtaining the necessary portions, transport the material to the location where tests are to be conducted or specimens are to be molded.

If wet sieving is necessary, it is performed at this point in the sampling process.

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General Requirements: Sampling

- ▶ Combine and mix the portions,
 - use a shovel
 - mix the minimum amount necessary to achieve uniformity
 - do not exceed any time limitations

After the portions of the sample are combined, the concrete is then referred to as a composite sample.

General Requirements: Sampling

- ▶ Be expeditious (quick) in obtaining and using the sampled concrete.
- ▶ Protect the sample from,
 - sun
 - wind
 - rapid evaporation
 - contamination

General Requirements: Sampling

- ▶ Start tests for slump, temperature, and air content (pressure or volumetric) within 5 min. after obtaining the final portion of the composite sample.
- ▶ Start molding strength specimens (cylinders or beams) within 15 min. after fabricating the composite sample.

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General Requirements: Sample Size

- ▶ A minimum of 28 L of material is needed when strength specimens are to be molded.
 - smaller sized samples are permitted for routine temperature, slump and air content tests
- ▶ Sample sizes shall be based on the maximum aggregate size.
- ▶ Sampling procedures shall be such that a representative sample is obtained.

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Procedure: Stationary Mixer

Sampling from stationary mixers, except paving mixers.

- ▶ These sampling requirements apply to tilting and non-tilting mixers.
- ▶ Obtain 2 or more portions at regular intervals from the middle portion of the batch.
- ▶ Note 3 - Do not obtain material before 10% or after 90% of the batch has been discharged.



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Procedure: Stationary Mixer

- ▶ Sample either by,
 - passing a receptacle completely through the discharge stream
 - completely diverting the discharge into a container
- ▶ If necessary, discharge the entire batch of concrete into a receptacle before obtaining a sample as described above.
 - the receptacle must accommodate the entire batch

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Procedure: Stationary Mixer

- ▶ Do not restrict the flow of the concrete, or otherwise cause segregation.
- ▶ Combine all portions into a single sample for testing.



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Procedure: Paving Mixer

Sampling from paving mixers.

- ▶ Sample the concrete after the contents of the mixer have been discharged.
- ▶ Obtain material from at least 5 different portions of the pile of discharged concrete.
- ▶ Avoid contamination, or prolonged contact, of the concrete with the subgrade.

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Procedure: Paving Mixer

- ▶ As an alternative to taking samples from the discharge pile,
 - place three shallow containers on the subgrade
 - discharge the concrete into the containers
- ▶ Combine all portions into a single sample for testing.



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Procedure: Paving Mixer



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Procedure: Revolving Drum Mixer

Sampling from revolving drum mixers or agitators.

- ▶ Obtain 2 or more portions at regular intervals from the middle portion of the batch.
- ▶ Do not obtain any material until all water and any admixtures have been added to the mixer.
- ▶ Note 3 - Do not obtain material before 10% or after 90% of the batch has been discharged.

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Procedure: Revolving Drum Mixer

- ▶ Sample either by,
 - repeatedly pass a receptacle through the entire discharge stream
 - completely diverting the discharge into a container
- ▶ Control the rate of discharge by controlling the rate of revolution of the drum.
- ▶ Combine all portions into a single sample for testing.

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Procedure: Revolving Drum Mixer



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Procedure: Other Units

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

- ▶ Take samples by the most applicable procedure from those previously described.



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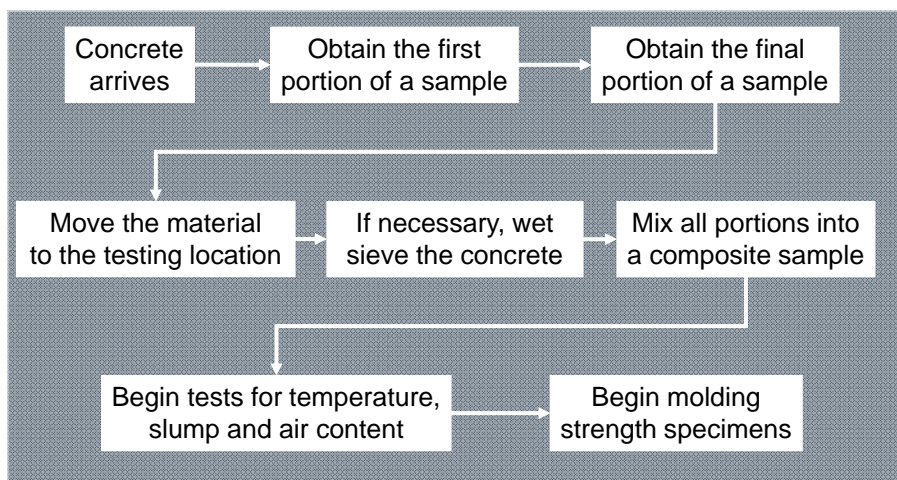
Sampling Time Line

- The following slides present a summary time line with respect to sampling and testing concrete in the field.
 - this time line is based on concrete being delivered to a project site by means of a revolving drum truck mixer

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Sampling Time Line



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Sampling Time Line

Concrete arrives → Obtain the first portion of a sample → Obtain the final portion of a sample

Time shall not exceed 15 min.

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Sampling Time Line

Concrete arrives → Obtain the first portion of a sample → Obtain the final portion of a sample

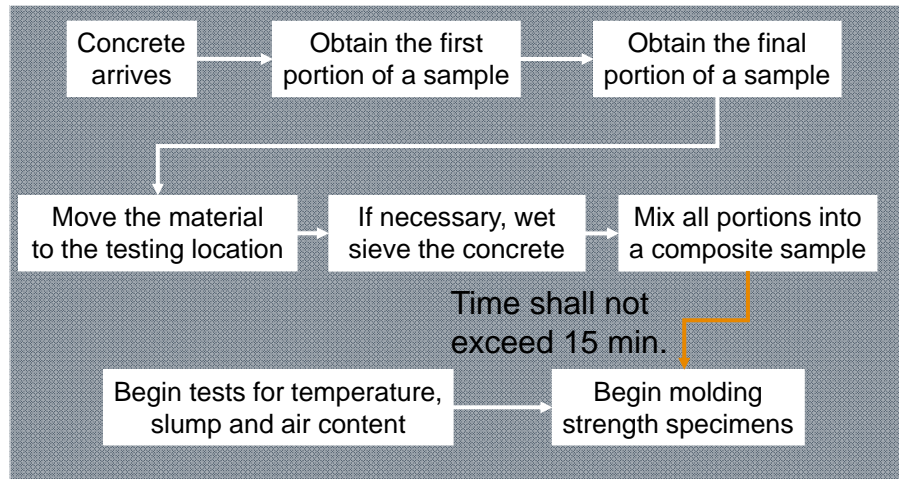
Time shall not exceed 5 min.

Begin tests for temperature, slump and air content → Begin molding strength specimens

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Sampling Time Line



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Limitations

- ▶ Elapsed time between obtaining the first and last portions of the composite sample is 15 minutes.
- ▶ Tests for slump or air content must begin within 5 minutes after obtaining the final portion of the composite sample.
- ▶ Molding strength specimens must begin within 15 minutes after making the composite sample.

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