

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

## HOW TO USE THIS JTA:

On the written examination, the Candidate must:

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

On the performance examination:

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

## RESOURCES:

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

AASHTO R 76/ASTM C702 – Standard Method of Test for Reducing Samples of Aggregate to Testing Size

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

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

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

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

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

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

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

- Understand scope of practice
- Understand distinction between "maximum" and "nominal maximum" aggregate sizes
- Understand significance and use of this practice
- Know general sampling requirements
- Know general inspection requirements of sample
- Know sampling requirements for a flowing aggregate stream
- Know sampling requirements for a conveyor belt
- Know sampling requirements for stockpiles and transportation units
- Understand scope of sampling practice from stockpiles and transportation units
- Know procedure for sampling aggregate from stockpiles
- Know procedure for sampling aggregate from transportation units
- Understand number and masses of field samples
- Know how to determine mass of field samples
- Understanding shipping requirements of samples

## AASHTO R 76/ASTM C702 – Standard Method of Test for Reducing Samples of Aggregate to Testing Size

- Understand scope of practice
- Understand significance and use of practice
- Reduction in size may not be recommended in some circumstances
- Know requirements for reducing fine aggregates
- Know reducing requirements for coarse aggregate
- Know equipment requirements for mechanical splitters

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

- Know and perform the procedure for introducing sample to splitter
- Know and perform procedure for quartering sample
- Understand alternative procedure for quartering sample
- Know and perform procedure for miniature stockpile samples

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

- Understand scope of procedure
- Know washing requirements, if not specified
- Understand general summary of method
- Know significance and use of practice
- Know the procedure and parameters under which the efficiency of the washing operation should be checked
- Know proper apparatus and materials
- Understand sampling procedure and requirements for combined samples
- Know the sample size requirements for different aggregate sizes
- Know and perform procedure for washing
- Know and perform calculation for amount of material passing 75- $\mu$ m sieve by washing
- Know and demonstrate the reporting requirements for percentage of material passing 75- $\mu$ m sieve

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

- Understand scope of test method
- Understand general summary of test method
- Understand general use of test method specific to aggregates
- Accurate determination of 75  $\mu$ m cannot be achieved by this method alone
- Recognize appropriate apparatus and requirements
- Know sieving requirements for mechanical sieve shakers
- Know that size of field sample shall be at least four times required test sample
- Know requirements for reducing sample to suitable testing size
- Know how to determine size of test samples for fine and coarse aggregates
- Know material requirements for testing a combined sample
- Know the requirements for testing an oven dried sample
- Know the requirements for sieve selection and adequacy of sieving
- Know the requirements for limiting the amount of materials on a sieve
- Know the procedure for hand sieving and the requirements for sufficiency of hand sieving
- Understand procedures for hand sieving oversized aggregate
- Know the requirements for verifying the masses after the test
- Know the calculations, percent passing, etc., to nearest 0.1%
- Know the requirements for calculating fineness modulus
- Know and demonstrate the reporting requirements

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

- Understand scope of practice
- Know definition of terms for specific gravity
- Understand general summary of test method
- Accuracy of balance required 0.05%
- Know requirements for sample container
- Know requirements for water tank

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

- Know requirements and procedure for sample preparation
- Know requirements for minimum sample size
- Understand requirements for individual size fractions
- Know the sequence of operations for the test procedure
- Know soaking requirements
- Know procedure for obtaining a SSD condition sample
- Know the procedure for determining submerged weight
- Know the procedure for obtaining the dry weight
- Calculate relative density, Density OD, Density SSD and apparent density and absorption
- Know and demonstrate reporting, with required precision, of specific gravity & type and absorption

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

- Understand scope of test method
- Know definition of terms
- Understand significance and use of test method
- Know the difference between dry, moist, SSD and free water on aggregates
- Understand balance (scale) requirements
- Know types of pycnometer that can be used
- Mold and tamper shape and size
- Sample and size of test specimen
- Know requirements for sample preparation before test
- Understand alternative procedure for sample preparation
- Spread sample and let air dry
- Know requirements for performing the cone test for surface moisture
- Know & perform the gravimetric procedure
- Understand the alternate method for obtaining equivalent dry weight of sample used in gravimetric procedure
- Understand the volumetric procedure
- Know & perform aggregate drying to constant mass
- Understand the alternate method for obtaining equivalent dry weight of sample used in volumetric procedure
- Determine mass of pycnometer with water
- Calculate bulk specific gravity (relative density)
- Calculate bulk specific gravity (relative density), SSD
- Calculate apparent specific gravity (apparent density)
- Calculate absorption
- Know and demonstrate reporting, with required precision, of specific gravity (relative density) and absorption

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

- Understand scope of test method
- Understand significance and use of test method
- Know required accuracy of the balance
- Understand types of heat sources
- Know requirements for type and size of container
- Know sample size requirements
- Know & demonstrate requirements for securing sample to prevent moisture loss
- Determine initial mass to 0.1%
- Know requirements for drying sample

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

- Understand detrimental effects of rapidly heating the sample
- Know when sample is thoroughly dry
- Determine final mass to 0.1%
- Calculate total evaporable moisture content
- Know surface moisture content

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

- Understand scope of test method
- Understand significance and use of test method
- Understand results of the test method
- Know requirements of glass bottles
- Understand requirements for glass color standard
- Know requirements for Reagent Sodium Hydroxide Solution
- Understand requirements and procedure for Standard Color Solution
- Know requirements for sample size and preparation
- Know requirements for introducing sample in the glass bottle
- Know requirements for introducing NaOH solution
- Know requirements for agitating the sample, and waiting period
- Understand method used for standard color solution procedure
- Know procedure for glass color standard
- Know proper procedure for interpreting results