**Job-Task Analysis (JTA) for ACI Cement Physical Tester 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:

- ASTM C185—Standard Test Method for Air Content of Hydraulic Cement Mortar
- ASTM C204—Standard Test Methods for Fineness of Hydraulic Cement by Air-Permeability Apparatus
- ASTM C305—Standard Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency
- ASTM C430—Standard Test Method for Fineness of Hydraulic Cement by the 45-μm (No. 325) Sieve
- ASTM C490/C490M—Standard Practice for Determination of Length Change of Hardened Cement Paste, Mortar, and Concrete

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- 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 (6, 9, or 12 cube batch)
- Know and perform flow test, including knowing acceptable range for this test
- Know and perform procedures for filling cube molds (hand tamping)
- Know timing requirements for filling cube molds
- Know and perform proper strike-off procedure of cube specimens
- Know and perform cleaning, curing, and demolding specimen
Job-Task Analysis (JTA) for ACI Cement Physical Tester Certification (Continued)

- 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 permissible tolerances for test ages
- Know moisture requirements prior to testing
- Know and perform cube preparation and checking for curvature
- Know and perform breaking cube in compression machine
- Understand strength calculation
- Understand reporting requirements for strength

**ASTM C151/C151M—Standard Test Method for Autoclave Expansion of Hydraulic Cement**
- 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 the safety precautions including usage of thermometer
- Know and perform Normal Consistency Determination prior to molding test specimen
- Know and perform molding of the test specimen
- Know all timing requirements related to heating, cycling, and cooling of specimen
- Know and perform the cooling of specimen
- Know and perform a length measurement
- Know how to calculate the change in length, as the autoclave expansion
- Know reporting requirements

**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
- 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

- 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
Job-Task Analysis (JTA) for ACI Cement Physical Tester Certification (Continued)

- 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


- 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

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
Job-Task Analysis (JTA) for ACI Cement Physical Tester Certification (Continued)

ASTM C430—Standard Test Method for Fineness of Hydraulic Cement by the 45-μm (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


- 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