



## Certification Policies for Nondestructive Testing Specialist—Concrete Strength

*Last revised by the Certification Programs Committee  
October 18, 2019*

The statements contained herein are approved policies and procedures. This policy statement supersedes all previous action with respect to Non-Destructive Testing Specialist I certification.

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

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**SECTION 1.0 CERTIFICATION CRITERIA**

- 1.01 The American Concrete Institute (ACI) certification program for Nondestructive Testing Specialist—Concrete Strength shall require successful completion of both a written examination and a performance examination.
- 1.02 No specific education or work experience are required as prerequisites for Nondestructive Testing Specialist—Concrete Strength certification. However, the candidate must provide and be proficient with their own equipment for the practical portion of this program.
- 1.03 ACI certification for Nondestructive Testing Specialist—Concrete Strength 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 691.1-1).

**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 Sponsoring Group.
- 3.03 ACI shall authorize the Sponsoring Group to conduct examination sessions for Nondestructive Testing Specialist—Concrete Strength 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 credentials 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 Sponsoring Group.

4.02 Individuals seeking to become ACI-approved Examiners shall submit their qualifications to ACI.

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 an ACI Nondestructive Testing Specialist—Concrete Strength; 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 Nondestructive Testing Specialist—Concrete Strength 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 two (2) 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.

4.05 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 4.11 of this policy;
- C) Order examinations;

- D) Verify the identity of each examinee;
- E) Ensure 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) Ensure 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; and
- 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.

4.06 Proctors may assist the Examiner in conducting the written examination.

4.07 Proctors shall satisfy the following requirements:

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

4.08 Supplemental Examiners shall assist the Examiner by conducting the performance examination.

4.09 Supplemental Examiners shall satisfy the following requirements:

- A) Have had experience in the concrete industry and nondestructive testing of concrete;
- B) Be selected and judged qualified by the Examiner;
- C) Be considered trustworthy and conscientious;
- D) Be familiar with current applicable ASTM Standards as appropriate.

**AND**

E) Be certified as an ACI Non-Destructive Testing Specialist—Concrete Strength or be an ACI-approved Examiner.

**OR**

F) Have attended an ACI Orientation program for the Nondestructive Testing Specialist—Concrete Strength.

4.10 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.

- 4.11 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.

#### **SECTION 5.0 EXAMINATION CRITERIA**

- 5.01 The content of the written and performance examinations shall be derived directly from the information listed in the *Job Task Analysis for ACI Nondestructive Testing Specialist—Concrete Strength Certification* (Annex 691.1-2).
- 5.02 The examinations shall be conducted by the Examiner, proctors, and Supplemental Examiners as applicable. [See Section 4.]
- 5.03 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.
- 5.04 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**

- 5.05 The written examination shall consist of approximately seventy [70] multiple choice questions, with six to twelve [6-12] questions on each of the following six ASTM Standards: C597, C803, C805, C873, C900, and C1074.
- 5.06 Ninety (90) minutes 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.
- 5.07 If an examinee is incapable of understanding the written examination, it may be administered verbally upon approval of the Examiner.
- 5.08 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
- B) Score a minimum of seventy percent [70%] for the overall examination (i.e., forty-nine [49] correct out of a possible seventy [70]).

#### **PERFORMANCE EXAMINATION**

- 5.09 Successful completion of the performance examination shall require the examinee to satisfactorily perform each of the following four ASTM Standard Test Methods: C597, C803, C805, and C900.

- 5.10 Examinees are expected to provide their own equipment which conforms to the applicable ASTM Standards and is in good working order. Provision of equipment to administer an exam session may be handled in a variety of ways. It is the Sponsoring Group's responsibility to collect information from registrants in advance and determine appropriate arrangements.
- 5.11 The examinee shall conduct the performance examination in the direct presence of the Supplemental Examiner or the Examiner when acting as a Supplemental Examiner.
- 5.12 Supplemental Examiners and Examiners acting as Supplemental Examiners shall observe only one examinee conducting tests at a time while conducting the performance examination.
- 5.13 For ASTM C597, it is suggested that a concrete beam measuring approximately 6 × 6 × 21 in. be provided to the examinee for testing.
- 5.13.1 For ASTM C803, the Sponsoring Group shall provide a variety of pins pre-set in the concrete ahead of the session. The candidate will then walk through proper preparation and set-up of the apparatus including up to the point of shooting the pin into concrete, but at this point the Supplemental Examiner will stop candidate and then direct them to the set of pre-set pins and ask them to proceed with measurements on these pins.
- 5.14 For ASTM C900, it is suggested that a 3 ft. × 3 ft. × 5.5 in. thick concrete slab with a minimum compressive strength of 4000 psi, be provided for the practical exam.
- 5.15 At the conclusion of performing each test method the examinee must record the results of the test.
- 5.16 The examinee's performance shall be evaluated based on the criteria of the performance examination checklist.
- 5.17 The Supplemental Examiner shall indicate pass, fail, or not applicable for each step on the checklist.
- 5.18 Grading for the performance examination shall be on a pass/fail basis only.
- 5.19 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.
- 5.20 The Supplemental Examiner shall not stop a trial at any point which an error is made.
- 5.21 Incorrect performance, incorrect order of performance, or omission, of one or more of the steps of the performance checklist shall constitute failure of that trial.
- 5.22 Performance of extraneous steps not part of the standard test or procedure shall constitute failure of that trial.
- 5.23 An examinee shall be allowed a second trial for each standard test method if the first trial was not successfully completed.
- 5.24 The second trial of a particular test shall not be conducted immediately following the first trial.

- 5.25 The second trial shall be administered by a different Supplemental Examiner than the first trial if more than one Supplemental Examiner is available.
- 5.26 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.
- 5.27 Immediately following completion of each trial, the Supplemental Examiner shall inform the examinee of the results, either pass or fail.
- 5.28 When a failure of a trial has occurred, the Supplemental Examiner shall inform the examinee of the particular step(s) performed incorrectly.
- 5.29 The examinee shall be permitted to leave the examining area between trials to consult notes or books.
- 5.30 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 5.08 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 four [4] 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 ACI Committee C 691.]
  - 4. Committee C 691, Nondestructive Testing Specialist 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





**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<sup>1</sup> 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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<sup>1</sup> 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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### 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.

## Annex 691.1-2

### Job Task Analysis (JTA) for ACI Nondestructive Testing Specialist—Concrete Strength Certification

#### 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 C597 Standard Test Method for Pulse Velocity Through Concrete

ASTM C803/C803M Standard Test Method for Penetration Resistance of Hardened Concrete

ASTM C805/C805M Standard Test Method for Rebound Number of Hardened Concrete

ASTM C873/C873M Standard Test Method for Compressive Strength of Concrete Cylinders Cast in Place in Cylindrical Molds

ASTM C900 Standard Test Method for Pullout Strength of Hardened Concrete

ASTM C1074 Standard Practice for Estimating Concrete Strength by the Maturity Method

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#### Pulse Velocity Through Concrete

- Understand the scope of test method
- Be familiar with the referenced documents
- Understand terminology
- Understand summary of test method
- Know significance and use
- Know the apparatus to be used in this test
- Know and understand the different components of the apparatus
- Know the use of the different components of the apparatus
- Know and perform zeroing of apparatus
- Know and perform procedure to determine transit distance
- Know and perform procedure for calculating the pulse velocity and knowledge of the formula
- Know and perform requirements of reporting results

#### Penetration Resistance of Hardened Concrete

- Understand scope
- Understand significance and use
- Know about variation for specific energy loading of probe
- Know about hardness and shape of probes to be used
- Know about measuring instrument for probes
- Know about reference base plate
- Know about driver unit
- Know and understand verification of spring-actuated units
- Know about hardness and uniformity of pins

## Annex 691.1-2

### Job Task Analysis (JTA) for ACI Nondestructive Testing Specialist—Concrete Strength Certification (Continued)

- Know about measuring instrument for pins
- Understand diameter requirement of depth gage
- Understand air blower requirement
- Know and understand hazards of unexpected or inadvertent discharge of probes or pins
- Know hazards of reinforcing steel or other metal embedment's within the concrete
- Know sampling for probe
- Know sampling for pins
- Know and perform requirements for surface preparation for probes
- Know and perform procedure for driving of probes
- Know and perform procedure checking probes for rebound and firm embedment
- Know and perform requirements for placement of the reference base plate & measurement of probes
- Know and perform procedures for testing of light weight concrete with probes
- Know and perform surface preparation of the test area where the test is to be performed
- Know and perform loading and driving of pins
- Know and perform cleaning of pin holes
- Know and perform measurement of pin hole depths
- Understand reporting requirements

#### Rebound Number of Hardened Concrete

- Understand the scope of the method
- Understand simple math conversion principles associated with this technique
- Knowledge of the following terms – as defined in ASTM C125 (related to ASTM C805): Aggregate, air void, cellular concrete, concrete, crushed gravel, grout, crushed stone, gravel
- Understand the significance and use of performing this method
- Know the parameters which affect the rebound number
- Understand that variations in hammers will create significant differences in value therefore use the same hammer
- Know and perform how to develop a strength-rebound number correlation curve to estimate strength; know accuracy of estimate
- Know that method is not suitable for acceptance or rejection of concrete
- Know how to apply a manufacturer correlation factor based on hammer orientation
- Know the required apparatus and calibration
- Understand importance of thickness of sample
- Understand importance of surface preparation
- Understand impact of frozen concrete
- Understand impact of rebar location on test results
- Know and perform proper operation of the hammer
- Know, understand, and perform importance of orientation of the hammer
- Know and perform the minimum distances between the tests and test/edges
- Know and perform observation of impact location
- Know and perform calculation and acceptance criteria
- Know reporting of results

## Annex 691.1-2

### Job Task Analysis (JTA) for ACI Nondestructive Testing Specialist—Concrete Strength Certification (Continued)

#### Compressive Strength of Concrete Cylinders Cast in Place in Cylindrical Molds

- Understand the scope and the range of concrete slab depths the test can be used for
- Understand the purpose of the components of the apparatus
- Understand the significance and use of the test
- Know how the test assembly is installed
- Know the geometrical requirements for the specimen molds
- Know procedures and requirements relevant to placement
- Know procedures and requirements relevant to consolidation and curing
- Know procedures and requirements relevant to removal and testing
- Know components of the report relative to the field portion of this method

#### Pullout Strength of Hardened Concrete

- Understand scope of method
- Know values are stated in SI units only, no other measure
- Understand two methods of inserting pullout stem: cast-in-place or post-installed
- Understand test only provides pullout strength, must be correlated to compressive strength
- Understand lightweight aggregate can affect readings
- Understand pullout tests are used for 4 purposes
- Understand variation of concrete strength due to depth of placement
- Understand pullout tests are indicative of outer surface quality of concrete
- Understand 3 parts of apparatus: bearing ring; tensile loading apparatus; load-measuring device
- Know diameter of the insert head is the basis for defining test geometry
- Know insert head diameter shall be at least 2/3 of the nominal maximum size aggregate
- Know, for cast-in-place inserts, the distance from the insert head to the concrete surface shall equal the diameter of the insert head
- Perform, for post-installed inserts, the groove to accept the expandable insert shall be cut so that the distance between the bearing surface of the groove and the concrete equals the insert diameter after expansion
- Know the bearing ring shall have an inside diameter of 2.0 to 2.4 times the insert head diameter
- Know force gauge can be digital or analog; analog read to 0.5 kN, digital to 0.1 kN
- Know force gauge must hold maximum value during load test
- Know pullout apparatus shall be standardized in accordance with Annex A1 at least once a year and after all repairs
- Know pullout test locations shall be separated so that the clear spacing between inserts is at least 7 times the pullout insert head diameter
- Know pullout test locations shall be at least 3.5 times the pullout insert head diameter from the edge of concrete
- Know pullout stem placed so that reinforcement is outside the expected conical failure surface by more than 1 bar diameter
- Know at least 5 tests performed when used to assess the in-place strength to allow the start of critical construction operations
- Understand inserts shall be located in portions of the structure that are critical in terms of exposure conditions and structural requirements
- Understand all inserts embedded to the same depth, perpendicular to formed surface
- Understand requirements for placing inserts into unformed surfaces
- Perform removal of any debris or surface abnormalities to ensure a flat bearing surface
- Perform drilling core perpendicular to the surface

## Annex 691.1-2

### Job Task Analysis (JTA) for ACI Nondestructive Testing Specialist—Concrete Strength Certification (Continued)

- Know use of impact drill is not permitted
- Know when to use a surface planning tool
- Perform removal free-standing water from the hole at completion of drilling and undercutting operations
- Know loading rate of 70 +/- 30 kPa/S
- Know load uniformly until rupture if testing to rupture
- Know load and hold for 10 seconds if tested for a minimum in-place strength
- Understand testing surrounding frozen concrete
- Know reasons to reject the test
- Know information to report

#### Estimating Concrete Strength by the Maturity Method

- Understand scope
- Understand terminology
- Understand summary of practice
- Understand significance and use
- Know maturity functions
- Know how to compute temperature-time factor
- Knowledge of the apparatus to perform test and the accuracy needed
- Know limits on time intervals between measurements
- Know procedure for developing strength/maturity relationship
- Know number of samples needed
- Know requirements if 2 batches are needed to prepare number of cylinders
- Know location requirement for embedded sensor
- Know time requirement to start test
- Know conditioning of samples
- Know required testing on samples
- Understanding recording requirements and graphing requirements
- Know procedure for estimating in place strength
- Know how to read off the graph to estimate compressive strength
- Understand determination of datum temperature
- Understand maturity functions