

Job-Task Analysis (JTA) for ACI Concrete Strength Testing Technician 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 C617/617M – Standard Practice for Capping Cylindrical Concrete Specimens

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

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

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

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

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

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

- Understand scope of practice
- Know compressive strength limits for the use of unbonded caps
- Understand significance and use of unbonded caps
- Know dimensional, material, and hardness requirements of elastomeric pads

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

- Know dimensional, material, and planeness requirements of pad retainers
- Know requirements governing the use of elastomeric pads
- Know and perform the check of the end condition requirements for specimens tested with unbonded caps
- Know requirements for the use of unbonded caps in combination with other capping methods
- Know the dimensional requirements and pad use limits
- Know that the procedures for loading, testing, and reporting of results are to be completed according to Test Method C39/C39M
- Understand qualification of other elastomeric materials
- Understand qualification of pad reuse
- Understand methodology used to qualify the use of unbonded caps for various strength levels and to qualify the permitted number of pad reuses
- Understand the use of calculations used in qualification testing for computing the difference in strength for each pair of cylinders and computing the average strength of cylinders tested using unbonded caps and the reference capping system
- Know the minimum percentage of reference capping system strength that must be met to qualify unbonded caps for use

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

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

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

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

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