



**Certification Policies
for
Concrete Laboratory Testing Technician – Level 1
Concrete Laboratory Testing Technician – Level 2** [®]

*Last revised by the Certification Programs Committee
October 23, 2012*

The statements contained herein are a consolidation of approved policies and procedures. This policy statement supersedes all previous action of the ACI Board of Direction with respect to Concrete Laboratory Testing Technician certification.

The certification program policies are organized into eight sections as follows:

Section 1.0	Certification Criteria
Section 2.0	Examination Criteria
Section 3.0	Re-examination Criteria
Section 4.0	Appeals Criteria
Section 5.0	Sponsoring Group Criteria
Section 6.0	Examiner/Supplemental Examiner Criteria
Section 7.0	ACI Responsibilities
Section 8.0	Recertification Criteria

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SECTION 1.0 CERTIFICATION CRITERIA

- 1.1 The American Concrete Institute (ACI) certification program for Concrete Laboratory Testing Technician—Level 1 (CLTT1) requires current certification as an ACI Concrete Strength Testing Technician (CSTT) and ACI Aggregate Testing Technician—Level 1 (ATT1).
- 1.2 No specific education or work experience is required for CLTT1 certification.
- 1.3 The American Concrete Institute (ACI) certification program for Concrete Laboratory Testing Technician—Level 2 (CLTT2) shall require successful completion of both a written examination and a performance examination.
- 1.4 Certification as a CLTT2 requires current ACI CLTT1 certification and at least one year (2000 hours) of approved work experience, of which up to one-half may be substituted with a minimum of 60 credit hours of verified advanced education.
- 1.5 ACI certification for CLTT1 and/or CLTT2 shall be valid for a period of five [5] years from the date of completion of all certification requirements.
- 1.6 A technician shall be permitted to renew certification by satisfying the recertification requirements.

SECTION 2.0 EXAMINATION CRITERIA

GENERAL REQUIREMENTS

- 2.1 ACI CLTT1 certification will be granted upon completion of the ACI CSTT and the ACI ATT1 certifications. ACI CSTT certification program content and operation is described in *ACI Certification Policies for Concrete Strength Testing Technician*, Appendix C620.1-1; ACI ATT1 certification program content and operation is described in *ACI Certification Policies for Aggregate Testing Technician – Level 1 / Aggregate Testing Technician – Level 2*, Appendix 620.1-2.
- 2.2 The content of the written and performance examinations for certification as a CLTT2 shall be derived directly from the *Job-Task Analysis (JTA) for ACI Concrete Laboratory Testing Technician—Level 2 Certification*, Appendix C620.1-3.

Both the written and performance examinations for CLTT2 must be successfully completed within a one (1) year period.
- 2.3 The examinations shall be conducted by the Examiner, Proctors, and/or Supplemental Examiners as applicable. [See Section 6.0]
- 2.4 The Examiners, Proctors, Supplemental Examiners, and/or Sponsoring Groups have no jurisdiction over the content of any examination, or over the grading of the written examination.

- 2.5 The CLTT2 written examination is open-book; reference materials other than those approved by ACI shall not be permitted in the examination area. The performance examination is closed-book; notes or other technical material shall not be permitted in the examination area. Simple function (non-programmable) pocket calculators shall be permitted for either examination.

WRITTEN EXAMINATION

- 2.6 The written examination for certification as a CLTT2 shall consist of approximately seventy-five [75] multiple choice questions, with eight to twelve [8–12] questions on each standard.
- 2.7 A maximum of two [2] hours shall be permitted for completion the written examination.
- 2.8 Oral administration of the written examination is permitted, contingent upon approval by the ACI Certification Department.
- 2.9 Successful completion of the written examination shall be considered as meeting both of the following requirements:
- A) Score sixty percent [60%] or higher on each individual standard (e.g., six [6] correct out of ten [10] questions); AND
 - B) Score a minimum of seventy percent [70%] for the overall examination (e.g., seventy [70] correct out of a possible one hundred [100]).

PERFORMANCE EXAMINATION

- 2.10 The performance examination for certification as an ACI CLTT2 shall require the Examinee to perform, pursuant to the contents of the ACI performance examination checklist, procedures described in Practice C192/C192M and Test Method C157/C157M.

NOTE: Some procedures and test methods may be described verbally as indicated on the performance exam checklists. Specific instructions keyed to these areas and describing administration procedures will be included with the exam materials for each session.

An Examinee may be waived from performing the procedures for Test Methods C143/C143M, C173/C173M, C231/C231M, C138/C138M, and C1064/C1064M under the Practice C192/C192M performance examination if he/she holds current certification as an ACI Concrete Field Testing Technician—Grade I.

Proof of certification must be verified by the Examiner/Supplemental Examiner at the time of testing for the waiver to be granted.

- 2.11 The Examinee shall conduct the performance examination in the direct presence of the Examiner or Supplemental Examiner(s).
- 2.12 The Examinee's performance shall be evaluated based on the criteria of the performance examination checklist.

- 2.13 Grading for the individual performance examinations shall be on a pass/fail basis only, with the Examiner/Supplemental Examiner indicating pass or fail for each step of the checklist.
- 2.14 Incorrect performance, or omission of one or more of the steps of the performance checklist, shall constitute failure of that trial.
- 2.15 An Examinee shall be allowed a second trial, on the same day of the examination, if the first trial was not successfully completed.
- 2.16 The second trial of a particular test shall not be conducted immediately following the first trial.
- 2.17 An Examinee shall be permitted to suspend one trial and begin the procedure over again. A voluntary suspension of a trial shall not be counted as a failure of that trial.
- 2.18 The Examiner/Supplemental Examiner shall not stop a trial at any point which an error is made.
- 2.19 A second trial, or voluntary repeat of a trial, shall require performance of the entire practice or test method from the beginning, not from the point the error was made.
- 2.20 Immediately following completion of each trial, the Examiner/Supplemental Examiner shall inform the Examinee of the results, either pass or fail.
- 2.21 When a failure of a trial occurs, the Examiner/Supplemental Examiner shall inform the Examinee of the particular step(s) performed incorrectly.
- 2.22 The Examinee shall be permitted to leave the examination area between trials to consult notes or books.
- 2.23 The Examinee shall have the option of using either a Type-A or Type-B meter when performing Test Method C231/C231M as included in the Practice C192/C192M checklist.
- 2.24 It shall be the Sponsoring Group's responsibility to provide equipment that conforms to the applicable ASTM practices and test methods and that it is in good working order. The Examinee shall not be penalized as a result of faulty or incorrect equipment.

NOTE: In cases where the Supplemental Examiners have been approved to conduct the performance examination without the direct supervision of an approved Examiner, the Supplemental Examiner shall be responsible for determining that the equipment requirements listed in Section 2.24 are met.

- 2.25 Failure of Practice C192/C192M or Test Method C157/C157M after two [2] trials will constitute failure of the performance examination.

SECTION 3.0 RE-EXAMINATION CRITERIA

- 3.1 Failure of the written examination by either of the criteria cited under Section 2.9 shall require reexamination on the entire written examination.

- 3.2 Failure or invalidation of the performance examination for CLTT2 shall require re-examination on the entire performance examination.
- 3.3 Reexamination on the written or performance examination must be taken within one [1] year of the initial examination. Otherwise, both the written and the performance examinations must be retaken in their entireties.

SECTION 4.0 APPEALS CRITERIA

- 4.1 All appeals shall be directed initially to the examiner.
- 4.2 In the event that the examinee is not satisfied with the decision of the examiner regarding an appeal, the examinee may pursue an appeal with ACI according to the following order:
1. Sponsoring Group
 2. ACI Director of Certification
 3. The Certification Appeals Committee [consisting of the Director of Certification, the Chairman of the Certification Programs Committee, and the Chairman of Committee C 620]
 4. Committee C 620, Laboratory Technician Certification
 5. Certification Programs Committee
- 4.3 Appeals submitted to ACI for consideration must be received, in writing, within sixty [60] days of the receipt of the examination at ACI Headquarters.

SECTION 5.0 SPONSORING GROUP CRITERIA

- 5.1 Groups desiring to conduct ACI Certification program(s) shall adhere to the current *Policy on Sponsoring Groups for Certification* (Appendix 620.1-4).

SECTION 6.0 EXAMINER / SUPPLEMENTAL EXAMINER CRITERIA

- 6.1 The Examiner shall be authorized by ACI to conduct the ACI certification examinations for CLTT2.
- 6.2 The Examiner shall be approved by ACI. Qualifications shall be submitted on Form D1/D3 and shall be evaluated in accordance with the criteria on Form D-13.
- 6.3 The Examiner shall meet the following requirement:
- A) Be a registered professional engineer;
 - B) Have had at least two [2] years of recent experience in concrete construction, inspection, or testing; and

- C) Be thoroughly familiar with the current applicable standards.
- 6.4 Examiners, supplemental examiners, examiners acting as supplemental examiners and proctors shall not conduct any portion of the examination for anyone with whom he/she is personally related.
- 6.5 Examiners/Supplemental Examiners shall not examine anyone on the performance examination who is employed in the same organization. Governmental or other organizations may petition ACI, in writing, and request a waiver of this requirement. Waivers shall be granted, on a case by case basis, only if it can be shown that the intent of the policy will be maintained.
- 6.6 Supplemental Examiners shall be permitted to assist in conducting the performance examination, and may be authorized to conduct the performance examination without direct supervision of an Examiner with prior approval of ACI Committee C 620.
- 6.7 Supplemental Examiners shall satisfy the following requirements:
- A) Have recent experience in concrete testing;
 - B) Be selected and adjudged qualified by the Examiner or ACI Committee C 620;
 - C) Be considered trustworthy and conscientious.
- 6.8 Proctors shall be permitted to assist the Examiner in conducting the written examination.
- 6.9 Proctors shall satisfy the following requirements:
- A) Be considered trustworthy and conscientious by the Examiner.
- 6.10 The Examiner shall be directly responsible for:
- A) Selection of the Supplemental Examiners and Proctors, except in cases where the Supplemental Examiners are approved by ACI Committee C 620;
 - B) Verification that the qualifications of the Supplemental Examiners and Proctors conform to the criteria outlined in Section 6.4 through 6.9 of this policy;
 - C) Ensuring the secure handling of examination materials;
 - D) Verification of the identity of each Examinee, and ensuring that the Examinees are aware of the certification criteria;
 - E) Verification that the Examinees have signed the release statement on the written and performance examinations prior to testing;
 - F) Verification that the performance evaluations are conducted by approved Supplemental Examiners, and co-signing the performance checklists where appropriate;
 - G) Entering the appropriate grade for the completed performance examination on the checklist report;
 - H) Ensuring that all Examinees have an opportunity to take a second trial on any failed procedure of the performance examination; and
 - I) Ensuring that terms are not defined and examination questions are not interpreted during the course of the written examination.
- 6.11 Examiners or Supplemental Examiners shall not observe more than one Examinee conducting tests at any one time during the performance examination.

- 6.12 Examiners or Supplemental Examiners monitoring the performance examination for Test Method C231/C231M shall be qualified for whichever type meter he/she is monitoring.
- 6.13 The examination sessions must be supervised constantly by the Examiner, Supplemental Examiner(s) and/or Proctor(s).

SECTION 7.0 ACI DUTIES AND RESPONSIBILITIES

- 7.1 ACI shall approve the Sponsoring Group.
- 7.2 ACI shall authorize the Sponsoring Group to conduct examination sessions for CLTT2 certification.
- 7.3 ACI shall approve the Examiner.
- 7.4 ACI shall grade the written examinations, review the performance examinations, and notify Examinees and the Examiner of the final results in writing.
- 7.5 ACI shall certify the Examinees who have satisfied the certification requirements. ®
- 7.6 ACI shall issue certificates and wallet cards to successful Examinees.

SECTION 8.0 RECERTIFICATION CRITERIA

- 8.1 Recertification as an CLTT1 or CLTT2 requires successful completion of the certification requirements outlined in Sections 1.0, 2.0, and 3.0 of this policy.

End of Policy Text



Certification

Certification Policies for Concrete Strength Testing Technician

*Last revised by the Certification Programs Committee
October 23, 2012*

The statements contained herein are approved policies and procedures. This revised policy statement supersedes all previous action of the ACI Board of Direction with respect to Concrete Strength Testing Technician certification.

The certification program policies are organized into eight sections as follows:

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SECTION 1.0 CERTIFICATION CRITERIA

- 1.1 The American Concrete Institute (ACI) certification program for Concrete Strength Testing Technician requires successful completion of a written examination and a performance examination. No certifications will be granted by ACI without successful completion of both examinations.
- 1.2 No specific education or work experience is required as a prerequisite for Concrete Strength Testing Technician certification.
- 1.3 ACI certification as a Concrete Strength Testing shall be valid for a period of five [5] years from the date all certification requirements are completed.
- 1.4 Certification is renewed by satisfying the recertification requirements.

SECTION 2.0 EXAMINATION CRITERIA

GENERAL REQUIREMENTS

- 2.1 The content of the written and performance examinations for certification as a Concrete Strength Testing Technician is derived from the *Job-Task Analysis for ACI Concrete Strength Testing Technician Certification* (Annex 620.2-1).

ACI will grant certification to examinees who successfully complete both the written and performance examinations within a one (1) year period.
- 2.2 There shall be no questions regarding general concrete technology on the written examination.
- 2.3 The examinations shall be conducted by the examiner, proctors, and/or supplemental examiners as applicable. [See Section 6.0]
- 2.4 The Examiners, Proctors, Supplemental Examiners, and/or Sponsoring Groups have no jurisdiction over the content of any examination or over the grading of the written examination.
- 2.5 All written and performance examinations are closed-book. Notes or other technical material will not be permitted in the examination area. Use of simple-function (*i.e.*, non-programmable) calculators will be permitted, but examinees will not be allowed to share calculators.

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WRITTEN EXAMINATION

- 2.6 The written examination for certification as a Concrete Strength Testing Technician shall consist of approximately thirty-five to forty [35–40] multiple choice questions, with eight to ten [8–10] questions on each Test Method and/or Practice.
- 2.7 A maximum of one [1] hour shall be permitted for completion of the written examination.
- 2.8 Oral administration of the written examination is permitted, contingent upon prior approval in writing by the ACI Certification Department.
- 2.9 Successful completion of the written examination shall be considered as meeting both the following requirements:
- A) Score sixty percent [60%] or higher on each individual Test Method and/or Practice (*i.e.*, six [6] correct out of ten [10] questions); AND
 - B) Score a minimum of seventy percent [70%] for the overall examination (*i.e.*, twenty-eight [28] correct out of a possible forty [40]).

PERFORMANCE EXAMINATION

- 2.10 The performance examination for certification as a Concrete Strength Testing Technician requires the examinee to perform, in their entirety, each of the following Test Methods and Practices: ASTM C39/C39M, ASTM C78, ASTM C617 and ASTM C1231/C1231M.
- 2.11 The examinee shall conduct the performance examination in the direct presence of the examiner or supplemental examiner(s).
- 2.12 The examinee's performance shall be evaluated based on the criteria of the performance examination checklist.
- 2.13 Grading for the individual performance examinations shall be on a pass/fail basis only, with the examiner/supplemental examiner indicating a passing or failing score for each step of the checklist.
- 2.14 Incorrect performance, or omission of one or more of the steps of the performance checklist, shall constitute failure of that trial.
- 2.15 An examinee shall be allowed a second trial for each of the applicable Test Methods and/or Practices, on the same day of the examination, if the first trial was not successfully completed.

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- 2.16 The second trial of a particular test shall not be conducted immediately following the first trial.
- 2.17 An examinee shall be permitted to suspend one trial and begin the procedure over again. A voluntary suspension of a trial shall not be counted as a failure of that trial.
- 2.18 The examiner/supplemental examiner shall not stop a trial when an error is made.
- 2.19 A second trial (or voluntary repeat of a trial) shall require performance of the entire Test Method or Practice from the beginning of the test, not from the point the error was made or the trial was suspended.
- 2.20 Immediately following completion of each trial, the examiner/supplemental examiner shall inform the examinee of the results, either pass or fail.
- 2.21 When a failure of a trial has occurred, the examiner/supplemental examiner shall inform the examinee of the particular step(s) performed incorrectly.
- 2.22 The examinee shall be permitted to leave the examining area between trials to consult notes or books.
- 2.23 It shall be the Sponsoring Group's responsibility to provide equipment that conforms to the applicable Test Methods and Practices and to ensure that the equipment is in proper working order. The examinee shall not be penalized as a result of faulty or incorrect equipment.
- 2.24 Failure on any of the prescribed Test Methods and/or Practices after two [2] trials will constitute failure of that part of the performance examination.

SECTION 3.0 RE-EXAMINATION CRITERIA

- 3.1 Failure of the written examination by either of the criteria cited under Section 2.9 shall require re-examination on the entire written examination.
- 3.2 Invalidation of the performance examination (e.g., non-conformance with Section 6.5) or failure on one [1] or more of the four [4] required Test Methods and Practices shall require re-examination on the entire performance examination.
- 3.3 Successful re-examination on the written or performance examination must be completed within one [1] year of the initial examination. Otherwise, both the written and the performance examinations must be retaken in their entireties.

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SECTION 4.0 APPEALS CRITERIA

- 4.1 All appeals shall be directed initially to the examiner.
- 4.2 In the event that the examinee is not satisfied with the decision of the examiner regarding an appeal, the examinee may pursue an appeal with ACI according to the following order:
1. Sponsoring Group
 2. ACI Director of Certification
 3. The Certification Appeals Committee [consisting of the Director of Certification, the Chairman of the Certification Programs Committee, and the Chairman of Committee C 620]
 4. Committee C 620, Laboratory Technician Certification
 5. Certification Programs Committee
- 4.3 Appeals submitted to ACI for consideration must be received, in writing, within sixty [60] days of the receipt of the examination at ACI Headquarters.

SECTION 5.0 SPONSORING GROUP CRITERIA

- 5.1 Groups desiring to conduct ACI Certification program(s) shall adhere to the current *Policy on Sponsoring Groups for Certification* (Annex 620.2-2).

SECTION 6.0 EXAMINER / SUPPLEMENTAL EXAMINER CRITERIA

- 6.1 The examiner shall be approved by ACI. Qualifications shall be submitted on Form D1/D3 and shall be evaluated according to ACI-approved criteria.
- 6.2 The examiner shall be authorized by ACI to conduct the ACI certification examinations for Concrete Strength Testing Technician.
- 6.3 The examiner shall meet the following requirements:
- A) Be a registered professional engineer;
 - B) Have had at least two [2] years of recent experience in concrete construction, inspection, or testing; and
 - C) Be thoroughly familiar with the current applicable Test Methods and Practices.
- 6.4 Examiners, supplemental examiners, examiners acting as supplemental examiners and proctors shall not conduct any portion of the examination for anyone with whom he/she is personally related.
- 6.5 Examiners/supplemental examiners shall not examine anyone on the performance examination who is employed in the same organization. Governmental or other organizations may petition ACI, in writing, and

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request a waiver of this restriction. ACI may grant waivers, on a case-by-case basis, only if it can be shown that the intent of the policy will be maintained.

- 6.6 Supplemental examiners shall be permitted to assist in conducting the performance examination, and may be authorized to conduct the performance examination without the direct supervision of an Examiner with prior approval of ACI Committee C 620.
- 6.7 Supplemental examiners shall satisfy the following requirements:
- A) Have recent experience in concrete testing;
 - B) Be selected and adjudged qualified by the examiner or ACI Committee C 620;
 - C) Be considered trustworthy and conscientious.
- 6.8 Proctors shall be permitted to assist the examiner in conducting the written examination.
- 6.9 Proctors shall satisfy the following requirements:
- A) Be considered trustworthy and conscientious by the Examiner.
 - B) Be selected by the Examiner.
- 6.10 The examiner shall be directly responsible for the following activities:
- A) Select the supplemental examiners and proctors, except in cases where the supplemental examiners are approved in advance by ACI Committee C 620;
 - B) Verify the qualifications of the supplemental examiners and proctors according to the criteria outlined in Section 6.4 through 6.9 of this policy;
 - C) Order examinations;
 - D) Verify the identity of each examinee, and ensure that the examinees are aware of the certification criteria;
 - E) Verify that the examinees have signed the release statement on the written and performance examinations prior to testing;
 - F) Verify that the performance evaluations were conducted by approved supplemental examiners, and co-sign the performance checklists where appropriate;
 - G) Enter the appropriate grade for the completed performance examination on the checklist report;
 - H) Ensure that all examinees have an opportunity to take a second trial on any failed procedure of the performance examination; and
 - I) Shall not define terms or interpret examination questions during the course of the written examination.
- 6.11 Examiners or supplemental examiners shall not observe more than one examinee conducting tests at any one time during the performance examination.
- 6.12 The examination sessions must be supervised constantly by the examiner, supplemental examiner(s) and/or proctor(s).

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SECTION 7.0 ACI DUTIES AND RESPONSIBILITIES

- 7.1 ACI shall approve the Sponsoring Group.
- 7.2 ACI shall authorize the Sponsoring Group to conduct examining sessions for Concrete Strength Testing Technician certification.
- 7.3 ACI shall approve the examiner.
- 7.4 ACI shall grade the written examinations and review the performance examination, and notify the examinee, examiner and the Sponsoring Group of the final results in writing.
- 7.5 ACI shall authorize the issuance of certificates to examinees who have satisfied the certification requirements.
- 7.6 ACI shall certify the examinees who have satisfied the certification requirements.
- 7.7 ACI shall issue a certificate and identification card to successful examinees.
- 7.8 ACI shall keep all written exam scores confidential, unless authorized in writing by the examinee.

SECTION 8.0 RECERTIFICATION CRITERIA

- 8.1 Recertification as a Concrete Strength Testing Technician requires successful completion of the then current certification requirements outlined in Sections 1.0, 2.0 and 3.0 of this policy.

End of Policy Text

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ANNEX 620.2-1

Job-Task Analysis (JTA) for ACI Concrete Strength Testing Technician Certification 4/16/13

HOW TO USE THIS JTA:

For each of the following assessment methods, the Candidate must:

On the written examination:

- **Understand** the following general concepts, which may not have specified values, procedures, or measurements; *and*
- **Know** the following specific procedures or values; performance of these items may also be assessed on the performance examination.

On the performance examination:

- **Perform**—or describe verbally, where allowed—the following tasks or steps, which are part of the specified procedure; knowledge of these items may also be assessed on the written examination.

RESOURCES:

ASTM C617/617M – Standard Practice for Capping Cylindrical Concrete Specimens

ASTM C1231/1231M – Standard Practice for Use of Unbonded Caps in Determination of Compressive Strength of Hardened Concrete Cylinders

ASTM C39/39M – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

ASTM C78/78M – Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)

Information contained in the footnotes and appendices of the above referenced documents shall not be subject to examination.

ASTM C617/617M – Standard Practice for Capping Cylindrical Concrete Specimens

- Understand scope of practice
- Understand significance and use of practice
- Know dimensional requirements of capping plates
- Know criteria for sulfur melting pots
- Understand use of Table 1 for strength and thickness requirements of capping materials
- Understand requirements for qualification of high-strength gypsum plaster
- Understand requirements for qualification of sulfur mortar caps
- Know and perform the procedures for capping hardened concrete specimens
- Know how to protect and store specimens after capping
- Understand safety issues related to melting pots
- Know the requirements for and perform alignment check of cylinders
- Know and perform the procedure for planeness check of caps, including the proper reporting of results
- Know and perform the procedure for thickness measurements of caps, including the proper reporting of results

ASTM C1231/1231M – Standard Practice for Use of Unbonded Caps in Determination of Compressive Strength of Hardened Concrete Cylinders

- Understand scope of practice
- Know compressive strength limits for the use of unbonded caps
- Understand significance and use of unbonded caps
- Know dimensional, material, and hardness requirements of elastomeric pads
- Know dimensional, material, and planeness requirements of pad retainers
- Know requirements governing the use of elastomeric pads
- Know the requirements for and perform perpendicularity check of concrete cylinder ends prior to test

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ANNEX 620.2-1

Job-Task Analysis (JTA) for ACI Concrete Strength Testing Technician Certification (Continued)

- Know the limits for and perform check for depressions in concrete cylinder ends prior to test
- Know requirements for the use of unbonded caps in combination with other capping methods
- Know wear requirements for pads and perform examination for excessive wear
- Know and perform the procedures for centering, initial loading, and checking specimens for perpendicularity
- Know and perform the procedures for loading, testing, and calculation per Test Method C39/C39M, including the proper reporting of test results
- Understand methodology used to qualify the use of unbonded caps for various strength levels and to qualify the permitted number of pad reuses
- Understand the use of calculations used in qualification testing for computing the difference in strength for each pair of cylinders and computing the average strength of cylinders tested using unbonded caps and the reference capping system
- Know the minimum percentage of reference capping system strength that must be met to qualify unbonded caps for use

ASTM C39/39M – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

- Understand scope of test method
- Understand summary of test method
- Understand significance and use of test method
- Understand calibration requirements of testing machine
- Understand design requirements of testing machine
- Understand accuracy requirements of testing machine
- Understand general requirements for bearing blocks
- Understand requirements for bottom bearing blocks
- Understand requirements for upper spherically-seated blocks
- Understand requirements for load-indicating dials
- Understand requirements for digital load indicators
- Know requirements for allowable variance in cylinder diameter
- Know requirements for and perform check of perpendicularity and planeness of cylinder ends
- Know the requirements for determining daily average diameter
- Understand the requirements for determining density of test specimens (when requested)
- Know the requirements for conducting length measurements
- Know the requirements for maintaining specimens in a moist condition until time of test
- Understand the permissible time tolerances for testing
- Know and perform the procedure for positioning and centering specimens in the machine
- Know and perform the procedures for zeroing the machine and aligning upper bearing block
- Know and perform the procedure for applying the test load at the proper rate
- Know and perform the procedures for applying the load to failure and identifying break type
- Know and perform the calculation of test results, including the proper reporting of compressive strength
- Know how to correct strength values for a given length-to-diameter ratio
- Know which information is to be included on reports

ASTM C78/78M – Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)

- Understand scope of test method
- Understand significance and use of test method
- Understand general requirements for testing machines
- Understand requirements for third-point loading apparatus

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ANNEX 620.2-1

Job-Task Analysis (JTA) for ACI Concrete Strength Testing Technician Certification (Continued)

- Know requirements for dimensions, shape, and surface conditions of test specimens
- Understand technician qualification requirements
- Know requirements for testing moist-cured specimens
- Know and perform the procedure for positioning specimens on support blocks, including checking and correcting for gap widths at contact points
- Understand how to calculate loading rate
- Know and perform the procedure for applying the test load at the proper rate
- Know and perform the procedure for measuring specimens for average width and depth after specimen fracture
- Know and perform the calculation of modulus of rupture when fracture occurs in the middle third of the span length
- Know and perform the calculation of modulus of rupture when fracture occurs outside the middle third of the span length
- Know the information to be included on reports
- Know and perform the reporting of modulus of rupture with proper precision

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APPENDIX 620.1-1

ANNEX 620.2-2

AMERICAN CONCRETE INSTITUTE

Policy on Sponsoring Groups for Certification

Approved by the ACI Board of Direction
March 21, 1991

Last revised by the ACI Certification Programs Committee
October 18, 2011

In developing certification exams for the concrete construction industry, the American Concrete Institute (ACI) has set forth minimum criteria by which an individual's proficiency is to be judged. Typically, ACI is not in a position to deliver certification exams directly to participants; therefore, it is necessary for ACI to have the ability to delegate this authority. However, if the need arises, ACI reserves the right to conduct exam sessions itself according to each program Policy.

In order to allow others to deliver its certification exams, ACI has adopted the "Sponsoring Group" concept. Sponsoring Groups act as agents of ACI in the delivery of ACI certification exams. Therefore, prior to being selected as an ACI Sponsoring Group, and for the duration of the period in which the group is authorized to act as a Sponsoring Group, such groups are subject to the following policies:

1. Sponsoring Groups shall be approved, in writing, by ACI's Certification Department (hereafter referred to as ACI) before they will be permitted to conduct an ACI¹ certification exam session. In all cases, approval of Sponsoring Groups shall be at the sole discretion of ACI.
2. In reviewing applications, ACI will consider, among other factors, the following:
 - A) The ability and willingness of the applicant to include in their constituency segments of the concrete construction industry impacted by the exams which they have applied to conduct. This includes individuals involved in the specification, production, design, construction, testing and inspection of concrete and concrete products. The applicant must establish a governance structure with representation appropriate to all of the exams for which the applicant has applied.

¹ For the purposes of this policy, references to "ACI certification" and "ACI certification program(s)" include only those administered solely by ACI (ACI programs). Programs with cosponsors are not directly addressed by this Policy.

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- B) The interest, experience and technical expertise necessary to conduct exam sessions exhibited by the applicant and/or their certification governance structure.
 - C) The legitimate need for the applicant to conduct a specific ACI certification exam within their approved operational jurisdiction.
 - D) The primary objective of the applicant in applying for sponsorship, which must coincide with ACI's overall mission of improving the quality of concrete construction within the political, social, and cultural dynamics of the intended operational jurisdiction.
3. Sponsoring Groups are required to maintain a governance structure to oversee the delivery of ACI exams. The governance structure shall consist of a committee of at least three (3) individuals, each working for a different employer and each producing a different product or service related to the concrete construction industry. At all times, at least one (1) member of the committee shall be a member of ACI. Further, ACI shall be furnished with a complete and accurate listing of contact information for all committee members including names, employers, type of businesses, physical addresses, email addresses, and both office telephone and cell phone numbers as available.
 4. The certification committee shall obtain the services of ACI-approved examiners. The examiners shall operate under the direct supervision of the certification committee to conduct ACI certification exam sessions. Examiners are permitted to conduct ACI certification exam sessions only under the auspices of ACI or ACI-approved Sponsoring Groups; and they must comply with all ACI certification policies and procedures.
 5. At the time of approval, ACI shall assign Sponsoring Groups specific geographical areas within which they will have authority to conduct ACI certification exam sessions. This area is the approved operational jurisdiction for the Sponsoring Group.
 6. ACI shall approve each Sponsoring Group on a calendar year basis for a period not to exceed two (2) years. Prior to the conclusion of this period, all groups shall reapply to ACI for approval to continue to act as an ACI Sponsoring Group.
 7. In the U.S., in areas where no Sponsoring Group is actively administering a specific ACI examination, the local ACI chapter (not a student chapter) shall have first rights to administer that specific exam. International sponsorship for any ACI examination will be assessed on a case-by-case basis.

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Policy on Sponsoring Groups for Certification

8. If an existing Sponsoring Group or ACI Chapter is solicited to administer an examination and participation is declined, or if a sponsor does not request an examination upon initial availability from ACI, or if a requested examination is not administered within two years following approval, administration of said examination may become available to other potential sponsors.
9. If more than one applicant wishes to sponsor an ACI certification exam in the same operational jurisdiction and there is documented need for more than one group to conduct the examination in that jurisdiction or portion thereof, a system of coordination between those groups shall be established. A description of this system shall be considered along with any new Sponsoring Group application and must be included in the governance system for any existing Sponsoring Group. In all cases, ACI reserves the right, in its sole discretion, to select a delivery system that in its judgment is best able to serve the interests of ACI.
10. Applicants wishing to sponsor ACI certification examinations on a "national" or "regional" basis will, in appropriate circumstances, be approved to conduct exams under specific conditions at the discretion of ACI.
11. Approved Sponsoring Groups are responsible for:
 - A) Maintaining control over the administration of ACI Certification exams offered within their operational jurisdiction. This includes, but is not limited to, maintaining control over the ethical and professional integrity of every sponsored examination session and providing ongoing oversight of exam session coordinators, examiners, and other exam delivery personnel.
 - B) Conducting a sufficient number of exam sessions and providing equitable access to those exam sessions for all individuals seeking ACI Certification within the group's operational jurisdiction.
 - C) Conducting all ACI exams in a manner which complies with the intent of ACI's policies and procedures governing certification.
 - D) Formulating, publishing, and enforcing consistent and equitable pricing for ACI Certification exams offered by the Sponsoring Group within their operational jurisdiction.
 - E) Developing and implementing participant registration processes that satisfy the policy requirements of each exam offered by the Sponsoring Group and verifying that each participant has met the eligibility requirements of the program before being allowed to complete an ACI exam.

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- F) Collecting exam fees from participants, paying materials invoices to ACI within 30 days of receipt, and distributing compensation to examiners and other program delivery personnel as warranted.
 - G) Developing a program delivery process that establishes separation between the education/training and testing divisions of the Sponsoring Group.
12. ACI has the right to revoke a Sponsoring Group's authority to conduct an ACI certification exam at any time, with or without cause, and with or without notice.
 13. Appeals resulting from the denial or revocation of Sponsoring Group status will be reviewed by ACI Staff for determination of appropriate action on a case-by-case basis.
 14. This policy shall become effective sixty (60) days after its approval by the ACI Certification Programs Committee, and shall render all previous Policy versions null and void. Sponsoring Groups shall be notified of this new policy in writing within thirty (30) days after it is approved by the ACI Certification Programs Committee.
 15. The Certification Programs Committee shall review, revise as necessary, and reapprove this Policy at intervals not exceeding two years in length.



Certification

Certification Policies for Aggregate Testing Technician – Level 1 Aggregate Testing Technician – Level 2

*Last revised by the Certification Programs Committee
November 10, 2009*

The statements contained herein are a consolidation of approved policies and procedures. This policy statement supersedes all previous action of the ACI Board of Direction with respect to Aggregate Testing Technician certification.

The certification program policies are organized into eight sections as follows:

Section 1.0	Certification Criteria
Section 2.0	Examination Criteria
Section 3.0	Re-examination Criteria
Section 4.0	Appeals Criteria
Section 5.0	Sponsoring Group Criteria
Section 6.0	Examiner/Supplemental Examiner Criteria
Section 7.0	ACI Responsibilities
Section 8.0	Recertification Criteria

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SECTION 1.0 CERTIFICATION CRITERIA

- 1.1 The American Concrete Institute (ACI) certification programs for Aggregate Testing Technician – Level 1 (ATT1) and Aggregate Testing Technician – Level 2 (ATT2) shall require successful completion of both a written examination and a performance examination.
- 1.2 No specific education or work experience are required for ATT certifications. Certification as an ACI ATT2 requires current ACI ATT1 certification.
- 1.3 ACI certification for ATT1 and/or ATT2 shall be valid for a period of five [5] years from the date of completion of all certification requirements.
- 1.4 A technician shall be permitted to renew certification by satisfying the recertification requirements.

SECTION 2.0 EXAMINATION CRITERIA

GENERAL REQUIREMENTS

- 2.1 The content of the written and performance examinations for certification as an Aggregate Testing Technician – Level 1 is derived from the *Job-Task Analysis for ACI Aggregate Testing Technician – Level 1 Certification* (Annex 620.3-1). ACI will grant certification to examinees who successfully complete both the written and performance examinations within a one (1) year period.
- 2.2 The content of the written and performance examinations for certification as a Concrete Strength Testing Technician is derived from the *Job-Task Analysis for ACI Aggregate Testing Technician – Level 2 Certification* (Annex 620.3-2). ACI will grant certification to examinees who successfully complete both the written and performance examinations within a one (1) year period.
- 2.3 The examinations shall be conducted by the examiner, proctors, and/or supplemental examiners as applicable. [See Section 6.0]
- 2.4 The Examiners, Proctors, Supplemental Examiners, and/or Sponsoring Groups have no jurisdiction over the content of any examination or over the grading of the written examination.
- 2.5 The written examinations are open book; reference materials other than those approved by ACI shall not be permitted in the examination area. The performance examinations are closed book; notes or other technical material shall not be permitted in the examination area. Simple function (non-programmable) pocket calculators shall be permitted for all examinations.

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WRITTEN EXAMINATION

- 2.6 The written examinations shall consist of approximately one hundred [100] multiple choice questions, with eight to twelve [8-12] questions on each Standard.
- 2.7 A maximum of two [2] hours shall be permitted for completion of each written examination.
- 2.8 Oral administration of the written examination is permitted, contingent upon prior approval in writing by the ACI Certification Department.
- 2.9 Successful completion of the written examination shall be considered as meeting both the following requirements:
- A) Score sixty percent [60%] or higher on each individual Standard (*e.g.*, six [6] correct out of ten [10] questions); AND
 - B) Score a minimum of seventy percent [70%] for the overall examination (*e.g.*, seventy [70] correct out of a possible one hundred [100])

PERFORMANCE EXAMINATION

- 2.10 The performance examination for certification as an ACI ATT1 and/or ATT2 shall require the examinee to perform, pursuant to the contents of the ACI performance examination checklists, procedures described in each of the Standards referenced in Sections 2.1 and 2.2, respectively.
- Note: Some procedures and test methods may be described verbally as indicated on the performance exam checklists. Specific instructions keyed to these areas and describing administration procedures will be included with the exam materials for each session.
- 2.11 The examinee shall conduct the performance examination in the direct presence of the examiner or supplemental examiner(s).
- 2.12 The examinee's performance shall be evaluated based on the criteria of the performance examination checklist.
- 2.13 Grading for the individual performance examinations shall be on a pass/fail basis only, with the examiner/supplemental examiner indicating pass or fail for each step of the checklist.
- 2.14 Incorrect performance, or omission of one or more of the steps of the performance checklist, shall constitute failure of that trial.

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- 2.15 All sections of the performance exam required for certification must be taken within a single examination session not exceeding eight calendar days.

Note: This provision was adopted to address the number of tests on the performance exam, their complexity, and the amount of time in setup and administration necessary to conduct one initial full exam (all sections) once through in its entirety. It is not intended that examinees be allowed more than two attempts to pass any one test method within any single eight-day exam session.

- 2.16 An examinee shall be allowed a second trial, on the same day of the examination, if the first trial was not successfully completed for each of the applicable Standards.

- 2.17 The second trial of a particular test shall not be conducted immediately following the first trial.

- 2.18 An examinee shall be permitted to suspend one trial and begin the procedure over again. A voluntary suspension of a trial shall not be counted as a failure of that trial.

- 2.19 The examiner/supplemental examiner shall not stop a trial at any point which an error is made.

- 2.20 A second trial, or voluntary repeat of a trial, shall require performance of the entire test method from the beginning, not from the point the error was made.

- 2.21 Immediately following completion of each trial, the examiner/supplemental examiner shall inform the examinee of the results, either pass or fail.

- 2.22 When a failure of a trial occurs, the examiner/supplemental examiner shall inform the examinee of the particular step(s) performed incorrectly.

- 2.23 The examinee shall be permitted to leave the examination area between trials to consult notes or books.

- 2.24 It shall be the Sponsoring Group's responsibility to provide equipment which conforms to the applicable Standards and that it is in good working order. The examinee shall not be penalized as a result of faulty or incorrect equipment.

Note: In cases where the Supplemental Examiners have been approved to conduct the performance examination without the direct supervision of an approved Examiner (6.6), the Supplemental Examiner shall be responsible for determining that the equipment requirements listed in Section 2.24 are met.

- 2.25 Failure on any of the required Standards after two [2] trials will constitute failure of that section of the performance examination.

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SECTION 3.0 RE-EXAMINATION CRITERIA

- 3.1 Failure of the written examination by either of the criteria cited under Section 2.9 shall require reexamination on the entire written examination.
- 3.2 Failure or invalidation (for example non-conformance with Section 6.5) of any of the required Standards covered by the performance examination in any one session shall require reexamination on the entire performance examination.
- 3.3 Reexamination on the written or performance examination must be taken within one [1] year of the initial examination. Otherwise, both the written and the performance examinations must be retaken in their entireties.

SECTION 4.0 APPEALS CRITERIA

- 4.1 All appeals shall be directed initially to the examiner.
- 4.2 In the event that the examinee is not satisfied with the decision of the examiner regarding an appeal, the examinee may pursue an appeal with ACI according to the following order:
 1. Sponsoring Group
 2. ACI Director of Certification
 3. The Certification Appeals Committee [consisting of the Director of Certification, the Chairman of the Certification Programs Committee, and the Chairman of Committee C 620]
 4. Committee C 620, Laboratory Technician Certification
 5. Certification Programs Committee
- 4.3 Appeals submitted to ACI for consideration must be received, in writing, within sixty [60] days of the receipt of the examination at ACI Headquarters.

SECTION 5.0 SPONSORING GROUP CRITERIA

- 5.1 Groups desiring to conduct ACI Certification program(s) shall adhere to the current *Policy on Sponsoring Groups for Certification* (Annex 620.3-3).

SECTION 6.0 EXAMINER / SUPPLEMENTAL EXAMINER CRITERIA

- 6.1 The examiner shall be authorized by ACI to conduct the ACI certification examinations for ATT1 and ATT2.

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- 6.2 The examiner shall be approved by ACI. Qualifications shall be submitted on Form D1/D3 and shall be evaluated in accordance with the criteria on Form D-13.
- 6.3 The examiner shall meet the following requirements:
- A) Be a registered professional engineer;
 - B) Have had at least two [2] years of recent experience in construction, including aggregate testing; and
 - C) Be thoroughly familiar with the current applicable Standards.
- 6.4 Examiners, supplemental examiners, examiners acting as supplemental examiners and proctors shall not conduct any portion of the examination for anyone with whom he/she is personally related.
- 6.5 Examiners/supplemental examiners shall not examine anyone on the performance examination who is employed in the same organization. Governmental or other organizations may petition ACI, in writing, and request a waiver of this requirement. Waivers shall be granted, on a case by case basis, only if it can be shown that the intent of the policy will be maintained.
- 6.6 Supplemental examiners shall be permitted to assist in conducting the performance examination, and may be authorized to conduct the performance examination without direct supervision of an Examiner with prior approval of ACI Committee C620.
- 6.7 Supplemental examiners shall satisfy the following requirements:
- A) Have had recent experience in aggregate testing;
 - B) Be selected and adjudged qualified by the examiner or ACI Committee C620;
 - C) Be considered trustworthy and conscientious.
- 6.8 Proctors shall be permitted to assist the examiner in conducting the written examination.
- 6.9 Proctors shall satisfy the following requirements:
- A) Be considered trustworthy and conscientious by the Examiner.
- 6.10 The examiner shall be directly responsible for:
- A) Selection of the supplemental examiners and proctors, except in cases where the supplemental examiners are approved by ACI Committee C620;
 - B) Verification that the qualifications of the supplemental examiners and proctors conform to the criteria outlined in Section 6.4 through 6.9 of this policy;
 - C) Assuring the secure handling of examination materials;
 - D) Verification of the identity of each examinee, and assuring that the examinees are aware of the certification criteria;

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- E) Verification that the examinees have signed the release statement on the written and performance examinations prior to testing;
- F) Verification that the performance examinations are conducted by approved supplemental examiners, and co-signing the performance checklists where appropriate;
- G) Entering the appropriate grade for the completed performance examination on the checklist report;
- H) Assuring that all examinees have an opportunity to take a second trial on any failed procedure of the performance examination; and
- I) Assuring that terms are not defined and examination questions are not interpreted during the course of the written examination.

6.11 Examiners or supplemental examiners shall not observe more than one examinee conducting tests at any one time during the performance examination.

6.12 The examination sessions must be supervised constantly by the examiner, supplemental examiner(s) and/or proctor(s).

SECTION 7.0 ACI DUTIES AND RESPONSIBILITIES

7.1 ACI shall approve the local sponsoring group.

7.2 ACI shall authorize the local sponsoring group to conduct examination sessions for ATT1 and ATT2 certifications.

7.3 ACI shall approve the examiner.

7.4 ACI shall grade the written examinations, review the performance examinations, and notify examinees and the examiner of the final results in writing.

7.5 ACI shall certify the examinees that have satisfied the certification requirements.

7.6 ACI shall issue certificates and wallet cards to successful examinees.

SECTION 8.0 RECERTIFICATION CRITERIA

8.1 Recertification as an ATT1 or ATT2 requires successful completion of the certification requirements outlined in Sections 1.0, 2.0 and 3.0 of this policy.

End of Policy Text

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ANNEX 620.3-1

Job-Task Analysis (JTA) for ACI Aggregate Testing Technician—Level 1 Certification 12/17/16

HOW TO USE THIS JTA:

On the written examination, the Candidate must:

- **Understand** the following general concepts, which may not have specified values, procedures, or measurements; *and*
- **Know** the following specific procedures or values; performance of these items may also be assessed on the performance examination.

On the performance examination:

- **Perform**—or describe verbally, where allowed—the following tasks or steps, which are part of the specified procedure; knowledge of these items may also be assessed on the written examination.

RESOURCES:

AASHTO T 2/ASTM D75 – Standard Method of Test for Sampling of Aggregates

AASHTO T 248/ASTM C702 – Standard Method of Test for Reducing Samples of Aggregate to Testing Size

AASHTO T 11/ASTM C117 – Standard Method of Test for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing

AASHTO T 27/ASTM C136 – Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates

AASHTO T 85/ASTM C127 – Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate

AASHTO T 84/ASTM C128 – Standard Method of Test for Specific Gravity and Absorption of Fine Aggregate

AASHTO T 255/ASTM C566 – Standard Method of Test for Total Evaporable Moisture Content of Aggregate by Drying

AASHTO T 21/ASTM C40 – Standard Method of Test for Organic Impurities in Fine Aggregates for Concrete

The content of the performance examination for certification as an ATT1 shall be derived from the afore-referenced resource standards. Information contained in the notes of the afore-referenced resource Standards shall be subject for the written examination. Information contained in the appendices of the afore-referenced resource standards shall not be subject for examination except for Appendix X1 of AASHTO T2/ASTM D75.

AASHTO T 2/ASTM D75 – Standard Method of Test for Sampling of Aggregates

- Understand scope of practice 1
- Understand distinction between "maximum" and "nominal maximum" aggregate sizes 3.1.2
- Understand significance and use of this practice 4
- Know general sampling requirements 5.1
- Know general inspection requirements of sample 5.2
- Know sampling requirements for a flowing aggregate stream 5.3.1
- Know sampling requirements for a conveyor belt 5.3.2
- Know sampling requirements for stockpiles and transportation units 5.3.3

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ANNEX 620.3-1

Job-Task Analysis (JTA) for ACI Aggregate Testing Technician—Level 1 Certification (Continued)

- Understand scope of sampling practice from stockpiles and transportation units X1.1
- Know procedure for sampling aggregate from stockpiles X1.2
- Know procedure for sampling aggregate from transportation units X1.3
- Understand number and masses of field samples 5.4.1
- Know how to determine mass of field samples 5.4.2
- Understanding shipping requirements of samples 6.1-6.2

AASHTO T 248/ASTM C702 – Standard Method of Test for Reducing Samples of Aggregate to Testing Size

- Understand scope of practice 1.1
- Understand significance and use of practice 4.1
- Reduction in size may not be recommended in some circumstances 4.2
- Know requirements for reducing fine aggregates 5.1-5.1.2
- Know reducing requirements for coarse aggregate 5.2
- Know equipment requirements for mechanical splitters 7
- Know and perform the procedure for introducing sample to splitter 8.1
- Know and perform procedure for quartering sample 10.1-10.1.1
- Understand alternative procedure for quartering sample 10.1.2
- Know and perform procedure for miniature stockpile samples 12

AASHTO T 11/ASTM C117 – Standard Method of Test for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing

- Understand scope of procedure 1.1
- Know washing requirements, if not specified 1.2, 7.1
- Understand general summary of method 3.1
- Know significance and use of practice 4.1-4.2
- Know the procedure and parameters under which the efficiency of the washing operation should be checked 4.1
- Know proper apparatus and materials 5
- Understand sampling procedure and requirements for combined samples 6.1
- Know the sample size requirements for different aggregate sizes 6.2
- Know and perform procedure for washing 8-9
- Know and perform calculation for amount of material passing 75- μ m sieve by washing 10
- Know and demonstrate the reporting requirements for percentage of material passing 75- μ m sieve 11

AASHTO T 27/ASTM C136 – Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates

- Understand scope of test method 1
- Understand general summary of test method 4
- Understand general use of test method specific to aggregates 5.1
- Accurate determination of 75 μ m cannot be achieved by this method alone 5.2

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Job-Task Analysis (JTA) for ACI Aggregate Testing Technician—Level 1 Certification (Continued)

- Recognize appropriate apparatus and requirements 6.1-6.2, 6.4
- Know sieving requirements for mechanical sieve shakers 6.3
- Know that size of field sample shall be at least four times required test sample 7.1
- Know requirements for reducing sample to suitable testing size 7.2
- Know how to determine size of test samples for fine and coarse aggregates 7.3-7.4
- Know material requirements for testing a combined sample 7.7-7.7.3
- Know the requirements for testing an oven dried sample 8.1
- Know the requirements for sieve selection and adequacy of sieving 8.2
- Know the requirements for limiting the amount of materials on a sieve 8.3-8.3.1.3, Note 5
- Know the procedure for hand sieving and the requirements for sufficiency of hand sieving 8.4
- Understand procedures for hand sieving oversized aggregate 8.5
- Know the requirements for verifying the masses after the test 8.6
- Know the calculations, percent passing, etc., to nearest 0.1% 9.1
- Know the requirements for calculating fineness modulus 9.2
- Know and demonstrate the reporting requirements 10

AASHTO T 85/ASTM C127 – Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate

- Understand scope of practice 1.1
- Know definition of terms for specific gravity 3.1
- Understand general summary of test method 4
- Accuracy of balance required 0.05% 6.1
- Know requirements for sample container 6.2
- Know requirements for water tank 6.3
- Know requirements and procedure for sample preparation 7.2
- Know requirements for minimum sample size 7.3
- Understand requirements for individual size fractions 7.4
- Know the sequence of operations for the test procedure 8
- Know soaking requirements 8.1
- Know procedure for obtaining a SSD condition sample 8.3
- Know the procedure for determining submerged weight 8.4
- Know the procedure for obtaining the dry weight 8.5
- Calculate relative density, Density OD, Density SSD and apparent density and absorption 9
- Know and demonstrate reporting, with required precision, of specific gravity & type and absorption 10

AASHTO T 84/ASTM C128 – Standard Method of Test for Specific Gravity and Absorption of Fine Aggregate

- Understand scope of test method 1
- Know definition of terms 3.1
- Understand significance and use of test method 4.1-4.2
- Know the difference between dry, moist, SSD and free water on aggregates 4.3

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ANNEX 620.3-1

Job-Task Analysis (JTA) for ACI Aggregate Testing Technician—Level 1 Certification (Continued)

- Understand balance (scale) requirements 5.1
- Know types of pycnometer that can be used 5.2
- Mold and tamper shape and size 5.3-5.4
- Sample and size of test specimen 7.1
- Know requirements for sample preparation before test 7.1.1
- Understand alternative procedure for sample preparation 7.1.2
- Spread sample and let air dry 7.2
- Know requirements for performing the cone test for surface moisture 7.2.1
- Know & perform the gravimetric procedure 8.1-8.2
- Understand the alternate method for obtaining equivalent dry weight of sample used in gravimetric procedure Note 5
- Understand the volumetric procedure 8.2.2
- Know & perform aggregate drying to constant mass 8.3
- Understand the alternate method for obtaining equivalent dry weight of sample used in volumetric procedure 8.3.1
- Determine mass of pycnometer with water 8.4
- Calculate bulk specific gravity (relative density) 9.1
- Calculate bulk specific gravity (relative density), SSD 10.1
- Calculate apparent specific gravity (apparent density) 11.1
- Calculate absorption 12.1
- Know and demonstrate reporting, with required precision, of specific gravity (relative density) and absorption 13

AASHTO T 255/ASTM C566 – Standard Method of Test for Total Evaporable Moisture Content of Aggregate by Drying

- Understand scope of test method 1.1
- Understand significance and use of test method 4
- Know required accuracy of the balance 5.1
- Understand types of heat sources 5.2
- Know requirements for type and size of container 5.3
- Know sample size requirements 6.1
- Know & demonstrate requirements for securing sample to prevent moisture loss 6.2
- Determine initial mass to 0.1% 7.1
- Know requirements for drying sample 7.2
- Understand detrimental effects of rapidly heating the sample 7.2.1
- Know when sample is thoroughly dry 7.4
- Determine final mass to 0.1% 7.5
- Calculate total evaporable moisture content 8.1
- Know surface moisture content 8.2

AASHTO T 21/ASTM C40 – Standard Method of Test for Organic Impurities in Fine Aggregates for Concrete

- Understand scope of test method 1.1
- Understand significance and use of test method 3.1
- Understand results of the test method 3.2

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Job-Task Analysis (JTA) for ACI Aggregate Testing Technician—Level 1 Certification (Continued)

- Know requirements of glass bottles 4.1
- Understand requirements for glass color standard 4.2.1, Note 1
- Know requirements for Reagent Sodium Hydroxide Solution 5.1
- Understand requirements and procedure for Standard Color Solution 5.2
- Know requirements for sample size and preparation 7.1
- Know requirements for introducing sample in the glass bottle 8.1
- Know requirements for introducing NaOH solution 8.2
- Know requirements for agitating the sample, and waiting period 8.3
- Understand method used for standard color solution procedure 9.1
- Know procedure for glass color standard 9.2
- Know proper procedure for interpreting results 10.1

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ANNEX 620.3-2

Job-Task Analysis (JTA) for ACI Aggregate Testing Technician—Level 2 Certification

HOW TO USE THIS JTA:

On the written examination, the Candidate must:

- **Understand** the following general concepts, which may not have specified values, procedures, or measurements; *and*
- **Know** the following specific procedures or values; performance of these items may also be assessed on the performance examination.

On the performance examination:

- **Perform**—or describe verbally, where allowed—the following tasks or steps, which are part of the specified procedure; knowledge of these items may also be assessed on the written examination.

RESOURCES:

- AASHTO T 19/ASTM C29/C29M Standard Method of Test for Bulk Density (“Unit Weight”) and Voids in Aggregate
- AASHTO T 96/ASTM C131 Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- AASHTO T 104/ASTM C88 Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
- AASHTO T 112/ASATM C142 Standard Method of Test for Clay Lumps and Friable Particles in Aggregate
- AASHTO T 113/ASTM C123/C123M Standard Method of Test for Lightweight Pieces in Aggregate
- AASHTO T 176/ASTM D2419 Standard Method of Test for Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test
- AASHTO T 304/ASTM C1252 Standard Method of Test for Uncompacted Void Content of Fine Aggregate
- ASTM C535 Standard Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- ASTM D4791 Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
- ASTM D5821 Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate

The content of the performance examination for certification as an ATT2 shall be derived from the listed resource Standards except T104/C88, T96/C131, and C535.

Information contained in the notes of the listed resource standards shall be subject for examination. Information contained in the appendices of the afore-referenced resource standards shall not be subject for examination.

AASHTO T 19 Standard Method of Test for Bulk Density (“Unit Weight”) and Voids in Aggregate

- | | |
|--|-----------------|
| • Understand the scope of the method | 1.1 |
| • Know the terminology of the method | 3.1–3.2 |
| • Understand the significance and use of the method | 4 |
| • Know the equipment required for the procedure | 5.1–5.4, Note 2 |
| • Know the requirements for sampling | 6 |
| • Know the requirements for sample size | 7 |
| • Understand the requirements and procedures for equipment calibration | 8 |
| • Know the requirements for procedure selection | 9 |
| • Know and perform the requirements for the rodding procedure | 10 |
| • Know the requirements for the jiggling procedure | 11 |

APPENDIX 620.1-2

ANNEX 620.3-2

Job-Task Analysis (JTA) for ACI Aggregate Testing Technician—Level 2 Certification (Continued)

- Know the requirements for the shoveling procedure 12
- Know and perform the calculation requirements for the test method 13
- Know and perform the reporting requirements 14

AASHTO T 96 Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

- Understand the scope of the method 1.1, Note 1
- Understand the summary of the method 4
- Understand the significance and use of the method 5
- Know the equipment required for the procedure 6
- Know the requirements for sampling 7
- Know the requirements for fabricating the test samples 8, Table 1
- Know the procedure for performing the test method 9
- Know the calculation requirements for the test method 10
- Know the reporting requirements 11

AASHTO T 104 Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate

- Understand the scope of the method 1.1–1.2
- Know the equipment required for the procedure 3.1–3.9
- Know the requirements for the solutions used in the procedure 4.1–4.2
- Know the requirements for fabricating the samples for testing 5.1–5.3
- Know the requirements for preparation of fine aggregate samples 6.1
- Know the requirements for preparation of coarse aggregate samples 6.2
- Know the procedure for storage of samples in solutions 7.1
- Know the procedure for drying samples after immersion 7.2
- Know the requirements for determining the number of cycles 7.3
- Understand the procedure for determining a quantitative analysis 8
- Understand the procedure for determining a qualitative analysis 9
- Understand the reporting requirements 10

AASHTO T 112 Standard Method of Test for Clay Lumps and Friable Particles in Aggregate

- Understand the scope of the method 1.1
- Understand the significance and use of the method 3
- Know the equipment required for the procedure 4
- Know the requirements for fabricating the test samples 5
- Know and perform the procedure for performing the test method 6
- Know and perform the calculation requirements for the test method 7.1
- Know and perform the reporting requirements 7.2

AASHTO T 113 Standard Method of Test for Lightweight Pieces in Aggregate

- Understand the scope of the method 1.1–1.2
- Understand the significance and use of the method 3
- Know the equipment required for the procedure 4
- Know the requirements for the heavy liquids used in the test method 5, Note 1
- Know the requirements for sampling 6
- Know and perform the procedure for performing the test method 7

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ANNEX 620.3-2

Job-Task Analysis (JTA) for ACI Aggregate Testing Technician—Level 2 Certification (Continued)

- Know and perform the calculation requirements for the test method 8
- Know and perform the reporting requirements 9

AASHTO T 176 Standard Method of Test for Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test

- Understand the scope of the method 1.1, 1.3
- Know the requirements for rounding result 1.2
- Understand the significance and use of the method 3
- Know the equipment required for the procedure 4.1–4.7, 4.10–4.14
- Understand the requirements for the stock solution 4.8
- Know the requirements for the working solution 4.9
- Understand the requirements for temperature control 5
- Know the requirements for sampling 6
- Know and perform the requirements for sample preparation (air dry) 7.1–7.1.1
- Understand the requirements for sample preparation (pre wet) 7.1.2
- Understand the requirements for sample preparation (reference method) 7.1.2
- Know and perform the procedure for performing the test method 8.1–8.4
- Understand the procedure for performing the mechanical shaker method (reference method) 8.4.1
- Understand the procedure for performing the mechanical shaker method 8.4.2
- Know and perform the procedure for performing the hand method 8.4.3
- Know and perform the procedure for performing the test method 8.5–8.10
- Know and perform the calculations required and the reporting requirements 9
- Understand the precautions for the test method 10

AASHTO T 304 Standard Method of Test for Uncompacted Void Content of Fine Aggregate

- Understand the scope of the method 1.1–1.3
- Understand the summary of the method 4
- Understand the significance and use of the method and the purpose of the results obtained for each method 5
- Know the equipment required for the procedure 6
- Know the requirements for sampling 7
- Know the requirements for calibrating the measure 8
- Know the requirements for preparing a standard graded test samples 9.1
- Know the requirements for preparing individual size fraction test samples 9.2
- Know and perform the requirements for preparing an as received test samples 9.3
- Know and perform the procedure for the test method 10
- Know and perform the calculations required and the reporting requirements 11
- Know and perform the reporting requirements 12

ASTM C535 Standard Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

- Understand the scope of the method 1.1, Note 1
- Understand the summary of the method 4
- Understand the significance and use of the method 5
- Know the equipment required for the procedure 6
- Know the requirements for sampling 7
- Know the requirements for fabricating the test samples 8, Table 1
- Know the procedure for performing the test method 9

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ANNEX 620.3-2

Job-Task Analysis (JTA) for ACI Aggregate Testing Technician—Level 2 Certification (Continued)

- Know the calculation requirements for the test method 10
- Know the reporting requirements 11

ASTM D4791 Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate

- Understand the scope of the method 1.1–1.2
- Know terminology 3
- Understand the summary of the method 4
- Understand the significance and use of the method 5
- Know the equipment required for the procedure 6
- Know the requirements for sampling 7
- Know and perform the procedure for performing the test method 8.1–8.2
- Know and perform the procedure Method A for performing the test method 8.3
- Know and perform the procedure Method B for performing the test method 8.4
- Know and perform the calculation requirements for the test method 9
- Know and perform the reporting requirements 10

ASTM D5821 Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate

- Understand the scope of the method 1.1–1.2
- Know the terminology of the method 3.1.1–3.2.1
- Understand the significance and use of the method 4
- Know the equipment required for the procedure 5
- Know the requirements for sampling 6
- Know the requirements for sample preparation 7
- Know and perform the procedure for performing the test method 8
- Know and perform the calculation and reporting requirements for the test method 9

APPENDIX 620.1-2

ANNEX 620.3-3

AMERICAN CONCRETE INSTITUTE

Policy on Sponsoring Groups for Certification

Approved by the ACI Board of Direction
March 21, 1991

Last revised by the ACI Certification Programs Committee
October 18, 2011

In developing certification exams for the concrete construction industry, the American Concrete Institute (ACI) has set forth minimum criteria by which an individual's proficiency is to be judged. Typically, ACI is not in a position to deliver certification exams directly to participants; therefore, it is necessary for ACI to have the ability to delegate this authority. However, if the need arises, ACI reserves the right to conduct exam sessions itself according to each program Policy.

In order to allow others to deliver its certification exams, ACI has adopted the "Sponsoring Group" concept. Sponsoring Groups act as agents of ACI in the delivery of ACI certification exams. Therefore, prior to being selected as an ACI Sponsoring Group, and for the duration of the period in which the group is authorized to act as a Sponsoring Group, such groups are subject to the following policies:

1. Sponsoring Groups shall be approved, in writing, by ACI's Certification Department (hereafter referred to as ACI) before they will be permitted to conduct an ACI¹ certification exam session. In all cases, approval of Sponsoring Groups shall be at the sole discretion of ACI.
2. In reviewing applications, ACI will consider, among other factors, the following:
 - A) The ability and willingness of the applicant to include in their constituency segments of the concrete construction industry impacted by the exams which they have applied to conduct. This includes individuals involved in the specification, production, design, construction, testing and inspection of concrete and concrete products. The applicant must establish a governance structure with representation appropriate to all of the exams for which the applicant has applied.

¹ For the purposes of this policy, references to "ACI certification" and "ACI certification program(s)" include only those administered solely by ACI (ACI programs). Programs with cosponsors are not directly addressed by this Policy.

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- B) The interest, experience and technical expertise necessary to conduct exam sessions exhibited by the applicant and/or their certification governance structure.
 - C) The legitimate need for the applicant to conduct a specific ACI certification exam within their approved operational jurisdiction.
 - D) The primary objective of the applicant in applying for sponsorship, which must coincide with ACI's overall mission of improving the quality of concrete construction within the political, social, and cultural dynamics of the intended operational jurisdiction.
3. Sponsoring Groups are required to maintain a governance structure to oversee the delivery of ACI exams. The governance structure shall consist of a committee of at least three (3) individuals, each working for a different employer and each producing a different product or service related to the concrete construction industry. At all times, at least one (1) member of the committee shall be a member of ACI. Further, ACI shall be furnished with a complete and accurate listing of contact information for all committee members including names, employers, type of businesses, physical addresses, email addresses, and both office telephone and cell phone numbers as available.
 4. The certification committee shall obtain the services of ACI-approved examiners. The examiners shall operate under the direct supervision of the certification committee to conduct ACI certification exam sessions. Examiners are permitted to conduct ACI certification exam sessions only under the auspices of ACI or ACI-approved Sponsoring Groups; and they must comply with all ACI certification policies and procedures.
 5. At the time of approval, ACI shall assign Sponsoring Groups specific geographical areas within which they will have authority to conduct ACI certification exam sessions. This area is the approved operational jurisdiction for the Sponsoring Group.
 6. ACI shall approve each Sponsoring Group on a calendar year basis for a period not to exceed two (2) years. Prior to the conclusion of this period, all groups shall reapply to ACI for approval to continue to act as an ACI Sponsoring Group.
 7. In the U.S., in areas where no Sponsoring Group is actively administering a specific ACI examination, the local ACI chapter (not a student chapter) shall have first rights to administer that specific exam. International sponsorship for any ACI examination will be assessed on a case-by-case basis.

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8. If an existing Sponsoring Group or ACI Chapter is solicited to administer an examination and participation is declined, or if a sponsor does not request an examination upon initial availability from ACI, or if a requested examination is not administered within two years following approval, administration of said examination may become available to other potential sponsors.
9. If more than one applicant wishes to sponsor an ACI certification exam in the same operational jurisdiction and there is documented need for more than one group to conduct the examination in that jurisdiction or portion thereof, a system of coordination between those groups shall be established. A description of this system shall be considered along with any new Sponsoring Group application and must be included in the governance system for any existing Sponsoring Group. In all cases, ACI reserves the right, in its sole discretion, to select a delivery system that in its judgment is best able to serve the interests of ACI.
10. Applicants wishing to sponsor ACI certification examinations on a "national" or "regional" basis will, in appropriate circumstances, be approved to conduct exams under specific conditions at the discretion of ACI.
11. Approved Sponsoring Groups are responsible for:
 - A) Maintaining control over the administration of ACI Certification exams offered within their operational jurisdiction. This includes, but is not limited to, maintaining control over the ethical and professional integrity of every sponsored examination session and providing ongoing oversight of exam session coordinators, examiners, and other exam delivery personnel.
 - B) Conducting a sufficient number of exam sessions and providing equitable access to those exam sessions for all individuals seeking ACI Certification within the group's operational jurisdiction.
 - C) Conducting all ACI exams in a manner which complies with the intent of ACI's policies and procedures governing certification.
 - D) Formulating, publishing, and enforcing consistent and equitable pricing for ACI Certification exams offered by the Sponsoring Group within their operational jurisdiction.
 - E) Developing and implementing participant registration processes that satisfy the policy requirements of each exam offered by the Sponsoring Group and verifying that each participant has met the eligibility requirements of the program before being allowed to complete an ACI exam.

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- F) Collecting exam fees from participants, paying materials invoices to ACI within 30 days of receipt, and distributing compensation to examiners and other program delivery personnel as warranted.
 - G) Developing a program delivery process that establishes separation between the education/training and testing divisions of the Sponsoring Group.
12. ACI has the right to revoke a Sponsoring Group's authority to conduct an ACI certification exam at any time, with or without cause, and with or without notice.
 13. Appeals resulting from the denial or revocation of Sponsoring Group status will be reviewed by ACI Staff for determination of appropriate action on a case-by-case basis.
 14. This policy shall become effective sixty (60) days after its approval by the ACI Certification Programs Committee, and shall render all previous Policy versions null and void. Sponsoring Groups shall be notified of this new policy in writing within thirty (30) days after it is approved by the ACI Certification Programs Committee.
 15. The Certification Programs Committee shall review, revise as necessary, and reapprove this Policy at intervals not exceeding two years in length.

APPENDIX 620.1-3

Job-Task Analysis (JTA) for ACI Concrete Laboratory Testing Technician—Level 2 Certification 5/26/17

HOW TO USE THIS JTA:

On the written examination, the Candidate must:

- **Understand** the following general concepts, which may not have specified values, procedures, or measurements; *and*
- **Know** the following specific procedures or values; performance of these items may also be assessed on the performance examination.

On the performance examination:

- **Perform**—or describe verbally, where allowed—the following tasks or steps, which are part of the specified procedure; knowledge of these items may also be assessed on the written examination.

RESOURCES:

ACI 214R Recommended Practice for Evaluation of Strength Test Results of Concrete

ACI 211.1 Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete

ASTM C192/C192M Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory

ASTM C470/C470M Standard Specification for Molds for Forming Concrete Test Cylinders Vertically

ASTM C496/C496M Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens

ASTM C42/C42M Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

ASTM C157/C157M Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete

The content of the performance examination for certification as a CLTT2 shall be derived from Practice C192/C192M and Test Method C157/C157M.

Information contained in the footnotes and appendices of the above referenced documents shall not be subject to examination.

ACI 214R Recommended Practice for Evaluation of Strength Test Results of Concrete

- Understand that inevitably, strength test results vary. 1
- Know and understand that the samples should be random. 1
- Know and understand the two principle sources of strength variation. Table 2.1
- Know and understand that the first criterion for producing concrete of consistent strength is to keep tight control over the w/cm. 2.2
- Know and understand that accurate, properly calibrated testing devices and using proper sample preparation procedures is essential, because test results can be no more accurate than the equipment and procedures used. 2.3
- Understand that less variable test results do not necessarily indicate accurate test results. 2.3
- Know and understand that a strength is the average of two or more single-cylinder strengths of specimens made from the same concrete sample (companion cylinders) and tested at the same age. 3.1.1 & 5.2
- Know how to calculate coefficient of variation. 3.3.3.1
- Know how to calculate range. 3.3.3.2
- Know how to calculate within-test variation. 3.3.3.2
- Know what affects within-test variation. 3.4.1

APPENDIX 620.1-3

Job-Task Analysis (JTA) for ACI Concrete Laboratory Testing Technician—Level 2 Certification (Continued)

• Understand that one of the primary purposes of statistical evaluation of concrete data is to identify sources of variability.	3.6
• Understand that there will always be a certain probability of tests falling below $f'c$.	4.1
• Know that when the number of strength test results is less than 15, the calculated standard deviation is not sufficiently reliable.	4.2
• Know how to calculate $f'cr$.	4.3
• Understand the different criteria options.	4.3
• Know to discard a specimen when questionable variations have been observed during fabrication, curing, or testing of a specimen.	5.3
• Know and understand that in general, the result from a single specimen in a set of three or more specimens can be discarded if its deviation from a test mean is greater than three times the previously established within-test standard deviation.	5.3
• Know and understand that a test (the average of all specimens of a single sample tested at the same age) should not be rejected unless it is very likely that the specimens are faulty. The test represents the best available estimate for the sample.	5.3
• Know and understand when job-cured specimens are desirable.	5.4
• Know and understand how to use within-test variation to evaluate a laboratory.	Table 3.3
• Guide assumes that the concrete test results conform to a normal distribution	1.1
• Batch to batch variations due to	1.1 & Table 3.1
• Within batch variations due to	1.1 & Table 3.1
• Number of cylinders for strength test	4.2
• % data within 1 standard deviation of mean	4.2
• % data within 2 standard deviations of mean	4.2
• Calculate to mean of the data	4.2.1
• difference between sample standard deviation and population standard deviation	4.2.2
• Coefficient of Variation	4.2.3.1
• Range of data	4.2.3.2
• Why the difference in the d_2 factor for calculating the within batch standard deviation	4.3.1
• Overall variation consists of ...	4.3.3
• Why do statistical analysis?	4.5
• What are the Standards of concrete control?	Table 4.3 & 4.4
• Concrete cylinders used to measure strength for acceptance contractual	5.1
• To establish the required average strength $f'cr$ an estimate is needed of the variability of the concrete	5.2
• Number of test records generally needed for estimating variability	5.2
• Random or consecutive tests?	5.2
• Criteria for strength requirements	5.3
• Minimum required strength without sufficient historical data	Table 5.2
• Evaluation of data required for three common applications	6.1
• Criteria for rejecting doubtful specimens	6.3
• Three examples of control charts	Fig. 6.1

APPENDIX 620.1-3

Job-Task Analysis (JTA) for ACI Concrete Laboratory Testing Technician—Level 2 Certification (Continued)

ACI 211.1 Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete

- Understand the practice is not for lightweight concrete. 1.1
- Understand the selection of concrete proportions involves a balance between economy and requirements for placeability, strength, durability, density, and appearance. 2.2
- Understand proportions calculated by any method must always be considered subject to revision on the basis of experience with trial batches. 2.4
- Understand when adding admixtures, performance of the reportioned concrete should be verified by trial batches in the laboratory or field. 2.5
- Understand strength is not the only important quality of concrete. 3.4
- Understand that in mass concrete, mixtures are generally proportioned to provide the design strength at an age greater than 28 days. 3.4
- Know and understand that the net water content excludes water absorbed by the aggregates. 3.5
- Know and understand resistance to severe weathering, particularly freezing and thawing, and to salts used for ice removal is greatly improved by incorporation of a proper distribution of entrained air. Entrained air should be used in all exposed concrete in climates where freezing occurs. 3.6
- Know that as a rough guide, hydration of cement will generate a concrete temperature rise of 10 to 15 F per 100 lb of portland cement/yd³ in 18 to 72 hours. 3.8
- Know that many large structural elements may be massive enough that heat generation should be considered, particularly when the minimum cross-sectional dimensions of a solid concrete member approach or exceed 2 to 3 ft or when cement contents above 600 lb/yd³ are being used. 3.8
- Know and understand why air entraining cement is rarely used today. (The use of an air-entraining admixture gives the concrete producer the flexibility to adjust the entrained air content to compensate for the many conditions affecting the amount of air entrained in concrete,) 4.2
- Know and understand air-entrained concrete usually contains up to 10 percent less water than non-air-entrained concrete of equal slump. 4.2
- Know and understand why water-reducing and set-controlling admixtures are widely used (durability improvement and economy). 4.3
- Know and understand that the manufacturer or manufacturer's literature should be consulted to determine the required dosage rate for each specific chemical admixture or combination of admixtures. 4.3
- Know and understand that the water in admixtures added at high dosages would be considered when determining the water content. 4.3
- Know and understand why other cementitious materials are used (economy, reduction of heat of hydration, improved workability, improved strength, and/or improved durability). 4.4
- Know and understand that to maximize the full strength-producing potential of silica fume in concrete, it should always be used with a water-reducing admixture, preferably a high-range, water reducing (HRWR) admixture. 4.4
- Understand that due to differences in their specific gravities, a given weight of a supplementary cementitious material will not occupy the same volume as an equal weight of portland cement. 4.4.2
- Know that when using either blended cements or supplementary cementitious materials, the yield of the concrete mixture should be adjusted using the actual specific gravities of the materials used. 4.4.2
- Know that many Class F fly ashes may require a higher dosage of air entraining admixture to obtain specified air contents. 4.4.3

APPENDIX 620.1-3

Job-Task Analysis (JTA) for ACI Concrete Laboratory Testing Technician—Level 2 Certification (Continued)

- Know that the use of most supplementary cementitious materials generally slows the time-of-set of the concrete. 4.4.4
- Know what background information will be helpful. 5.2
- Know Step 1 – Slump. 6.3.1
- Know and understand Step 2 - Maximum size of aggregate ("In no event should the nominal maximum size exceed one-fifth of the narrowest dimension between sides of forms, one-third the depth of slabs, nor three-fourths of the minimum clear spacing between individual reinforcing bars, bundles of bars, or pretensioning strands.") 6.3.2
- Know Step 3 - Estimation of mixing water and air content. 6.3.3
- Understand how aggregate shape may affect water demand. 6.3.3
- Know and understand that chemical admixtures should be used only after an appropriate evaluation has been conducted to show that the desired effects have been accomplished in the particular concrete under the conditions of intended use. 6.3.3
- Know Step 4 - Selection of water-cement or water-cementitious materials ratio. 6.3.4
- Know Step 5 - Calculation of cement content. 6.3.5
- Know Step 6 - Estimation of coarse aggregate content. 6.3.6
- Know that the smaller the maximum size coarse aggregate, the less coarse aggregate is used in the mix. Table 6.3.6
- Know Step 7 - Estimation of fine aggregate content. 6.3.7
- Know Step 8 - Adjustments for aggregate moisture. 6.3.8
- Know and understand Step 9 - Trial batch adjustments. 6.3.9
- Practice describes methods for selecting proportions of ingredients for hydraulic cement concrete 1.1
- Selection of proportions involves a balance between economy and requirements 2.2
- Water-cement ratio to estimate strength known since 1918 2.3
- Air entrainment recognized in early 1940s 2.3
- Concrete proportions must provide necessary placeability, density, strength and durability 3.1
- Effects of air entraining admixtures on concrete 4.2
- Chemical admixtures - types 4.3
- Supplemental cementitious materials 4.4
- Useful information for selection of concrete proportions 5.2
- Step 1, selection of slump 6.3.1
- Step 2, choice of maximum aggregate size 6.3.2
- Step 3, estimate of mixing water and air content 6.3.3
- severity of exposure 6.3.3
- Step 4, selection of water-cementitious ratio 6.3.4
- Step 5, Calculation of cement content 6.3.5
- Step 6, Estimate of coarse aggregate content 6.3.6
- Step 7, Estimate of fine aggregate content 6.3.7
- Difference between weight method and absolute volume method 6.3.7.1–6.3.7.2
- Step 8, Adjustments for aggregate moisture 6.3.8
- Step 9, Trial batch adjustments 6.3.9

ASTM C192/C192M Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory

- Understand Scope 1.1
- Understand significance and use (including note 1) 3.1-3.2.4
- Understand the requirements for molds 4.1–4.3
- Know the various size rods for use in rodding 4.4–4.4.2

APPENDIX 620.1-3

Job-Task Analysis (JTA) for ACI Concrete Laboratory Testing Technician—Level 2 Certification (Continued)

• Know the weight of the mallet	4.5
• Know the material for the mallet	4.5
• Know the frequency of the internal vibrator	4.6.1
• Know the frequency of the external vibrator	4.6.2
• Understand the other tools required for this test	4.7–4.14
• Understand the direction of casting	5.1.1
• Understand the direction of casting	5.1.2
• Understand the direction of casting	5.2
• Understand when wet sieving is required	5.4
• Know the required temperature of the materials	6.1
• Know the sieve size to pass the cement through before batching	6.2
• Understand the grading process	6.3
• Know that the fine aggregate should be kept in damp condition unless it is to be separated and batched in individual size fractions.	6.3.1
• Know the procedure for batching aggregates	6.3.2.1
• Know the procedure for batching aggregates	6.3.2.2
• Know the procedure for batching aggregates	6.3.2.3
• Know the procedure for batching aggregates	6.3.2.4
• Understand the limitations for light weight aggregate	6.4
• Know the requirements for dry and liquid admixture addition to the batch	7.1.2
• Know to leave about 10% excess after molding of specimens	7.1.1
• Know the batching sequence for mixing	7.1.2
• Know the 3, 3, 2 mix timing	7.1.2
• Know to cover the mixer during rest period	7.1.2
• Know the procedures in note 13 for buttering or over mortaring	Note13
• Understand the procedures for hand mixing	7.1.3-
	7.1.4
• Know that slump, air content, yield and temperature test are required	7.2-
	7.2.4
• Know that specimens are to be molded as close as possible to where they will be stored for the first 24 hours	7.3.1
• Know the surface needs to be rigid surface free from vibration	7.3.1
• Know to use a scoop, blunted trowel or shovel to fill molds	7.3.2
• Know to remix the concrete to avoid segregation	7.3.2
• Know to move the scoop or trowel around the top edge of the mold while filling	7.3.2
• Know the number of layers required for each size mold	Table1
• Know to rod or vibrate when slump is equal to or greater than 1"	7.4.1
• Know to vibrate when slump is less than 1"	7.4.1
• Know that internal vibration is not allowed when mold is less than 4" diameter.	7.4.1
• Know the size of rod and number of strokes for each mold size as designated in table 2	7.4.2
• Know that the first layer is rodded throughout it's depth	7.4.2
• Know to distribute rodding evenly	7.4.2
• Know to penetrate the previous layer 1" when rodding	7.4.2
• Know to tap the mold 10-15 times with a mallet to close voids	7.4.2
• Know to tap light gauge single use molds with the hand	7.4.2
• Know to spade the sides and ends of beam and prism molds after tapping	7.4.2
• Know to vibrate until the top is relatively smooth and large air bubbles cease	7.4.3
• Know the correct number of layers as prescribed in table 2	7.4.3
• Know that max overfill is 1/4" and 1/8" is desired	7.4.3

APPENDIX 620.1-3

Job-Task Analysis (JTA) for ACI Concrete Laboratory Testing Technician—Level 2 Certification (Continued)

- Know that the vibrator is to be inserted slowly 7.4.3
- Know that the vibrator is to be withdrawn slowly 7.4.3
- Know that the vibrator is not to touch the sides or bottom of the mold 7.4.3
- Know the number of vibrator insertions as described in table 3 7.4.3.2
- Know that when more than one insertion is required the insertions are uniformly placed 7.4.3.2
- Know to penetrate the previous layer 1" when vibrating 7.4.3.2
- Know to tap the mold 10-15 times with a mallet to close voids 7.4.3.2
- Know to tap light gauge single use molds with the hand 7.4.3.2
- Know to insert vibrator at not more than 6" spacing along center 7.4.3.3
- Know that for specimens wider than 6" use alternating insertions on 2 lines 7.4.3.3
- Know to penetrate the previous layer 1" when vibrating 7.4.3.3
- Know to tap the mold 10-15 times with a mallet to close voids 7.4.3.3
- Know that the mold is rigidly attached to or securely held against the vibrating element or surface. 7.4.4
- Know the tools to finish surface with 7.5
- Know that depressions or projections of more than 1/8" is not allowed. 7.5
- Know the tools to finish surface with 7.5.1
- Know the tools to finish surface with 7.5.2
- Know to cover the specimens to prevent moisture loss 8.1
- Know to record the max and min ambient temp during initial curing 8.1
- Know to remove the specimens from the molds 24 +/- 8 hr after casting 8.2
- Know to remove the specimens from the molds with prolonged setting times 20 +/- 4 hr after final set 8.2
- Know the curing temp is 73.5 +/- 3.5 F from the time of molding until time of test 8.3
- Know that moist curing is required from the time of molding until time of test 8.3
- Know that storage for the first 48 hours is to be in a vibration free environment 8.3
- Know that flexural strength test specimens shall be stored for a minimum period of 20h immediately prior to testing immersed in water saturated with calcium hydroxide at 73 +/- 3F. 8.4
- Understand the scope of the procedure. 1.1
- Understand the use of the data 3.2
- Understand that there are two sized of rods and what determines which rod to use. 4.4
- Know that the frequency requirements of the vibrators are different depending upon whether internal vibration or external vibration. 4.6.1 & 4.6.2
- Know the accuracy of the scales 4.12
- Understand when a pan mixer is preferable over a revolving drum mixer. Note 5
- Understand that the nominal maximum size of the aggregate dictates the specimen size. 5.4
- Bring the concrete materials to room temperature in the range from 68 to 86 °F [20 to 30 °C] 6.1
- The cement shall be thoroughly mixed to provide a uniform supply throughout the tests. It shall be passed through a 850-µm [No. 20] or finer sieve to remove all lumps, remixed on a plastic sheet, and returned to sample containers. 6.2
- For the coarse aggregates, separate into individual size fractions of and for each batch recombine in the proper proportions to produce the desired grading. 6.3
- Maintain fine aggregate in a damp condition or restore to a damp condition until use. 6.3.1
- Know how to condition the aggregates 6.3.2
- Mix powder admixtures with the cement 6.5
- Powdered admixtures which are largely insoluble but contain hygroscopic salts may cause balling of cement and should be mixed with the sand. 6.5

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Job-Task Analysis (JTA) for ACI Concrete Laboratory Testing Technician—Level 2 Certification (Continued)

- Water-soluble and liquid admixtures should be added to the mixer in solution in the mixing water. 6.5
- The quantity of admixture-water solution used shall be included in the calculation of the water content of the concrete. 6.5
- Hand-mixing procedures are not applicable to air-entrained concrete or concrete with no measurable slump. 7.1.1
- Hand mixing should be limited to batches of 1/4 ft³ or less 7.1.1
- Mixing procedure 7.1.2
- Perform required tests 7.2
- Make the required specimens 7.3
- Know the number of layers and the rod size Table1
Table2
- Know the penetration depths of the rodding 7.4.2
- Know when sufficient rodding has occurred 7.4.3
- Know the curing requirements 8.1
- Know when to remove specimens from molds 8.2
- Develop information for 4 items 3.2
- Horizontal molds for creep specimens with embedded gages only 4.2.2
- Tolerances for beam or prism molds 4.3
- Internal vibrator at least 7000 vibrations per minute 4.6.1
- Size of vibrator head 4.6.1
- Accuracy of scales 4.12
- Specimen size vs. aggregate size 5.4
- Specimens involving a given variable; 3 separate batches mixed on different days 5.5
- Conditioning of concrete materials 6.1
- Coarse aggregate separate into individual size fractions and then recombine in proper proportions 6.3
- Fine aggregate maintained in damp condition 6.3.1
- Prepare aggregate for a uniform condition of moisture 6.3.2
- Determine aggregate moisture by C70 or C566 6.3.2.2
& .3
- Procedure for adding materials to the mixer 7.1.2
- Mixing times 7.1.2
- Tests of plastic concrete 7.2
- Making and consolidating specimens 7.3 &
7.4
- Finishing specimens 7.5
- Initial curing 8.1
- Removing molds 8.2
- Curing environment 8.3
- Curing flexural strength specimens 8.4

ASTM C185—Standard Test Method for Air Content of Hydraulic Cement Mortar

- Understand the scope and significance of the test method
- Know the required equipment necessary to perform the test
- Know the requirements of necessary equipment
- Know temperature and humidity requirements
- Know and perform mixing procedure, including order and timing
- Know and perform batch proportions for this method

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Job-Task Analysis (JTA) for ACI Concrete Laboratory Testing Technician—Level 2 Certification (Continued)

- Know and perform flow test, including knowing acceptable range for this test
- Know and perform procedures for filling of 400-mL cup
- Know timing requirements for filling 400-mL cup
- Know and perform cleaning and weighing of 400-mL cup
- Understand air content calculation
- Understand reporting requirements for air content

ASTM C187—Standard Test Method for Amount of Water Required for Normal Consistency of Hydraulic Cement Paste

- Understand the significance and use of the test method
- Know the required equipment necessary to perform the test
- Know the requirements of necessary equipment
- Know temperature and humidity requirements
- Know and perform mixing procedure, including order and timing
- Know and perform molding of the test specimen
- Know all timing requirements related to molding test specimen
- Know and perform consistency determination
- Know and perform all timing requirements related to consistency determination
- Know how to calculate the water requirement
- Know reporting requirements

ASTM C191—Standard Test Methods for Time of Setting of Hydraulic Cement by Vicat Needle

- Understand the scope and significance of the test method
- Know the required equipment necessary to perform the test
- Know the requirements of necessary equipment
- Know temperature and humidity requirements
- Know and perform mixing procedure and molding of the test specimen per Normal Consistency (C187)
- Know all timing requirements related to molding specimen as per Normal Consistency (C187)
- Know and perform time of setting determination (one cycle)
- Know and perform all timing requirements related to time of setting
- Know how to interpolate initial time of setting
- Know how to determine final set
- Know reporting requirements

ASTM C204—Standard Test Methods for Fineness of Hydraulic Cement by Air-Permeability Apparatus

- Understand the scope and significance of the test method
- Know the required equipment necessary to perform the test
- Know the requirements of necessary equipment
- Know how to determine the bed volume and calculate cement weight
- Know and perform preparation of the cement bed
- Know and perform permeability test including the airtight connection and temperature checks
- Know how to calculate the specific surface values
- Know reporting requirements

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Job-Task Analysis (JTA) for ACI Concrete Laboratory Testing Technician—Level 2 Certification (Continued)

ASTM C305—Standard Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency

- Understand the significance and use of this practice
- Know the required equipment necessary to perform mixing of cements and mortars
- Know the requirements of necessary equipment
- Know temperature and humidity requirements of room
- Know temperature requirements of the water and dry materials
- Know and perform mixing procedure for pastes, including order and timing
- Know and perform mixing procedure for mortars, including order and timing

ASTM C430—Standard Test Method for Fineness of Hydraulic Cement by the 45- μ m (No. 325) Sieve

- Understand the scope and significance of the test method
- Know the required equipment necessary to perform the test
- Know the requirements of necessary equipment
- Know how to determine the Sieve Correction Factor
- Know and perform the procedure
- Know acceptable cleaning procedure and frequency
- Know how to calculate the fineness

ASTM C490—Standard Practice for Determination of Length Change of Hardened Cement Paste, Mortar, and Concrete

- Understand the scope and significance of this practice
- Know and understand what length change is
- Know and understand what gage length is
- Know the requirements of molds for test specimens
- Know the requirements for gage studs used for test specimens
- Know the requirements for preparation of the molds for use
- Know the requirements for the comparator and the reference bar
- Know and perform the length measurement procedure
- Know procedure for length measurements of specimens stored in moist conditions

ASTM C1437—Standard Test Method for Flow of Hydraulic Cement

- Understand the scope and significance of the test method
- Know the required equipment necessary to perform the test
- Know the requirements of necessary equipment
- Know temperature and humidity requirements
- Know and perform filling the mold (*can be performed as part of C185 or C109 demonstration)
- Know all timing requirements related to filling mold
- Know and perform removing mold, dropping table, and measuring the flow
- Know and perform flow calculation

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AMERICAN CONCRETE INSTITUTE

Policy on Sponsoring Groups for Certification

Approved by the ACI Board of Direction
March 21, 1991

Last revised by the ACI Certification Programs Committee
October 18, 2011

In developing certification exams for the concrete construction industry, the American Concrete Institute (ACI) has set forth minimum criteria by which an individual's proficiency is to be judged. Typically, ACI is not in a position to deliver certification exams directly to participants; therefore, it is necessary for ACI to have the ability to delegate this authority. However, if the need arises, ACI reserves the right to conduct exam sessions itself according to each program Policy.

In order to allow others to deliver its certification exams, ACI has adopted the "Sponsoring Group" concept. Sponsoring Groups act as agents of ACI in the delivery of ACI certification exams. Therefore, prior to being selected as an ACI Sponsoring Group, and for the duration of the period in which the group is authorized to act as a Sponsoring Group, such groups are subject to the following policies:

1. Sponsoring Groups shall be approved, in writing, by ACI's Certification Department (hereafter referred to as ACI) before they will be permitted to conduct an ACI¹ certification exam session. In all cases, approval of Sponsoring Groups shall be at the sole discretion of ACI.
2. In reviewing applications, ACI will consider, among other factors, the following:
 - A) The ability and willingness of the applicant to include in their constituency segments of the concrete construction industry impacted by the exams which they have applied to conduct. This includes individuals involved in the specification, production, design, construction, testing and inspection of concrete and concrete products. The applicant must establish a governance structure with representation appropriate to all of the exams for which the applicant has applied.

¹ For the purposes of this policy, references to "ACI certification" and "ACI certification program(s)" include only those administered solely by ACI (ACI programs). Programs with cosponsors are not directly addressed by this Policy.

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Policy on Sponsoring Groups for Certification

- B) The interest, experience and technical expertise necessary to conduct exam sessions exhibited by the applicant and/or their certification governance structure.
 - C) The legitimate need for the applicant to conduct a specific ACI certification exam within their approved operational jurisdiction.
 - D) The primary objective of the applicant in applying for sponsorship, which must coincide with ACI's overall mission of improving the quality of concrete construction within the political, social, and cultural dynamics of the intended operational jurisdiction.
3. Sponsoring Groups are required to maintain a governance structure to oversee the delivery of ACI exams. The governance structure shall consist of a committee of at least three (3) individuals, each working for a different employer and each producing a different product or service related to the concrete construction industry. At all times, at least one (1) member of the committee shall be a member of ACI. Further, ACI shall be furnished with a complete and accurate listing of contact information for all committee members including names, employers, type of businesses, physical addresses, email addresses, and both office telephone and cell phone numbers as available.
 4. The certification committee shall obtain the services of ACI-approved examiners. The examiners shall operate under the direct supervision of the certification committee to conduct ACI certification exam sessions. Examiners are permitted to conduct ACI certification exam sessions only under the auspices of ACI or ACI-approved Sponsoring Groups; and they must comply with all ACI certification policies and procedures.
 5. At the time of approval, ACI shall assign Sponsoring Groups specific geographical areas within which they will have authority to conduct ACI certification exam sessions. This area is the approved operational jurisdiction for the Sponsoring Group.
 6. ACI shall approve each Sponsoring Group on a calendar year basis for a period not to exceed two (2) years. Prior to the conclusion of this period, all groups shall reapply to ACI for approval to continue to act as an ACI Sponsoring Group.
 7. In the U.S., in areas where no Sponsoring Group is actively administering a specific ACI examination, the local ACI chapter (not a student chapter) shall have first rights to administer that specific exam. International sponsorship for any ACI examination will be assessed on a case-by-case basis.

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8. If an existing Sponsoring Group or ACI Chapter is solicited to administer an examination and participation is declined, or if a sponsor does not request an examination upon initial availability from ACI, or if a requested examination is not administered within two years following approval, administration of said examination may become available to other potential sponsors.
9. If more than one applicant wishes to sponsor an ACI certification exam in the same operational jurisdiction and there is documented need for more than one group to conduct the examination in that jurisdiction or portion thereof, a system of coordination between those groups shall be established. A description of this system shall be considered along with any new Sponsoring Group application and must be included in the governance system for any existing Sponsoring Group. In all cases, ACI reserves the right, in its sole discretion, to select a delivery system that in its judgment is best able to serve the interests of ACI.
10. Applicants wishing to sponsor ACI certification examinations on a "national" or "regional" basis will, in appropriate circumstances, be approved to conduct exams under specific conditions at the discretion of ACI.
11. Approved Sponsoring Groups are responsible for:
 - A) Maintaining control over the administration of ACI Certification exams offered within their operational jurisdiction. This includes, but is not limited to, maintaining control over the ethical and professional integrity of every sponsored examination session and providing ongoing oversight of exam session coordinators, examiners, and other exam delivery personnel.
 - B) Conducting a sufficient number of exam sessions and providing equitable access to those exam sessions for all individuals seeking ACI Certification within the group's operational jurisdiction.
 - C) Conducting all ACI exams in a manner which complies with the intent of ACI's policies and procedures governing certification.
 - D) Formulating, publishing, and enforcing consistent and equitable pricing for ACI Certification exams offered by the Sponsoring Group within their operational jurisdiction.
 - E) Developing and implementing participant registration processes that satisfy the policy requirements of each exam offered by the Sponsoring Group and verifying that each participant has met the eligibility requirements of the program before being allowed to complete an ACI exam.

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- F) Collecting exam fees from participants, paying materials invoices to ACI within 30 days of receipt, and distributing compensation to examiners and other program delivery personnel as warranted.
 - G) Developing a program delivery process that establishes separation between the education/training and testing divisions of the Sponsoring Group.
12. ACI has the right to revoke a Sponsoring Group's authority to conduct an ACI certification exam at any time, with or without cause, and with or without notice.
 13. Appeals resulting from the denial or revocation of Sponsoring Group status will be reviewed by ACI Staff for determination of appropriate action on a case-by-case basis.
 14. This policy shall become effective sixty (60) days after its approval by the ACI Certification Programs Committee, and shall render all previous Policy versions null and void. Sponsoring Groups shall be notified of this new policy in writing within thirty (30) days after it is approved by the ACI Certification Programs Committee.
 15. The Certification Programs Committee shall review, revise as necessary, and reapprove this Policy at intervals not exceeding two years in length.