

## **TESTS ON CONCRETE AND ITS COMPONENTS**

As authorized by Los Angeles Building Code Section 1903.1 and the ACI 318 Section 3.1.1, the following concrete tests, its components, and reinforcement shall be required.

### **I. CEMENT**

No cement required to be tested shall be used until there is on file, in the Office of the Superintendent of Building, a certificate giving the following information with regard to the cement to be used:

- Manufacturer's name and brand;
- Place of sampling;
- Type designation;
- Silo number, if sampled at mill;
- Lot number;
- Testing agency;
- Total weight in lot;
- Statement that the cement conforms to ASTM standard specifications C150 for Portland cement, C595 for Blended hydraulic cement, C845 for Expansive hydraulic cement, or C1157 for Hydraulic cement;
- Signature of a person making the certificate of test, and the date of execution of the certificate.

Tests on cement shall be performed by an approved Testing Agency. Cement mill laboratories may be approved as testing agencies for this purpose when evidence has been submitted to show that they are qualified to perform tests.

All shipments of cement to a job site, or fabrication plant, either in bulk, sacks or in ready-mixed concrete shall be accompanied by load tickets bearing the following information:

1. Brand name of the cement;
2. Quality of cement in the shipment;
3. Name of the testing agency, if other than the cement mill laboratory;
4. Lot or test number as certified above.

### **II. AGGREGATES**

Aggregates used in concrete with a design strength ( $f'_c$ ) exceeding 2,500 psi (17.24 MPa), shall be tested by an approved Testing Agency. Further tests shall be performed whenever there is evidence of a change in the character of the material.

Aggregates used in structural concrete shall be tested for conformity with ASTM C 33 for normalweight or C 330 for lightweight.

### III. STEEL REINFORCEMENT

1. All required reinforcement shall be tested in conformity with the specifications listed in Sections 3.5 and 3.8 of the ACI 318.

Exception: Unless there is evidence of non-conformity with the specifications listed in Sections 3.5 of the ACI 318, the following reinforcement need not be tested:

- a. Any reinforcement when the yield stress used in design is not in excess of 50 percent of the specified yield stress  $f_y$ .
  - b. Any reinforcement, other than prestressed concrete reinforcement, where the total amount used in the structure does not exceed five tons, if the department finds that no hazard exists.
  - c. Reinforcement for temperature and shrinkage. When high-strength pre-stressing strands, wires or rods are used, samples shall be taken from one end of selected coils of strand or wire, or from selected rods as delivered on the job and shall be tested by an approved testing agency prior to the placing of concrete. A minimum of one sample per each 5000 pounds or fraction thereof from each heat used on the job shall be tested.
2. No required reinforcement shall be encased in concrete until there is on file in the office of the Superintendent of Building a certificate from an approved testing agency giving the following information with regard to the reinforcement to be used:
    - a. Place of sampling;
    - b. ASTM designation number;
    - c. Size of reinforcement;
    - d. Number of tons represent by the test;
    - e. Heat identification;
    - f. Chemical analysis;
    - g. Statement that the reinforcement referred to meets all of the requirements of the applicable ASTM specification for the material tested;
    - h. Signature of the person making certificate and date of execution of the certificate.
  3. The testing agency's lot number may include all sizes of bars of the same heat number but shall not include more than one heat number. At least one tensile and one bending test shall be made of each 25 tons or fraction thereof of each size reinforcement in each lot. When the name of the manufacturer, the heat identification number, or the manufacturer's chemical analysis is not known, the testing agency's lot number may include any amount of reinforcement, but at least one tensile and one bending test shall be made of each five tons, or fraction thereof, of each size of reinforcement in each lot.

### **Certification of Identification**

When any reinforcement is required to be tested before use, it may be sampled at the site, or every delivery to the site shall be accompanied by a Certificate of Identification. The Certificate of Identification shall be issued by the dealer or fabricator furnishing the reinforcement, shall be delivered to the Superintendent of Building at the site and shall bear the following data relating to the reinforcement in the shipment:

1. Dealer's name and address;
2. Address of site;
3. Numbers of tons of each size in the shipment;
4. Name of testing agency;
5. Testing agency's lot number;
6. Signature of the person making the certificate and date of execution of the certificate.

### **IV. ADMIXTURES**

An approved admixture may be used in concrete, but only in an approved proportion. Compatible admixtures may be used in combination in a mix when approved for use in such combination, but only in approved proportions.

Any admixture which is added to concrete at the job site shall be delivered to the site in a sealed container bearing the name of the manufacturer, the brand name and type designation.

To secure General Approval of an admixture to be used in concrete, the admixture shall be shown to conform to the following regulations:

1. A certified statement of the chemical composition shall be filed in the Office of the Superintendent of Building;
2. No admixture shall contain deleterious amounts of any substance;
3. Admixtures shall be tested by an approved Testing Agency and shall show conformance with ASTM Standard Specifications listed in Sections 3.6 of the ACI 318 or with alternate specifications approved by the Superintendent of Building.

### **V. CONCRETE**

Concrete slump and compression tests shall be made in accordance with ASTM C 172 and ASTM C 39, respectively, on samples taken at the discharge from the mixer.

Samples for strength tests of each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 150 cubic yards of concrete, nor less than once for each 5000 square feet of surface area for slabs or walls.

Exceptions:

1. When the total volume of a given class of concrete is less than 50 cubic yards, strength tests are not required when evidence of satisfactory strength is submitted to and approved by the building official.
2. Tests are not required for concrete with a compressive strength ( $f'_c$ ) of 2500 psi (17.24 Mpa) or less or when continuous inspection is not required by Los Angeles Building Code Section 1705.3.

Additional tests may be required by the department whenever there is evidence that any concrete being placed does not conform to the provision of this code.

Each test shall consist of a slump test and two or more compressive strength specimens tested at the specified age, and the strength indicated by the test shall be the average of the strengths of the two or more specimens tested.

For post-tensioned concrete, cylinder test results of the concrete shall be provided at the time of initial prestress to verify the value of  $f'_c$ .