

Job-Task Analysis (JTA) for ACI Aggregate Base Testing Technician—AASHTO Methods 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 R 90 Standard Practice for Sampling Aggregate Products

AASHTO R 76 Standard Practice for Reducing Samples of Aggregate to Testing Size

AASHTO R 58 Standard Practice for Dry Preparation of Disturbed Soil and Soil-Aggregate Samples for Test

AASHTO T 89 Standard Method of Test for Determining the Liquid Limit of Soils

AASHTO T 90 Standard Method of Test for Determining the Plastic Limit and Plasticity Index of Soils

AASHTO T 88 Standard Method of Test for Particle Size Analysis of Soils

AASHTO T 265 Standard Method of Test for Laboratory Determination of Moisture Content of Soils

AASHTO T 180 Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

AASHTO T 99 Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in.) Drop

AASHTO R 90 – Standard Practice for Sampling Aggregate Products

- Understand scope of practice
- Understand significance and use of practice
- Know general sampling requirements for coarse and fine aggregates
- Know requirements for inspecting samples
- Know and perform procedure for sampling aggregate from a flowing aggregate stream
- Know and perform procedure for sampling aggregate from a conveyor belt
- Know and perform procedure for sampling aggregate from stockpiles
- Know and perform procedure for sampling aggregate from a transportation unit
- Understand requirements for number and masses of field samples
- Know how to determine mass of field samples
- Understanding requirements for shipping samples

AASHTO R 76 – Standard Practice for Reducing Samples of Aggregate to Testing Size

- Understand scope of practice
- Understand significance and use of practice
- Know requirements for reducing fine aggregates
- Know requirements for reducing coarse aggregate
- Know equipment requirements for mechanical splitters
- Know and perform the procedure for introducing sample into the splitter

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- Know and perform procedure for quartering sample
- Know and perform procedure for miniature stockpile samples

AASHTO R 58 – Standard Practice for Dry Preparation of Disturbed Soil and Soil-Aggregate Samples for Test

- Understand scope of practice
- Understand significance and use of practice
- Know requirements for the balance
- Know what sieve sizes will be required
- Understand sample reduction requirements
- Know how to air-dry sample, break up aggregations with mortar and pestle, and how to reduce sample to representative amounts for testing
- Know required amounts of material passing the No. 10 sieve that are needed for particle size analysis of sandy soils and silt/clay soils
- Know required amounts of material passing the No. 40 sieve needed for testing of soil constants
- Know how to prepare a sample for particle size analysis

AASHTO T 89 – Standard Method of Test for Determining the Liquid Limit of Soils & AASHTO T 90 – Standard Method of Test for Determining the Plastic Limit and Plasticity Index of Soils

- Understand scope of test method
- Understand terminology and definitions
- Understand the significance and use
- Understand the requirements for equipment used to determine liquid limit
- Understand the requirements for equipment used to determine plastic limit
- Know how to obtain a representative sample of material passing the No. 40 sieve
- Understand how to check the liquid limit device and tools for wear
- Know how to check and adjust the height of drop for the cup
- Know how to prepare an appropriate-sized sample of material passing the No. 40 sieve
- Know and perform procedures for obtaining multi-point liquid limit values by adjusting moisture content
- Know and perform procedures for obtaining moisture content on soil samples
- Know and perform the one-point liquid limit determination
- Know how to calculate the one-point liquid limit
- Know how to select a sample for plastic limit determination
- Know and perform procedures for plastic limit
- Know how to calculate the plasticity index using the moisture content values from the liquid limit and plastic limit determinations
- Understand information required on the report

AASHTO T 88 – Standard Method of Test for Particle Size Analysis of Soils

- Understand scope of test method
- Understand requirements for apparatus
- Understand use of a dispersing agent
- Understand use of distilled or demineralized water in the test and control of water temperature during the test
- Know and perform procedures for obtaining and preparing a soil sample for the test

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- Know how to separate material on the No. 10 sieve and how to conduct a sieving operation on the material retained on the No. 10 sieve
- Understand how to determine a composite correction for hydrometer readings
- Know and perform determination of the hygroscopic moisture content of the sample to be used in the hydrometer test
- Know and perform steps for sample preparation including dispersion and agitation
- Know and perform taking hydrometer readings and temperature measurements at appropriate time intervals
- Know and perform the washing procedure and sieve analysis
- Know and perform procedures for determining the percentages of soil in suspension at each hydrometer reading
- Know and perform procedures for determining the diameter of soil particles corresponding to the percentages indicated at each hydrometer reading
- Understand how to determine sieve analysis values for the portion of the sample finer than the No. 10 sieve
- Understand how to develop a graph of the test results
- Understand reporting requirements

AASHTO T 265 – Standard Method of Test for Laboratory Determination of Moisture Content of Soils

- Understand scope of test method
- Understand terminology
- Understand significance of use of test method
- Understand requirements for apparatus
- Understand proper handling and transporting of samples
- Understand requirements for test specimen size
- Understand guidelines for selection of samples
- Know and perform determination of the mass of the container (and lid)
- Know how to select a representative sample
- Know and perform determining the mass of the container and the moist specimen
- Know and perform drying the specimen to constant mass
- Know and perform determining the mass of the container and the dry specimen
- Know how to calculate the percent moisture content of the sample
- Understand the reporting requirements

AASHTO T 180 – Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

- Understand scope of test method
- Understand the significance of use of test method
- Understand requirements for apparatus
- Understand requirements for standardization/calibration of apparatus
- Understand how to estimate the mass of the test specimen needed and how to select the appropriate method for testing
- Understand how to assemble the compaction mold and check equipment prior to testing
- Understand how to select and prepare the required number of subspecimens
- Know and perform procedures for compaction of subspecimens

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- Know and perform procedures for removing the mold collar and baseplate and trimming the specimen after compaction
- Know and perform procedures for determining the mass of the specimen and the mold
- Know and perform procedures for extracting the specimen from the mold and obtaining a representative sample for determining the molded moisture content
- Know and perform remaining steps after compacting first point until the test is complete
- Understand how to calculate the dry mass of each specimen using the wet mass and the moisture content of the sample
- Understand how to determine the oversize (coarse) fraction percentage
- Understand how to determine the test (finer) fraction percentage
- Know how to calculate molding moisture content, moist density, dry density, and dry unit weight of each compacted specimen
- Understand how to plot the dry unit weight and molding moisture content values, and how to draw a smooth curve connecting the points
- Understand the reporting requirements

AASHTO T 99 – Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in.) Drop

- Understand scope of test method
- Understand terminology
- Understand the significance of use of test method
- Understand requirements for apparatus
- Understand requirements for standardization/calibration of apparatus
- Understand how to estimate the mass of the test specimen needed and how to select the appropriate method for testing
- Understand how to assemble the compaction mold and check equipment prior to testing
- Understand how to select and prepare the required number of subspecimens
- Know and perform procedures for compaction of subspecimens
- Know and perform procedures for removing the mold collar and baseplate and trimming the specimen after compaction
- Know and perform procedures for determining the mass of the specimen and the mold
- Know and perform procedures for extracting the specimen from the mold and obtaining a representative sample for determining the molded moisture content
- Know and perform remaining steps after compacting first point until the test is complete
- Understand how to calculate the dry mass of each specimen using the wet mass and the moisture content of the sample
- Understand how to determine the oversize (coarse) fraction percentage
- Understand how to determine the test (finer) fraction percentage
- Know how to calculate molding moisture content, moist density, dry density, and dry unit weight of each compacted specimen
- Understand how to plot the dry unit weight and molding moisture content values, and how to draw a smooth curve connecting the points
- Understand the reporting requirements