

# 1 RCNY §5-02

## CHAPTER 5 CONCRETE

**§5-02 Licensing of Concrete Testing Laboratories.** (a) *General.* (1) Each laboratory shall have in responsible charge a Director who shall be professionally qualified and who shall personally supervise all technical functions of the laboratory relating to testing of concrete and concrete materials.

Sections 27-605 and 27-607 of the Administrative Code require that a licensed Professional Engineer or a Registered Architect supervise the testing of materials and the inspection of concrete construction.

(2) All technicians shall be qualified to perform all tests they may be required to conduct under the supervision of the Director.

(3) The laboratory shall annually furnish to the Department of Buildings a list of all personnel who are supervising and performing tests and their qualifications.

*Note:* §502(b)(6) shall also be complied with.

(4) The laboratory shall furnish to the Department of Buildings a list of all the equipment used to perform tests on concrete and concrete materials.

(5) The laboratory shall request and have an inspection made of its procedure and equipment by the "Cement and Concrete Reference Laboratory" whenever the "Cement and Concrete Reference Laboratory" is inspecting laboratories in this area on its cyclical tour of inspection. These inspections shall be made at the cost and expense of the laboratory seeking a license. A copy of the inspection report shall be promptly submitted to the Department of Buildings.

(6) The laboratory shall correct within 10 days any condition ordered by the Department of Buildings which in its judgment may adversely affect the results of any test.

(7) A license shall be issued to each applicant upon proof of compliance with these rules and upon payment of a fee of one hundred dollars (\$100).

(8) The annual renewal fee shall be fifty dollars (\$50).

(9) A violation of any of these rules or the falsifying or misrepresentation of any fact in any required report shall constitute cause for revocation or suspension of the license by the Commissioner, after a hearing upon prior notice of at least ten calendar days. However, notwithstanding the foregoing, when the public safety may be imminently jeopardized or when false report has been made, the Commissioner shall have the power, pending a hearing and determination of charges, to forthwith suspend the license for a period not exceeding five working days. The presence of batch tickets at a plant filled in on any day other than the day the specific batch is to be delivered to the construction site, whether signed or unsigned, shall constitute a false report.

(10) All reports submitted by the laboratory shall bear its name and its license number.

(11) Renewal of licenses or certificates of qualification, heretofore issued, and issuance of new licenses shall be conditioned upon and subject to the provisions of §§26-131 through 26-139 and 26-200 through 26-204 of the Administrative Code.

(12) The laboratory shall display a copy of its license on its premises.

(13) The Director shall furnish all of his employees an identification card with a photograph of the employee affixed thereto.

(14) The Director shall maintain a daily record of the activities of all of his employees, indicating the time of departure to and return from batch plant or construction site inspections, the construction project to which the employee is assigned, and the batch plant visited. This record shall be maintained for 2 years and shall be made available to the department personnel.

(b) *Personnel.*

(1) The Director shall be qualified by virtue of education and experience to supervise all tests of concrete and concrete materials conducted by the laboratory. He shall be qualified to practice Professional Engineering or Architecture in the State of New York.

(2) All technicians performing tests on the chemical composition of cement shall be qualified analytical chemists.

(3) All other technicians, field personnel, and all personnel having direct supervision of technical staff shall be qualified by education and experience to take samples and perform required tests. Qualifying education and experience may include a degree in engineering, suitable experience in concrete construction, suitable training in concrete industry sponsored programs and the like.

(4) Satisfactory proof of such qualifications for concrete field testing technicians shall include certification resulting from the ability to pass a qualification test following the guidelines of the American Concrete Institute as set forth in ACI publication CP-2(82).

(5) All concrete field testing technicians shall be qualified pursuant to §5-02(b)(4) on or before July 1, 1985.

(6) The Department of Buildings shall annually publish in the City Record, on or before the first of July, a listing of concrete field testing technicians qualified pursuant to §5-02(b)(4).

(7) The Director shall submit to the department an affidavit that all technicians and field personnel are qualified to perform their designated tasks and shall keep on the premises a record of the qualifications of all personnel, which shall be made available to the department upon request.

(c) *Reports.* Reports shall be presented in a form acceptable to the Department of Buildings.

(d) *Tests.*

(1) The following specifications of the American Society for Testing and Materials (ASTM) shall be considered as part of these rules:

C29-78 Test for Unit Weight and Voids in Aggregate.

C31-85 Methods of Making and Curing Concrete Test Specimens in the Field.

- C39-84 Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- C40-84 Test Method for Organic Impurities in Fine Aggregates for Concrete.
- C42-84a Methods of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
- C70-79 Standard Method of Test for Surface Moisture in Fine Aggregate.
- C88-83 Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
- C109-86 Test Method for [sic] Compressive Strength of Hydraulic Cement Mortars (Using 2-inch or 50 cube Specimens).
- C114-85 Method of Chemical Analysis of Hydraulic Cement.
- C115-79b Standard Method of Test for Fineness of Portland Cement by the Turbidimeter.
- C117-84 Test Method for Material Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing.
- C127-84 Test Method for Specific Gravity and Absorption of Coarse Aggregate.
- C128-84 Test Method for Specific Gravity and Absorption of Fine Aggregate.
- C136-84a Method for Sieve Analysis of Fine and Coarse Aggregates.
- C138-81 Standard Method of Test for Unit Weight, Yield and Air Content (Gravimetric) of Concrete.
- C143-78 Test Method for Slump of Portland Cement Concrete.
- C151-84 Test Method for Autoclave Expansion of Portland Cement.
- C172-82 Method of Sampling Fresh Mixed Concrete.
- C173-78 Standard Method of Test for Air Content of Freshly-Mixed Concrete by the Volumetric Method.
- C183-83a Method of Sampling and Acceptance of Hydraulic Cement Mortar.
- C184-83 Test for Fineness of Hydraulic Cement by the 150-um (No. 100) and 75-um (No. 200) Sieves.
- C187-86 Test Method for Normal Consistency of Hydraulic Cement.
- C190-85 Test Method for Tensile Strength of Hydraulic Cement Mortars.
- C191-82 Test Method for Time of Setting of Hydraulic Cement by Vicat Needle.
- C192-81 Method of Making and Curing Concrete Test Specimens in the Laboratory.
- C204-84 Test Method for Fineness of Portland Cement by Air Permeability Apparatus.
- C230-83 Specification for Flow Table for Use in Tests of Hydraulic Cement.
- C231-82 Standard Method of Test for Air Content of Freshly-Mixed Concrete by the Pressure Method.
- C260-86 Specification for Air-Entraining Admixtures for Concrete.
- C266-77 Test for Time of Setting of Hydraulic Cement by Gillmore Needles.
- C494-86 Specification for Chemical Admixtures for Concrete.
- C131-81 Resistance to Abrasion of Small-Size Coarse Aggregate by Use of Los Angeles Machine.
- C535-81 Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine, Test for
- C803-82 Penetration Resistance to Hardened Concrete, Test for
- E4-83a Practices for Load Verification of Testing Machines.

(2) All testing of cement shall be conducted in accordance with the Standard Specifications of the American Society for Testing and Materials (A.S.T.M.).

(e) *Curing and testing of concrete specimens.*

(1) The laboratory shall be equipped with a suitable size enclosed room for the curing of all concrete test specimens. It shall be of such size that specimens can be easily handled during storage and preparation for testing. The room shall be equipped with the necessary equipment to maintain a temperature of 73.4 degrees  $\pm$  3.0 degrees F. at all times, as per A.S.T.M. C-192. The room also shall be equipped to maintain a relative humidity of 95 percent plus in order that the specimens will be maintained in a moist condition in which free water is on the surface at all times. The test specimen shall not be exposed to a stream of running water.

(2) The laboratory shall have equipment for determining relative humidity and temperature of the room and recording devices to monitor them.

(3) The laboratory shall be equipped with a power operated testing machine with a variable speed control. It shall be of sufficient capacity and capable of applying load without shock at a rate of loading prescribed in §4(b) of A.S.T.M. C-39.

(4) The testing machine shall be equipped with two steel bearing blocks with hardened faces, one of which is a spherically seated block that normally will bear on the upper surfaces of the specimen and the other a plain rigid block on which the specimen will rest. The bearing faces of these blocks used for compression testing of concrete shall have a Rockwell hardness of not less than 55 HRC. The bearing faces shall be at least as large and preferably slightly larger than the surface of the specimen to which the load is applied. The bearing faces when new shall not depart from a plan by more than 0.0005-inch at any point and they shall be maintained within a permissible variation limit of 0.001-inch. The movable portion of the spherically seated block shall be designed so that the bearing face can be rotated freely and tilted through small angles in any direction.

(5) The machine, if hydraulic, shall be equipped with a dial gauge having a sufficient diameter to allow the increments of load to be read within plus or minus 1/2 percent of the load being applied.

(6) The machine shall show a certificate of calibration or verification within the time limits set by requirements of A.S.T.M. E-4. If any major repairs have been made on the testing machines, the machine shall be re-calibrated.

(f) *Equipment.* The laboratory shall provide and maintain in proper working condition the following equipment as a minimum requirement:

- (1) Necessary for concrete mix designs:

- (i) Concrete mixer
- (A) 1 1/2 cubic foot capacity
- (B) 3 1/2 cubic foot total drum volume
- (ii) Slump cone 8-inches in diameter at the base and 4-inches at the top of a height of 12-inches and conforming to A.S.T.M. C143.
  - (iii) A tamping rod consisting of a round, straight steel rod 5/8-inch in diameter.
  - (iv) Cylindrical metal measures of 1/2 cubic foot and a cubic foot capacity conforming to the requirements of A.S.T.M. C138.
  - (v) A sturdy, flat plate about 15-inches square for striking off the concrete in the measure.
  - (vi) Appropriate air meter.
  - (vii) Necessary scoops, wood floats, trowels.
  - (viii) A balance or scale sensitive to 0.1 pound, having a capacity of not less than 100 pounds.
- (1) Necessary equipment for preparation of concrete test cylinders:
  - (i) for compression tests:
    - (A) Capping plates for cement or plaster caps. Plate glass at least 1/4-inch thick, or machined metal plates at least 1/2-inch thick or polished stone plates of suitable materials, such as granite or diabase and at least 3-inches thick. A capping plate shall be at least 1-inch greater in diameter than the specimen.
    - (B) Capping plates for use with mixtures of sulphur and granular materials, or similar materials and dimensions, recessed to retain the molten mixture.
    - (C) The surface of any capping plate shall not depart from a plane by more than .002-inch in the diameter of the specimen.
    - (D) Straight edge and feeler gauges to check planeness of capping plates and caps.
    - (E) Calipers and rule for checking size of cylinders.
    - (F) Controlled temperature melting pot if sulphur mixtures are to be used. Mixing pans, scoops, spoons, trowels, spatulas, etc., if cement or plaster caps, are to be used.
    - (G) Appropriate grinding equipment may be substituted for the capping equipment.
  - (ii) Materials Required:
    - (A) For cement or plaster caps, any of the following:
      - Type I Portland Cement
      - High Alumina Cement (Lumnite)
      - Type III Portland Cement
      - High strength gypsum plasters such as: Hydrostone and Hydrocal White
 (Note: Plaster of Paris is not satisfactory).
    - (B) For sulphur caps either of the following:
      - Laboratory prepared mixtures of sulphur and granular materials
      - Proprietary mixtures such as: Vitroband, Leadite, Cylcap, etc.
 (Note: See A.S.T.M. C1982 for limitations of various type caps).
- (3) Necessary for analysis of fine and coarse aggregates:
  - (i) Square or round mesh sieves, Pan Nos. 200, 100, 50, 30, 16, 8, 4, 1/4-inch, 3/8-inch, 1/2-inch, 3/4-inch, 1-inch, 1 1/2-inches, 2-inches, 3-inches, 3 1/2-inches, No. 12.
  - (ii) Sieve shaking equipment.
  - (iii) Scales:
    - (A) Gram scale sensitive to at least 0.1 gram.
    - (B) Gram scale with at least 5,000 gram capacity and sensitive to 1 gram.
    - (C) Pound scale sensitive to 1/4-ounce.
    - (D) Steel brush to brush sieves.
    - (E) Oven-heat continuously between 221 degrees and 230 degrees F.
    - (F) Containers for holding solutions.
    - (G) Perforated containers for immersing aggregates in solutions - wire baskets.
      - (H) Calibrated Volumetric (milliliters) graduate, 500 milliliters capacity.
      - (I) Conical metal mold 1 1/2-inches diameter at top, 3 1/2-inches diameter at bottom, 2 7/8-inches high.
      - (J) Tamping rod - 12-ounces, having a flat circular tamping face 1-inch in diameter.
      - (K) Tamping rod - 5/8-inch diameter, 24-inches length.
      - (L) Cubic foot cylindrical measure either 1/2 cubic foot, 1/4 cubic foot, 1/3 cubic foot, 1/10 cubic foot or 1 cubic foot.
- (M) 500 milliliters flask.
- (N) Thermometer - heats over 100 degrees C.
- (4) Necessary for field testing and inspection:
  - (i) Thermometer, 0 degrees-200 degrees F.
  - (ii) Scale, 100 lbs. capacity.
  - (iii) 6-inch round by 12-inch long container.
  - (iv) Slump cone and 5/8-inch by 24-inch rod.
  - (v) Air meter.
  - (vi) Rule, 12-inches.
  - (g) *Cement testing.*

(1) *Introduction.* Cement testing shall be done in laboratories equipped to make the basic tests required for evaluating cement.

(2) *Division into physical and chemical tests.* These tests are divided into two parts, physical and chemical and all physical test specimens shall be prepared in a room or area where the temperature is controlled within the limits of 20 to 27.5 degrees C. and the humidity at not less than 50 percent.

(3) Physical test equipment:

(i) Analytical balance complete with calibrated weights.

(ii) Scale of 2,000 gram capacity accurate to 0.1 percent.

(iii) Wagner Turbidimeter or Blaine permeability apparatus calibrated with standard cement from the Bureau of Standards.

(iv) One 325 mesh sieve as well as 100, 50, 30 and 16 mesh sizes.

(v) Electrically driven mixer bowl and paddle.

(vi) Flow table and flow mould.

(vii) Trowel and tamper for cubes.

(viii) Cube moulds and sealing compound.

(ix) Autoclave, moulds and comparator with steel reference bar.

(x) Vicat apparatus and moulds.

(xi) Gillmore needles and glass plates for samples.

(xii) LeChatelier flask.

(xiii) Supply of graded Ottawa Sand.

(xiv) Glass graduates of 100, 150 and 200 ml. capacity.

(xv) Cylindrical measure of 400 ml.

(xvi) Straight edge and spatula.

(xvii) Calibrated testing machine of not less than 30,000 lbs., capacity equipped with spherically seated upper steel block of not more than 3 1/2 inch [*sic*] diameter.

(4) A.S.T.M. standard tests for cements. Standard tests for cements as required by A.S.T.M. are as follows:

Fineness

Soundness

Time of setting

Air content of mortar

Compressive tests of 2-inch by 2-inch cubes.

(5) Chemical composition of cement:

(i) The laboratory shall be equipped with an analytical balance and standard weights, platinum and porcelain crucibles, cassettes, pipettes, etc.

(ii) Distilled water and all reagents necessary for the determination of the oxides of silica, iron, aluminum, magnesium, sulphur, calcium, and insoluble residue by one of approved.

(iii) All tests shall be performed in a room equipped with fume chamber, gas burners, working benches, by a qualified analytical chemist.

(iv) Special tests such as the alkalis of sodium and potassium shall be made as outlined by the A.S.T.M.