

# C210 – Specific Checklist: Construction Materials Testing Laboratory Accreditation Program

## ASTM

### Standard Practices for Laboratories Testing Concrete and Concrete Aggregates, Bituminous Materials, Soil, and Rock for Use in Construction and Criteria for Laboratory Evaluation

The following pages present the applicable criteria from ASTM C1077, D3740, D3666 and E329 in a checklist format. The criteria contained on this checklist are unique to these ASTM Guides and are not required by ISO 17025, but are required by A2LA for accreditation to the respective guides. As an option, the laboratory may obtain accreditation for these Construction Materials Engineering Standards. The laboratory's policies and procedures must meet these requirements in order to obtain accreditation. Quality system documentation and supporting records must be available for the assessor's review.

Before the assessment, the laboratory is asked to complete the document reference identifiers in the checklist's second column (labeled Reference") and place a tick mark in the yes (Y), no (N), or not applicable (NA) space for each checklist item. This serves to help both the laboratory and the assessors prepare for the assessment and may save a significant amount of assessment time and cost. The appropriate "reference" can include quality manual, laboratory manual, SOPs, records, etc. references. The noted references should specify procedure number, page number and section number, if possible, where each checklist item is addressed.

Assessor Instructions: Review the laboratory's documented quality system to verify compliance with the appropriate ASTM Practice. Assess to verify that the documented quality system is indeed implemented as described. Assess the laboratory's technical competence to perform specific tests or specific types of tests. Record comments related to tests on separate sheets and/or on the draft scope(s) of accreditation. All deficiencies must be identified and explained in the assessor deficiency report. Notations can be recorded below the cited paragraph. Paragraphs which do not apply may be designated by N/A.

- Note to assessors and laboratory personnel: Redundant checklist entries need to be recorded only once, in the highest-level checklist in which it is found (i.e. ISO 17025⇒specification checklists⇒test method checklists).

Please circle ASTM assessed: C1077-05      D3740-04      D3666-05      E329-05

Laboratory Name: \_\_\_\_\_ Lab Code: \_\_\_\_\_ Assessment I.D.: \_\_\_\_\_

<b>CMT Practice Requirements</b>	Reference	Yes	No	N/A	C1077	D3740	D3666	E329
<p><b><u>General</u></b></p> <p>ASTM E329 invokes requirements of C1077, D3740, D3666, for appropriate materials. Therefore, when one of these specifications is mentioned it is appropriate that the requirements also apply to E329 depending on material tested.</p>								
<p>E329, D3666 requires <u>accreditation</u> from third party i.e. A2LA, NVLAP etc. in field of operations.</p> <p>Site or temporary facilities must be on scope of accreditation.</p>							✓	✓
<p>C1077 and D3740 require <u>inspection</u> only by a third party.</p> <p>Accreditation to D3740 requires that at least five tests are on the scope.</p>					✓	✓		
<p><b><u>Organization and Management</u></b></p> <p><b><u>Management</u></b></p> <p>All relevant testing services are provided under the full-time technical direction of a registered professional engineer with at least 5 years experience in construction materials testing. Employed by lab. May be responsible for more than one location. (Note: A QC laboratory used only for QC testing may be managed by a QC Manager). (Per E329; if a laboratory only serves as a Quality Control laboratory and produces no tests for acceptance, payment, or official record the requirement for a professional engineer is waived)</p>					✓			✓
<p>... or an equivalent science degree with related experience.</p>						✓	✓	

<b>CMT Practice Requirements</b>	Reference	Yes	No	N/A	C1077	D3740	D3666	E329
<p><b><u>Supervising Field Technician</u></b></p> <p>3 years experience and current technician certification: (Certified as a NICET Level I, or ACI Level I Field and Laboratory certified technician fulfill requirement). Relevant tests covered by the certification program are: C31, C138, C143, C172, C173, C231, and C1064.</p> <p>Alternate certification program shall include:</p> <ul style="list-style-type: none"> <li>• Written examination covering subject adequately;</li> <li>• Performance evaluation;</li> <li>• Relevant test methods;</li> <li>• Approval by Professional Engineer. (A2LA Criteria)</li> <li>• Concrete and/or aggregate tests apply as appropriate.</li> </ul>					✓			For Concrete only
<p>5 years experience.... additionally D3666 – Supervisor shall have certifications or qualifications through an agency or state DOT program or NICET Level II program.</p>							✓	
<p>This person shall demonstrate competency by performance evaluation and by oral and/or written examination, the ability to perform correctly the required duties. 5 years experience is required. Reevaluation every three years of each test. (Current NICET Level III is also evidence of competency)</p>						✓		
<p>This person shall be able to demonstrate competency by performance evaluation and by oral and/or written examination, the ability to perform correctly the required duties. 5 years experience is required. (Current NICET Level III, ACI, or other qualified national, regional, or state authorities, is also evidence of competency.) (Also AWS-CWI, ASNT Level II)</p>								✓

<b>CMT Practice Requirements</b>	Reference	Yes	No	N/A	C1077	D3740	D3666	E329
<p><b><u>Supervising Laboratory Technician</u></b></p> <p>3 years experience and current technician certification: (Certified as a NICET Level I, or ACI Level I Field and Laboratory certified technician fulfill requirement). Relevant tests covered by the certification program are: C31, C39, C40, C117, C127, C128, C136, C138, C143, C172, C173, C231, and C1064.</p> <p>Alternate certification program shall include:</p> <ul style="list-style-type: none"> <li>• Written examination covering subject adequately;</li> <li>• Performance evaluation;</li> <li>• Relevant test methods;</li> <li>• Approval by Professional Engineer. (A2LA Criteria)</li> <li>• Concrete and/or aggregate tests apply as appropriate.</li> </ul>					✓			For Concrete only
<p>This person shall demonstrate competency by performance evaluation and by oral and/or written examination, the ability to perform correctly the required duties. 5 years experience is required. Reevaluation every three years of each test. (Current NICET Level III is also evidence of competency)</p>						✓		
<p>5 years experience.... additionally D3666 – Supervisor shall have certifications or qualifications through an agency or state DOT program or NICET level II program.</p>							✓	
<p>This person shall be able to demonstrate competency by performance evaluation and by oral and/or written examination, the ability to perform correctly the required duties. 5 years experience is required. (Current NICET Level III, ACI Grade II, or other qualified national, regional, or state authorities, is also evidence of competency.) (AWS-CWI, ASNT Level II)</p>								✓

CMT Practice Requirements	Reference	Yes	No	N/A	C1077	D3740	D3666	E329
<p><b><u>Inspecting, Laboratory, and Field Testing Technician</u></b></p> <p>A technician certification program must include a written examination and performance evaluation of relevant tests. An equivalent program (as approved by an evaluation authority) may be used by the lab; a NICET I, or ACI Level I may also be used. (Also applies to Laboratory Technician and Aggregate Technician) Laboratory tests include: ASTM C39, C617 or C1231; Aggregate Lab – C40, C117, C127, C128, C136; Field – C31, C138, C143, C172, C173, C231, C1064.</p> <p>Alternate certification program shall include:</p> <ul style="list-style-type: none"> <li>• Written examination covering subject adequately;</li> <li>• Performance evaluation;</li> <li>• Relevant test methods;</li> <li>• Approval by Professional Engineer. (A2LA Criteria)</li> </ul> <p>Concrete and/or aggregate tests apply as appropriate</p>					✓			
<p>This person shall be able to demonstrate by performance evaluation and either by oral or written examination, or both, the ability to perform correctly the required duties. (With high school diploma or equivalent, NICET Level I, also ACI Level 1 in Aggregate testing)</p>						✓		
<p>Demonstrate competence for the test being performed and work under the direct supervision of personnel meeting the above criteria given.</p>								✓
<p>Shall have qualifications/certifications thru a State DOT or NICET Level I. A trainee must achieve certification within two years.</p>							✓	

<b>CMT Practice Requirements</b>	Reference	Yes	No	N/A	C1077	D3740	D3666	E329
<p>The QAM shall contain a document describing the method(s) used to evaluate staff competency to ensure that each test covered by the scope of this standard is performed in accordance with standard procedures. This description shall include the frequency of evaluations for each technician, a description of the levels of training, the criteria for each level, and indicate what position(s) or employee(s) is responsible for evaluating staff competency and maintaining records. These procedures shall ensure that each technician performing the test method is evaluated.</p> <p>Note 13 – Proficiency sample testing may be useful in evaluating staff competency, however, it should be used in conjunction with observation of actual testing performed.</p>					✓	✓	✓	✓
<p><b><u>Test and Calibration Methods</u></b></p> <p>The testing laboratory shall be capable of performing the required ASTM test methods or practices and may request additional evaluation for optional methods to the extent that those services are provided by the laboratory. In addition, concrete and aggregate technician certification shall also cover the following tests as applicable:</p> <p>These include for concrete: ASTM C31, C39, C138, C143, C172, C173 or C231, C1064</p> <p>For aggregate: ASTM C40, C117, C127, C128, C136.</p>					✓			
<p>The laboratory shall use the latest version of each referenced method within one year of its publication unless an earlier version of the standard is required by the client.</p>					✓			
<p>Moist room or curing tanks shall meet ASTM C511</p>					✓			

<b>CMT Practice Requirements</b>	Reference	Yes	No	N/A	C1077	D3740	D3666	E329
<p>Capping shall be in accordance with Practice C617. Strength of capping materials shall be determined at least once every three months. During each day's capping operations, the planeness of at least three specimens shall be checked in accordance with Test Method C39.</p> <p>If pad caps are used, ASTM C1231 shall be followed.</p>					✓			
<p>Verification of sieve accuracy shall be performed at least annually on each sieve used in the test for sieve analysis (Test Methods C117 and C136). Any one of the following three methods of verification is acceptable. Each method of sieve verification shall include an inspection of sieve cloth for punctures or obvious defects. (1) Verification of each sieve used according to the procedures prescribed in the Annex of Specification E11. (2) A comparison of the results of a split sample sieved on different sieve sets. Results shall be verified for single operator precision to the within the acceptable range of two results stated in the test method. (3) Participation in the sieve analysis test in an aggregate proficiency sample program, as described in the Quality System section. Results shall be verified for multilaboratory precision to be within the acceptable range of two results stated in the test method.</p>					✓			
<p>When mechanical sieving devices are used, the period of mechanical agitation shall be checked at least annually for adequacy of sieving as described in Test Method C136. Mechanical agitation periods must be established for each different type of aggregate tested.</p>					✓			
<p>Specific Gravity and Absorption Tests—When <u>performing</u> the procedures of Test Methods C127 and C128, duplicate tests shall be made at least once every 6 months. Results shall be verified for single operator precision within tolerance stated in the respective test method. Participation in a proficiency test program with satisfactory scores achieved in Test Methods C127 and C128 is an acceptable alternative.</p>					✓			

<b>CMT Practice Requirements</b>	Reference	Yes	No	N/A	C1077	D3740	D3666	E329
Single Use Cylinder Molds – Three molds from each shipment will be inspected to meet requirements.					✓			
<p><b><u>Reports</u></b></p> <p>Test reports shall include the following information: Name of the registered professional engineer or his designee, and identification of tests performed by subcontractors.</p>					✓	✓		
<p>A record of each test report and related records shall be retained for at least 3 years.</p> <p>(3 years for D3740, C1077) (1 year for D3666)</p>					✓	✓	✓	
<p>The laboratory shall (1) report deficiency corrections to AAP, A2LA, CMEC, NVLAP or other recognized accreditation body who will issue a certificate of accreditation when their requirements are satisfied, or (2) if an inspection service is used, supplement copies of the final report with a statement of corrective actions taken signed by the laboratory's professional engineer.</p>					✓			
<p>Laboratory Procedure Manual- A laboratory procedure manual outlining the method or inspection procedure for each customary test or service performed by the laboratory shall exist.</p> <p>....procedure manual shall include reference to ASTMs etc., and if there are applicable exceptions ... and special instructions.</p>						✓		

<b>CMT Practice Requirements</b>	Reference	Yes	No	N/A	C1077	D3740	D3666	E329
The quality manual shall contain a list showing applicable dates of the qualifications, accreditations and recognition of the agency by others.						✓		
The quality manual shall contain position descriptions for each technical operational position shown on the agency's organization chart in testing areas covered by the scope of this standard. These position descriptions shall identify the position and include a description of the duties associated with the position, required skills, education and experience, and supervision exercised and received. A reference to where the required position descriptions may be found is acceptable if they are not included in the quality manual.						✓	✓	
<p>The quality manual shall contain typical test report forms, which illustrate the manner in which tests results and supporting information (See Section 8.1.11) are documented.</p> <p>Note 17 - A printout showing a typical test record is acceptable if the laboratory uses electronic media for report storage.</p>						✓		
The results of any on-the-job training performed including name of person, date of training, by whom and type of training...						✓		

<b>CMT Practice Requirements</b>	Reference	Yes	No	N/A	C1077	D3740	D3666	E329
When the agency is responsible for collecting samples, the samples must be identified with the respective portions of the work in which the material represented was or will be used.								✓
Corrective actions reported by evaluating authority shall be corrected within 30 days.					✓	✓		✓
Test reports shall not be reproduced except in full without the permission of the laboratory.								✓

The tables included below are provided for reference and include Table 1 from D3740 for soils equipment calibration requirements with calibration intervals and Table 1 from D3666 for Bituminous Materials Test Equipment with calibration intervals.

**TABLE 1 Test Equipment Calibration and Verification Requirements – ASTM D3740**

<b>Equipment—Test Method</b>	<b>Requirement</b>	<b>Interval (Month)</b>
Mechanical Shakers	Ck. Sieving Thoroughness	12
Gen. Purpose Balances, Scales & Weights	Verify	12
Compression or Loading Device	Calibrate	12
Mechanical Compactor	Calibrate	12
CA Kneading Compactor	Calibrate	24
Ovens	Verify Temperature Setting(s)	4
Vacuum System	Ck. Pressure	24
Molds	Ck. Critical Dimensions	12
Manual Hammer	Ck. Wt. & Critical Dimensions	12
Sieves	Ck. Physical Condition	6
Liquid Limit Device	Ck. Wear & Critical Dimensions	12
Grooving Tool	Ck. Critical Dimensions	12
Hydrometers	Ck. Critical Dimensions	24
Straightedge	Ck. planeness of edge	6
Weighted Foot Assembly	Ck. weight	12
CBR Annular and Slotted Weights	Ck. weight	12
CBR Penetration Piston	Ck. diameter	12
Standard Metal Specimen	Ck. outside diameter	12
Metal Follower	Ck. diameter	12
Gen. Purpose Balances, Scales, Weights	Verify	12
Compression or Loading Device	Verify Load Indications	12
Ovens	Verify Temperature Settings	4
Sieves	Check Physical Condition	6
Dial Gages, LVDTs, Micrometers	Verify Indications	6
Pressure Gages and Transducers	Calibrate	6
Load Cells	Calibrate	12
Flow Meters	Calibrate	12
Thermal Meters and Transducers	Calibrate	12
Sonic Transducers	Verify	6

<b>TABLE 1 Bituminous Materials Test Equipment – ASTM D3666</b>		
Equipment—Test Method	Requirement	Interval (Month)
Saybolt Viscometers—D 244	Calibrate	36
Mechanical Shakers	Verify sieving thoroughness	12
General Purpose Balances, Scales and Weights	Calibrate	12
Temperature Measuring Devices— D 5, D 70, D 113, D 2041, D 2170, D 2171, D 3142, D 4402, D 6648, D 2872, D 6521	Calibrate	6
Analytical Balances and Weights	Calibrate	24
Compression Testing Machine— D 1074, D 1075, D 1559, D 1560	Calibrate	12
CA Kneading Compactor—D 1561	Calibrate	24
Timers—D 2170, D 2171	Calibrate	6
Ovens	Calibrate temperature settings	4
Penetrometer and Accessories— D5	Calibrate dial and timer accuracy and verify needle condition	6
Ductility Machine—D 113	Verify molds and speed of travel	12
TFO and RTFO Oven—D 1754, D 2872	Verify shelf/carriage rotation speed and temperature	12
Sieves	Verify physical condition	6
Molds, Followers, Calibration Cylinders—D 1560, D 1561	Verify critical dimensions	12

Equipment—Test Method	Requirement	Interval (Month)
Molds, Manual Compaction Hammers, Breaking Heads— D 1559	Verify critical dimensions and mass of hammer	12
Molds and Plungers—D 1074	Verify critical dimensions	12
Brass Rings and Assembly— D36	Verify critical dimensions	12
Pycnometers—D 70	Calibrate critical dimensions	12
Collars and Floats—D 139	Verify critical dimensions	12
Flowmeters—D 1856, D 2872	Calibrate	12
Molds and Tampers—C 128	Verify critical dimensions	24
Flash Cups—D 92, D 3143	Verify critical dimensions	12
Rotary transducers—D 4402	Verify with a reference fluid	6
Pressure Gages—D 6521	Calibrate	6
Stainless steel beams—D 6648	Verify dimensions	12
Standard masses—D 6648	Verify masses	12
Internal balances—D 6307	Calibrate	12

Document Revision History

Date	Description
06/06/06	Updated Checklist to reflect changes in C1077-05, D3740-04, D3666-05, and E329-05