

3.14 TESTING

A number of laboratory tests are described in this section. Following is a list of concrete properties and the corresponding test numbers.

Property	Test no.
Consistency of concrete, slump test	CON-1
Consistency of concrete, ball penetration test	CON-8
Unit weight and yield of concrete	CON-2
Air content of concrete	CON-2
Mixing of concrete	CON-4
Compressive strength of concrete	CON-3
Flexural strength of concrete	CON-6
Splitting tensile strength of concrete	CON-7
Modulus of elasticity of concrete	CON-5
Capping procedure	CON-9
Compressive strength of cement using tests on mortar cubes	CON-10
Rebound number of concrete	CON-11

* Test CON-1: Slump Test of Portland Cement Concrete

PURPOSE: To determine the slump of plastic concrete.

RELATED STANDARDS: ASTM C143, C172.

EQUIPMENT: Slump mold, tamping rod (5/8-in. diameter), pan, scale, shovel, hand scoop.

SAMPLE: Minimum 0.3 ft³ of plastic concrete.

PROCEDURE:

1. Start the test within 5 min. after obtaining the final portion of the composite sample.
2. Dampen the mold and place it on a flat moist pan.
3. Hold the mold firmly in place during filling (by standing on the two foot pieces).
4. Fill the mold in three layers, each approximately one-third the volume of the mold.

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6. Strike
7. Remc entire be co
8. Place meast displa slump

REPORT:

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PURPOSE (gravime

RELATED

DEFINITIC

- Yield meter
- Air cc

EQUIPME
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SAMPLE:

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- ON-8
- ON-2
- ON-2
- ON-4
- ON-3
- ON-6
- ON-7
- ON-5
- ON-9
- ON-10
- ON-11

5. Rod each layer with 25 strokes of the tamping rod. In filling and rodding the top layer, heap the concrete above the mold before rodding is started.
6. Strike off the surface by screeding and a rolling motion of the tamping rod.
7. Remove the mold immediately by raising it in a vertical direction. (The entire test, from the start of the filling through removal of the mold, should be completed within 2½ min.)
8. Place the empty mold (upside down) adjacent to the concrete sample and measure the vertical difference between the top of the mold and the displaced original center of the top surface of the specimen. This is the slump.

REPORT: Record the slump in inches to the nearest 1/4 in.

Test CON-2: Unit Weight, Yield, and Air Content of Concrete

PURPOSE: To calculate unit weight, yield, and air content of fresh concrete (gravimetric basis).

RELATED STANDARDS: ASTM C138, C172.

DEFINITIONS:

- *Yield* is the volume of concrete produced per batch, cubic yard, or cubic meter.
- *Air content* is defined as the percentage of air voids in concrete.

EQUIPMENT: 0.2-ft³ metal cylindrical measure (bucket), 5/8-in. tamping rod, balance, mallet (with a rubber or rawhide head) weighing approximately 1.25 lb, flat trowel. (*Note:* Bucket measure is for maximum size of coarse aggregate equal to or smaller than 1 in.)

SAMPLE: A minimum of 0.3 ft³ of fresh concrete.

PROCEDURE:

1. Weigh the empty measure.
2. Fill the measure with concrete sample in three layers of approximately equal volume. Rod each layer with 25 strokes of the tamping rod. Add the final layer so as to avoid overfilling.
3. After each layer is rodded, tap the sides of the measure smartly 10–15 times with the mallet. (This procedure is required to release any trapped air bubbles.) After consolidation, the measure must not contain any excess

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