The statements contained herein are a consolidation of approved policies and procedures. This policy statement supersedes all previous action regarding Shotcrete Inspector certification.

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

Section 1.0 Certification Criteria
Section 2.0 Examination Criteria
Section 3.0 Appeals Criteria
Section 4.0 Sponsoring Group Criteria
Section 5.0 Examiner/Proctor Criteria
Section 6.0 ACI Responsibilities
Section 7.0 Recertification Criteria
SECTION 1.0 CERTIFICATION CRITERIA

1.1 The American Concrete Institute (ACI) shall recognize individuals certified as Shotcrete Inspector.

1.2 Certification as a Shotcrete Inspector shall require:

   A) Successful completion of a written examination.

   B) Fulfillment of requirements in ACI Concrete Field Testing Technician—Grade I as follows:

      1. Be currently certified as an ACI Concrete Field Testing Technician—Grade I

      OR

      2. Have been certified as an ACI Concrete Field Testing Technician—Grade I at one time

      AND

      3. Pass the current ACI Concrete Field Testing Technician—Grade I written exam within one year of passing the Shotcrete Inspector exam.

      If the ACI Concrete Field Testing Technician—Grade I requirement is not held at the time of testing for Inspector, the requisite ACI Concrete Field Testing Technician—Grade I certification or validation of prior ACI Concrete Field Testing Technician—Grade I certification with successful completion of the current ACI Concrete Field Testing Technician—Grade I written examination must be obtained within one year of the first examination passed for Inspector. Otherwise, the certifications must be retaken in their entireties.

      ACI Concrete Field Testing Technician—Grade I certification program content and operation are described in ACI Certification Policies for Concrete Field Testing Technician—Grade I, Appendix C661.1-1.

   C) Demonstrate satisfactory education and work experience.

1.3 The education and work experience required for Shotcrete Inspector certification is as follows:

   A) Three years of satisfactory work experience.

1.4 Satisfactory work experience must include at least one of the following:

   A) Testing, inspection, and quality control of shotcrete.

   B) Supervision of shotcrete construction work

   C) Design of shotcrete structures.
1.5 Shotcrete training/education may be applied towards up to two [2] years of experience to satisfy the requirements of 1.4. Recognized training/education programs are listed in Recognized Training and Education Programs for ACI Shotcrete Inspector Certification, Appendix 661.1-2

1.6 ACI certification shall be valid for a period of five [5] years from the date of completion of all certification requirements.

SECTION 2.0 EXAMINATION CRITERIA

2.1 The written examination shall consist of approximately eighty [80] multiple choice.

2.2 The Shotcrete Inspector written examination is derived from the information listed in Job Task Analysis (JTA) for ACI Shotcrete Inspector Certification, Appendix 661.1-3.

2.3 The written examination is open-book. The technical materials allowed into the examination room are limited to the resource materials listed in Appendix 661.1-3.

2.4 A maximum time of ninety [90] minutes shall be allowed to complete the written examination.

2.5 The examination shall be supervised by an ACI-approved Examiner, assisted, when necessary, by a proctor appointed by the Examiner.

2.6 The Examiner, proctors, and members of the Sponsoring Group have no jurisdiction over the content of questions on any specific examinations.

2.7 Verbal administration of the examination shall be permitted, contingent upon prior approval by the ACI Certification Department.

2.8 Successful completion of the written examination requires a minimum grade of 75%.

2.9 Examinations shall be graded by ACI.

SECTION 3.0 APPEALS CRITERIA

3.1 An appeal procedure shall be available if the examinee feels some aspect of the examination process is unclear, incorrect, or unfair.

3.2 Appeals regarding the conduct of the examination should be referred initially to the Examiner. If the Examiner cannot satisfy the complaint, it should be referred to the Sponsoring Group.
3.3 Appeals referred to ACI are handled in order by the following people or groups:

1. Sponsoring Group
2. ACI Managing Director of Certification
3. The Certification Appeals Committee [consisting of the Managing Director of Certification; the Certification Programs Committee Chairman, and the Chairman of Committee C661]
4. Committee C661, Shotcrete Inspector Certification
5. Certification Programs Committee

SECTION 4.0 SPONSORING GROUP CRITERIA

Groups desiring to conduct ACI Certification program(s) shall adhere to the current Policy on Sponsoring Groups for Certification, Appendix 661.1-4.

SECTION 5.0 EXAMINER/PROCTOR CRITERIA

5.1 The Examiner must be authorized by ACI to conduct sessions for this program. Examiner applications must be submitted by the Sponsoring Group and will be evaluated based on the applicant's experience and familiarity with this and/or other ACI Certification programs.

5.2 The Examiner shall be present and in full supervision during the examination session.

5.3 Proctors adjudged trustworthy and conscientious by the Examiner shall be permitted to assist the Examiner in conducting the written examination.

5.4 Examiners and proctors shall be unrelated professionally and personally to the examinees. Government organizations may petition ACI, in writing, and request a waiver of this requirement. Waivers shall be granted only if it can be shown that the intent of the policy will be maintained.

5.5 The Examiner shall:
   1. Verify the identity of each examinee, and ensure that the examinees are aware of the certification criteria.
   2. Confirm the suitability of the facilities selected by the Sponsoring Group.
   3. Maintain exam security and secrecy of the examination content.
   4. Not define terms or interpret examination questions while conducting the examination.

SECTION 6.0 ACI RESPONSIBILITIES

6.1 ACI shall:
   1. Approve the Sponsoring Group.
2. Approve the Examiner.
3. Grade the examinations and notify the examinee of the final results in writing.
4. Evaluate education and work experience and determine conformance with requirements of applicants as a Shotcrete Inspector.
5. Authorize the Sponsoring Group to conduct examination sessions for:

   Shotcrete Inspector

6. Issue certification credentials to successful examinees.

SECTION 7.0  RECERTIFICATION CRITERIA

Recertification criteria shall be the successful completion of the then-current requirements for certification. Reevaluation of work experience is not required for recertification.

End of Policy Text
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 Field Testing Technician certification.

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

- Section 1.0  Certification Criteria
- Section 2.0  Definitions
- Section 3.0  ACI Responsibilities
- Section 4.0  Examiner, Supplemental Examiner, and Proctor Criteria and Responsibilities
- Section 5.0  Examination Criteria
- Section 6.0  Re-examination Criteria
- Section 7.0  Appeals Procedures
SECTION 1.0 CERTIFICATION CRITERIA

1.01 The American Concrete Institute (ACI) certification program for Concrete Field Testing Technician - Grade I shall require successful completion of both a written examination and a performance examination.

1.02 No specific education or work experiences are required as prerequisites for Concrete Field Testing Technician - Grade I certification.

1.03 ACI certification for Concrete Field Testing Technician - Grade I shall be valid for a period of five [5] years from the date of completion of all certification requirements.

1.04 Recertification requires the successful completion of both a written and performance examination according to Section 5 of this policy.

1.05 Groups desiring to conduct ACI Certification program(s) shall adhere to the current Policy on Sponsoring Groups for Certification (Annex 610.1-1).

SECTION 2.0 DEFINITIONS

2.01 Examinee - a person taking either the written or performance examination, or both.

2.02 Examiner - a person authorized by ACI to be in responsible charge of an examination session.

2.03 Performance Exam Checklist - a list of criteria used by the supplemental examiner to judge the compliance of the examinee with the provisions of the performance examination.

2.04 Proctor - a person authorized to assist the Examiner in conducting the written examination.

2.05 Supplemental Examiner - a person who assists the Examiner by administering the performance examination.

SECTION 3.0 ACI RESPONSIBILITIES

3.01 ACI shall assemble, maintain and distribute all examination materials.

3.02 ACI shall approve the local sponsoring group.

3.03 ACI shall authorize the local sponsoring group to conduct examination sessions for Concrete Field Testing Technician - Grade I certification.
3.04 ACI shall approve the examiner.

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

3.06 ACI shall certify examinees who meet the certification requirements.

3.07 ACI shall issue a certificate, wallet card, and hard hat decal to examinees who meet the certification requirements.

SECTION 4.0 EXAMINER, SUPPLEMENTAL EXAMINER, AND PROCTOR CRITERIA AND RESPONSIBILITIES

4.01 To maintain access to ACI examination materials, the examiner shall maintain approval from ACI and authorization from the Local Sponsoring Group.

4.02 Applicants must be selected by an approved Sponsoring Group and shall submit a current ACI Examiner Application to ACI through that same Sponsoring Group.

4.03 In order to be considered for examiner status, the applicant shall have assisted in the administration of at least two (2) ACI examination sessions (any program including written and performance components where applicable), performing to the satisfaction of the examiner of record, and:

A) Satisfy the following criteria:
   1. Be a registered professional engineer, or hold equivalent international credentials; and
   2. Have been certified as a Concrete Field Testing Technician – Grade I; and
   3. Have had at least two (2) years of verifiable experience in concrete construction, inspection or testing.

OR

B) Satisfy the following alternate criteria:
   1. Be certified as an ACI Concrete Field Testing Technician – Grade I at the time of application; and
   2. Have had at least five (5) years of verifiable experience in ACI certification administration, concrete construction, inspection or testing; and
   3. Have participated in at least four (4) ACI examination sessions as a proctor and/or supplemental examiner for this program. This is in addition to the administration assistance, as stated above, but is permitted to be completed concurrently.

4.04 The examiner shall be present at, and supervise, the examination session.
The examiner shall be directly responsible for the following activities:

A) Select the supplemental examiners and proctors;
B) Verify the qualifications of the supplemental examiners and proctors according to the criteria outlined in Section 4.06 through 4.12 of this policy;
C) Order examinations;
D) Verify the identity of each examinee;
E) Assure that the examinees are aware of the certification criteria;
F) Verify that the examinees have signed the release statement on the performance examination prior to performing any test methods or procedures;
G) Verify the performance evaluations conducted by the supplemental examiners by co-signing the performance examination checklist report;
H) Enter the appropriate grade for the completed performance examination on the checklist report;
I) Assure that all examinees have an opportunity to perform each test method at least once and to take a second trial on any failed procedure of the performance examination;
J) Refrain from interpreting examination questions during the course of the written examination;
K) Assist, if requested, the examinee by providing definitions for general use words (i.e. “depict” = “shows”). Examiners shall not define terms specific to the ASTM Standards whose definitions are readily available through adequate study of the Standards.

Proctors may assist the examiner in conducting the written examination.

Proctors shall satisfy the following requirements:

A) Be selected, and adjudged qualified by the examiner; and
B) Be considered trustworthy and conscientious.

Supplemental examiners shall assist the examiner by conducting the performance examination.

Supplemental examiners shall satisfy the following requirements:

A) Have had experience in concrete testing;
B) Be selected and adjudged qualified by the examiner;
C) Be considered trustworthy and conscientious;
D) Be certified as an ACI Concrete Field Testing Technician - Grade I or be an ACI-approved examiner.
E) Be thoroughly familiar with current applicable ASTM Standards as appropriate

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.

Examiners, supplemental examiners, and examiners acting as supplemental examiners shall not examine anyone on the performance examination who is employed in the same organization. Governmental
organizations may petition ACI, in writing, and request a waiver of this requirement. Waivers shall be granted only if it can be shown that the intent of the policy will be maintained.

4.12 Supplemental examiners and examiners acting as supplemental examiners monitoring the performance examination for ASTM C 231 shall be qualified for whichever type meter he/she is monitoring.

SECTION 5.0 EXAMINATION CRITERIA

5.01 The content of the written and performance examinations shall be derived directly from the Job Task Analysis for ACI Concrete Field Testing Technician – Grade I Certification (Annex 610.1-2).

5.02 Questions regarding general concrete technology shall not be included on either examination.

5.03 The examinations shall be conducted by the examiner, proctors, and supplemental examiners as applicable. [See Section 4.]

5.04 The examiners, proctors, supplemental examiners, and sponsoring groups have no jurisdiction over the content of either examination, or over the grading of the written examination.

5.05 Both the written and performance examinations are closed book. Notes or other technical material related to the subject matter shall not be permitted in the examination area. Non-programmable calculators shall be permitted.

WRITTEN EXAMINATION

5.06 The written examination shall consist of approximately fifty-five [55] multiple choice questions, with five to ten [5-10] questions on each ASTM Standard.

5.07 One hour shall be permitted for completion of the written examination, after which the exam answer sheets must be collected. Additional time, up to one-half hour, with access to the exam question booklet will be allotted to the examinee to facilitate exam question challenges.

5.08 If an examinee is incapable of understanding the written examination, it may be administered orally upon approval of the Examiner.

5.09 Successful completion of the written examination shall require the examinee:

   A) Score sixty percent [60%] or higher on each individual ASTM Standard (i.e. five [5] correct out of eight [8] questions); AND
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B) Score a minimum of seventy percent [70%] for the overall examination (i.e., thirty-nine [39] correct out of a possible fifty-five [55]).

PERFORMANCE EXAMINATION

5.10 Successful completion of the performance examination shall require the examinee to satisfactorily perform each of the following ASTM Standard Test Methods: C172, C143, C138, C231, C173, C1064, and C31.

5.11 It shall be the sponsoring group's responsibility to provide equipment which conforms to the applicable ASTM Standards and that is in good working order. The examinee shall not be penalized as a result of faulty or incorrect equipment.

5.12 The examinee shall conduct the performance examination in the direct presence of the supplemental examiner or the examiner when acting as a supplemental examiner.

5.13 Supplemental examiners and examiners acting as supplemental examiners shall observe only one examinee conducting tests at a time while conducting the performance examination.

5.14 The procedures of ASTM C172 may be described verbally or performed at the local sponsoring group's discretion.

5.15 The examinee shall have the option of using either a Type A or Type B meter when performing method C231 if a supplemental examiner qualified in the operation of a Type A meter is available (see Section 4.12).

5.16 For ASTM C31, the examinee shall fabricate a compression test specimen.

5.17 At the conclusion of performing each test method the examinee must record the results of the test.

5.18 The examinee's performance shall be evaluated based on the criteria of the performance examination checklist.

5.19 The supplemental examiner shall indicate pass or fail for each step on the checklist.

5.20 Grading for the performance examination shall be on a pass/fail basis only.

5.21 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.

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

5.23 Incorrect performance, or omission, of one or more of the steps of the performance checklist shall constitute failure of that trial.

5.24 An examinee shall be allowed a second trial for each standard test method if the first trial was not successfully completed.
5.25 The second trial of a particular test shall not be conducted immediately following the first trial.

5.26 The second trial shall be administered by a different supplemental examiner than the first trial if more than one supplemental examiner is available.

5.27 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.

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

5.29 When a failure of a trial has occurred the supplemental examiner shall inform the examinee of the particular step(s) performed incorrectly.

5.30 The examinee shall be permitted to leave the examining area between trials to consult notes or books.

5.31 Failure on any of the prescribed ASTM Standards after two [2] trials will constitute failure of that part of the performance examination.

SECTION 6.0 RE-EXAMINATION CRITERIA

6.01 Failure of the written examination by either of the criteria cited under Section 5.09 shall require a reexamination on the entire written examination.

6.02 Invalidation of the performance examination (for example non-conformance with Section 4.11) or failure on one [1] or more of the seven [7] required ASTM Standards shall require reexamination on the entire performance examination.

6.03 Reexamination on the written or the 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 7.0 APPEALS CRITERIA

7.01 Appeals regarding the conduct of the exam should be made during the exam session and shall be directed to the examiner.

7.02 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 Certification Programs Committee Chairman, and the Chairman of Committee C 610.]
4. Committee C 610, Field Testing Technician Certification
5. Certification Programs Committee
7.03 Appeals submitted directly to ACI for consideration after the exam session must be received, in writing, within sixty [60] days of the receipt of the examination at ACI Headquarters.

End of Policy Text
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 ACI 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.
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.
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.
Policy on Sponsoring Groups for Certification

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.
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 C1064/C1064M—Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM C172/C172M—Standard Practice for Sampling Freshly Mixed Concrete
ASTM C143/C143M—Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C138/C138M—Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
ASTM C231/C231M—Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C173/C173M—Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C31/C31M—Standard Practice for Making and Curing Concrete Test Specimens in the Field

ASTM C1064/C1064M—Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
• Know the working requirements, including measurement range and accuracy, of the temperature measuring device (TMD)
• Know the calibration requirements of the TMD
• Know the allowance for measuring temperature of concrete in transportation equipment
• Know the requirements for measuring temperature of concrete in either the transporting equipment or the forms
• Know the sampling requirements when not measured in transporting equipment or forms
• Perform temperature measurement as specified
• Perform reporting of temperature to the required accuracy

ASTM C172/C172M—Standard Practice for Sampling Freshly Mixed Concrete
• Understand the scope and significance of use of practice
• Know and perform (or describe verbally) the time limit for sampling
• Know and perform (or describe verbally) the transportation and remixing requirements within maximum time limits
• Know and perform (or describe verbally) the time limits for starting tests for slump, temperature, air content, and molding specimens for strength tests
• Know and perform (or describe verbally) protection of sample
• Know and perform (or describe verbally) the requirements for sample sizes to be used for strength tests, air content, temperature, and slump
• Know and perform (or describe verbally) sampling procedures from stationary mixers, paving mixers, revolving drum truck mixers or agitators, and continuous mixers
Job Task Analysis (JTA) for ACI Concrete Field Testing Technician—Grade I Certification (Continued)

- Know and perform (or describe verbally) the procedure for removal of large maximum size aggregate
- Know the apparatus and procedure for wet-sieving

**ASTM C143/C143M—Standard Test Method for Slump of Hydraulic-Cement Concrete**

- Understand the significance of the test method
- Know the maximum aggregate size for the test method
- Know the applicability of test method for non-plastic concrete
- Know required equipment: sizes, shapes of mold, rod length and diameter, measuring device and scoop
- Know the requirements for obtaining a sample
- Perform the test procedure, including filling of the mold, consolidation, lifting, and measuring as specified
- Perform reporting of the slump to the required accuracy

**ASTM C138/C138M—Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete**

- Understand the scope of test method
- Know the requirements of the apparatus (balance, rod/vibrator, measure, strike-off plate, mallet, scoop)
- Understand calibrated volume of the density (unit weight) measure
- Know the requirements for obtaining a sample
- Perform the test procedure, including tare weight, filling the measure, rodding/vibration, strike-off, cleaning, and weighing
- Know and perform the calculation and reporting of density (unit weight) to the specified accuracy
- Know how to calculate theoretical density
- Know how to calculate yield
- Know how to calculate relative yield
- Understand the influence of cement content on density (unit weight)
- Understand the relationship of air content and density (unit weight)

**ASTM C231/C231M—Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method**

- Understand the scope and significance and use of test method
- Know the requirements for the proper working condition of the equipment
- Understand calibration recordkeeping and know how to verify that equipment has been calibrated as required
- Know the requirements for obtaining a sample
- Know and perform proper procedures for placement and consolidation of sample, including strike-off
- Know and perform preparation procedures and assembly of air meter for test
- Perform test procedure (using Type A or Type B meter), including proper sequence & use of water, petcocks, valves, pump, and gauge
- Perform reading of the pressure gauge
- Perform the release of pressure and disassembly of air meter
- Know and perform calculation of air content of sample tested
- Know and perform proper use of aggregate correction factor in calculating air content
- Perform reporting of air content to the required accuracy
ASTM C173/C173M—Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

- Understand the scope and significance and use of test method
- Know the requirements for the proper working condition of the equipment
- Understand calibration recordkeeping and know how to verify that equipment has been calibrated as required
- Know the requirements for obtaining a sample
- Know and perform proper procedures for placement and consolidation of sample, including strike-off
- Know and perform preparation procedures and assembly of air meter for test
- Know and perform initial addition of water and alcohol to the air meter
- Perform the process of inverting, shaking, and rolling the air meter to displace the volume of air in the concrete specimen
- Perform initial meter reading as specified, within allowable time & percentage limits
- Perform final meter reading as specified, within allowable time & percentage limits
- Perform the disassembly of air meter
- Know and perform examination of measuring bowl to verify a valid or invalid test
- Know and perform calculation of air content
- Perform reporting of air content to the required accuracy

ASTM C31/C31M—Standard Practice for Making and Curing Concrete Test Specimens in the Field

- Understand the scope of practice
- Know the allowable types and sizes of molds
- Know the sizes and proper use of equipment, including tamping rod, vibrator, mallet, and placement & finishing tools
- Know the testing requirements, including acceptable nominal maximum aggregate sizes
- Know the requirements for obtaining a sample
- Perform molding of cylindrical specimen, including placing, consolidation, and finishing
- Know the procedure for molding of beam specimens, including placing, consolidation, and finishing
- Know and perform the marking of specimens for identification
- Know and perform (or demonstrate verbally) the requirements for initial storage of specimens
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.

RESOURCES:
ACI 305R Guide to Hot Weather Concreting
ACI 305.1 Specification for Hot Weather Concreting
ACI 306R Guide to Cold Weather Concreting
ACI 306.1 Standard Specification for Cold Weather Concreting
ACI 506R Guide to Shotcrete
ACI 506.1R Guide to Fiber-Reinforced Shotcrete
ACI 506.2 Specification for Shotcrete
ACI 506.4R Guide for the Evaluation of Shotcrete
ACI 506.6T Visual Shotcrete Core Quality Evaluation
ACI CCS-4 Shotcrete for the Craftsman
ASTM C1140 Standard Practice for Preparing and Testing Specimens from Shotcrete Test Panels
ASTM C1604 Standard Test Method for Obtaining and Testing Drilled Cores of Shotcrete
ASA Safety Guidelines for Shotcrete

ACI 506R Part 1
• Understand the scope and limitations of the guide
• Understand what is structural shotcrete
• Understand what are the characteristics of the processes
• Understand the different types of shotcrete (refractory, fiber-reinforced, etc)
• Understand the information needed to satisfy submittals required by project documents (PD)
• Understand the purpose of preconstruction testing as required by the PD
• Understand who conducts QA
• Understand who conducts QC
• Understand the QA and QC requirements as required by the PD
• Understand the different type shotcrete panels and their purpose
• Understand what size material panel is required by the PD
• Understand the reason for different size panels
• Understand the terminology related to shotcrete
• Understand standards related to shotcrete testing

ACI 506R Part 2
• Knows the difference between cement and supplementary cementitious materials
• Knows the cement SUPPLEMENTARY cement requirements per PD
• Knows where to find the aggregate grading limits and applicable ASTM documents
Job Task Analysis (JTA) for ACI Shotcrete Inspector Certification

- Knows what is acceptable water for shotcrete and what tests are needed if the water source is questionable
- Can list and describe purpose of admixtures
- Knows the minimum amount of air entraining required by PD and when/where the test is taken
- Knows the potential challenges presented by reinforcement and steps to be taken to reduce interference
- Knows why epoxy coated steel should be tested prior to being incorporated into project
- Knows and describe the different type and size fibers
- Knows the potential limitations of adding fibers
- Knows the range of compressive strength that can be expected from shotcrete
- Knows the compressive strength of shotcrete as required by the PD
- Knows the expected air content of the in-place shotcrete
- Knows the maximum water soluble chloride ion concentration
- Knows the purpose and limitations of boiled water absorption (BWA) test
- Knows the purpose of flexural testing
- Knows the purpose and can describe bond test
- Knows the typically expected bond test results of shotcrete to properly prepared concrete surface
- Knows what factors contribute to early-age plastic & long-term drying shrinkage
- Knows how to measure slump and what is the typical range for encasing steel
- Knows the proportions of a typical shotcrete mixture for both wet and dry mix shotcrete
- Knows the range of w/cm ratio for typical shotcrete
- Knows the methods used to mix and batch shotcrete
- Knows the visual indicators of an appropriate mixture
- Knows the common time limits for wet-mix and dry-mix shotcrete
- Knows the advantages of pre-dampening pre-packaged dry materials
- Knows the use of curing compounds for shotcrete
- Understands the use of bonding compounds for shotcrete
- Knows the factors that affect strength of a shotcrete mixture

ACI 506R Part 3

- Knows the purpose of surface preparation as require by the PD
- Knows what is SSD and how it is achieved
- Knows the results of insufficient surface preparation
- Knows the visual indications of excessive bruising or surface moisture
- Knows the advantages of non-contact laps and spacing
- Knows that shotcrete & reinforcement can be installed in single or multiple layers
- Knows lap requirements for mesh reinforcement
- Knows why anchor spacing is important
- Knows what characteristics are required for formwork
- Knows whether form release agent can be used
- Knows tolerance for inflated forms, if specified
- Knows and can describe different types of joints
- Knows what is permitted alignment control
- Knows and describe different ways vertical shotcrete walls can be shot
- Knows what limits height of bench shooting
- Knows limitations of layering shotcrete
Job Task Analysis (JTA) for ACI Shotcrete Inspector Certification

- Knows what areas need protection from overspray and rebound
- Knows the importance of maintaining a safe distance from electrified power lines
- Knows the importance of ventilation, visibility and access
- Knows appearance of consistent mixture
- Knows proper angle to receiving surface
- Knows importance of proper impact velocity
- Knows when to shoot corners
- Can describe rebound and how to control
- Can describe overspray and how to control
- Knows when blow pipe is beneficial
- Identify laitance and how to address when present
- Knows procedures to prepare surfaces for application of multiple layers of shotcrete
- Knows what factors control and what to look for to ensure proper encasement of reinforcement
- Knows what weather conditions control placement of shotcrete
- Knows factors that affect finishing
- Knows the finishing requirements of PD
- Knows why curing is important and purpose of curing
- Knows acceptable methods of curing and required curing time
- Knows ways to protect shotcrete and under what conditions
- Knows when adjacent surfaces are to be protected
- Knows tolerances as required by PD
- Knows why shotcrete is suitable for repair
- Knows what are the acceptance criteria for shotcrete
- Knows methods to help reduce early age plastic shrinkage cracking
- Understand steel surface conditions
- Understand methods to maintain consistency
- Know time limits for shotcrete placement
- Know when adjacent surfaces are to be protected
- Knows tolerances as required by PD
- Knows why shotcrete is suitable for repair
- Knows what are the acceptance criteria for shotcrete
- Knows methods to help reduce early age plastic shrinkage cracking
- Understand steel surface conditions
- Understand methods to maintain consistency
- Know time limits for shotcrete placement
- Knows who is in charge of the shotcrete crew

ACI 506R Part 4

- Can describe different types of dry-mix and wet-mix equipment
- Knows the difference between delivery line pressure in dry-mix and wet-mix
- Knows what is the recommended amount (in cfm) of air needed for dry-mix and wet-mix operations
- Describe different type batching operations
- Knows what is the main factor controlling equipment layout for dry-mix and wet-mix operations
- Knows why communication is vital between operator and nozzleman
- Knows who is in charge of the shotcrete crew

ACI 506.2

- Understand required submittals
- Understand and describe the requirements of preconstruction testing
Job Task Analysis (JTA) for ACI Shotcrete Inspector Certification

- Understand the types of tests and inspection that may be required by contract documents during construction
- Understand and describe types of surface preparation
- Know and describe types of joint requirements and methods
- Understand tolerance requirements and alignment control methods
- Know and understand that type, location and frequency of inspection will differ with different types of shotcrete projects
- Understand the curing requirements
- Understand that each project has distinct and specific requirements that will be required from the Specification Checklist
- Know the acceptance criteria
- Know form requirements
- Know when to use a compressed air blow pipe

ACI 306R, ACI 306.1

- Understand the significance of use of practice
- Know what is considered cold weather concreting (Temps, Ambient Air Changes etc)
- Know parameters and constituents of concrete mix designs needed for cold weather concrete
- Know substrate preparation for cold weather concrete
- Know concrete protection methods needed in cold weather concrete
- Know forming techniques in and around protection devices
- Know any special placement equipment necessary for cold weather concreting
- Identify temperature testing mechanisms for in-place, protected concrete
- Know curing procedures with regard to protection mechanisms and ambient temperature fluctuations above and below freezing
- Identify differences in strength gain based on temperature (maturity concept)
- Know impact on concrete from large steel members at temperatures below freezing
- Know the objectives of cold weather concreting practices
- Understand cold-weather factors that affect strength development

ACI 305R, ACI 305.1

- Know the properties of concrete / wet - dry process shotcrete
- Understand the relationship between slump and concrete temperature
- Know the max temperature allowed for placing concrete
- Understand hydration
- Understand how wind, humidity and ambient temperature can affect concrete
- Understand methods for cooling concrete
- Understand the importance of advance planning for hot weather placement
- Understand how to prepare the substrate in hot weather conditions
- Understand how reinforcing and embeds can affect concrete in hot weather
- Understand the importance and methods of curing concrete
- Understand what is needed to cool the aggregates before batching in hot weather

ACI 506.4R

- Understand the objectives of a specific test program for a particular project
- Understand the concept of testing shotcrete vs form and poured concrete
Job Task Analysis (JTA) for ACI Shotcrete Inspector Certification

- Understand the different tests for fresh properties of dry vs wet mix shotcrete
- Understand the relationship between equipment, material, nozzleman skills and shotcrete quality
- Know how shotcrete test specimens are obtained
- Understand the difference between pre-construction, and during construction, testing
- Understand tests to detect lack of bond and voids
- Understand variations in homogeneity of shotcrete
- Understand in-place density of shotcrete

ACI 506.1R
- Know the difference between Micro and Macro Fibers
- Know the difference between metallic and synthetic fibers
- Understand the effects of fibers on shotcrete placement
- Understand the general purpose of fiber reinforcement
- Understand hardened properties of fiber-reinforced shotcrete
- Understand proportioning fiber-reinforced shotcrete mixtures

ACI CCS-4
- Understand the basic properties of concrete
- Know composition of concrete (main ingredients, proportions & how mixed)
- Understand concrete proportioning
- Know the definition of shotcrete
- Know the difference between wet-mix and dry-mix shotcrete processes
- Understand the requirements for proper encapsulation of reinforcement
- Understand the w/cm and how water content affects concrete
- Know what equipment is required for both shotcrete processes
- Understand the effect of equipment layout
- Understand the importance of substrate surface preparation
- Understand how curing affects concrete strength and durability
- Understand how compaction and proper encasement of rebar affect the quality of shotcrete
- Understand hot and cold weather shotcrete placement
- Understand the finishing process

ASTM C1140
- Understand the scope and significance of use of practice
- Know the allowable geometry and materials for test panel forms
- Know the appropriate test mixtures for the tests
- Know the appropriate number of panels, equipment, personnel and application of shotcrete for test panels
- Know curing requirements for test panels
- Know proper procedures for obtaining, conditioning and testing specimens from test panels
- Know the reporting requirements for the test procedure

ASTM C1604
- Understand the scope and significance of use of practice
- Know the apparatus required for the test
- Know the requirements for proper sampling and handling of cores from hardened concrete
Job Task Analysis (JTA) for ACI Shotcrete Inspector Certification

- Know the geometric constraints on core samples
- Know the test requirements for moisture conditioning
- Know the sawing or capping requirements of compressive strength core samples
- Know the measurement, testing, calculation and reporting requirements for compression strength core tests
- Know the bearing surface requirements for splitting tensile strength cores
- Know the measurement, testing, calculation and reporting requirements for splitting tensile strength core tests
- Know when correction factors are applied and why

ASA Safety Guidelines

- Know and Understand the hazards of the shotcrete process
- Know PPE
- Know project specific personal safety requirements

ACI 506.6T

- Understand the scope and significance of the TechNote
- Know and describe process for visual examination of cores
- Know and describe what imperfections visual evaluation can provide
- Know and describe the categories of core quality
- Know and describe the two criteria used for assigning categories
- Know and describe when the licensed design professional may modify visual evaluation criteria
- Know and describe how Figure 1 is used to graphically enumerate the evaluation criteria
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 ACI 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.

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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.