

**NEW YORK STATE DEPARTMENT OF TRANSPORTATION**  
**PLANT INSPECTION OF PORTLAND CEMENT CONCRETE**  
**TRAINING PROGRAM**

**Students must read and acknowledge by signature PRIOR TO BEGINNING EXAM.**

The Federal Highway Administration (FHWA) established requirements under section 23 CFR 637, - Construction Inspection and Approval, mandating that anyone performing testing or inspection of portland cement concrete (PCC) be Aqualified.® The Main Office Materials Bureau has developed a Plant Inspection of Portland Cement Concrete Training Program to train Department personnel or their representatives involved with testing or inspection of PCC to meet these requirements. To be in compliance with FHWA requirements, all Department personnel or their representatives involved with Plant Inspection of PCC must be qualified by this program.

This Training Program provides training only related to Plant Inspection of PCC. This training includes demonstrations and hands on training to insure that the plant inspection of PCC is in compliance with ASTM test procedures, Departmental Materials Methods and Directives. To successfully complete this program each student must attend the training class and successfully complete the requirements of the written examination.

The written examination questions are based on ASTM Laboratory procedure and test procedures outlined in Materials Method 9.1 and supplementary material given to each student prior to this training program. While the level of difficulty may vary for each question, they are not designed to trick or confuse you. If you encounter difficulty reading or understanding the questions, you may discuss the problem with the Examiner. The Examiner may administer the examination orally if this option is appropriate to solve the problem, but the Examiner may not define terms or interpret the examination question.

The examination is closed book; access to technical materials or notes during the examination is prohibited. Calculations may be required for some questions, therefore the use of a non-programmable calculator will be allowed. Examinees may not share calculators with each other during the examination.

The written examination is required to test your detailed knowledge of PCC Plant Inspection procedures and basic reading skills. The examination consists of 6 sections containing calculations, multiple-choice, true/false, or yes/no questions, with a total of 50 questions.

To successfully pass the written examination, at least 60% (i.e., 5 correct out of 8 equals 63%) of the questions in each section must be answered correctly and obtain an overall average score of 70% .

**Note: Only one re-test will be allowed per calendar year.**

- ✓ Circle only one answer for each question.
- ✓ One hour is allowed to complete the entire examination.



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I acknowledge that I have read the instructions included in this examination packet, and supplementary information (M.M. 9.1 and supplements), and I understand the testing and grading policies. I agree to comply with all examination rules and procedures.

**Student Name (please print):** \_\_\_\_\_

**Student Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**For an overall passing grade on the written exam, the student must have a minimum passing grade of 60% for each section and an overall score of 70%.**

**Note: Only one re-test will be allowed per calendar year.**

**OVERALL GRADE ON WRITTEN EXAM:** \_\_\_\_\_

**PASS**                       **FAIL**

<u>SECTION:</u>	<u>GRADE:</u>
<b>General</b>	-----
<b>Sampling</b>	-----
<b>Gradations/Moisture Content</b>	-----
<b>Gradation Calculations</b>	-----
<b>Specifications/Actions</b>	-----
<b>Automation/Batching</b>	-----

**Comments:** \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

As an Examiner for the New York State Department of Transportation, Plant Inspection of Portland Cement Concrete Training Program, I certify that this written examination was administered according to the requirements and procedures described above. It is my understanding that the Student did not receive assistance or guidance from anyone associated with this program that might have interfered with the fair and objective testing of the Student's abilities.

**Examiner Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_



## 2013 P.C.C. BATCH PLANT INSPECTOR WRITTEN EXAM

### GENERAL:

- 1) The Batch Plant Inspector must determine that the plant is using NYSDOT approved admixtures by:
  - A. Submitting samples to the Materials Laboratory.
  - B. Verifying current "NYSDOT Approval Seal, (BR 320-A)" on the admixture tank.
  - C. Comparing the brand name and manufacturer to the Departments Approved List.
  - D. All of the above.
  
- 2) The "on site" purity of microsilica may be checked by using:
  - A. Wide range pH test paper.
  - B. Thermometer.
  - C. Hygrometer.
  - D. Calibrated vial.
  
- 3) Round the following numbers to the nearest tenth, following ASTM rounding procedures described in ASTM E29: **(3.14, 0.05, 3.05, 5.35)**
  - A. 3.1, 0.1, 3.1, 5.4
  - B. 3.1, 0.0, 3.1, 5.3
  - C. 3.1, 0.1, 3.0, 5.3
  - D. 3.1, 0.0, 3.0, 5.4
  
- 4) Where is the aggregate % absorption found?
  - A. Inspectors Diary
  - B. Aggregate Supplier Certification
  - C. NYSDOT Approved List
  - D. NYSDOT Spec. Book
  
- 5) The concrete mix design (batching masses) is computed based on a (SSD) saturated surface dry condition of all aggregates.

True                      False
  
- 6) Which of the following is best test to utilize to identify friction aggregates?
  - A. Aggregate Identification Test
  - B. Acid-Insoluble Residue Test
  - C. Gradation Test
  - D. Minus 200 Wash Test

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- 7) The inspector should consult the Department's Approved List to determine if the aggregates intended for use:
- A. Are restricted from use on pavements and other wearing surfaces.
  - B. Are restricted from use with High Alkali Cements, without the use of supplemental pozzolans.
  - C. Meet the characteristics for Friction as per NYSDOT Specifications Section 501 and MM 28.
  - D. All of the above.
- 8) The term "free moisture" refers to?
- A. Moisture content in excess of SSD.
  - B. Total moisture content.
  - C. Both A and B.
  - D. None of the above.
- 9) If the average of the three most recent FM test results has changed by more than \_\_\_ from the value used in the mix design, contact the Regional Materials Engineer to make the appropriate adjustments to the concrete mix design.
- A. 0.20
  - B. 0.50
  - C. 1.00
  - D. None of the above.
- 10) When comparing the measured pH of the Microsilica with the certification for the shipment. If the measured pH falls within  $\pm$ \_\_\_ of certified pH level from the manufacturer, the sample is not contaminated.
- A. 0.5
  - B. 1
  - C. 5
  - D. None of the above.

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### SAMPLING:

- 11) What points on a “conical” stockpile should be sampled for gradations?
- A. Top, middle, and bottom on 3 sides for a total of 9 samples.
  - B. Top, middle, and bottom on 2 sides for a total of 6 samples.
  - C. Top, middle, and bottom from the side closest to the work in progress for a total of 3 samples.
  - D. Top and bottom on 3 sides for a total of 6 samples.
- 12) When sampling from a conveyor belt, the sample is best obtained by?
- A. Taking 3 random samples on a “stopped” belt.
  - B. Taking one sample on a “moving” belt.
  - C. Taking one sample large enough to perform the test using a square shovel and brush on a “stopped” belt.
  - D. None of the above.
- 13) What points on a “non-conical” stockpile should be sampled for gradation?
- A. Sample on 3 sides: top, middle, and bottom on for a total of 9 samples
  - B. Sample on 2 sides: top, middle, and bottom on for a total of 6 samples
  - C. Sample on 1 side: 3 top and 3 bottom on for a total of 6 samples
  - D. Sample from front face: 2 top, 2 middle and 2 bottom for a total of 6 samples
- 14) Aggregate samples may be quartered to obtain a representative sample prior to performing a gradation test.
- True   False
- 15) The minimum test sample size for performing a gradation test on #2 or #1 & #2 blend coarse aggregate is?
- A. 120 lb/55 kg
  - B. 60lb/28kg
  - C. 15 lb/7 kg
  - D. 8 lb/4 kg
- 16) The minimum test sample size for performing a gradation test on fine aggregate is?
- A. 4.5 kg
  - B. 1000 g
  - C. 5000 g
  - D. 500 g

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- 17) A sample of fine aggregate with visible free moisture should be reduced for testing by:
- A. Wet sieving.
  - B. Splitting using a "Fine Aggregate" splitter.
  - C. Quartering.
  - D. None of the above.
- 18) The minimum original sample size for performing a gradation test on #2 or #1 & #2 blend coarse aggregate is?
- A. 120 lb/55 kg
  - B. 60lb/28kg
  - C. 16 lb/8 kg
  - D. 8 lb/4 kg

### GRADATION/MOISTURECONTENT:

- 19) The visual identification test is generally performed in conjunction with the aggregate gradation tests:
- True                  False
- 20) Fine aggregate free moisture tests are performed:
- A. Daily
  - B. As necessary
  - C. Both A and B
  - D. Twice daily
- 21) Overloading a coarse aggregate sieve is evident when:
- A. Over 200 grams is retained on any sieve.
  - B. Some particles are stuck in the mesh.
  - C. Any coarse aggregate particles appear to be dirty.
  - D. Sieve has more than a single layer of aggregate retained on it.
- 22) When running a standard gradation test, the total weight after sieving should not vary more than \_\_\_\_\_ from the original dry sample weight.
- A. 0.30 g.
  - B. 3 g.
  - C. 0.3%
  - D. None of the above.



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23) When computing Fineness Modulus "FM", all standard fine aggregate sieves are used except the 3/8" (9.5 mm) and the #200 (75  $\mu$ m) sieve.

True                  False

24) Particles can be removed from a #200 (75  $\mu$ m) mesh sieve by using a?

- A. Light mallet
- B. Putty knife
- C. Soft brush
- D. Cloth

25) When a Concrete Plant Inspector performs an aggregate cleanness test, what size sieve is needed to be used with the #200 (75  $\mu$ m) mesh sieve?

- A. None
- B. #4 (4.75 mm)
- C. 1/4" (6.3 mm)
- D. #16 (1.18 mm)

26) Given the following information, calculate the moisture content:

Mass of wet sample including tare: 525.20 g;  
Mass of oven dry sample including tare: 495.15 g;  
Tare weight: 12.33 g

- A. 5.7%
- B. 5.9%
- C. 6.1%
- D. 6.2%

27) Using the above information and an absorption of 1.2%, calculate the % "free moisture":

- A. 4.5%
- B. 4.7%
- C. 5.9%
- D. 5.0%

28) When conducting an aggregate free moisture test, the sample must be "cool to the touch", after drying, prior to recording the weight.

True                  False

## 2013 P.C.C. BATCH PLANT INSPECTOR WRITTEN EXAM

### GRADATION CALCULATIONS:

- 29) The Concrete Plant Inspector used 15.20 lbs of a coarse aggregate material to run a gradation test. Given the following information, calculate the percent retained and percent passing (cumulative) to the nearest 0.1%.

SIEVE SIZE	MASS RETAINED	% RETAINED	% PASSING
1-½" (37.5 mm)	0.0		
1" (25.0 mm)	0.56		
½" (12.5 mm)	8.93		
¼" (6.3 mm)	5.31		
Pan	0.37		
Total	15.17		

- 30) Is the above gradation a valid test?

Yes                  No

- 31) Percent passing the #200 (75 µm) sieve is calculated using the following formula:

- A.  $\frac{\text{original dried weight} - \text{washed dried weight}}{\text{original dried weight}} \times 100$
- B.  $\frac{\text{original dried weight} - \text{washed dried weight}}{\text{washed dried weight}} \times 100$
- C.  $\frac{\text{original sample weight} - \text{washed sample weight}}{\text{original sample weight}} \times 100$
- D. None of the above

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32) Using the information in the provided table, what is the “FM” value?

Sieve Size	Total % Passing	Total % Retained
3/8" (9.5 mm)	99	1
#4 (4.75 mm)	92.5	7.5
#8 (2.36 mm)	76.1	23.9
# 16 (1.18 mm)	67.2	32.8
#30 (600 µm)	37.5	62.5
# 50 (300 µm)	21.2	78.8
# 100 (150 µm)	5.5	94.5
# 200 (75 µm)	1.2	98.8
<b>Total</b>	-	399.8

- A. 0.3998
- B. 3.998
- C. 4.00
- D. 3.00

### SPECIFICATIONS/ACTIONS:

33) Microsilica samples should be retained for possible testing:

- A. For each structure.
- B. For each shipment of microsilica.
- C. For each 3 days of production for Department projects.
- D. All of the above.

34) If the fine aggregate has free moisture in excess of \_\_\_\_\_, it should not be used:

- A. 6%
- B. 7%
- C. 8%
- D. 10%

35) The Regional Materials Engineer must be contacted if an admixture used in Department PCC mixes shows signs evident that the product:

- A. Has been frozen.
- B. Has not been used for 6 months.
- C. Appears thick and cloudy.
- D. Smells of ammonia.

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36) What is the first thing that the Batch Plant Inspector should do when the coarse aggregate gradation is found to be out of NYSDOT specification limits?

- A. Notify the Project Engineer.
- B. Notify the Materials Engineer.
- C. Stop the production of all Department mixes until the problem is corrected.
- D. Notify the Producer.

37) If only 30 yd<sup>3</sup> of concrete is being produced for a project in one day, is it necessary to perform gradation tests on the fine and coarse aggregate?

True                      False

38) If the microsilica sample is found to be contaminated, the Inspector may:

- A. Allow the Producer to run off additional material from the bin, in an effort to obtain another sample that may be more representative of the bin contents.
- B. Inform the Producer that, if the Materials Bureau determines that the sample does not meet the physical and chemical requirements of Section 711-11, the contents of the bin are subject to rejection.
- C. Deny production of any mixes using material from that bin until the microsilica contained in that bin is proven to be uncontaminated.
- D. All of the above.

39) If the "FM" average of the three most recent tests results has changed by more than 0.20 from the value used on the mix design, contact the Regional Materials Engineer to make appropriate changes to the mix design.

True                      False

40) The Regional Materials Engineer must be contacted when the coarse aggregate appears:

- A. Different in color as compared to the reference sample.
- B. Different in shape as compared to the reference sample.
- C. Uncrushed if the aggregate is gravel.
- D. All of the above.

## 2013 P.C.C. BATCH PLANT INSPECTOR WRITTEN EXAM

### AUTOMATION/BATCHING:

- 41) The following information must be clearly identified on the Digital Recordation for each batch:
- A. Time and date of batch.
  - B. Cementitious material quantity.
  - C. Admixture identification.
  - D. All of the above.
- 42) PCC Batching Facilities must be configured so that:
- A. Aggregates are batched without contacting each other.
  - B. Cements are batched without contacting each other.
  - C. Admixtures are batched without contacting each other.
  - D. All of the above.
- 43) The batch masses may be adjusted for free moisture:
- A. At any time there is a change in free moisture.
  - B. Only between batches.
  - C. Only when the Regional Materials Engineer allows the adjustment.
  - D. Only when the moisture meter malfunctions.
- 44) Batching interlocks are required to interrupt the batching cycle whenever:
- A. An error occurs in the weighing of aggregates.
  - B. An error occurs in the weighing of cement.
  - C. An error occurs in the discharge of admixtures.
  - D. All of the above.
- 45) If an asterisk (\*) appears on an automated batching record, it is safe to assume:
- A. The ingredients were batched "over tolerance".
  - B. The ingredients were batched "under tolerance".
  - C. The "zero tolerance" interlock was out of limits.
  - D. All the above.
- 46) Typically the minimum mixing time for central mixed concrete is?
- A. 2 minutes
  - B. 6 minutes
  - C. 180 seconds
  - D. 90 seconds
- 47) If a "recently approved" Batch Plant installs a different automation system, does the plant have to be re-evaluated again, in order to produce material for NYSDOT?

Yes

No

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- 48) When producing PCC in a “Central Mix” facility, the following additional requirements apply:
- A. If the total mix time, regardless of duration, was interrupted, the time must be printed on the batching record.
  - B. Only the quantity of “Temper” water added during batching must be printed on the batching record.
  - C. The “water cement” (W/C) ratio must be printed on the batching record.
  - D. Both A and B.
- 49) Concrete batching plants are equipped with a moisture meter that measures the moisture in the fine aggregate bin. This meter provides a continuous reading of the?
- A. “Free Moisture” (in excess of SSD).
  - B. Total moisture content.
  - C. Both A and B.
  - D. None of the above.
- 50) PCC Batch Plant scales must be checked for accuracy:
- A. Annually, prior to use for Department work.
  - B. At intervals not exceeding 90 days.
  - C. Whenever a plant changes location.
  - D. All of the above.

**SFY  
2018-  
2019**

PIN	RES	Route	FROM RM	TO RM	MUNI	COUNTY	SCOPE DESCRIPTION	LOCATION DESCRIPTION
6V1900	VAR	VAR	VAR	VAR	VAR	VAR	VPP PREP	VAR
6M1901	VAR	VAR	VAR	VAR	VAR	VAR	CRACK SEAL	VAR
6DRN19	VAR	VAR	VAR	VAR	VAR	VAR	UNDERDRAIN MBC	VAR
6V1912	6-1	305	305-6102-1034	305-6102-1116	Town of Clarksville	ALLEGANY	CIPR & Overlay (1" & 3/4" Mill & Fill in Village)	Genesee Town Line to CR 6
6V2012	6-1	417	17-6103-1246	17-6103-1304	T- WELLSVILLE	ALLEGANY	CIPR w/ Overlay	Dyke Rd to Wellsville Village Limits
6V2032	6-3	226	226-6302-1049	226-6302-1105	T- TYRONE	SCHUYLER	CIPR & 6.3mm Overlay	Tyrone/Reading Line South
6V2044	6-2	371	371-6401-1004	371-6401-1048	T- COHOCTON & AVOCA	STEUBEN	CIPR w/ Overlay	Steuben/Ontario CL South
		21	21-6402-3275	21-6402-3289				
6V1942	6-2	226	226-6401-1030	226-6401-1005	T-Bath, Bradford and Orange	Steuben	T&L and Top	Savona Village Line to CR 23 Tyrone
			226-6302-1000	226-6302-1047				
6V1814	6-1	244	244-6101-1080	244-6101-1142	Town of Alfred	Allegany	1" 6.3 mm	Alfred Station to Decker Road
6V1714	6-1	248	248-6101-1000	248-6101-1093	T - INDEPENDENCE	ALLEGANY	2nd Course Chip Seal	Stannards (Rt 19) to Whitesville
6V1921	6-3	223	223-6201-1125	223-6201-1050	T-Van Etten and Erin	Chemung	Heater Scarify and 1" 6.3 mm	SR 224 to Erin
6V1944	6-2	248	248-6402-1000	248-6402-1142	T- West Union	Steuben	T&L and Top	Slate Creek Road to Allegany CL