

CEMENT AND CONCRETE REFERENCE LABORATORY
4441 Buckeystown Pike, Suite C
Frederick, MD 21704
www.ccrl.us
ccrl@astm.org

Subject: General Information on Concrete Laboratory Inspections

The Cement and Concrete Reference Laboratory (CCRL) uses ASTM Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation (C1077) as the basis for its concrete inspection program. This memorandum is presented in an effort to answer some of the more common questions concerning important details of the inspection and alert participants to those changes from previous inspections. Laboratory personnel participating in previous inspections will find this paper a helpful review in preparing for the inspection. Those laboratories experiencing their first inspection by CCRL will find it helpful in preparing facilities, advising technicians, and minimizing delays.

It is advised that a careful review of these details be undertaken by the laboratory personnel who will be taking an active role in the inspection, in order to maximize the benefits derived from the inspection.

Scope

The specifications and methods of test to which frequent reference will be made during the course of the inspection are ASTM designations C31, C39, C138, C143, C172, C173, C231, C470, C511, C617, C1064, C1077, and C1231. It is anticipated that the laboratory will have current editions of these standards.

Procedures, Apparatus and Quality System

(1) Test Procedures

The demonstrations of the standard tests by the laboratory personnel are considered to be one of the most important features of an inspection. Laboratory personnel performing the tests should be prepared with the necessary equipment and test specimens to perform the following test procedures normally reviewed during the inspection. The demonstrations of these procedures should be made in strict accordance with the requirements of the applicable ASTM test methods, and special laboratory practices should be avoided. If the laboratory anticipates demonstrating a test not ordinarily used, the operator should practice the procedures of the test to attain suitable proficiency.

- a) Slump of Portland Cement Concrete(C143)
- b) Unit Weight of Freshly Mixed Concrete.....(C138)
- c) Air Content of Freshly Mixed Concrete by the Volumetric Method(C173)
- d) Air Content of Freshly Mixed Concrete by the Pressure Method.....(C231)
- e) Preparation, Curing, Capping and Testing Cylinders(C31, C39, C511, C617 and C1231)
- f) Preparation and Curing Beams(C31 and C511)
- g) Temperature of Freshly Mixed Portland Cement Concrete(C1064)

(2) Apparatus

Item	Features Checked
a) Curing facilities (C511)	
1) Moist room	Prescribed automatic temperature control and recording thermometer; relative humidity and air temperature of storage area; and free moisture on specimens in storage. AND / OR,
2) Water tank	Automatic temperature control and recording thermometer; water temperature; and water saturated with high calcium hydrated lime.
b) Compression machine (C39 and E4)	Accuracy of indication and design of machine; and design and condition of bearing blocks for testing concrete cylinders.
c) Cylinder molds	
1) Reusable molds (C31 and C470)	Dimensions, design and watertightness.
2) Single-use molds (C470)	Dimensions, design, and watertightness; and if cardboard, elongation and absorption. Damage resistance to dry rodding aggregate (laboratory supplied dry crushed aggregate No. 57 or No. 67 stone).
d) Capping equipment	
1) Sulfur, gypsum or cement capping (C617)	Dimension and planeness of capping plates; perpendicularity and centering of guides; straightedge and 0.002" feeler stock to check cap planeness; cube mold and cover plate for strength determination; vent hood for sulfur fumes; and review of laboratory's qualification data (if required). AND / OR,
2) Unbonded Caps (C1231)	Dimensions and planeness of retaining rings; dimensions of neoprene pads; review of laboratory's qualification data (if required); and a check of accessory equipment (straightedge, 0.20 in. rod, protective cage, saw or grinder, and a means for checking perpendicularity).
e) Tamping rod and slump cone (C31 and C143)	Dimensions and design.
f) Vibrator (C31)	Element dimensions and frequency of vibration.
g) Unit weight equipment (C138)	Dimensions, planeness of rim, and capacity of measure; capacity and accuracy of scales; and availability of strike-off plate and mallet.
h) Air content equipment (Volumetric Method) (C173)	Design and capacity of meter and 1% cup; and specified mallet, funnel, strike-off bar, syringe, and measuring vessel.
a) Air content equipment Method) (C231)	Design; calculation of expansion factor; aggregate correction factors; (Pressure and prescribed mallet, strike-off bar and syringe.
b) Temperature measuring device (C1064)	Range and readability; and availability of certified reference device.

(3) Quality System

Item	Features Checked
a) Equipment checklist	Availability of inventory; records and frequency of calibrations; and written descriptions of calibration procedures.
b) Personnel records	Registered engineer on staff; experience of supervisors; descriptions of training and performance evaluation programs; documentation of training and evaluation; and pertinent certifications.
c) Laboratory records	Written procedures for: identification, transfer and test results of specimens; handling technical complaints; external services used; and quality assurance practices.
d) Reports	Identification of client, project and sample; test results and person performing test; deviations from standards; and signature of engineer.
e) Organization	Complete legal name and address of the laboratory; other facilities under technical direction of the laboratory; principal officers of the organization; description of the laboratory's management structure; and technical services offered.

Preparation for Inspection

In many instances inspections are delayed because apparatus is not readily available, or is not in the best mechanical or physical condition when it is first examined by the inspector. A careful review of the items listed on the previous pages, before the inspector's arrival, will facilitate the inspection operation and minimize the disruption of the laboratory's normal routine. Those pieces of equipment which the laboratory would like to present for inspection should be cleaned and collected in a single accessible location for the inspector's examination. Further delays might be avoided by determining that all written procedures and records are current and ready for review. The availability of a quality control manual and personnel records should facilitate the inspection of those articles described in C1077. Any optional tests that the laboratory might wish to include for inspection should be clearly conveyed to the Cement and Concrete Reference Laboratory prior to the scheduled inspection, and the associated apparatus and procedures carefully prepared for review.