

# **HCMTCB MATERIALS SAMPLING & TESTING CERTIFICATION**

## **KEY ELEMENTS LIST**

Release Date: October 26, 2009

## PERFORMANCE CHECKLIST

### AASHTO T-2 Sampling of Aggregates

#### Sampling Coarse Aggregate

##### Sampling From A Stockpile

###### By Hand

- 1 Sample increments taken from where in the pile?
- 2 How to prevent segregation?

###### Power Pile

- 1 Power equipment draws materials from?
- 2 Field sample combined from?

##### Sampling From A Conveyor Belt

- 1 Sampling locations selected how?
- 2 Number and relative size of increments?
- 3 Isolate sample increment using . . . ?
- 4 Collect how much material from between templates?
- 5 What to do with fines?

##### Field Sample Size - Coarse Aggregate

Show the evaluator the proper table in T 2 and determine the minimum size field sample for the requested gradation.

**PERFORMANCE CHECKLIST**  
**AASHTO T-2 Sampling of Aggregates**

**Sampling From Flowing Aggregate Stream**

- 1 Sampling locations selected how?
- 2 Number and relative size of increments?
- 3 Take each increment from . . . ?
- 4 Reduce segregation by what method?

**Sampling From Roadway**

- 1 Sampling locations selected how?
- 2 Number and relative size of increments?
- 3 Increments of what depth?
- 4 Do what with underlying material?

### **Sampling Fine Aggregate**

- 1 Do what with outer layer?
- 2 Minimum size of sampling tube?
- 3 Minimum number of increments?

### **Field Sample Size - Fine Aggregate**

Have the applicant show the examiner the proper table in T - 2 and determine the minimum size field sample for fine aggregate.

## PERFORMANCE CHECKLIST

### AASHTO T-141 Sampling Freshly Mixed Concrete All Verbal

#### Global Constraints

- 1 Total elapsed time allowable between obtaining first and final portions of the composite sample.
- 2 Before starting tests, individual samples must be \_\_\_\_ & \_\_\_\_.
- 3 Temperature, air, and slump tests should be started within how long after obtaining the final portion of the composite sample?
- 4 Protect the sample from sources of \_\_\_\_ & \_\_\_\_.
- 5 Make samples for strength tests what minimum size?

#### Sampling from Revolving Drum Truck Mixers or Agitators

- 1 Collect how many portions?
- 2 Take portions omitting what parts of the batch?
- 3 Two methods for obtaining sample.
- 4 Take sample before or after water is added to mix?
- 5 Method for regulating rate of discharge.

## PERFORMANCE CHECKLIST

### Type B Air Meter Calibration

- 1 Insert specified tube into proper opening.
- 2 Prepare cover and introduce water.
- 3 Open petcocks and add water through specified opening.
- 4 Pump up to initial pressure.
- 5 Introduce air as specified.
- 6 Verify initial pressure line and adjust if necessary.
- 7 Adjust gauge if? How? (Verbal)
- 8 Insert specified tube and fill vessel to top.
- 9 Bring air to specified %.
- 10 Bring gauge to initial pressure reading.
- 11 Take pressure reading.
- 12 Verify correct reading.

## PERFORMANCE CHECKLIST

### AASHTO T-152 Air Content of Freshly Mixed Concrete by Pressure Method

- 1 Prepare measuring bowl.
- 2 Introduce layer of material to specified depth.
- 3 Rod layer specified number, distribution, and depth of strokes using proper rod.
- 4 Consolidate layer properly.
- 5 Repeat steps 2, 3, & 4 for specified number of layers.
- 6 Last layer filled to proper height?
- 7 Strike off excess concrete with proper tool and prepare bowl for cover.
- 8 Prepare cover and clamp to base.
- 9 Petcocks open or closed?
- 10 Fill with water and remove air as specified.
- 11 Pump up to specified pressure.
- 12 Allow a few seconds for the compressed air to stabilize and adjust the gauge to specified pressure line.

## AASHTO T-152 Air Content of Freshly Mixed Concrete by Pressure Method

- 13 Close both petcocks.
- 14 Open air valve between chamber and bowl.
- 15 Take air reading as specified.
- 16 Release pressure as specified and remove cover.
- 17 Calculate air content correctly:

## PERFORMANCE CHECKLIST

### AASHTO T-196 Air Content of Freshly Mixed Concrete by Volumetric Method

- 1 Prepare measuring bowl.
- 2 Introduce layer of material to specified depth.
- 3 Rod layer specified number, distribution, and depth of strokes using proper rod.
- 4 Consolidate layer properly.
- 5 Repeat steps 2, 3, & 4 for specified number of layers.
- 6 Last layer filled to proper height?
- 7 Strike off excess concrete with proper tool and prepare bowl for cover.
- 8 Clamp the top section into position and add water and alcohol using the funnel.
- 9 Adjust the liquid level using rubber syringe.
- 10 Attach cap as specified.

## PERFORMANCE CHECKLIST

### AASHTO T-196 Air Content of Freshly Mixed Concrete by Volumetric Method

- 11 Invert and agitate for specified minimum time.
  
- 12 Tilt, turn, and roll as specified.
  
- 13 Stabilize liquid level as specified.
  
- 14 Repeat step 12 and 13 until two consecutive readings do not change by more than specified amount.
  
- 15 Take reading to specified tolerance.
  
- 16 Calculate the air content.

## PERFORMANCE CHECKLIST

### AASHTO T-119 Slump of Hydraulic Concrete

- 1 Describe proper conditions for base and prepare cone and base.
- 2 Stabilize apparatus as specified.
- 3 Ensure sample is representative.
- 4 Introduce layer of material to specified depth.
- 5 Rod layer specified number, distribution, and depth of strokes using proper rod.
- 6 Repeat steps 4 & 5 for specified number of layers.
- 7 Level of concrete in mold for last layer.
- 8 Strike off excess concrete with proper tool.
- 9 Lift cone as specified.
- 10 Measure slump to specified tolerance.

## PERFORMANCE CHECKLIST

### AASHTO T-23 Making and Curing Concrete Test Specimens in the Field

- 1 Place mold on surface meeting specification.
- 2 Select a representative sample.
- 3 Place layer in mold as specified.
- 4 Rod layers as specified.
- 5 Consolidate as specified.
- 6 Strike off the surface with a tamping rod or, if necessary, finish with a trowel or float. Use the minimum amount of manipulation necessary to produce a flat even surface.
- 7 Cover specimens with a non absorptive, non reactive sheet, cap, or plate.

## PERFORMANCE CHECKLIST

### AASHTO T-309 Temperature of Freshly Mixed Concrete

- 1 Sample must be large enough to provide how much cover around sensor?
- 2 Tolerance (accuracy) of approved thermometer?
- 3 Place thermometer in sample as specified.
- 4 Gently press concrete around sensor.
- 5 Read temperature after minimum time allowed.
- 6 Complete temperature measurement within time constraint.
- 7 Record temperature to within specified tolerance.

## PERFORMANCE CHECKLIST

### AASHTO T-121 Weight per Cubic Foot, Yield, And Air Content of Concrete

- 1 Determine the weight of the empty 0.5 ft<sup>3</sup> measure.
- 2 Introduce layer of material to specified depth.
- 3 Rod layer specified number, distribution, and depth of strokes using proper rod.
- 4 Consolidate layer properly.
- 5 Repeat steps 2, 3, & 4 for specified number of layers.
- 6 Last layer filled to proper height?
- 7 Strike off the concrete to a smooth surface with a flat strike off plate.
- 8 Clean off all excess concrete and determine the weight of the full measure.
- 9 Calculate net weight.
- 10 Calculate the unit weight in lbs/ft<sup>3</sup>

## PERFORMANCE CHECKLIST

### AASHTO T-22 Compressive Strength of Cylindrical Concrete Specimens

- 1 Check the ends of the cylinder and verify they do not depart from perpendicularity by more than tolerance.
- 2 Check the ends of the cylinder for depressions outside tolerance.
- 3 Examine the pads for splits or cracks.
- 4 Pads may be reused how many times?
- 5 All lab cured cylinders shall be tested in the \_\_\_\_\_ condition.
- 6 Concrete cylinder, caps, bearing surfaces of extrusion rollers, and bearing blocks of the test machine must be free of \_\_\_\_?
- 7 Align the axis of the cylinder with the center of thrust of the testing machine by centering the upper retaining ring on the spherically seated bearing block.
- 8 Turn on the testing machine and allow it to warm up. When the machine has warmed up, the display will clear, then press "test", then press "zero" then press "hold peak"
- 9 Apply load at Full Advance until one-half of the anticipated maximum load is attained, then slow to a rate of movement corresponding to a stress rate of \_\_\_\_?
- 10 Apply the compressive load until \_\_\_\_\_?
- 11 Record the maximum load and compressive strength to the specified accuracy.
- 12 Note the type of failure and the appearance of the concrete.

## PERFORMANCE CHECKLIST

### AASHTO T-168 Sampling of Bituminous Material

#### Explain how samples are to be obtained from: (Verbal)

- 1 Funnel Device
  - 2a Select units to be sampled by what method?
  - 2b Relative size and number of increments.
  - 2c Collect sample units how?
  - 2d Form field sample how?
- 2 Roadway after compaction
  - 4a Select units to be sampled by what method?
  - 4b Relative size and number of increments.
  - 4c Samples taken to what depth?
  - 4d Acceptability determined how?
- 3 Oklahoma Sampling location preference

#### Sample from truck transport. (Performance)

- 1 Top surface removed.
- 2 Obtain specified number and relative size of increments.

## PERFORMANCE CHECKLIST

### OHD L-14 Alternate Method (Nuc Gauge)

- 1 Gauge warm up procedure. (Verbal)
- 2 Place gauge on standard block correctly.
- 3 Place standard block on material with minimum density of \_\_\_? (Verbal)
- 4 Take standard count.
- 5 Enter unit weight.
- 6 Set instrument for specified count.
- 7 Set gauge to backscatter.
- 8 Proper depth set.
- 9 Maximum void between gauge and surface. (Verbal)
- 10 Properly position gauge on surface.
- 11 Take and record specified number of counts.
- 12 If surface is hot, do you need to let the gauge cool between measurements? (Verbal)
- 13 Number of test locations required for correlation? (Verbal)

## PERFORMANCE CHECKLIST

### OHD L 5 Liquid AC

#### Containers (Verbal)

- 1 Type of container used for AC.
- 2 Type of container used for emulsions.

#### 3 Sample Care (Verbal)

- 3a Take care that samples are not \_\_\_\_\_.
- 3b Container must be perfectly \_\_\_\_ and \_\_\_\_.
- 3c Emulsions must be protected from \_\_\_\_\_.
- 3d Mark for identification on \_\_\_\_ or \_\_\_\_.
- 3e Clean outside of container with only \_\_\_\_\_.

#### Sampling Locations (Verbal)

- 4 Truck transport.
  - 4a Valve located in the \_\_\_\_ or \_\_\_\_.
  - 4b Sample taken from what part of load?
- 5 Mixing Plant Valve Location
- 6 Storage Tank (Circulating)

Continued on next page.

## OHD L 5 Liquid AC

- 7 Storage Tank (Not Circulating)
  - 7a Obtain sample by means of \_\_\_\_\_.
  
  - 7b Lower to near \_\_\_\_\_.
  
  - 7c Withdraw at rate so that \_\_\_\_\_.
  
  - 7d Sampling device should be \_\_\_\_\_ and \_\_\_\_\_ before taking the sample.

### **Sampling Procedure (Performance)**

**Tell applicant - Gloves, heavy long sleeves, and face shield must be used.**

- 8 Treatment of first portion of material from valve.
  
- 9 Container filled to appropriate level.
  
- 10 Container properly sealed and cleaned.

## PERFORMANCE CHECKLIST

### AASHTO T-310 In Place Density and Moisture Content of Soil and Soil Aggregate by Nuclear Method (Shallow Method)

- 1 Turn on Unit.
- 2 Warm up unit for specified time (Ram Test) (Verbal)
- 3 Place standard block on material with minimum density of \_\_\_? (Verbal)
- 4 Take Standard Count
- 5 If standard count fails? (Verbal)
- 6 Enter Standard Density (Proctor)
- 7 How to correct for surface voids. (Verbal)
- 8 Make hole and set unit to proper depth
- 9 Take readings for specified time.
- 10 Read and record results.