Materials Procedures Committee Regular Meeting

Meeting Time/Date: August 20th, 10:00 AM

Meeting Location: MCS&T (Conference Room) - 190 Dry Branch Drive, Charleston WV, 25301

Online Meeting: Google Meet Video Conference

Online Link - (https://meet.google.com/qaq-awvh-wcv?authuser=0)

Files Available on ProjectWise for DOT users – See Invite or Follow P/W path:

WVDOH ORGS\MCS&T (0077) - FM\Materials Procedure Committee\MP Committee Meeting Files\2025\2025 08 20 MP Meeting

Files Available on Webpage:

https://transportation.wv.gov/highways/mcst/Pages/MP-Committee-Page.aspx

Materials Procedures – Approved at Last Meeting

1. 700.00.54 - Procedure for Evaluating Quality Control Sample Test Results with Verification Sample Test Results
2. 601.00.49 - Method of Test for Determining the Condition of Concrete Bridge Decks
3. 700.04.23 - Operating And Emergency Procedures for Nuclear Gauges
4. 307.00.51 - Procedure for Monitoring the Activities Related to Sieve Analysis of Fine and Coarse Aggregate
5. 601.05.50 - Quality Assurance Procedures for Portland Cement Concrete

Materials Procedures - Old Business

Number	Champion	Title	Description
1& - 700.04.22	Wagner	Method for Approving Devices Used for Testing Density and/or Moisture Content of In-Place Material	Process for creating approved list for Density/Moisture Devices
2* - 679.02.99	Kukaua	Calibration of Concrete Continuous Mobile Mixer	This is a guideline for QC to verify the contractor's calibration of volumetric mixers.
3* 106.03.50	Harper	General Information Guide for Technician and Inspector Certification Program (TICP)	Changing 3 to 5 years for certification, adds apprentice program.
4* 700.00.50	Wagner	Method for Acceptance of Compaction Testing	New Acceptance Process through AWP.
5* - 604.02.40	Thaxton	Inspection And Acceptance Procedures for Precast Concrete Products	6x12 cylinders from the Specification

6* - 711.03.23	Thaxton	Mix Design for Portland Cement Concrete	Andrew to Discuss
7* - 715.14.01	Gum	Quality Assurance of Laminated Elastomeric Bridge Bearing Pads with Internal Shims	Editorial Edits from previously approved version
8* - 109.00.23	Brayack	Auto-Authorization of Industry Sample Records	Adds a "fast pass" metric for industry sample record payment.
9* - 109.00.22	Brayack	Procedure for the Submission and Documentation of Quality Control Test Results	Adds reference to 109.00.23

Materials Procedures – Editorial Edits

-None on this Agenda

Materials Procedures - New Business with Significant or Process Updates

1& - 700.00.53	Boothroyd	Procedure for the Independent Assurance Program	Updated to reflect comments on the 2024 IA report, Adds the reporting of the WVDOH's 10 percent threshold for QA Verification Samples.
2& - 106.00.02	Brayack	Procedure for Evaluating Products for Use in Highway Construction	Revises our "No APL" and "Non-Approval" APL Language.
3& - 106.10.50	Brayack	WVDOH Buy America Acceptance Guidelines	Section 8.1.2 "In the event of a change order which includes the addition of new materials, a new Certificate of Compliance shall be furnished to include the new materials. " Also, adds reference to a newly available tool.
4& - 606.03.50	Brayack	Procedure for Determining a Reduced Unit Price to Be Paid for Underdrain Aggregate Which Does Not Conform to The Grading Requirements of The Governing Specifications	Adds a sample calculation for clarity and updates the format of variables.

Note 1: * Denotes this MP is up for Vote

Note 2: & Denotes this MP is not up for Vote

Comments

Comments are due August 13th, so the Champion may review and address them. Submit comments to Adam Nester (Adam.W.Nester@wv.gov)

Next Meeting

New or Updated MPs due to the MP Chair 3-weeks before the next meeting: September 24th

Meeting Time/Date: 10:00 AM, October 15, 2025

Meeting Location: MCS&T Library

Online Meeting: Google Meet Video Conference (Link TBD)

Additional MP Committee Meeting Information

For details of previous meetings, please visit the MCST MP Committee Webpage
https://transportation.wv.gov/highways/mcst/Pages/MP-Committee-Page.aspx

Tentative MP Committee Dates for 2025:

October 15, December 17

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

METHOD FOR APPROVING DEVICES USED FOR ~~ACCEPTANCE~~ TESTING DENSITY AND/OR MOISTURE CONTENT OF IN-PLACE MATERIAL

1. PURPOSE

1.1. The WVDOH has a long history of using nuclear moisture/density gauges and is familiar with the test procedures, reliability, maintenance, and calibration procedures of such devices. In recent years, more devices have come to the market that are low or non-nuclear. This MP is in place ~~T~~to establish procedures ~~used~~ to approve the use of any testing device~~s~~ for Density and/or Moisture ~~of~~ for in-place material on WVDOH projects.

2. SCOPE

2.1. This MP applies to moisture and density testing devices used for acceptance testing, as well as any time such devices might be used when quality control testing results are used for acceptance.~~To establish procedures used to approve the use of testing devices for Density and/or Moisture of in-place material on WVDOH projects.~~

3. REFERENCED DOCUMENTS

3.1. West Virginia Department of Transportation Specifications

~~3.1.~~3.2. AASHTO T355 - Standard Method of Test for In-Place Density of Asphalt Mixtures by Nuclear Methods

~~3.2.~~3.3. ASTM D2216 - Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

~~3.3.~~3.4. ASTM D4959 – Standard Test Method for Determination of Water Content of Soil by Direct Heating

3.5. ASTM D8167/D8167M – Standard Test Method for Density of Asphalt Mixtures in Place by Nuclear Methods~~Add Name~~

3.6. ASTM D7830/D7830M Standard Test Method for In-Place Density (Unit Weight) and Water Content of Soil Using an Electromagnetic Soil Density Gauge

3.7. AASHTO T 343-12 (2024) Density of In-Place Asphalt Pavement by Electronic Surface Contact Devices

Commented [1]: JC - Asphalt - PWL - Contractor can do anything they want. Contractors use it for non-nuclear for check. Will this approve list roll that out?

Commented [2]: This is only for gauges used for acceptance

Commented [3]: Do we need the 401 section here

Commented [4]: Added the specs

Commented [5]: Is this the same as T-355

~~3.4.~~3.8. ASTM D7113/D7113M Standard Test Method for Density of Asphalt Mixtures in Place by the Electromagnetic Surface Contact Methods

~~3.5.~~3.9. MP 207.07.20 – Nuclear Field Density – Moisture Test for Random Material Having less than 40% of +3/4 Inch Material

3.10. MP 700.00.24 – Nuclear Density Test by Roller Pass Methods

~~3.6.~~3.11. MP 717.04.21 – Guide for Quality Control of Compaction ~~Add MPs from BW email~~

4. APPROVAL REQUIREMENTS OF DEVICES FOR TESTING OF DENSITY AND/OR MOISTURE OF IN-PLACE MATERIAL~~TESTING PROCEDURE~~

4.1. The testing device must meet ~~WV DOH Standard~~ Specification ~~717~~716.3.2, as well as conform to the needs of the above referenced MPs and ASTM procedures as applicable.

4.2. ~~—~~The testing device must provide accurate and precise results according to the Gauge Comparison process described in section 401.6.4.1.1 of the Specifications.

4.3. The testing device must be suitable for each application. The testing device must be capable of providing wet density, dry density, and moisture of asphalt, soil, and aggregates.

4.4. ~~—~~The testing device must be entirely self-contained and must be capable of providing results for Dry Density, Wet Density and Moisture content through the operations of ~~a~~in one single test, without the need for ~~other~~supporting devices.

4.5. The testing device must be capable of completing a test and delivering ~~rapid~~ results within a ~~, suitable for the application. M~~maximum of one minute per test.

4.6. The testing device must, ~~not allow the introduction of bias into test results, i.e., the device~~under normal operations, collect a single reading and produce~~s~~ a single result~~s~~ for each operation~~s~~ of the device. This result must not be an average, minimum or maximum of values collected by the device through subsequent readings. ~~must test once and provide a reliable result, rather than test multiple times to find the best result.~~

~~The testing device must not interfere with, nor be susceptible to interference from, any other typical testing device that is expected to be on a project.~~

5. APPROVAL PROCESS

5.1. For consideration to be added to the list of approved devices, submit the ~~gauge~~device information and manufacturer's documentation to dohcompaction@wv.gov.

5.2. The WVDOH will evaluate each brand/model of moisture/density testing device as needed. Evaluations shall be based~~base~~ on ~~according to~~ the requirements listed in Section 4 and ~~compared to~~ the manufacturer's documentation. WVDOH ~~and~~ reserves th

Commented [6]: Are these MP names going to change?

Commented [7]: I would assume so based on trends, but as of now those are the current names of those MPs

Commented [8]: Doesn't exist, needs to be updated/deleted, BW to take a look at this

Commented [9]: Define Accurate, precise and comparable or reference AASHTO that does…
If you are not willing to specify hard requirements for what is allowed then just delete this whole section. This it is too vague and subjective to set a reliable and unbiased

Commented [10]: Added sentence to address this

Commented [11]: Stating precise and repeatable is redundant

Commented [12]: Combine with 4.4

Commented [13]: "The testing device must of suitable for testing the properties in 4.4 for the

Commented [14]: What would you define as another device? Even the non nukes can

Commented [15]: This is not regarding correlation. This is to address test devices

Commented [16]: I suggest writing it out, don't imply what you want.

Commented [17]: Any piece of equipment will fail this requirement… all testing has some

Commented [18]: Yes there is inherent error. That is not what this is about. Our current

Commented [19]: What device are you referring too?

Commented [20]: Nuclear gauges are susceptible to being around steel…

Commented [21]: True, and that is why we teach not to test around steel. We have

Commented [22]: specify "testing" devices.

Commented [23]: What is the Evaluation Process?

Commented [24]: added "compared to the manufacturer's documentation". Will submit to

e right to reject or remove any ~~brand or model~~device from the approval list. ~~without further explanation~~.

4.1. Devices that meet all of the requirements of this MP will be evaluated first as a QC device. Upon satisfactory field performance as a QC device, it will be listed as a QA device. The brand and model can be found on the appropriate approved list on the MCS&T website.

Commented [25]: This seems excessive… if a bunch of consultant firms buy into a piece of equipment that you have on this approval list and you abruptly remove it what are the firms supposed to do? There should be fair warning and a justification for its removal.

~~5. CURRENT APPROVED LIST OF DEVICES FOR TESTING OF DENSITY AND/OR MOISTURE OF IN-PLACE MATERIAL~~

~~Humbolt HS-5001 series~~

~~Troxler 3430/3440 series~~

~~Instrotek 3500 series~~

~~Instrotek Xplorer 2~~

~~Instrotek/CPN MC-1~~

~~5.1. Instrotek/CPN MC-3Process TBD~~

Commented [26]: These should be an online list, attachment or addendum so the entire MP doesn't have to go through committee for a change.

~~6. APPROVAL OF DEVICES FOR TESTING OF DENSITY AND/OR MOISTURE OF IN-PLACE MATERIAL~~

~~6.1.~~5.3. ~~Process TBD~~

Commented [27]: Agree. This is moving to an approved list.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIAL CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

QUALITY ASSURANCE PROCEDURES FOR CALIBRATION AND APPROVAL OF CONCRETE VOLUMETRIC MIXERS

1. PURPOSE

1.1. To set forth the Divisions Quality Assurance procedure which governs the calibration, and approval of concrete volumetric mixer units.

2. SCOPE

2.1. This procedure establishes guidelines for verifying the contractor's calibration of volumetric mixers; and provides an Attachment for QA documentation of the calibration.

3. CALIBRATION FREQUENCY

3.1. The Contractor shall perform the calibration of volumetric mixers prior to the start of placement in the presence of the Divisions project designated personnel.

3.2. The Division's project designated personnel shall verify the contractor has completed all mixer calibrations , per mobilization of each unit. Additional calibrations may be required at the discretion of the Divisions project designated personnel. Alterations to the approved mix design will require the unit to be recalibrated.

3.3. The Contractor shall provide documentation for any unit repair. After the unit has been repaired, it shall be recalibrated prior to use on a project.

4. PRE-CALIBRATION INSPECTION

4.1. District personnel, or the designated inspector shall verify that the contractor confirmed all components of the unit are functioning properly , and all material component bins are empty and clean, the main conveyor belt and supply systems are clean, and all vibrators are functioning properly prior to the start of the calibration.

4.2. MIX DESIGN

The Division's designated personnel shall review the approved mix design prior to the start of the calibration and record them on Attachment 1.

4.3. QUALITY CONTROL PLAN

The Division's designated personnel will review the contractor's Quality Control Plan prior to the start of calibration. Any deviations from this procedure will be documented

in the Contractors Quality Control Plan. Possible deviations include the addition of fibers, which shall be calibrated according to the manufacturer's recommendations.

5. FIELD CALIBRATION PROCEDURE

5.1. For cement, sand and stone, verify that the contractor begins each by filling the specific material bin until the augers are completely covered, set mobile mixer to run at proper operating speed, = and that the Contractor is using a clean container that can be placed under the chute of the mixer to catch all discharged material.

5.2. CEMENT CALIBRATION

The Division's designated personnel shall verify that the Contractor has checked the discharge tube at bottom of the cement bin and that it is clean and clear of residue. After reaching predetermined count, the Division's designated personnel shall record the weight of cement, the elapsed time, and the meter count provided by the Contractor on Attachment 1. The contractor shall perform a minimum of 3 trials and provide the calculations to the Division's designated personnel, who will record the data on Attachment 1.

5.3. SAND AND STONE CALIBRATION

After reaching predetermined count, the Division's designated personnel shall record the weight of aggregate, the elapsed time, and the meter count provided by the Contractor on Attachment 1. Using approximately the same number of counts. The Contractor shall perform a minimum of 3 trials at both high and low settings and record.

5.4. WATER AND LATEX CALIBRATION

Division's designated personnel will verify that the Contractor adjusts the setting to achieve the target weight of water, or latex. The Contractor shall discharge the water, or latex into a suitable container capable of catching all material. The Division's designated personnel will record the weight of material discharged provided by the Contractor on Attachment 1. The contractor shall perform a minimum of 3 trials on both the water and latex.

5.5. ADMIXTURE CALIBRATION

Division's designated personnel will verify that each admixture is calibrated and used in accordance with manufacturer's recommendations and adheres to the proportions specified in the approved mix design. The Division's designated personnel shall record the application rate provided by the Contractor on Attachment 1.

5.6. YIELD TEST

The Contractor shall perform one yield test of ¼ cubic yard for every calibration performed. . All materials and settings used during the yield test will be from those established during the calibration process.

The Division's designated personnel will record the results provided by the Contractor for the yield test in Attachment 1. The weight batched divided by the unit weight tested should be within ±2% of the theoretical quantity batched. If the unit weight is not within ±2% of the theoretical quantity batched, additional calibrations will be performed until the required yield result is achieved.

If after 3 trials a passing yield test is not achieved, at the discretion of the Engineer a unit may not be certified to perform the concrete placement until the Contractor has proven he has taken corrective action to improve the units performance

Michael A Mance, PE
Director
Materials Control, Soils, & Testing Division

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIAL CONTROL, SOILS AND TESTING DIVISION

CONCRETE VOLUMETRIC MIXER FIELD CALIBRATION SHEET

Project Number: _____ County: _____
District: _____ Contractor: _____
Truck Number: _____ Description: _____
Calibrated By: _____ Date of Calibration: _____

MIX DESIGN: Approved Mix ID: _____

Material	Cement	Sand	Stone	Water	Latex		
Amount							

Theoretical Yield: _____(cubic yard)

CEMENT:

	Weight (Lbs.)	Meter Count	Time (sec.)
1			
2			
3			
4			
5			
Totals			

$\text{Lbs./Count} = \frac{\text{Total Lbs.}}{\text{Total Counts}} = \frac{\quad}{\quad} = \_\_\_\_\_$

$\text{Lbs./Sec.} = \frac{\text{Total Lbs.}}{\text{Total Sec.}} = \frac{\quad}{\quad} = \_\_\_\_\_$

$\text{Counts for 94 Lbs.} = \frac{94}{\text{Lbs./Count}} = \frac{94}{\quad} = \_\_\_\_\_$

$\text{Sec. for 94 Lbs.} = \frac{94}{\text{Lbs./Seconds}} = \frac{94}{\quad} = \_\_\_\_\_$

SAND: Time for Calibration: _____ Moisture Content: _____

Setting					
Lbs. of Sand					

STONE: Time for Calibration: _____ Moisture Content: _____

Setting						
Lbs. of Sand						

WATER: Time for Calibration: _____

Setting					
Amount					

LATEX: Time for Calibration: _____

Setting						
Amount						

ADMIXTURE: Time for Calibration: _____

Setting					
Amount					

CALCULATED YIELD: _____(cubic yard)

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

GENERAL INFORMATION GUIDE FOR TECHNICIAN AND INSPECTOR CERTIFICATION PROGRAM (TICP)

1. PURPOSE

1.1. The purpose of the West Virginia Division of Highways (WVDOH) Technician and Inspector Certification Program is to improve the quality assurance of various materials by the certification of industry and WVDOH. This procedure is to establish guidelines for this purpose.

2. GENERAL

2.1. It is the WVDOH's intent to conduct a cooperative program of training, study, and examination so that personnel of the producer, contractor, and the WVDOH will be able to better assure, by their increased technical knowledge, the level of quality required by the governing Specifications.

3. REFERENCED DOCUMENTS

3.1. MP 720.10.01 - Guide for Using a High-Speed Inertial Profiler to Measure the Longitudinal Profile of Pavement.

3.2. MP 106.03.51 - Policy for Materials Certification Reciprocity with PCC Inspector, PCC Technician, and Aggregate Technician

4. SCOPE

4.1. This procedure is applicable to all requirements, guidelines, and other support documents of the WVDOH that reference conditions, methods, and levels of qualification specific to the WVDOH Training and Certification Program.

5. POLICIES AND ADMINISTRATION

5.1. Certification Board - The Certification Program will be carried out in accordance with general policy guidelines established or approved by the State Highway Engineer. They will be advised by a Board composed of the following members:

1. State Highway Engineer
2. Deputy General Counsel
3. Director of MCS&T - hereafter referred to as “Director”
4. Quality Assurance Training Program Administrator (QATPA)
5. Applicable MCS&T Supervisor(s)

5.1.1. The Certification Board will meet when called by the Director.

5.1.2. Administration - The program will be administered by the Director.

5.1.3. The Program Administrator shall be appointed by the Director. The Program Administrator will be assigned to assist the Director in administering the program and to handle planning, administration, and coordinating functions as may be delegated within the scope of appropriate WVDOH directives.

6. REQUIREMENTS

6.1. Where applicable, quality control representatives of the contractor and/or producer will be certified in the applicable certifications listed below, depending on the individual's duties or responsibilities. Responsibilities and qualification requirements are listed in appropriate support documents such as Specifications, Materials Procedures and/or Quality Control Plans.

6.2. For purposes of the WVDOH Quality Assurance Program, a non-WVDOH employee who is a certified Technician/Inspector represents the company of which they are a full-time employee on the project, owner, or partner (as defined by the Federal Wage and Hour Legislation). If said company has subsidiary or affiliated organizations, each organization will be required to have its own certified Technicians/Inspectors where applicable unless the State Highway Engineer makes an exception. Exceptions will be granted only when it can be proven that the certified Technician/Inspector performs the duties of the Technician/Inspector for all the subsidiary or affiliated organizations.

7. CERTIFICATION CLASSES

7.1. The TICP offers certification classes in the following disciplines:

1. Aggregate Technician
2. Aggregate Sampling Inspector
3. Soils & Aggregate Compaction Technician
4. Asphalt Field & Compaction Technician
5. Portland Cement Concrete Technician
6. Portland Cement Concrete Inspector
7. Asphalt Plant Technician
8. Asphalt Preservation Technician
9. Radiation Safety
10. Inertial Profiler Operator

7.2. Except as noted, all certifications are valid for a five-year period

7.3. All certifications require written examinations. Some also require a practical examination after successful completion of the written examination.

7.4. It is the responsibility of the applicant to determine which certification is applicable to their assignment. Following is a description of the certifications listing relevant information about each.

8. AGGREGATE TECHNICIAN

8.1. Details of this class are available on the MCS&T Webpage[1]

8.2. The written examination for an Aggregate Inspector consists of the following areas:

1. Aggregate Specifications and Procedures
2. Aggregate Fundamentals
3. Sampling, Control, and Inspection of Aggregates
4. Aggregate Testing

8.3. After successful completion of the written examination, the applicant will be required to ~~complete an apprentice cycle and~~ pass the practical examination. The technician must demonstrate the testing common to normal aggregate quality requirements. The applicant must complete an apprentice cycle, please refer to section 19.2.1

8.4. Certification as an Aggregate Inspector qualifies the technician to perform sampling and/or testing of aggregates for both Quality Control and Quality Assurance.

~~8.4.~~8.5. American Concrete Institute (ACI) Aggregate Testing Technician - Grade I certification will be accepted as a portion of the West Virginia Aggregate Technician training. However, the applicant must pass the online West Virginia Aggregate Technician written certification test before a certification is issued. Refer to MP 106.03.51. Documented 40 hours of work experience shall be submitted for certification.

~~8.5.~~8.6. APPRENTICESHIP REQUIREMENTS

~~8.5.1.~~8.6.1. ~~After successfully completing the written exam, and before~~ Before scheduling the Practical ~~Exam~~Exam, each participant shall complete a minimum~~e~~ 40 hours of hands-on training under the supervision of a WVDOH Certified Aggregate Technician in the eight different aggregate tests on which the participant will be tested. The tests to be trained in are:

1) AASHTO T 11 Materials Finer Than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
2) AASHTO T 19 Bulk Density (“Unit Weight”) and Voids in Aggregate
3) AASHTO T 27 Sieve Analysis of Fine and Coarse Aggregates
4) AASHTO T 84 Specific Gravity and Absorption of Fine Aggregate
5) AASHTO T 85 Specific Gravity and Absorption of Coarse Aggregate
6) AASHTO T 89 Determining the Liquid Limit of Soils
7) AASHTO T 90 Determining the Plastic Limit and Plasticity Index of Soils
8) MP 703.00.21 Standard Method of Test for Percent Crushed Particles

[1] https://transportation.wv.gov/highways/mcst/Pages/Agg-Technician.aspx

Once the Participant has completed the minimum 40 hours of training, The WVDOH Certified Aggregate Technician who performed the training will complete the Apprenticeship Log Sheet and include their written name, signature and certification number with the date of completion. The Log Sheet shall then be submitted to the QATPA electronically.

~~8.5.2.~~8.6.2. Once the Training Log has been received and verified by the QATPA, the participant will be contacted by the MCS&T Aggregate Section to schedule the practical exam. Each participant will be given one chance to pass the practical. (All Practical Examinations must be completed within 90 days from the date of the original written test date.) If the participant fails, they will be denied the Certification.

~~8.5.3.~~8.6.3. ~~The WVDOH Aggregate Technician who performs the training shall ensure the participant is trained in each of the tests according to the AASHTO procedures.~~

9. AGGREGATE SAMPLING INSPECTOR

9.1. Details of this class are available on the MCS&T Webpage[2]

9.2. The web-based examination for an Aggregate Sampling Inspector consists of the following areas:

1) Specifications
2) Sampling Fundamentals
3) Sampling Methods and Equipment
4) AASHTO T 27 Sieve Analysis of Fine and Coarse Aggregates
5) AASHTO T 11 Materials Finer Than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing The Aggregate Sampling Inspector requires the successful completion of an online examination.

9.3. Certification as an Aggregate Sampling Inspector qualifies the technician to perform sampling of aggregates for both Quality Control and Quality Assurance.

9.4. No practical examination nor apprenticeship is required for this certification.

10. SOILS AND AGGREGATE COMPACTION TECHNICIAN

10.1. Details of this class are available on the MCS&T Webpage[3]

10.2. The written examination for this class consists of the following areas:

1. Specifications
2. Soil & Aggregate Compaction Test Procedures
3. Radiation Safety and Nuclear Gauge
4. Test Procedure Problems

[2] https://transportation.wv.gov/highways/mcst/Pages/aggsamplinspec.aspx

[3] https://transportation.wv.gov/highways/mcst/Pages/compactioninspector.aspx

10.3. After successful completion of the written examination, the applicant will be required to ~~complete an apprentice cycle and~~ pass the practical examination. The technician must demonstrate the testing common to the certification's requirements. The applicant must complete an apprentice cycle, please refer to section 19.2.1

~~10.3.~~

10.4. Certification of the Soils and Aggregate Compaction Technician qualifies the technician to conduct tests on all Soil and Aggregate construction materials that require compaction testing.

10.5. APPRENTICESHIP REQUIRMENTS

10.5.1. ~~After successfully completing the written exam, and~~ ~~before~~ Before scheduling for the Practical Exam, each Participant shall complete a minimum 40 hours of hands-on training for the following tests under the supervision of a WVDOH certified Soil and Aggregate Compaction technician.

1) MP 700.00.24 Nuclear Density Test by Roller Pass Method
2) MP 712.21.26 Procedure for Determining Random Location of Compaction Lots
3) MP 207.07.20 Nuclear Field Density/Moisture Test for Random Material Having Less than 40% + ~~3/4 inch~~3/4-inch Material

~~Tests shall be on any project where WVDOH Materials Procedures and Specifications are required.~~ Once the Participant has completed the minimum 40 hours of training, the WVDOH certified Technician who performed the training will complete the Apprenticeship Log Sheet ~~(Attachment 2)~~ and include their written ~~name, signature~~name, signature and certification number with the date of completion. The Log Sheet shall then be submitted to the QATPA electronically.

10.5.2. Once the Training Log has been received and verified by the QATPA, the participant will be contacted by the MCS&T Soil and Aggregate Compaction Section to schedule the practical exam. Each participant will be given one chance to pass the practical. (All Practical Examinations must be completed within 90 days from the date of the original written test date.) If the participant fails, they will be denied the Certification.

~~10.5.3. The WVDOH Soil and Aggregate Compaction Technician who performs the training shall ensure the participant is trained in each of the tests according to the AASHTO procedures.~~

11. ASPHALT FIELD AND COMPACTION TECHNICIAN

11.1. Details of this class are available on the MCS&T Webpage[4]

11.2. The written examination for this class consists of the following areas:

[4] https://transportation.wv.gov/highways/mcst/Pages/AsphaltFieldTech.aspx

1. Specifications
2. Surface Preparation
3. Mix Delivery and Placement
4. Joint Construction
5. PWL
6. Troubleshooting
7. Compaction Test Procedures
8. Radiation Safety and Nuclear Gauge
9. Test Procedure Problems
10. Testing Forms

11.3. This certification has two options: with or without gauge endorsement. For the option without the gauge, participants will take a written exam. For the option with the gauge, after successful completion of the written examination, the applicant will be required to pass the practical examination. The technician must demonstrate the testing common to the certification's requirements. Only the applicant for the option with gauge must complete an apprentice cycle, please refer to section 19.2.1

~~11.3. Successful completion of the written examination, practical examination, and apprenticeship cycle is required.~~

11.4. Certification as an Asphalt Field and Compaction Technician qualifies the technician to oversee or inspect asphalt pavement construction. In addition, the class hand-out material is a valuable reference tool for each stage of the construction process. The required radiation safety training is included in this class and will certify attendees with a passing score to perform nuclear density testing on asphalt pavements.

11.5. APPRENTICESHIP REQUIRMENTS

11.5.1. ~~After successfully completing the written exam,~~ ~~each~~ Each Participant shall complete a minimum 40 hours of hands-on training for the following tests under the supervision of a WVDOH certified Asphalt Field and Compaction Technician.

1) AASHTO T 355 Standard Method of Test for In-Place Density of Asphalt Mixtures by Nuclear Methods

2) Specification 401 Gauge Comparison

~~Tests shall be on any project where WVDOH Materials Procedures and Specifications are required.~~ Once the Participant has completed the minimum 40 hours of training, the WVDOH certified Asphalt and Field Compaction Technician who performed the training will complete the Apprenticeship Log Sheet ~~(Attachment 2)~~ and include their written ~~name, signature~~name, signature and certification number with the date of completion. The Log Sheet shall then be submitted to the QATPA electronically. ~~This shall be submitted within one calendar year of passing written~~the written ~~exam.~~

11.5.2. The participant will be contacted by the MCS&T Pavement Analysis and Evaluation Section to schedule the practical exam. The practical exam may be attempted prior to the completion of the apprenticeship cycle. Each participant will be given one chance to pass the practical. (All Practical Examinations must be completed within 90 days

from the date of the original written test date.) If the participant fails, they will be denied the Certification.

~~11.6. District Verification.~~

~~11.6.1.~~11.5.3. ~~The follow criteria is an additional requirement for the Asphalt and Field Compaction Certification.~~

~~11.6.1.1.~~11.5.3.1. ~~The WVDOH Asphalt and Field Compaction Technician who performs the training shall ensure the participant is trained in each of the tests according to the AASHTO procedures.~~

~~11.6.1.2.~~11.5.3.2. ~~Asphalt Field and Compaction Technicians must also be evaluated by qualified District personnel on the first WVDOH paving project in which they perform this testing.~~

~~11.6.1.3.~~11.5.3.3. ~~The District personnel will make the decision as to whether or not the technician is correctly conducting the nuclear density tests in accordance with the Specifications.~~

~~11.6.1.4.~~11.5.3.4. ~~The District will also complete an evaluation form and send it to the MCS&T for processing.~~

~~11.7.~~11.6. ~~11.6~~ A technician that does not demonstrate proper radiation safety training shall not be allowed to continue testing on the WVDOH Project. They must be replaced by another qualified technician. Anyone who does not meet the applicable safety standards must provide proof of additional WVDOH approved radiation safety training before another evaluation will be conducted.

12. PORTLAND CEMENT CONCRETE TECHNICIAN

12.1. Details of this class are available on the MCS&T Webpage[5]

12.2. The written examination for this class consists of the following areas:

1. Specifications
2. Fundamentals
3. Sampling and Testing
4. Control and Inspection
5. Mix Proportioning and Adjustment

12.3. The Concrete Technician requires only the successful completion of the written examination; no practical examination test is required.

12.4. Certification of the Concrete Technician qualifies the technician to make plant and mix adjustments, proportioning, and other concrete related duties.

12.4.1. National Ready Mixed Concrete Association (NRMCA) Concrete Technologist Certification Course, "Short Course," will be accepted as a portion of the West Virginia PCC Technician training. However, the applicant must pass the online West Virginia

[5] https://transportation.wv.gov/highways/mcst/Pages/concretetech.aspx

PCC Technician written certification test before a certification will be issued. Refer to MP 106.03.51. ~~Documented work experience shall be submitted for certification.~~

12.5. APPRENTICESHIP REQUIREMENTS

12.5.1. PCC Inspector certification is a required prerequisite for the PCC Technician certification.

13. PORTLAND CEMENT CONCRETE INSPECTOR

13.1. Details of this class are available on the MCS&T Webpage[6]

13.2. The written examination for this class consists of the following areas:

1. Fundamentals
2. Sampling and Testing
3. Control and Inspection
4. Specifications

13.3. After successful completion of the written examination, the applicant will be required to pass the practical examination. The technician must demonstrate the testing common to the certification's requirements. The applicant must complete an apprentice cycle, please refer to section 19.2.1

~~13.3. TAfter successful completion of the written examination, the applicant will be required to pass a practical examination demonstrating their proficiency in conducting tests common to concrete quality control.~~

13.4. Certification as a Concrete Inspector qualifies the technician to perform sampling and/or testing of concrete for Quality Control and/or Quality Acceptance.

13.4.1. American Concrete Institute (ACI) Field Testing Grade I certification will be accepted as a portion of the West Virginia PCC Inspector training. However, the applicant must pass the online West Virginia PCC Inspector written certification test before a certification is issued. Refer to MP 106.03.51. ~~Documented work experience shall be submitted for certification.~~

13.4.1.1. ~~Apprenticeship requirements are waived if a certification is obtained via reciprocity~~.

13.5. APPRENTICESHIP REQUIREMENTS

13.5.1. ~~After successfully completing the written exam, each~~Each participant shall complete a minimum 40 hours of hands-on training under the supervision of a WVDOH Certified PCC Inspector in the tests on which the participant will be tested. The tests to be trained in are:

1) AASHTO R60 Standard Practice for Sampling Freshly Mixed Concrete
2) ASTM C1064 Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete

[6] https://transportation.wv.gov/highways/mcst/Pages/concreteinspector.aspx

3) AASHTO T119 Standard Method of Test for Slump of Hydraulic Cement Concrete

4) AASHTO T196 Standard Method of Test for Air Content of Freshly Mixed Concrete by the Volumetric Method

5) AASHTO T152 Standard Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method

6) AASHTO T121 Standard Method of Test for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete

7) AASHTO R100 Standard Method of Making and Curing Concrete Test Specimens in the Field

8) AASHTO T22 Standard Method of Test for Compressive Strength of Cylindrical Concrete Specimens

Once the Participant has completed the minimum 40 hours of training, the WVDOH Certified PCC Inspector who performed the training will complete the Apprenticeship Log Sheet and include their written name, signature and certification number with the date of completion. The Log Sheet shall then be submitted to the QATPA electronically.

13.5.2. The participant will be contacted by the MCS&T Concrete Section to schedule the practical exam. The practical exam may be attempted prior to the completion of the apprenticeship cycle. Each participant will be given one chance to pass the practical exam. (All Practical Examinations must be completed within ~~60~~ 90 days from the date of the original written test date.) If the participant fails, they will be denied the Certification.

~~13.5.3. The WVDOH PCC Inspector who performs the training shall ensure the participant is trained in each of the tests according to the AASHTO procedures.~~

~~After successfully completing the written exam: Before scheduling for the Practical Exam, each Participant shall complete 40 hours of hands-on training for test outlined in the Apprenticeship Cycle (Attachment 1) under the supervision of a WVDOH certified technician for PCC Inspector. Tests can be on either a doh project or private work. If the testing is conducted on a private project, DOT materials, procedures and specifications must be followed. Once the Participant has completed the 40 hours of training, The WVDOH certified Technician who performed the training will complete the Apprenticeship Log Sheet (Attachment 2) and include their signature and written name with the date of completion. The Log Sheet shall then be submitted to the QAPA electronically.~~

~~10.5.2 Once the Training Log has been received and verified by the WVDOH MCS&T personnel the participant will be contacted by the Concrete Section located at MCS&T to schedule the practical. Each participant will be given one chance to show they can proficiently run each of test specified in the apprenticeship cycle (attachment 1). (All Practical Examinations must be completed within 90 days from the date of the original written test date.) If the participant does not show proficiency during each of the tests~~

~~the participant will be denied the PCC Inspector Technician Certification. The documented experience hours shall be completed before they can proceed with their practical.~~

14. ASPHALT PLANT TECHNICIAN

14.1. Details of this class are available on the MCS&T Webpage[7]

14.2. The written examination for this class consists of the following areas:

1. Specifications
2. Fundamentals
3. Sampling and Testing
4. Control and Inspection
5. Mix Proportioning and Adjustment

14.2.1. ~~After successful completion of the written examination, t~~The applicant will be required to complete an apprentice cycle and pass the practical examination demonstrating their proficiency~~After successful completion of the written examination, the applicant will be required to pass a practical examination demonstrating their proficiency~~ in conducting tests common to Asphalt quality control.

14.3. Certification of the Asphalt Technician qualifies the employee technician to take asphalt mixture samples, perform quality control or quality assurance testing on plant produced asphalt mixtures, make plant and mix adjustments, aggregate proportioning, and other duties.

14.4. APPRENTICESHIP REQUIREMENTS

14.4.1. ~~After successfully completing the written exam, e~~Each participant shall complete a minimum ~~40~~ 24 hours of hands-on training under the supervision of a WVDOH Certified Asphalt Plant Technician in the tests on which the participant will be tested. The tests to be trained in are:

1) ASTM D6926 - Preparation of Asphalt Mixtures by

Means of the Marshall Apparatus

2) AASHTO T 312 - Preparing and Determining the Density

Of Asphalt Mixture Specimens by Means of the Superpave Gyratory Compactor

3) AASHTO T 166 - Bulk Specific Gravity (GMB) of

Compacted Hot Mix Asphalt (HMA) Using Saturated

Surface-Dry Specimens

4) AASHTO T 331 - Bulk Specific Gravity (GMB) and Density

of Compacted Hot Mix Asphalt (HMA) Using Automatic

[7] https://transportation.wv.gov/highways/mcst/Pages/hotmixasp.aspx

Vacuum Sealing Method

5) AASHTO T 209 – Theoretical Maximum Specific Gravity (GMM) and Density of Hot Mix Asphalt (HMA)

6) ASTM D6927 – Resistance to Plastic Flow of Asphalt Mixtures Using Marshall Apparatus

7) AASHTO T 308 – Determining the Asphalt Binder Content of Hot-Mix Asphalt (HMA) By the Ignition Method, (Method A)

8) AASHTO T 30 – Mechanical Analysis of Extracted Aggregate

9) AASHTO T 269 Standard Method of Test for Percent Air Voids in Compacted Dense and Open Asphalt Mixtures

Once the Participant has completed the minimum 24 hours of training, the WVDOH Certified Asphalt Plant Technician who performed the training will complete the Apprenticeship Log Sheet and include their written name, signature and certification number with the date of completion. The Log Sheet shall then be submitted to the QATPA electronically.

14.4.2. The participant will be contacted by the MCS&T Asphalt Section to schedule the practical exam. The practical exam may be attempted prior to the completion of the apprenticeship cycle. Each participant will be given one chance to pass the practical exam. (All Practical Examinations must be completed within 90 days from the date of the original written test date.) If the participant fails, they will be denied the Certification.

~~14.4.3. The WVDOH Asphalt Plant Technician who performs the training shall ensure the participant is trained in each of the tests according to the AASHTO procedures.~~

~~APPRENTICESHIP REQUIREMENTS~~

~~The technician shall submit an Apprenticeship Log Sheet (Attachment 2) of 24 hours of documented experience signed by QC manager/supervisor. The plant technician can run QC samples under the direct supervision of a certified tech who must sign off on testing. The technician will have one opportunity to pass the practical.~~

15. ASPHALT PRESERVATION TECHNICIAN

15.1. Details of this certification are available on the MCS&T Webpage[8]

15.2. This exam is based on web-based training found in the TC3 Course "Flexible Pavement Preservation Treatment Series."

[8] https://transportation.wv.gov/highways/mcst/Pages/Asphalt-Preservation-Technician.aspx

15.3. A printed copy of the Certificate of Training from this course is required to be presented for registration on the day of the exam.

15.4. The written examination for an Asphalt Preservation Technician consists of the following areas in regards to chip seals, micro surfacing, thin overlays, and crack sealing

1. Fundamentals of Preservation
2. Pavement Conditions and Treatment Selection
3. Performance Characteristics
4. Inspection and Best Practices

15.4.1. Certification of the Asphalt Preservation Technician is currently optional. This certification is for technicians who want to be more prepared for asphalt preservation style projects.

15.4.2. No practical examination nor apprenticeship is required for this certification.

16. RADIATION SAFETY

16.1. This certification is required by the Nuclear Regulatory Commission (NRC) before operating a portable nuclear gauge. The training consists of 3 - 4 hours classroom instruction and has a 25-50 question closed book exam. A minimum score of 70 percent is required ~~for passing~~to pass the course. The course and exam will cover the following areas:

1. Proper storage and security of portable nuclear gauges
2. Transportation of portable nuclear gauges
3. Personal safety while operating a portable nuclear gauge.

16.2. No practical examination nor apprenticeship is required for this certification.

17. INERTIAL PROFILER OPERATOR

17.1. This certification does not have class, nor does the test need to be proctored by the WVDOH. The exam is provided upon request. Details of this certification are in MP 720.10.01 - Guide for Using a High-Speed Inertial Profiler to Measure the Longitudinal Profile of Pavement

17.2. The written examination for the inertial profiler operator covers of the following areas:

1. WVDOH Specifications
2. AASHTO and ASTM Specifications
3. Knowledge of operation and analysis of collected data.

17.3. This certification allows a technician to operate a lightweight/low-speed and high-speed inertial profiler.

17.4. No practical examination nor apprenticeship is required for this certification.

18. TESTING PROTOCOL

18.1. TESTING PROTOCOL

18.1.1. The TICP has a testing protocol that must be followed. The protocol includes testing environment, time limits, proctoring exams, etc. The entire protocol will be covered with attendees prior to testing.

18.2. CLASS SUPPLY LIST

18.2.1. We recommend that participants bring the following items with them to the certification classes:

1. Laptop Computer or Tablet (Mandatory)
2. Photo ID
3. Current WV Specification book and the latest Supplemental to the Specification book. You will need this during the test. These are also available in printable PDF format on the WVDOH Webpage.[9]
4. Hand held calculator (No electronic devices other than a Hand held calculators are allowed to be used during testing.)
5. Highlighters
6. Sticky Notes
7. Ruler / Straight edge

18.3. SPECIAL NEEDS AND REQUESTS

18.3.1. Applicants with special needs should notify the Quality Assurance Training Program Administrator prior to the class to ensure that the training location is prepared to accommodate their needs.

19. CERTIFICATION, APPRENTICESHIP, AND RE-CERTIFICATION

19.1. Certification

19.1.1. An individual must pass the written examination in each level for which they are requesting certification. Unless otherwise noted, to pass the written examinations, the applicant must obtain a minimum score of 70 percent.

19.1.2. If an applicant fails to receive a minimum score of 70% on the first written exam, they will be given another attempt at a later date to score 70%. This second attempt shall be a subsequent, scheduled make-up written exam. Failure to attend any scheduled written examination counts as a failed exam.

19.1.2.1. If the applicant fails the second written exam, they may not attempt the written examination again until they retake the class or wait one calendar year.

19.1.3. If required by the certification, a practical exam must be successfully completed. Specific requirements for the practical exam are included in the respective sections. If a participant fails the practical exam, they may not retake the practical exam until they

[9] https://transportation.wv.gov/highways/contractadmin/specifications/Pages/default.aspx

have attended the respective class and successfully passed the written examination again~~, or one year.~~.

19.1.4. Upon successfully completing the requirements for certification, applicants may print their certification card from the Divisions Webpage. http://dotftp.wv.gov/materialsdir/

19.1.5. This certification is not transferable. A certification is valid for ~~up to~~ ~~five~~ 5 years and expires December 31, of the 5th year of certification. Radiation Safety must be renewed every 3 years from the certification date.

19.2. APPRENTICESHIP

19.2.1. For the initial certification of an applicant technician, an apprenticeship is required which consists of three tasks; pass a written exam, hands-on experience, and pass a hands-on practical exam. ~~Upon successful completion of the written exam, the~~The Technician shall work as an apprentice under the supervision of a certified technician for the Apprenticeship Cycle. This must be completed up to one year before and ninety days after the written exam. This requirement shall not apply to a technician who has let their ~~certification expire~~certification expire with proof of previous certification.

An applicant who seeks certification via reciprocity must provide 40 hours of experience documented by the company's QC Manager or applicant's Supervisor on the Apprenticeship Log Sheet. ~~within the past year or applicants who seek certification through reciprocity.~~

~~The apprenticeship should be completed before attempting the practical portion of the certification process.~~

19.2.2. The apprentice shall keep a work log that is signed by the supervising technician. (See attachment 1~~2~~). The work log shall record the number of hours performing ~~doing~~ the specified testing as outlined in the respective section. Hours shadowing or observing others does not count. The work log shall be submitted to the QAPTA and must be reviewed and approved by the appropriate MCS&T Section.

19.2.3. Apprenticeship requirements vary between certifications. See the respective section for details of the apprenticeship requirements.

19.2.4. APPRENTICE CYLE

19.2.5. The Apprentice Cycle is the number of hours for specific tests which must be performed by the applicant and documented by a certified technician. For each of the certification schools, the hours of testing ~~is~~are listed in the respective section.

~~19.2.6.~~19.3. RE-CERTIFICATION

~~19.2.7.~~19.3.1. The responsibility for obtaining re-certification shall lie with the certified individual.

~~19.2.7.1.~~19.3.2. Certification holders are responsible for ensuring that their certifications stay current. The WVDOH will no longer mail reminder letters to certification holders.

~~19.2.8.~~19.3.3. The renewal of all certifications shall require a written exam and a hands-on practical exam, where applicable.

~~19.2.9.~~19.3.4. Applicants will be given two scheduled attempts to pass the written recertification exam and one attempt to pass the practical exam (each, respectively). Any applicant that fails to acquire a minimum score of 70% on a recertification exam or who fails the subsequent practical exam will not have their certification renewed. The applicant will be required to take the respective certification classes at the next available time given by MCS&T.

~~19.2.10.~~19.3.5. Any failed recertification examination taken prior to the expiration date of the current certification, either practical or written, will not result in termination of any current certification prior to the expiration date of that certification.

~~19.2.11.~~19.3.6. The certification holder is responsible for updating their personal information on the online learning website[10].

~~19.2.12.~~19.3.7. If an applicant seeking recertification disagrees with a recertification decision, they may file a written appeal with the Certification ~~b~~Board.

~~19.3.~~19.3.8. If certification is not renewed by December 31, the Technician should take the class and shall take the full exam and practical at the next available offering.

19.4. INSTRUCTOR'S EXTENDED CERTIFICATION

19.4.1. Anyone who teaches during the certification classes shall have their certification extended 1 year per calendar year per certification taught.

20. RECIPROCAL CERTIFICATIONS

20.1. Acceptance of WVDOH Certifications by other state agencies is at the sole discretion of the other agency. Refer to MP 106.03.51

21. TRAINING

21.1. Training - The Division of Highways, contractors, and producers may sponsor courses of instruction consisting of schools and seminars to help prepare personnel for certification under one or more of these certification programs. To the extent possible, these courses of instruction will be joint efforts of the industry and WVDOH. Nothing in this document shall be interpreted to prohibit any party from conducting courses of instruction for their personnel to assist in preparation for these exams.

21.2. The purpose of the schools is to provide helpful information and instruction for people preparing to take the WVDOH Technician/Inspector examinations. These courses are designed to provide instruction for people with a basic foundation in the subject matter. Work experience in the subject matter is encouraged before attending classes.

[10] http://www.onlinelearning.wv.gov/student/home.html

22. EXAMINATIONS

22.1. Renewal and Certification – Certifications shall be renewed as required in this document. General guidance and information for renewal will be recommended by the Certification Board as required by the State Highway Engineer. All certifications, except Radiation Safety, shall terminate on December 31st of the year of expiration. There may be written, and practical examination required for recertification where applicable.

22.1.1. Upon obtaining renewal of certification, a renewal card may be printed from the MCS&T Webpage.

22.2. For further information on classes, recertification, schedules, class calendars and other helpful information please visit the MCS&T's Webpage.

23. FUNCTIONS AND RESPONSIBILITIES

23.1. Contractor or Producer - The producer and contractor will be responsible for product control of all materials during the handling, blending, and mixing operations. The contractor and producer also will be responsible for the formulation of a design mix that will be submitted to the Division for approval.

23.1.1. Technician/Inspector - A Quality Control representative of a contractor or producer should be a certified Technician/Inspector as outlined in Section 5. and whose responsibilities may include such duties as proportioning and adjusting the mix, sampling and testing the product, and preparing control charts.

23.2. The WVDOH is responsible for all acceptance decisions.

23.2.1. District Materials Supervisor - District Materials activities are the responsibility of the District Materials Supervisor.

23.2.2. Division Technicians and Inspectors – The WVDOH Technicians and Inspectors will be assigned as necessary to carry out the required acceptance decision activities. The WVDOH representatives will not issue instructions to the contractor or producer regarding process control activities. However, the WVDOH representatives have the responsibility to question, and where necessary to reject, any operation or sequence of operations, which are not performed in accordance with the contract documents.

24. REVOCATION OF CERTIFICATION

24.1. If at any time a WVDOH, contractor's, producer's, or supplier's Technician or Inspector is found to have altered or falsified test reports or is found to have improperly performed tests or reported their results, the individual's certification may be rendered invalid by the State Highway Engineer upon recommendation of the Certification Board.

24.2. Generally, certifications may be revoked if in the opinion of the certifying authority, an individual has knowingly committed acts detrimental to the integrity of the

Certification Program or transportation industry. Examples of situations that warrant revocation include, but are not limited to:

1. Deliberate falsification of field or quality control test results or records.
2. Deliberate falsification of calculations, test results or materials
3. Cheating on certification/re-certification exams.
4. Submittal of false information on certification applications.
5. Submitting trial mix mixture and/or calculations completed by someone other than the signatory or knowingly supplying trial mix mixture and/or calculations for another individual's certification.

24.3. The Quality Assurance Training Program Administrator will take the lead in gathering facts and investigating any allegations which may require revocation of a certification. The Certification ~~review~~ ~~b~~Board will notify the individual in writing of intent to revoke certification(s).

25. APPEALING A DECISION

25.1. Any individual who disagrees with a decision by the Certification Board has 10 business days from the date of receipt of the notification to respond in writing to the board and present documentation to support their continued certification and/or request an opportunity for a meeting to present their case.

Appeals should be mailed to:
Certification Board
ATTN: Quality Assurance Program Administrator
West Virginia Division of Highways
190 Dry Branch Dr.
Charleston, WV 25306

25.2. If the individual fails to respond within 10 days of receipt of the original notification of revocation letter, the revocation becomes final.

25.3. Not later than 20 business days after receiving a request for a meeting from the individual, the Certification Board will schedule a meeting in which the appellant can present their case. If the Certification Board was not persuaded by the documentation provided by the appellant and believes that revocation of the certification is warranted, the appellant may file a written appeal to the State Highway Engineer for review. All information including any letter(s) of explanation from the appellant will accompany the documents submitted to the State Highway Engineer. The board will mail the decision of the State Highway Engineer to the appellant. The decision by the State Highway Engineer is final.

26. THE LENGTH OF REVOCATION:

26.1. First Offense

26.1.1. This may include revocation of all certifications for up to one year. After the revocation period the individual may obtain recertification by passing respective certification exam and a practical (if applicable). If either exam is failed, the individual will be

required to take the certification class before being permitted to test again. The individual will be required to retake and pass the written exam regardless of whether it was previously passed.

26.2. Second Offense

26.2.1. This may include revocation of all certifications for up to five years. There is also the possibility of demotion and reduced pay for WVDOH employees. After the revocation period the individual may obtain recertification by passing the respective certification exam and a practical (if applicable) at the discretion of the board. If either exam is failed, the individual will be required to take the certification class before being permitted to test again. The individual will be required to retake and pass the written exam regardless of whether it was previously passed.

26.3. Third Offense

26.3.1. This may include revocation of all certifications for life. There is also the possibility of termination, demotion and reduced pay for WVDOH employees.

27. CONTACT INFORMATION

27.1. If an applicant/technician/appellant has any questions about the DOH program or needs more information. Please contact: Qaschoolscoordinator@wv.gov

Michael A Mance, PE
Director
Materials Control, Soils & Testing Division

MP 106.03.50 Steward – Personnel, Payroll Section
MM:Bh

ATTACHMENT

~~ATTACHMENT 1 – Apprenticeship Cycle~~

ATTACHMENT 1~~2~~ – Apprentice Log Form

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

METHOD FOR ACCEPTANCE OF COMPACTION TESTING OF SOIL AND AGGREGATE

1. PURPOSE

1.1 To provide a procedure for the acceptance of compaction testing of soil and aggregate.~~.~~

2. SCOPE

2.1 This procedure is applicable to all soil and aggregate materials that require evaluation of compaction tests.

3. TESTING

3.1 The minimum frequency for acceptance testing shall be 10% of the contractor's individual tests. Five tests shall be performed in a lot for acceptance testing.

3.2 Acceptance testing shall be distributed throughout the placement of material.

3.3 The material should be categorized according to the base, subgrade, pipe backfill, embankment, etc.

4. EVALUATION

4.1 Calculations shall be rounded to the following significant digits according to ASTM Method E29.

Average (X)	0.1%
Standard Deviation	0.01
Range	1%

4.2 Determine the number of lots tested by the contractor for a particular material since the last monitoring, including the lot just tested. ~~Record the percent relative densities on the attached form.~~After completion of the QA lot, the test data shall be entered into AWP, or the current System. Enter the test data for the QC lots into AWP, or the current System. Each QC lot shall be linked to the appropriate QA lot.

~~4.3 Calculate the standard deviation (S) for the percent relative densities.~~

4.4~~4.3~~ ~~Calculate the range (R) for plus and minus 1.65 standard deviations (S) from the average (X) for the contractor's tests (R = X ± 1.65 S).~~Generate the appropriate Compaction Similarity Report in AWP, or the current System.

~~4.5 Compare the acceptance tests to the calculated range.~~

~~4.5.1~~4.3.1 If all the acceptance tests in the report are within the range of plus or minus 1.65 standard deviations, the testing is similar. When the testing is similar, the degree of compaction for the lots of material represented by the acceptance evaluation may be accepted.

~~4.5.2~~4.3.2 If any of the 5 acceptance tests are outside the range of plus or minus 1.65 standard deviations, compare the acceptance tests to the range in the report calculated using plus or minus 3 standard deviations.~~calculate 3 standard deviations for the contractor's tests (R = X ± 3 S).~~

~~4.5.3~~4.3.3 If all acceptance tests are within the range, the testing is considered similar, however, the quality control practices of~~by~~ the contractor should be reviewed for possible problems.

~~4.5.4~~4.3.4 Any test outside the plus or minus 3 standard ~~3~~ deviation range indicates that there may be problems within the quality control system and no additional material shall be placed until the problem is investigated and resolved. The investigation shall~~would~~ include checking such areas as equipment, test procedures, location of tests, variability of materials, compaction techniques, etc. The results of the investigation shall be documented in the project files and a copy forwarded to Materials Control, Soils & Testing Division via email at DOHCompaction@wv.gov.

MP 700.00.50 Steward – Laboratory Support Section
MM:W
ATTACHMENT

PROJECT NUMBER: _____

ITEM NUMBER (S): _____

TYPE OF MATERIAL: _____ DATE: _____

QUALITY CONTROL
TESTS

LOT NUMBER				
	1 2 3 4 5			
	AVERAGE (X)		STANDARD DEVIATION	
ACCEPTANCE TESTS				
TEST NUMBER	1 2 3 4 5	X + 1.65 (S) = _____ X - 1.65 (S)= _____ WITHIN LIMITS	YES NO	= UPPER LIMIT = LOWER LIMIT (SIMILAR) (DISSIMILAR)
		X + 3(S) = _____ X - 3(S) = _____ WITHIN LIMITS	YES NO	= UPPER LIMIT = LOWER LIMIT (SIMILAR) (DISSIMILAR)

EVALUATED BY: _____ CHECKED BY: _____

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

INSPECTION AND ACCEPTANCE PROCEDURES FOR PRECAST CONCRETE PRODUCTS

1. PURPOSE

1.1. To set forth procedures for the inspection and acceptance of precast concrete products, including inlets, manholes, box culverts, 3-sided bridge units, retaining wall panels, headwalls, wingwalls, lagging, junction boxes, and any other precast products, and the approval of the plants at which they are fabricated.

2. SCOPE

2.1. This procedure will apply to all precast concrete products supplied for use on West Virginia Division of Highways projects and to all precast concrete product fabricators that supply material for use on West Virginia Division of Highways projects.

2.2. For prestressed concrete members refer to MP 603.10.40 “Inspection and Acceptance Procedure for Prestressed Concrete Bridge Beams.”

3. FABRICATOR APPROVAL

3.1. All precast concrete product fabricators (hereafter referred to as the Fabricator) shall be approved by Materials Control Soils and Testing MCS&T Division prior to the start of any work for the WVDOH. If not listed on the WVDOH Approved List of Precast Concrete Fabricators, a Fabricator shall contact MCS&T Division a minimum of six weeks prior to the planned date on which fabrication is to begin to initiate the approval process.

3.2. In order for a Fabricator to be approved and listed on the WVDOH Approved List of Precast Concrete Fabricators, they must be NPCA (National Precast Concrete Association) certified, QCAST (American Concrete Pipe Association) Certified, or have an equivalent type of certification.

3.2.1. All fabricators must set up their invoicing as an E-Ticket that meets the requirements of Section 109.20.1 of the Standard Specification prior to approval.

3.3. The process for approving a Fabricator shall include, but not be limited to, an on-site visit to the fabrication plant by a WVDOH representative from MCS&T Division. During this visit, the WVDOH Quality Assurance (QA) personnel shall inspect the fabrication facility, the Quality Control (QC) lab, and meet with QC and other key personnel from the Fabricator. Component materials which will be used in the fabrication of precast items shall be sampled for testing. Batch scales shall be calibrated in accordance with MP 700.00.03 at a minimum once per year.

3.3.1. Sampling and testing of component materials shall be done in accordance with MP 603.02.10. Copies of recent component delivery tickets should be presented on the day of sampling. All component materials must be approved prior to the start of fabrication.

3.3.1.1. Any Fabricator which does not produce for the WVDOH for a period of 2 years shall be removed from the Approved Fabricator list. After removal from the approved list, before a Fabricator can again produce for the WVDOH, they must repeat the approval process. Sampling of component materials will not continue when the plant is not listed on the Approved Fabricator list.

3.3.2. Personnel from the Fabricator required to be present during the initial on-site visit and meeting between WVDOH and Fabricator shall include representatives from Production and Quality Control. Any questions and concerns regarding WVDOH requirements, including applicable Specifications, Materials Procedure (MP's), Standard Details, and QC/QA Inspections shall be addressed at this meeting.

3.3.3. The Fabricator must submit the Quality Control Manual/Plan for review at this meeting.

3.4. All Concrete Mix Designs which will be used on products fabricated for the WVDOH must be submitted for review & approval, prior to the start of fabrication. Any design mix with an aggregate(s) that has a reactivity class~~es~~ R1, R2, or R3, as shown as in Approved Aggregates Source List, shall be developed in accordance with WVDOH specifications, subsection 601.3.1.1. If an aggregate Source is not listed on the Approved Aggregates Source List, the Division will test the fine and coarse aggregate from the Source, in accordance with AASHTO T 303, to determine the reactivity class of the aggregate prior to its use on any WVDOH project. The Division will inform the Fabricator of the reactivity class of aggregates that they are proposing to use. If a cement Source and/or a SCM Source are not listed on the Approved Source List, the Division will test cement and/or SCM from that Source prior to its use on any WVDOH project.

3.5. The Fabrication Plant QC Personnel, as a minimum, shall be a certified ACI Grade I Concrete Field Testing Technician and/or a WVDOH PCC Inspector. In addition, if Self-Consolidating Concrete (SCC) is used, Fabrication Plant QC Personnel shall be a certified ACI SCC Testing Technician.

3.6. All Precast Concrete items shall be accepted by Direct or Master Coverage except when a Fabricator is certified as an Approved Source of concrete lagging as defined in Section 7.

4. FABRICATION & INSPECTION OF PRODUCTS FOR DIRECT & MASTER COVERAGE

4.1. Prior to beginning fabrication of any precast concrete products, the Fabricator shall provide written or email notification to MCS&T Division at least one calendar week in advance of the date on which fabrication is to begin.

4.1.1. Depending upon the precast items being fabricated, MCS&T Division may choose to monitor fabrication. Fabrication of structurally significant products such as box culverts and 3-sided bridge units shall be monitored. Other items may be monitored at the discretion of MCS&T.

4.1.2. After fabrication has begun, the Fabricator shall keep MCS&T Division and the Inspector (whether a WVDOH employee or a contract employee representing the WVDOH) informed in advance of the days on which fabrication will take place.

4.2. Shop Drawings must be approved by the West Virginia Division of Highways prior to the start of any work by the Fabricator. The Inspector must have a copy of these approved shop drawings prior to start of any work by the Fabricator.

4.3. Concrete cylinders shall be made for compressive strength testing with ~~6-inch by 12-inch or~~ 4-inch by 8-inch molds. The cylinders are to be cured in the same area as the products for which they represent (Field Cured as outlined in AASHTO R100) until tested to create a curing environment similar to the product that they represent. A compressive strength test shall consist of the average result of a set of cylinders, which is at least two cylinders. Form removal for wet cast concrete is not permitted until concrete has reached 50% of the design strength, unless otherwise specified. If forms are stripped from box culverts at 50% of the design strength, another curing method from section 601.12, or ASTM C1577 must be used until 70% of the design strength is obtained. Form removal limitations do not apply to elements fabricated with dry cast concrete. Dry cast concrete is defined as concrete with a slump less than 1-inch.

4.3.1. For both conventional wet cast concrete and SCC mixes, a minimum of one set of compressive strength cylinders shall be fabricated from every 7 cubic yards of concrete, or fraction thereof, with a minimum of one set per day per mix design. Both the form removal strength and the 28-day strength must be confirmed by a set of cylinders. Cylinders shall be the same size as those used in the initial approved mix design. For conventional concrete, slump, temperature, and air content tests shall be conducted on the first batch of concrete each day and every time that cylinders are fabricated. For SCC mixes, spread, temperature, and air content tests shall be conducted on every batch. For all types of concrete, unit weight and yield tests shall be conducted on the first batch of concrete each day and thereafter as deemed necessary by Quality Control and Quality Assurance Personnel.

4.3.2. For dry cast mixes, the 28-day strength shall be confirmed by a set of compressive strength cylinders. Compressive strength testing for form removal is not required for dry cast mixes. A minimum of one set of 28-day compressive strength cylinders shall be fabricated from every 20 cubic yards of concrete, or fraction thereof, with a minimum of one set per day per mix design. The cylinders are to be fabricated in the molds on the vibration table in accordance with ASTM C497. For dry cast mixes, slump testing is not required, and concrete temperature testing shall be performed on the first batch of concrete each day and every time that cylinders are fabricated.

4.4. For precast manholes fabricated with wet cast and SCC mixes, absorption tests are to be conducted in accordance with ASTM C642. Tests should be conducted on a weekly basis for each mix design used, at a minimum, unless otherwise specified.

4.5. For precast products fabricated with dry cast mixes, absorption tests are to be conducted in accordance with ASTM C642, and tests should be conducted on a weekly basis for each mix design used. The maximum allowable absorption shall be 9%.

4.6. Unless otherwise specified, for conventional wet cast and SCC mixes, plastic concrete shall have an air content measured at 7.0 ± 2.0%. For dry cast concrete, the air content test requirement is waived.

4.6.1. Prior to the use of Self-Consolidating Concrete in precast items all mix designs must be submitted to MCS&T for approval and meet the requirements of the following table. Test results from trial batches produced by the laboratory which designed it shall be included in the submittal. The compressive strength of the design mix shall be at least 15% above the specified design strength.

Table 4.6.1 - SCC Mix Design Acceptance

Fresh Property	**Mix Design Batch Acceptance Criteria**
Air Content	7.0± 1.5%
Spread (ASTM C1611)	Target ± 1.5 inches 2 seconds $\leq T_{50} \leq$ 7 seconds Visual Stability Index ≤1.0
Passing Ability (ASTM C1621)	J-Ring Value $\leq$ 1 inch
Segregation Resistance (ASTM C1610)	Segregation ≤ 12%
Unit Weight and Yield	±2% of Theoretical

4.6.2. The following table lists the criteria for SCC production.

Table 4.6.2 - SCC Production Acceptance

Fresh Property	**Production Acceptance Criteria**
Air Content	7.0± 2.0%
Spread (ASTM C1611)	Target ± 2 inches 2 seconds $\leq T \leq$ 7 seconds Visual Stability Index ≤1.0
Concrete Temperature	<90°F
Unit Weight and Yield	±2% of Theoretical

4.6.3. SCC should only be given minimal vibration; and shall not be dropped from a distance greater than 4 feet relative to the top of the form.

4.6.4. Precast products fabricated with dry cast concrete shall be limited to a maximum wall thickness of 12 inches when single sided vibration is used and 18 inches when double sided vibration is used.

5. FINAL INSPECTION

5.1. After fabrication is completed and prior to shipment, the precast items will be stored on dunnage. The Fabricator shall provide MCS&T Division with a written or email

request for final inspection a minimum of one calendar week prior to the desired date of inspection. Effective communication from the Fabricator to MCS&T Division and Consultant Inspection Agency is the key to avoiding any scheduling conflicts regarding final inspection.

5.2. At the final inspection, the fabricator shall provide the inspector with documentation of required data pertinent to the product(s) being produced. Attached to this document is a sample inspection sheet to be used as a guide for presenting this information. This documentation is also available on the MCS&T Division Website[1].

5.2.1. For the final inspection, the Inspector may witness compressive strength tests if required, inspect repairs as needed, and conduct a thorough visual examination of each member. A copy of the Inspector's daily reports, a copy of the final inspection report, and all other pertinent information provided to the Inspector by the Fabricator shall be kept on file by MCS&T Division.

5.2.2. For box culverts, trial fitting of adjacent pieces, prior to shipping, will be required as part of the final inspection process. Each adjacent box culvert will be trial fitted in pairs horizontally or vertically; the gaps between each pair will be measured. Dunnage will be placed on a smooth level surface below the bottom of the culvert to prevent damage. The maximum gap between the adjacent pieces shall not exceed ½ inch (13 mm), unless otherwise stated in the construction plans.

6. ACCEPTANCE & REJECTION

6.1. Upon completion of final inspection, if a precast product meets all specification requirements and does not contain any defects, the Inspector will stamp the precast product as accepted by MCS&T Division and provide a 7-digit Laboratory Reference Number for shipment.

6.1.1. Shipping invoices shall document the assigned Laboratory Reference Number, type of material, number of pieces, size, and cast dates. All Division invoicing must be submitted as an E-Ticket to the project that meets the requirements of Section 109.20.1 of the Specifications.

6.2. If, however, the precast product does not meet all specification requirements due to damage, defect, or dimensional tolerance, the product must be further evaluated before potential acceptance by the MCS&T Division as described in the following subsections.

6.2.1. Minor defects may be repaired in accordance with the pre-approved repair procedures which should be incorporated within the Fabricator QC Plan. Cracks 4 mils or less shall be sealed by silane; and cracks between 4 mils and 16 mils shall be repaired by epoxy injection in accordance with Section 603.10.2. Any crack exceeding 16 mils shall be considered a major defect and the item shall be rejected by MCS&T. If repairs have been approved, and appear satisfactory and all other specifications are met, the Inspector shall stamp the product as approved for shipment and issue a 7-digit Laboratory Reference Number for acceptance.

[1] https://transportation.wv.gov/highways/mcst/Pages/WVDOH-Materials-Procedures.aspx

6.2.2. Major defects shall include dimensions that exceed tolerances, failure to reach required compressive strength, cracks greater than 16 mils, and any defect that could be considered structural. Lagging dimensions shall be within ± ¼'' from the specified dimension, and all other items must meet relevant tolerances in AASHTO and ASTM Standards. Items with major defects shall be rejected by MCS&T Division, and a 7-digit Laboratory Reference Number will be assigned documenting MCS&T Division's rejection. When items are load bearing, they shall be evaluated by the Designer for structural adequacy and then may be accepted by DMIR, pending concurrence by the District, and or the Engineer of Record. If a product is approved for repair, and if repairs appear satisfactory, the Inspector shall proceed with a final shipping inspection of the piece. Any items found to be not acceptable by the Engineer of Record, Designer, or the District/Division; shall be rejected by the Division.

6.2.3. When an item does not achieve the specified 28-day compressive strength prior to shipment, and if it is accepted by a DMIR, the following formula for the price adjustment shall be used in the DMIR, plus any administrative fee.

f'_c – 28 Day Compressive Strength (psi)
$\overline{X}$ – Average 28 – day Compressive Strength (psi)
IC - The invoiced cost of the precast item only.

Formula 1 (Constructed by Contractor)

$$\text{Price Reduction} = \left[\frac{f'_c - \mathbf{X}}{.5\, f'_c}\right] x\ 40\%\ \text{Unit Bid Price}$$

Formula 2 (Constructed by Division)

$$\text{Price Reduction} = \left[\frac{f'_c - \mathrm{X}}{.5\, f'_c}\right] x\ \mathrm{IC}$$

7. PROCEDURE FOR APPROVED SOURCE OF PRECAST CONCRETE LAGGING

7.1. Precast concrete Fabricators may be classified as an Approved Source of precast concrete lagging if they have met the requirements of Section 3 and are producing lagging which is made in accordance with the relevant WVDOH Standard Details. Once classified as an Approved Source of precast concrete lagging, an Approved Source Lab Number will be assigned to the Fabricator for material tracking.

7.2. MCS&T Division may perform regular quality assurance inspections prior to shipment and/or, monitor fabrication of lagging from a Fabricator that is an Approved Source. The Approved Source Lab Number shall be noted on all shipping documents from the fabricator, and material coverage will be requested under the assigned Approved Source Lab Number. All relevant concrete test data, component material information, QC inspection data, and shipping information shall be kept on file at the Fabricator for the last three years of fabrication and shall be available upon request by the Division.

Failure to produce requested documentation may result in revocation of the Fabricator's Approved Source certification status.

7.3. Approved Sources will be evaluated by the Division by random audits. Audits will be conducted on the material that is available to the Inspector at the time of the audit. All documentation and records for the pieces must be made available to the Inspector on the day of the audit and must be complete, current, and accurate. Failure to produce records shall be a cause for decertification.

7.3.1. All shipping documentation, concrete test data, and component material certifications shall be made available to the Inspector for review. These documents shall include all documents from material that has been shipped to state projects since the last audit. If data indicates that any material did not conform to this MP, the applicable Specifications, or Standard Detail; and was used in a state project, then the Fabricator will be de-certified as an Approved Source of precast concrete lagging.

7.3.2. In addition to documentation, the audit will consist of fabrication monitoring, test observance, and a visual inspection of material that is stocked for shipping on the day of the audit.

7.3.2.1. Each material test monitored during the audit must be performed in accordance with the applicable Standards and Specifications. Visual inspection of stocked material will include quality checks of surface finish for cracks, spalls, and other surface blemishes after all repairs have been performed and dimensional checks. The material shall be properly stored to avoid handling damage and be accessible to the Inspector. Audits shall be graded on a point system deducted from 100 and weighted based on the Non-Conformance Points found per Table 7.3. A minimum score of 75 shall be considered passing.

TABLE 7.3

Audit Category	**Non-Conformance Points**
Material Test Data Review	10 (per error)
Component Material Certification Review	10 (per error)
Shipping Documentation	10 (per error)
Stocked Material Visual Inspection	15 (per defect)
Dimension Check	20 (per error)
Test Performance Check	15 (per Test)

7.4. When a Fabricator, which is an Approved Source, fails an audit, the Fabricator must submit a written corrective action plan to bring their QC program back into compliance with this MP and corresponding Specifications during a probationary period of one month during which time the fabricator must prove they have fulfilled the corrective actions they submitted before supplying the material again. If the Fabricator fails to bring their material back into compliance within the probationary period, the Approved Source status will be revoked for a minimum of one year from the date of the end of the probationary period, or until the Fabricator has corrected the nonconformances listed during the failed audit. Two failing audits in a year shall result in revocation of the Fabricator's Approved Source status for one year from the date of the last failed audit. Any evidence of document falsification shall result in immediate loss of

Approved Source status, and removal from the Approved List of Concrete Fabricators for a minimum 2 years. Depending on the severity and the legality of the falsified documents the removal may be permanent.

7.5. Non-Conforming material received by WVDOH projects and reported to MCS&T shall result in an immediate failing audit and will require the Fabricator to submit corrective actions. If the Fabricator fails the subsequent audit, it will result in the loss of their Approved Source status.

Michael A. Mance, P.E.
Director
Materials Control, Soils and Testing Division

MP 604.02.40 Steward – Cement and Concrete Section
MM:T
ATTACHMENT

PRECAST CONCRETE PRODUCTS
WVDOT DIVISION OF HIGHWAYS MCS&T DIVISION

SAMPLE FABRICATION CHECKLIST

Preliminary Verifications

NPCA (National Precast Concrete Association) Certification _____

CONCRETE COMPONENTS

Mix Design Lab # (if applicable): _____

Cement Source: _____ **Fly Ash Source:** _____

Coarse Aggregate Source 1: _____ **Coarse Aggregate Source 2:** _____

Cement Type: _____ **Approved/Tested:** _____

Fly Ash Type: _____ **Approved/Tested:** _____

Coarse Aggregate 1: _____ **Approved/Tested:** _____

Coarse Aggregate 2: _____ **Approved/Tested:** _____

Fine Aggregate 1: _____ **Approved/Tested:** _____

Fine Aggregate 2: _____ **Approved/Tested:** _____

Batch Water Source: _____ **Approved/Tested:** _____

Admixtures: _____

STEEL COMPONENTS

Reinforcement: Supplier(s): _____

Description: _____ **Lab Number:** _____

Description: _____ **Lab Number:** _____

Description: _____ **Lab Number:** _____

Inserts: Supplier(s): _____

Description: _____ **Lab Number:** _____

_____

_____

SHIPLOOSE MATERIAL

Grates: Fabricator: _____

Mill Certs.: _____ **Galvanize Cert.:** _____ **Lab Number:** _____

Mastic: Fabricator: _____

Inspected at: _____ **Lab Number:** _____

SHOP DRAWING REVIEW

Approval Date: _____ **Approved By:** _____

PRECAST CONCRETE PRODUCTS
WVDOT DIVISION OF HIGHWAYS MCS&T DIVISION
SAMPLE FABRICATION CHECKLIST

Preliminary Verifications

POST POUR WORK

Repairs: **Approved Repair Procedures: ____**

Approved by: _____ **Approval Date: _____**

Repair Witnessed: _____

Comments: _____

Sample Form Inspection (Pre-Placement of Concrete)

Product Type (s)				
Criteria	**Design Dimension**	**Tolerance (±)**	**Actual Measurement**	**Within Tolerance**
Fill in Form Information (if applicable)				
Height of Product (ft-inch)				
Depth of form (ft-inch)				
Inside Width of form (inch)				
Outside Width of form (inch)				
Inside Length of form (inch)				
Outside Length of form (inch)				
Wall Thickness (inch)				
Forms Square and Level (√)				
Skew dimensions [if applicable (ft-inch)]				
Locations of inserts, sleeves, block outs, etc. (√)				

Product Type(s)		**Form Properly sealed at joints & edges (√)**	
Framework Constructed of metal on concrete foundation (√)		**Form Clean & Free of debris (√)**	
Form dimensionally correct (√)		**Release Agent applied (√)**	
Other Information:			

Reinforcing Steel	
Reinforcing Steel (Condition)	
Fill in steel information (if applicable)	
Size & Grade	
Location & Lapping Length (√)	
Spacing and Clearances (√)	
Chairs, Spacers properly used	

Sample Concrete Placement & Curing

Quality Control Concrete Testing			
Concrete Truck Arrival Time		**Concrete Truck Departure Time**	
Concrete Temp		**Ambient Temp, Weather Conditions**	
Slump/Spread (inch)		**Air Content (%)**	
QC Tests performed per Specifications & Passing		**Number & diameter (inch) of Cylinders**	
Comments:			

Placement of Concrete			
Lift	**Start Time**	**Completion Time**	**Vibrated (External/Internal/Both)**
1st			
2nd			
3rd			
4th			
Placement of Concrete Completion Time			
Comments:			

Curing/Finishing of Concrete	
Top Surface Finished Per Specification	
Lifting loops/inserts accessible	
Product Curing Location (Inside/Outside)	
Product Covered & Heat Applied (Time Start & Time Finished)	
Heat Sensors Installed (√)	
Compressive Strength Cylinders Stored with Product under Curing/Normal Environment (√)	
Compressive Strength Test Conducted when curing was discontinued (√)	
Comments:	

Sample Concrete Post Pour Product Inspection

Product	
Visual Inspection for Damage (√)	
Notes (Size & Location of cracks, spalls, honeycomb, etc.)	
Products in Need of Repair (√)	
Repair Method Approved (√)	
Comments:	

Product Type (s)				
Criteria	**Design Dimension**	**Tolerance (±)**	**Actual Measurement**	**Within Tolerance**
Fill in Form Information (if applicable)				
Height of Product (ft-inch)				
Inside Width of product (inch)				
Outside Width of product (inch)				
Inside Length of product (inch)				
Outside Length of product (inch)				
Wall Thickness (inch)				
Product Square and Level (√)				
Skew dimensions [if applicable (ft-inch)]				
Locations of inserts, sleeves, block outs, etc. (√)				

Product	
Dimensional Tolerances Met? (yes or no)	
Heights (yes or no)	
Widths (yes or no)	
Depths (yes or no)	
Wall Thickness(es) (yes or no)	
Inserts, sleeves, lifting points, etc. (yes or no)	
All Concrete Finishes per specification (yes or no)	
Product properly transported (yes or no)	

Product stored on proper dunnage (yes or no)	
Design Shipping Strength met (yes or no)	
Repairs Satisfactory (yes or no)	
Product Stamped for Final Inspection (yes or no)	
Comments:	

Sample Inspection Sheet

Inspection Date_____ QC Personnel_____ QC Signature_____

Fabricator_____ Location_____

Project Name_____ WV State Project #_____ Federal Project #_____

Authorization # _____ Inspection done by_____

Steel Reinforcement

Reinforcement Supplier _____

Description_____ Approved Lab #_____

Description_____ Approved Lab #_____

Description_____ Approved Lab #_____

Product Description	Quantity	Date Cast	Slump/ Spread (inch)	Air Content (%)	Design Strength (psi)	Cylinder Breaks (psi)	Date Of Break	Absorption (%)
Type "D" inlet								
Type "G" inlet								
36-inch Manhole (base, riser, top)								
48-inch Manhole (base, riser, top)								
10'0"x 12'0" Box Culvert								NA
Lagging 8"x24"x54"								NA
Type A Reinforced Panel								NA
6'0" Coping								NA
24-inch Wing wall								

Please review Page 14, Section 8.3.5 and Section 8.4

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

MIX DESIGN FOR PORTLAND CEMENT CONCRETE

1. PURPOSE

1.1 To establish a procedure for testing the physical properties of a proposed mix design.

1.2 To establish criteria for evaluating the test data to arrive at acceptable batch proportions for an approved mix design.

2. SCOPE

2.1 This procedure shall apply to the design of all portland cement concrete which is required by the specifications to be batched in accordance with an approved mix design. This procedure shall also apply to the design of self-consolidating concrete (SCC) specified in Section 603, but not to normal (non-SCC) concrete specified in Section 603.

3. REFERENCED DOCUMENTS

3.1 AASHTO Standards:

1. M 201, Standard Specification for Mixing Rooms, Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes
2. R 18, Standard Practice for Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories
3. R 39, Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
4. R 76, Standard Practice for Reducing Samples of Aggregate to Testing Size
5. T 11, Standard Method of Test for Materials Finer Than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
6. T 19, Standard Method of Test for Bulk Density (Unit Weight) and Voids in Aggregate
7. T 22, Standard Method of Test for Compressive Strength of Cylindrical Concrete Specimens
8. T 27, Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates
9. T 84, Standard Method of Test for Specific Gravity and Absorption of Fine Aggregate
10. T 85, Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate
11. T 119, Standard Method of Test for Slump of Hydraulic Cement Concrete
12. T 121, Standard Method of Test for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete

Please review Page 14, Section 8.3.5 and Section 8.4

13. T 152, Standard Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method
14. T 196, Standard Method of Test for Air Content of Freshly Mixed Concrete by the Volumetric Method
15. T 197, Standard Method of Test for Time of Setting of Concrete Mixtures by Penetration Resistance16. T 231, Standard Practice for Capping Cylindrical Concrete Specimens
16. T 358 Surface Resistivity Indication of Concrete's Ability to Resist Chloride Ion Penetration T309, Standard Method of Test for Temperature of Freshly Mixed Portland Cement Concrete
17. T395 Standard Method of Test for Characterization of the Air-Void System of Freshly Mixed Concrete by the Sequential Pressure Method

3.2 ASTM Standards:

1. C 1231, Standard Practice for Use of Unbonded Caps in Determination of Compressive Strength of Hardened Cylindrical Concrete Specimens
2. C 1567 Standard Test Method for Determining the Potential Alkali Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)

3.3 WVDOH Materials Procedures[1]:

1. MP 700.00.06, Aggregate Sampling Procedures
2. MP 603.06.20, Test Method for the Determination of Bond Strength Between Prestressing Steel Strand and Self-Consolidating Concrete (SCC)

3.4 WVDOH Forms:

1. WVDOH Form T 301E, A-Bar Calculation Worksheet
2. Optimized Aggregate Gradation (OAG) Worksheet
3. Excel Spreadsheet for 711.03.23

4. TEST PROCEDURE

4.1 With the exception of SCC produced in accordance with Section 603, mix designs shall be performed in accordance with the applicable requirements of AASHTO R39 (ASTM C 192) by a Division Approved Laboratory. To obtain Division approval, a laboratory must be accredited by the AASHTO Accreditation Program for AASHTO R18 for the following Standards: AASHTO M201 (ASTM C511), AASHTO R39 (ASTM C192), AASHTO T22 (ASTM C39), AASHTO T119 (ASTM C143), AASHTO T121 (ASTM C138), AASHTO T152 (ASTM C231), AASHTO T196 (ASTM C173), AASHTO T197 (ASTM C403), AASHTO T231 (ASTM C617) or ASTM C1231, , AASHTO T309 (ASTM C1064), AASHTO T11 (ASTM C117), AASHTO T19 (ASTM C29), AASHTO T27 (ASTM C136), AASHTO T84 (ASTM C128), AASHTO T85 (ASTM C127), AASHTO R76 (ASTM C702), AASHTO T 358. In addition, all personal performing the SAM test must be certified by the

[1] https://transportation.wv.gov/highways/mcst/Pages/WVDOH-Materials-Procedures.aspx

Please review Page 14, Section 8.3.5 and Section 8.4

Division to run AASHTO T395. A listing of these laboratories, that are approved to develop concrete mix designs for the Division, is available on the WVDOH, MCS&T Web Page[2]. Requests to be placed on that list of Division Approved Concrete Mix Design Labs shall be sent to the following e-mail address: DOHMCSnTconcretelab@wv.gov. To be placed on that list, all Division Approved Laboratories shall agree to allow the WVDOH, CCRL, and AASHTO re:source to freely share information about assessment reports, proficiency samples, corrective actions, quality management system, and personnel competency and certification records.

4.2 The following information for each of the materials listed below that are to be used in the proposed mix design shall be listed in Attachments 1 and 6-ASR. For mix designs which meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1, the following information for each of the materials listed below that are to be used in the proposed mix design shall be listed in Attachments 1 OAG and 6-ASR OAG. The Ā requirements will not apply for those mix designs which meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1. Attachments 1 S-P and 6-ASR shall be used for SCC produced in accordance with Section 603.

4.2.1 Mix Design Component Materials

Cement:	Type, Materials Code, SiteManager Materials Code, Source and Location, Source Code, Producer/Supplier Code, Specific Gravity, Alkali Content
Supplementary Cementitious Material (SCM):	Type, Materials Code, SiteManager Materials Code, Source and Location, Source Code, Producer/Supplier Code, Specific Gravity, Alkali Content
Chemical Admixtures:	Type, Materials Code, SiteManager Materials Code, Source and Location, Source Code, Producer/Supplier Code
Coarse Aggregate:	Type, Materials Code, SiteManager Materials Code, Size, Source and Location, Source Code, Producer/Supplier Code, Specific Gravity, Absorption, A-Bar, Unit Weight, ASR Aggregate Reactivity Class
Fine Aggregate:	Type, Materials Code, SiteManager Materials Code, Source and Location, Source Code, Producer/Supplier Code, Specific Gravity, Absorption, A-Bar, Fineness Modulus, ASR Aggregate Reactivity Class

The mass and volume of each material that is to be used in each batch shall be listed in Attachment 2. Attachment 2 OAG shall be used for those mix designs which meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1. Attachment 2 S-P shall be used for SCC produced in accordance with Section 603.

[2] https://transportation.wv.gov/highways/mcst/Pages/APL_By_Number.aspx.

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4.2.2 The aggregate correction factor, as defined in AASHTO T 152, shall be listed in Attachment 3. Attachment 3 OAG shall be used for those mix designs which meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1. Attachment 3 S-P shall be used for SCC produced in accordance with Section 603.

4.2.3 The completed WVDOH form T301E, A-Bar calculation worksheet, used to establish the target A-Bar, shall be included in the mix design submittal package. An A-Bar calculation worksheet is not required to be included with the mix design submittal package for SCC produced in accordance with Section 603 and those mix designs which meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1. The completed optimized aggregate gradation (OAG) worksheet shall be included in the mix design submittal package.

4.2.4 Information (i.e. raw data) pertaining to the compressive strength test results of each cylinder shall be included in the mix design submittal package. This raw data shall include the specimen test age, date tested, cylinder ID, average cylinder diameter, maximum load applied to the cylinder, type of fracture, and compressive strength of the cylinder.

4.3 All classes of the concrete (except Class H, concrete for specialized overlays, and SCC produced in accordance with Section 603) for the proposed mix design shall be batched in at least five separate batches. Two of the batches shall be proportioned to produce a mix having a minimum cement factor. Two of the batches shall be proportioned to produce a mix having a minimum cement factor equal to the specified minimum cement factor plus one bag of cement [94 lb. (42.6 kg)]. These batches at the minimum cement factor plus one bag of cement shall be proportioned at a different water-cement ratio (w/c) that the batches at the minimum cement factor. A fifth batch shall also be proportioned to produce a mix at the minimum cement factor, but this batch shall be proportioned at a different water-cement ratio than the previous four batches. The slump tolerance in Section 4.4 shall not apply to this fifth batch. All batches described above shall maintain the same replacement percentage of SCMs including plus one bag.

4.3.1 The Sequential Air Meter (SAM) test shall be performed for each trial batch of any mix design used on bridge decks. The average SAM number shall be recorded on Attachment 3 and must be less than or equal to 0.20 psi for establishment of the mixture proportions in accordance with AASHTO T 395 for mix design approval.

Class H concrete, concrete for Specialized Overlays, as set forth in Section 679 of the specifications, and SCC produced in accordance with Section 603 for the proposed mix design shall be batched in at least two separate batches.

The batches for Class H concrete shall be produced at the cement factor for Class H concrete that is required in the specifications. The surface resistivity tests shall be performed accordance with AASHTO T 358, specified in Section 601.3 shall be performed, at the same test age, on each of these batches, and the same method of curing shall be used for all the test specimens.

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The batches for specialized concrete overlays shall be produced at or above the minimum cement factor specified in Section 679.2.2.1 or 679.2.2.2. The surface resistivity test shall be performed, at the same test age, on each of these batches, and the same method of curing shall be used for all the test specimens.

The information (i.e. raw data), from which each surface resistivity test result was derived, shall also be included in the mix design submittal package.

The batches for SCC for prestressed concrete members shall be produced as outlined in Section 603.6.2.1 and at the cement factor required in Section 603.6.3.1.

4.4 Each batch of concrete shall be tested in the plastic state for air, consistency and yield. Each batch shall be adjusted as necessary to produce a plastic concrete having an air content, consistency, and yield equal to the specified value plus or minus a reasonable laboratory working tolerance. The following tolerances shall be used as a guide for all classes of concrete except SCC produced in accordance with Section 603: Air Content, ± ½ percent; Consistency, ± ½ in. (± 12 mm) of slump; Yield, ± 2 percent.

4.4.1 For SCC produced in accordance with Section 603, testing shall begin at the time immediately after the mixing sequence is completed. This time shall be designated as T_0. Temperature, air content, consistency, T_{50}, VSI, passing ability, rapid assessment of static segregation resistance, segregation resistance, unit weight, and yield tests shall be conducted on these batches and shall be within the tolerances set forth in Table 603.6.2.1A.

Air Content, consistency, and passing ability tests shall be conducted every thirty minutes until either the air content falls below the target value by more than 1.5%, the slump flow falls below the target spread by more than 2.0 inches (50 mm), or the J-Ring value falls below the target value by more than 1.5 inches (38 mm). For each time of testing, these values shall be plotted versus time after batching. Linear interpolation shall be used to determine the exact time when either the air content falls below the target value by more than 1.5%, the slump flow falls below the target spread by more than 2.0 inches (50 mm), or the J-Ring value falls below the target value by more than 1.5 inches (38 mm). The elapsed time, after T_0, when this occurs shall be noted as the "Workable Period" and shall be recorded in Attachment 2 S-P. This workable period shall be used as the time frame in which the entire member shall be construction, reference Section 603.6.7.

4.5 When the properties of a concrete batch have been established within acceptable limits, seven 4 by 8 in. (100 by 200 mm) cylinders shall be made from each batch produced in Section 4.3 (or 4.3.1) and tested in compression at the following ages: one cylinder at age 24 hours ± 2 hours (the exact age to the nearest hour at time of test shall be noted on the report); one cylinder at age 3 days; one cylinder at age 7 days; one cylinder at age 14 days; and three cylinders at age 28 days. The values of the physical properties of each mix produced in Section 4.3 (or 4.3.1) shall be the average of the physical properties established in the first two mixes produced at the minimum cement factor, the average of the physical properties established in the two mixes produced at the

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minimum cement factor plus one bag of cement, and the physical properties of the fifth batch at the minimum cement factor and different water-cement ratio. These values shall be listed in Attachment 3. 4 by 8 in. (100 by 200 mm) cylinders shall be permitted for SCC produced in accordance with Section 603. The results of these tests shall be listed in Attachment 3 S-P.

4.5.1 The following properties of each batch of concrete produced in Sections 4.3 (or 4.3.1) shall be listed in Attachment 2: A-bar of total solids, consistency, air content, unit weight and yield, water-cement ratio, and temperature. The following properties of each batch of concrete produced in Sections 4.3 (or 4.3.1) shall be listed in Attachment 2 OAG, for those mix designs which meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1: optimized aggregate gradation (OAG) worksheet, consistency, air content, unit weight and yield, water-cement ratio, and temperature.

4.5.2 For SCC produced in accordance with Section 603, from one of the SCC trial batches required in 603.6.2.1, six more cylinders shall be fabricated for modulus of elasticity testing, eight more cylinders shall be fabricated for creep testing, three specimens shall be fabricated for length change testing, three specimens shall be fabricated for surface resistivity testing , and three specimens shall be fabricated for freeze-thaw resistance testing. Casting of all Class S-P specimens to be used for hardened concrete property testing shall be done in one lift without rodding or vibration. Curing and testing parameters for these specimens are noted in Section 603.6.2.1. These results of these tests shall be listed in Attachment 2 S-P.

Also, from one of the SCC trial batches required in 603.6.2.1, a prestressing strand bond strength test, in accordance with MP 603.06.20, shall be conducted, and the result shall be recorded in Attachment 3 S-P.

4.6 Mix design submittal packages including Attachments 1, 2, 3 and 6-ASR, A-bar worksheet(s), and raw data pertaining to the compressive strength and surface resistivity tests shall be submitted to the WVDOH District Materials Section in which the Source (i.e. Concrete Batch Plant) is located. Mix design submittal packages, for those mix designs which meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1 including Attachments 1 OAG, 2 OAG, 3 OAG and 6-ASR OAG, optimized aggregate gradation worksheet, and raw data pertaining to the compressive strength and surface resistivity tests shall be submitted to the WVDOH District Materials Section in which the Source (i.e. Concrete Batch Plant) is located. These submittal packages may be submitted to the District electronically, and MCS&T Division may be copied on the electronic submittal also, as this may expedite the process. All mix concrete mix designs, except SCC mix designs, that are sent to MCS&T Division shall be submitted electronically to the following e-mail address: DOHConcreteMixDesign@wv.gov.

SCC mix designs, produced in accordance with Section 603, shall be submitted directly to MCS&T Division and shall include Attachments 1 S-P, 2 S-P, 3 S-P and 6-ASR.

4.6.1 In the case of mix design submittals for a single mix design which is used at multiple concrete plants, one submittal package (for the same design) may be used for multiple

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concrete plants. All the concrete plants at which the mix design is being used shall be noted on Attachment 1, and each WVDOH Materials Section in which the concrete plants are located shall be included on the submittal. Attachment 1 OAG shall be used in leu of Attachment 1, for those mix designs which meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1. This submittal will be reviewed by MCS&T Division, and if the mix design is approved, a separate lab number will be assigned to the mix design for each location at which it is approved.

5. ACCEPTANCE CRITERIA

5.1 If the standard deviation of the concrete plant production has been established, the mix design must have an average laboratory compressive strength, based on the 4 by 8 in. (100 by 200 mm) cylinder results equal to or greater than the "Design 28-Day Compressive Strength" required by the specifications plus two times the standard deviation. Data used to establish the standard deviation shall be taken from the Division's data bank and shall consist of at least 30 individual test results obtained from recent plant production of concrete with proportions similar to the design mix. Information relative to the statistics for a particular plant will be furnished to the Contractor upon request.

5.2 If the standard deviation of the concrete plant production has not been established, or in the case of mobile mixer units, the mix design must have an average laboratory compressive strength equal to or greater than the "Design 28-Day Compressive Strength" plus 1,300 psi (9 MPa). The Division shall note the Plant Compressive Strength Standard Deviation, at the time of the mix design approval, in Attachment 3.

5.2.1 Note that the "Design 28-Day Compressive Strength" required by the Specifications is the minimum field strength sought in 4 by 8 in. (100 by 200 mm) cylinders representing the concrete being placed in the field and should not be confused with the laboratory compressive strengths required for design. The compressive strength, required in Section 5.1 or 5.2 for mix design approval, shall be noted as the “Mix Design Approval Strength”.

5.3 SCC mix designs, produced in accordance with Section 603, shall meet the mix design requirements as set forth in this MP and not the ACI mix requirements as specified in Section 603.6.2, except for the compressive strength “overdesign” requirements. SCC mix designs, produced in accordance with Section 603, shall meet the compressive strength “overdesign” requirements of ACI 301 Chapter 4.

6. PROPORTIONING DESIGN MIX

6.1 If the average of the batches produced in Section 4.3 (or 4.3.1), with the specified minimum cement factor, satisfies the acceptance criteria of Section 5, then it will be considered acceptable as the mix design for the class of concrete being designed.

6.2 If the average of the batches produced in Section 4.3 with the specified minimum cement factor does not satisfy the acceptance criteria of Section 5, then a linear compressive strength-cement factor relationship will be established using the average

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28-day compressive strength, based on the 4 by 8 in. (100 by 200 mm) cylinder results, of the batches with the minimum cement factor and the average 28-day compressive strength of the batches with the minimum cement factor plus one bag of cement. This relationship will be interpolated to determine a cement factor [to the nearest 1 lb. (0.45 kg)] which would cause the acceptance criteria to be satisfied. This interpolated cement factor will be considered acceptable for proportioning the mix design for the class of concrete being designed.

6.2.1 If neither of the averages of the batches produced in Section 4.3 satisfies the acceptance criteria of Section 5, then that proposed mix design cannot be considered as acceptable, and a new mix design will be required.

6.2.2 Section 6.2 does not apply to Class H concrete, specialized overlay concrete, and SCC produced in accordance with Section 603. Therefore, if the average compressive strength of the Class H, specialized overlay concrete batches, or SCC produced in accordance with Section 603, in Section 4.3.1 does not satisfy the acceptance criteria of Section 4, then that proposed mix design cannot be considered as acceptable, and a new mix design will be required.

6.3 The submittal for a proposed mix design shall include completed copies of Attachments 1 and 3. It shall also include a completed copy of Attachment 2 for each of the batches at the minimum cement factor. It shall also include a completed copy of Attachment 2 for each of the batches at the minimum cement factor plus one bag of cement, and a completed copy of Attachment 2 for the batch at the minimum cement factor with a different water-cement ratio(i.e. fifth batch), when applicable. Attachments 1 OAG, 2 OAG, and 3 OAG shall be used in leu of Attachments 1, 2, and 3 respectively, for those mix designs which meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1. All pertinent information supporting these attachments and pertaining to the information in them shall be submitted also. Upon approval of the subject mix design, the Division shall include a copy of Attachment 4 or 5 in ProjectWise, along with the approved mix design.

SCC mix design submittals, produced in accordance with Section 603, shall include completed copies of Attachments 1 S-P and 3 S-P. They shall also include a completed copy of Attachment 2 S-P for both batches produced in the mix design. All pertinent information supporting these attachments and pertaining to the information in them, including the test results pertaining to the workable period as outlined in Section 4.4.1, shall be submitted also.

6.4 Although the Contractor has satisfied all requirements for concrete design and a mix design has been approved by the Engineer, the Contractor may still be required to adjust the approved mix design in the field as necessary to maintain all properties within the limits of the specification. These field adjustments shall include increasing the cement factor above the value specified in the approved mix design if such an adjustment would be necessary to cause the strength of the field placed concrete to conform to the requirements of the specification. These field adjustments shall also include the addition of water in the field for slump adjustment. The procedure for determining the

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maximum amount of water, which may be added to an approved concrete mix in the field, is outlined in the following sections.

6.4.1 Using the three different water-cement ratios from the batches produced in Section 4.3 and the corresponding 28-day compressive strengths from Section 4.5, the Excel file in Attachment 4 of this MP shall be used to create a best-fit line through these three points.

6.4.2 The water-cement ratio that corresponds to the Mix Design Approval Strength, as outlined in Section 5.1 or 5.2, shall be determined from the Excel file in Attachment 4 of this MP. The maximum water that is allowed to be added to an approved concrete mix in the field, shall be the amount of water, which corresponds to that water-cement ratio (i.e. the water-cement ratio that corresponds to the Mix Design Approval Strength). This maximum water amount shall be shown in Attachment 4. However, under no circumstance, shall the total amount of water in a mix, including field additions, exceed the amount of water corresponding to the maximum water content noted in Table 601.3.1A (i.e. under no circumstances shall the water-cement ratio in Table 601.3.1A be exceeded).

6.4.3 For existing approved mix designs, for which there are only two different water-cement ratios, Attachment 5 shall be used to determine the maximum water, that is allowed to be added to that approved concrete mix in the field. Attachment 4 shall be used to determine the maximum water, that can be added in the field, for all other mixes.

6.4.4 For Class H mixes and concrete mixes for specialized overlays, as set forth in Section 679 of the specifications, no additional water beyond what was used in the approved mix designs shall be added in the field.

7. MIX DESIGN RE-APPROVAL

7.1 Each mix design shall remain approved for a period of three years from the date of approval, after which the mix design may be re-approved for an additional three years based on re-qualification tests outlined in Section 7.2 and conducted at the Concrete Producer or a Division Approved Laboratory, meeting the requirements of Section 4.1. If a mix design is used often enough (at least fifteen air content, slump, and compressive strength tests for the previous three-year period), the re-qualification tests shall not be required, and the mix design may be re-approved based on the actual field tests performed during the previous three-year period.

Re-approval of SCC mix designs, produced in accordance with Section 603, shall be re-approved as outlined in Section 603.6.2.

The mix design shall meet the ASR requirements in Section 601.3.1.1 according to the most recent aggregate reactivity, alkali content of cement and SCM, and CaO content of fly ash from the Division Approved Products Lists APLs. A mix design using an SCM replacement level below that required in Table 601.3.1.1.1.4.2b of the Specifications may evaluate the effectiveness of SCM to prevent deleterious expansion as described in Section 601.3.1.1.1.6 to meet the ASR requirements.

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7.1.1 When a Concrete Producer desires to have a mix design re-approved, he shall submit a written request to the WVDOH District Materials Section in which that plant is located noting such and including the current mix design lab numbers to be evaluated. The WVDOH District Materials personnel shall verify if there are a minimum of fifteen air content, slump, and compressive strength tests for that mix design in the previous three-year period.

7.1.2 If there are at least fifteen air content, slump, and compressive strength tests for that mix design in the previous three-year period, then the WVDOH District Materials personnel shall notify MCS&T Division that the subject mix design may be re-approved based on the criteria in Section 7.1. MCS&T Division shall then update the approval date of the subject mix design.

7.1.3 If there are not at least fifteen air content, slump, and compressive strength tests for that mix design in the previous three-year period, then the WVDOH District Materials personnel shall notify the Concrete Producer that the subject mix design must be re-approved as outlined in Section 7.2.

7.2 The following procedures shall be used to re-approve concrete mix designs that do not meet the criteria in Section 7.1.

7.2.1 The Concrete Producer shall provide a statement to the Engineer verifying that all sources of materials used in the approved mix designs are unchanged and the same as used in the original approved mix design. All materials shall meet the applicable sections of the specifications. The original mix design shall meet the ASR requirements in Section 601.3.1.1 according to most recent aggregate reactivity, alkali content of cement and SCM, and CaO of fly ash from the Division APLs.

7.2.2 Coarse and fine aggregate samples shall be obtained at the Concrete Producer's facility in accordance with MP 700.00.06, and the following tests shall be conducted on those aggregate samples by a WVDOH certified Aggregate Inspector: specific gravity (both coarse and fine aggregate), combined A-bar of total solids, absorption (both coarse and fine aggregate), fineness modulus (fine aggregate), and unit weight (coarse aggregate). The results of these tests shall be used by a WVDOH certified PCC Technician at the Concrete Producer or a Division Approved Laboratory, to establish a new target A-bar for the mix design and, if necessary, to adjust any batch volumes. Combined aggregate gradation shall be conducted in leu of combined A-bar of total solids for those mix designs with the optimized aggregate gradation. The working range on each sieve from cumulative combined percent retained from aggregate gradation shall be in accordance with Table 601.3.2.4.1B from Section 601.3.2.4.1.

7.2.3 The Concrete Producer shall then, at the Producer's facility and in the presence of WVDOH District Materials personnel, produce a representative batch (acceptable to both the Producer and the WVDOH personnel) in accordance with Sections 601.6 and 601.7 of no less than 6 yd^3 (4.6 m^3) of the concrete mix subject for re-approval. This batch shall be tested for air content, slump, unit weight and yield. Also, three 4 by 8 in.(100 by 200 mm) 28-day compressive strength specimens, and if applicable, ~~two~~

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three surface resistivity specimens (each to be tested at an age of ~~90~~ 28 days ~~or earlier~~ and the average result used) shall be fabricated and tested from this batch.

7.2.3.1 In lieu of the batch produced at the Producer's facility, as outlined in Section 6.2.3, a batch may be produced at a Division Approved Laboratory. This batch does not need to be witnessed by WVDOH personnel. The size of this batch shall be the same as the size of the batches produced for new laboratory mix designs. If there are any changes to either the coarse or fine aggregate, certified laboratory personnel may perform the testing and mix adjustments as stated in Section 7.2.2.

7.3 The Concrete Producer or Division Approved Laboratory Personnel shall record the results of all tests required and the proportions used in the batch outlined in Section 7.2 in the applicable sections of Attachments 1, 2, and 3. Attachments 1 OAG, 2 OAG, and 3 OAG shall be used in leu of Attachments 1, 2, and 3 respectively, for those mix designs which meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1. The Concrete Producer or Division Approved Laboratory Personnel shall then submit those attachments, along with the test data required in Section 7.2.2 to the WVDOH District Materials section, who will then forward them to MCS&T Division for evaluation. Based on these results, the existing mix design will either be re-approved (possibly with slight adjustments), or the current mix design will be considered to have expired, and a new mix design will be required. When a mix design is re-approved by MCS&T Division, the laboratory approval number for that mix shall not be changed, but the approval date (the "Date Sampled") shall be revised.

7.3.1 For mix design re-approval purposes, the compressive strength of the representative batch produced at the Producer, as outlined in Section 7.2.3, must meet or exceed the "Design 28-day Compressive Strength" in Section 601.3, but it does not have to meet the "overdesign" acceptance criteria outlined in Section 5.

7.3.1.1 If a laboratory batch is produced in lieu of a batch at the Producer, as outlined in Section 7.2.3.1, then the compressive strength of that batch must have a compressive strength which exceeds the "Design 28-Day Compressive Strength" required by the specifications by the value (f'_{cr}) obtained from the formula below. The criteria used to establish the standard deviation is outlined in Section 5.1.

$$f'_{cr} = f'_c + \sigma$$

Where:
f'_{cr} = Required compressive strength of the batch produced in Section 7.2.3.1 (expressed in psi)
f'_c = Design 28-Day Compressive Strength (expressed in psi)
σ = Concrete Plant Standard Deviation (outlined in Section 5.1)

7.3.2 For mix design re-approval purposes the surface resistivity test results from the representative batch produced in Section 7.2.3 or 7.2.3.1 must be ~~be~~ equal to or greater than 30 kΩ-cm in order for the mix design to be re-approved.

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7.3.3 If a mix design has expired, it may still be used on projects which have started before the mix design expired. However, after its date of expiration, a mix design may not be used on any new projects; a new mix design shall be required for these projects.

8. CHANGING A COMPONENT MATERIAL USED IN A MIX DESIGN

8.1 Whenever more than one component material in an approved mix design is changed simultaneously, a new laboratory mix design, in accordance with Section 4 shall be required. This option is not permitted for SCC mix designs produced in accordance with Section 603.

8.1.1 There are circumstances when one component material in an approved mix design may be changed to another WVDOH approved component material without requiring a new laboratory mix design. Those circumstances, and the subsequent steps which must be taken for that component material change to be approved, are outlined in the following sections.

8.2 The changes, outlined below, to any of the following component materials are permitted provided the requirements in Section 8.3 are met. Only one component material may be changed at a time, otherwise a new laboratory mix design in accordance with Section 4 shall be required. When changing the type and/or source of any one component material, minor adjustments to the quantities of other component materials in the mix design are permitted, to maintain desired mix properties. When changing the type and/or source of any one component material, the mix design shall meet the ASR requirements in Section 601.3.1.1 according to the most recent aggregate reactivity, alkali content of cement and SCM, and CaO of fly ash from the APLs. ASTM C1567 testing in accordance with Section 601.3.1.1.1.6 may be used to evaluate the effectiveness of SCM to prevent deleterious expansion if the SCM minimum replacement requirements of Table 601.3.1.1.1.4.2b are not met.

8.2.1 Cement: The source of cement may be changed provided the requirements of Section 8.3 are met. A change from a Type I cement to a Type IL cement (or from a Type IL cement to a Type I cement) may also be considered a single component material change.

8.2.2 Supplementary Cementitious Material (SCM): The source and/or type of SCM may be changed provided the requirements of Section 8.3 are met.

8.2.3 Chemical Admixture: The source and/or type of any individual admixture (*i.e.*, air entraining, water reducing, or water-reducing and retarding, *etc.*) may be changed provided the requirements of Section 8.3 are met. If more than one admixture is used in a mix design, a change to an individual component material means a change in only one of those admixtures. If more than one admixture is used in a mix design, and a change to one of these admixtures is desired (a change to an individual component material), then the source of the new admixture must still be the same as the source of the rest of the admixtures in the mix (*i.e.*, water-reducing admixture A from Source X may be changed to water-reducing admixture B from Source X.)

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8.2.4 Latex Admixture: The source of latex admixture may be changed provided the requirements of Section 8.3 are met.

8.2.5 Fine Aggregate: The source of fine aggregate may be changed provided the requirements of Section 8.3 are met. However, if the type of fine aggregate changes (*i.e.*, silica sand to limestone sand or natural sand to manufactured sand), a new laboratory mix design in accordance with Section 3 shall be required.

8.2.6 Coarse Aggregate: The source of coarse aggregate may be changed provided the requirements of Section 8.3 are met. However, if the type or size of coarse aggregate changes (*i.e.,* river gravel to limestone or #57 limestone to #67 limestone), a new laboratory mix design in accordance with Section 4 shall be required.

8.3 When a change to any individual component material in an approved mix design, as outlined in Sections 8.1.1 and 8.2, is desired, the Concrete Producer shall, at the Producer's facility and in the presence of WVDOH District Materials personnel, produce two separate representative batches (acceptable to both the Producer and the WVDOH personnel) in accordance with Sections 601.6 and 601.7. Each of these batches shall be no less than 3 yd^3 (2.3 m^3), shall be batched at the target cement factor, and shall consist of the concrete mix with the proposed material change. The proportions for these batches shall be determined by a WVDOH certified PCC Technician.

8.3.1 If there is a change to either the coarse or fine aggregate, then a sample of the new material shall be obtained at the Concrete Producer's facility in accordance with MP 700.00.06, and the following tests shall be conducted by a WVDOH certified Aggregate Inspector on that aggregate sample: specific gravity, solid A-bar of the new material and A-bar of total solids, absorption, fineness modulus (fine aggregate), and unit weight (coarse aggregate). The results of these tests shall be used by a WVDOH certified PCC Technician at the Concrete Producer to establish a new target A-bar for the mix and, if necessary, to adjust any batch volumes. Combined aggregate gradation shall be conducted in leu of solid A-bar of the new material and A-bar of total solids for those mix designs with the optimized aggregate gradation. The results of these tests shall be used by a WVDOH certified PCC Technician at the Concrete Producer to establish a new target Combined % Retained for the mix, if necessary, to adjust any batch volumes.

8.3.2 In lieu of the two batches produced at the Producer's facility, as outlined in Section 8.3, two batches may be produced at a Division Approved Laboratory, meeting the requirements of Section 4.1. These batches do not need to be witnessed by WVDOH personnel. The sizes of these batches shall be the same as the size of the batches produced for new laboratory mix designs, and their proportions shall be determined by certified laboratory personnel. If there are any changes to either the coarse or fine aggregate, certified laboratory personnel may perform the testing and mix adjustments as stated in Section 8.3.1.

8.3.3 All of the information pertaining to the materials used in these batches shall be listed in Attachments 1, 2, 3 and 6-ASR as outlined in Section 4.2. Attachments 1 OAG, 2

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OAG, and 3 OAG shall be used in leu of Attachments 1, 2, and 3 respectively, for those mix designs which meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1.

8.3.4 Both batches of concrete shall be tested in the plastic state for air, consistency, and yield. Each batch shall be adjusted as necessary to produce a plastic concrete having an air content, consistency, and yield equal to the specified value plus or minus the following tolerances: Air content, ± 1 percent; Consistency, ± 1 in. (± 25 mm) of slump; Yield, ± 2 percent.

8.3.4.1 If laboratory batches are produced in lieu of batches at the Producer, as outlined in Section 8.3.2, then the batch tolerances specified in Section 4.4 shall apply.

8.3.5 When the properties of a concrete batch have been established within acceptable limits, 3 - 4 in by 8 in. (100 by 200 mm) cylinders shall be made from each batch produced in Section 8.3 and tested in compression at an age of 7, 14, 21 and 28 days until the requirements of average compressive strength as outlined in Section 8.5 are met. The values of the physical properties of this new mix design (with the component material change) shall be the average of the physical properties established in the two batches produced in Section 8.3. These values shall be listed in the column for the mix with the "Minimum Cement Factor" in Attachment 3. Attachment 3 OAG shall be used in leu of Attachment 3, for those mix designs which meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1.

The following properties of each batch of concrete produced in Section 8.3 shall be listed in Attachment 2: A-bar of total solids, consistency, air content, unit weight and yield, water-cement ratio, and temperature. For those mix designs which meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1, the following properties of each batch of concrete produced in Section 8.3 shall be listed in Attachment 2 OAG: optimized aggregate gradation (OAG) worksheet, consistency, air content, unit weight and yield, water-cement ratio, and temperature.

8.4 When it is desired to change a component material in a mix which requires the surface resistivity test (Class H, K concrete and specialized concrete overlays as outlined in Section 679), specimens shall be fabricated from each of the batches produced in Section 8.3. The specimens may be tested for Surface Resistivity at and ~~d~~ age of 7, 14, 21 or 28 days as long as the requirements of Section 8.5 are met. The average value of these surface resistivity specimens shall be no less than ten percent of the mix designs surface resistivity value, required in the applicable specification, when tested at the time frame specified in the applicable specification.

8.4.1 If laboratory batches are produced in lieu of batches at the Producer, as outlined in Section 8.3.2, then the average value of these surface resistivity specimens shall be less than or equal to the mix design surface resistivity value required in the applicable specification, when tested at the time frame specified in the applicable specification.

8.5 The average compressive strength of the two batches produced at the Producer in Section 8.3 must have an average compressive strength which exceeds the "Design

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28-Day Compressive Strength" required by the specifications by the value (f'_{cr}) obtained from the formula below. The criteria used to establish the standard deviation is outlined in Section 5.1.

$$f'_{cr} = f'_c + 2.33\sigma - 500$$

Where:
f'_{cr} = Required average compressive strength of the batches produced in Section 8.3 (expressed in psi)
f'_c = Design 28-Day Compressive Strength (expressed in psi)
σ = Concrete Plant Standard Deviation (outlined in Section 4.1)

8.5.1 If laboratory batches are produced in lieu of batches at the Producer, as outlined in Section 8.3.2, then the average compressive strength of these batches must have an average compressive strength which exceeds the "Design 28-Day Compressive Strength" required by the specifications by the value (f'_{cr}) obtained from the formula below. The criteria used to establish the standard deviation is outlined in Section 5.1.

$$f'_{cr} = f'_c + 2\sigma$$

8.5.2 If the average compressive strength of the two batches produced in Section 8.3 (f'_{cr}) is less than the "Design 28-Day Compressive Strength" (f'_c) required by the specifications, the new mix (with the component material change) cannot be considered as acceptable, unless the requirements of Section 8.7 are met.

8.6 It is not required, but if the Concrete Producer desires, two additional separate batches may be produced, at the same time that the two batches in Section 8.3 are being produced. These two additional batches shall be acceptable to both the Producer and the WVDOH personnel and shall be produced in accordance with Sections 601.6 and 601.7. Each of these batches shall be no less than 3 yd^3 (2.3 m^3), shall be batched at the target cement factor plus one bag of cement [94 lb. (42.6 kg)], and shall consist of the concrete mix with the proposed material change.

8.6.1 In lieu of the two batches produced at the Producer's facility, as outlined in Section 8.7, two batches at the target cement factor plus one bag of cement [94 lb. (42.6 kg)] may be produced at a Division Approved Laboratory, meeting the requirements of Section 4.1. These batches, produced at a Division Approved Laboratory, do not need to be witnessed by WVDOH personnel. The sizes of these batches shall be the same as the size of the batches produced for new laboratory mix designs, and their proportions shall be determined by certified laboratory personnel.

8.6.2 Production of these two additional batches is not an option for Class H concrete or specialized overlay concrete.

8.6.3 Both batches of concrete shall be tested in the plastic state for air, consistency, and yield. Each batch shall be adjusted as necessary to produce a plastic concrete having an air content, consistency, and yield equal to the specified value plus or minus the

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following tolerances: Air Content, ± 1 percent; Consistency, ± 1 in. (± 25 mm) of slump; Yield, ± 2 percent.

8.6.3.1 If laboratory batches are produced in lieu of batches at the Producer, as outlined in Section 8.7.1, then the batch tolerances specified in Section 4.4 shall apply.

8.6.4 When the properties of a concrete batch have been established within acceptable limits, three 4 by 8 in. (100 by 200 mm) cylinders shall be made from each batch produced in Section 8.7 and tested in compression at an age of 28 days. The values of the physical properties of this new mix design (with the component material change) shall be the average of the physical properties established in the two batches produced in Section 8.7. These values shall be listed in the column for the mix with the "Minimum Cement Factor + 1 Bag" in Attachment 3. Attachment 3 OAG shall be used in leu of Attachment 3, for those mix designs which meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1.

The following properties of each batch of concrete produced in Section 8.7 shall be listed in Attachment 2: A-bar of total solids, consistency, air content, unit weight and yield, water-cement ratio, and temperature. For those mix designs which meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1, the following properties of each batch of concrete produced in Section 8.7 shall be listed in Attachment 2 OAG: optimized aggregate gradation (OAG) worksheet, consistency, air content, unit weight and yield, water-cement ratio, and temperature.

8.6.5 If the average of the batches produced in Section 8.3, with the specified target cement factor, does not satisfy the acceptance criteria set forth in Section 8.6, then a linear compressive strength-cement factor relationship will be established using the average 28-day compressive strength [based on the 4 by 8 in. (100 by 200 mm) cylinder results] of the batches with the target cement factor (Section 8.3) and the average 28-day compressive strength of the batches with the target cement factor plus one bag of cement (Section 8.7). This relationship will be interpolated to determine a cement factor [to the nearest 1 lb. (0.45 kg)] which would cause the acceptance criteria to be satisfied. This interpolated cement factor will be considered acceptable for proportioning the design mix for the class of concrete being designed.

8.6.6 If neither of the averages of the batches produced in Sections 8.3 or 8.7 satisfy the acceptance criteria in Section 8.6, then that proposed component material change cannot be considered as acceptable, and a new laboratory mix design will be required to make a change in component materials.

8.7 The submittal for a proposed mix design change, as outlined in Section 8, shall include completed copies of Attachments 1 and 3. It shall also include a completed copy of Attachment 2 for each of the batches produced in Section 8. Attachments 1 OAG, 2 OAG, and 3 OAG shall be used in leu of Attachments 1, 2, and 3 respectively, for those mix designs which meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1. All pertinent information supporting these attachments and pertaining to the information in them shall be submitted also. The lab numbers of the original mix design shall be included in the submittal. This new mix design shall be submitted to the

Please review Page 14, Section 8.3.5 and Section 8.4

District in the same manner as a normal mix design, and it shall then be forwarded to MCS&T Division for review and approval. If approved, a new lab number will be assigned to this mix design, and it shall, from that point forward be treated as a new mix design.

8.8 No additional component material changes are permitted to this mix design (without a new laboratory mix design) until there are a minimum of 20 consecutive field test results, from this new mix design, which meet or exceed the design compressive strength requirements. Once there are 20 consecutive field test results, from this new mix design, which meet or exceed the design compressive strength requirements, this mix design is eligible for another component material change in accordance with Section 8.

9. REPLACEMENT OF FLY ASH WITH CEMENT OR ANOTHER APPROVED SOURCE OF FLY ASH IN A MIX DESIGN

9.1 When an issue arises with a fly ash source or any other circumstance arises which causes a Concrete Producer to discontinue the use of a source of fly ash in an approved mix design, an equal volume of cement, or an equal volume of fly ash from a different WVDOH approved fly ash source, may be substituted for the fly ash in that mix. This option is not permitted for SCC mix designs produced in accordance with Section 603.

9.1.1 This option of replacing fly ash with cement, or fly ash from a different approved source, does not apply to Class H concrete and concrete for specialized overlays, as set forth in Section 679 of the specifications.

9.2 The Concrete Producer shall notify the WVDOH District Materials personnel that it is desired to replace the fly ash in an approved concrete mix design with an equal volume of cement or fly ash from a different approved source. The WVDOH District Materials personnel may then approve this change on a temporary basis. Field test data, as outlined in the following sections, shall be used to approve this mix design change as a permanent new mix design. The change on a temporary basis and permanent new mix design shall meet the ASR requirements in Section 601.3.1.1 according to the most recent aggregate reactivity, alkali content of cement and SCM, CaO of fly ash from the APLs. Evaluation of the effectiveness of SCM in accordance with 601.3.1.1.1.6 may be used if SCM replacement level does not meet the minimum replacement level described in Table 601.3.1.1.1.4.2b.

9.2.1 When fly ash from a different approved source is being substituted for the existing source of fly ash in an approved mix design, tests to determine the air content of the plastic concrete shall be performed at the Concrete Producer's facility and at the job site, in the presence of WVDOH personnel, on at least the first three batches of concrete produced with this different approved source of fly ash.

9.3 Two batches of concrete, produced with this mix containing either all cement or fly ash from a different approved source shall then be tested in the presence of WVDOH District Materials personnel. Both of these batches of concrete shall be tested in the plastic state for air, consistency, and yield. Each batch shall have an air content,

Please review Page 14, Section 8.3.5 and Section 8.4

consistency, and yield equal to the specified value plus or minus the following tolerances: Air content, ± 1 percent; Consistency, ± 1 in. (± 25 mm) of slump; Yield, ± 2 percent.

9.3.1 Three 4 by 8 in. (100 by 200 mm) cylinders shall be made from each batch outlined in Section 9.3 and tested in compression at an age of 28 days. The values of the physical properties of this new mix design (with the fly ash replacement) shall be the average of the physical properties established in the two batches produced in Section 9.3. These values shall be listed in the column for the mix with the "Minimum Cement Factor" in Attachment 3.

The following properties of each batch of concrete produced in Section 9.3 shall be listed in Attachment 2: A-bar of total solids, consistency, air content, unit weight and & yield, water-cement ratio, and temperature. For those mix designs which meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1, the following properties of each batch of concrete produced in Section 9.3 shall be listed in Attachment 2 OAG: optimized aggregate gradation (OAG) worksheet, consistency, air content, unit weight & yield, water-cement ratio, and temperature.

9.4 The average compressive strength of the two batches produced in Section 9.3 must have an average compressive strength, which exceeds the "Design 28-Day Compressive Strength" required by the specifications.

9.5 The submittal for a mix design change from a mix containing fly ash to a mix using either only cement as the cementitious material or fly ash from a different approved source, as outlined in Section 9, shall include completed copies of Attachments 1, 3 and 6-ASR. It shall also include a completed copy of Attachment 2 for each of the batches produced in Section 9.3. Attachments 1 OAG, 2 OAG, and 3 OAG shall be used in leu of Attachments 1, 2, and 3 respectively, for those mix designs which meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1. All pertinent information supporting these attachments and pertaining to the information in them shall be submitted also. This mix design change submittal shall be submitted to the District in the same manner as a normal mix design, and it shall then be forwarded to MCS&T Division for review and approval. A new lab number will be assigned to this mix design, and it shall, from that point forward be treated as a new mix design, using only cement as the cementitious material, or using fly ash from a different approved source along with the original source of cement as the cementitious materials.

10. ADDITION OF HYDRATION CONTROL STABILIZING ADMIXTURES TO EXISTING MIX DESIGNS

10.1 Approved Hydration Control Stabilizing Admixtures, as specified in Section 707.15, designed to stop the hydration of cement in a concrete mix, enabling an extension to the allowable discharge time from a truck mixer as outlined in Section 601.7 of the Specifications may be added to an existing approved concrete mix design in accordance with the procedures outlined in this Section. This option is not permitted for SCC mix designs produced in accordance with Section 603.

Please review Page 14, Section 8.3.5 and Section 8.4

10.2 Two separate batches of concrete shall be produced as outlined in Section 8.3. These concrete batches shall be tested as outlined in Sections 8.3 and 8.4.

10.2.1 Additional testing, as outlined in the second, third, and fourth paragraphs of Section 707.15.2.1, shall also be performed on one of the batches produced in Section 9.2 to verify that the allowable concrete discharge time may be extended.

10.3 If the requirements set forth in Section 8.6 are met, then the procedures set forth in Sections 8.8 and 8.9 shall be followed, and the existing mix shall be approved for use with the hydration control stabilizing admixture, and a new lab number will be assigned to this mix design.

10.4 No additional changes to the existing mix design are permitted at the time that these concrete batches are being produced for the acceptance of the addition of the hydration control stabilizing admixture to the existing mix design.

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Michael A Mance, PE
Director
Materials Control, Soils & Testing Division

MM:Td
MP 711.03.23 Steward – Cement and Concrete Section
ATTACHMENTS

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

QUALITY ASSURANCE OF LAMINATED ELASTOMERIC BRIDGE BEARING PADS WITH INTERNAL SHIMS

1. PURPOSE

1.1. To set forth the procedures which govern the Quality Assurance testing of laminated ~~(with internal shims)~~ elastomeric bridge bearing pads with internal shims.

1.2. To set forth manufacturer's Quality Control requirements.

1.3. To set for acceptance procedures.

1.4. To set forth documentation and shipping procedures.

2. SCOPE

2.1. This procedure will apply to all manufacturers of laminated elastomeric bridge bearing pads.

2.2. This procedure will establish the basis for acceptance of laminated elastomeric bridge bearing pads.

2.3. This procedure will establish MCS&T Division's acceptance test procedures of laminated elastomeric bridge bearing pads.

2.4. This procedure will establish accepted dimensions of sample size submitted to MCS&T.

3. REFERENCED DOCUMENTS

3.1. All standard types of elastomeric bridge bearing pads with shims are to be manufactured and tested in accordance with Sections 715.14, of the ~~WVDOH~~ Specifications ~~for Roads and Bridges~~.

3.2. Each production lot of laminated elastomeric bearing pads shall be tested and conform to Section 4 of AASHTO M251, ~~section 4~~ and the ~~Specification~~ Sections 106.3, and ~~Specification sub-section~~ 715.14.1 of the Specification

A production "LOT" is defined as follows:

~~It is a~~A laminated bearing pad of the same size and class that is manufactured using the same process and materials during continuous days of production.

For laminated bearing pads, the sampling rate shall be one bearing pad per lot, per nominal dimensional size. (A change in nominal dimensional size is any change in the designed length, width or height of the bearing pad.)

3.2.1. The bearing pad dimension of each bearing pad LOT shall be checked in accordance with ASTM D3767, modified as follows; measure dimensions 100mm [4 in.] or less according to ASTM D3767 Procedure B; measure dimensions greater than 100 mm [4 in.] according to ASTM D3767 Procedure C. If any dimension is outside the limits in Section 6 (ASTM M251M), the bearing pad lot shall be rejected.

3.2.2. The Durometer Hardness Test - (ASTM D2240 Type A) shall be used to determine material hardness in accordance with (ASTM M251M, Section 4.2, Table 1.) which shall be conducted on the individual sample selected from the LOT.

3.2.3. Oven Aging shall be conducted for samples selected as per (ASTM D573) for 70 hrs. at 212°F (100°C).

3.2.4. The minimum tensile strength and minimal ultimate elongation shall be conducted on samples selected as per (ASTM D412, Method A) for both original and oven aged samples.

3.2.5. The compression set test - (ASTM D395, Method B, Type 1) shall be conducted on both original and oven aged samples selected. Tolerance shall be no greater than 35% change in compression between original and oven aged samples.

3.2.6. The low temperature test shall be performed in accordance with (ASTM D3746 Procedure B.)

3.2.7. Each sample shall be tested for adhesion to rigid substrates in accordance with (ASTM D429-14).

3.2.8. Shear Modulus shall be tested in accordance with (ASTM D4014, Annex A1).

3.2.9. Low temperature crystallization shall be tested in accordance with (ASTM D4014, Annex A1).

3.2.10. Instantaneous thermal stiffening shall be tested in accordance with (ASTM D1043).

3.2.11. Oil swell testing shall be tested in accordance with (ASTM D471).

4. QUALITY CONTROL REQUIREMENTS

4.1. Quality Control is the responsibility of the manufacturer and shall include the following:

4.1.1. Ensure all component materials used in fabrication of the bearing pads have been sampled, tested, and approved in accordance with Section 715.14 of ~~WVDOH Standards and SS~~pecifications ~~for Roads and Bridges (Section 715.14,~~ and (ASTM M251).

4.2. Ensure quality workmanship as well as a quality product throughout production.

4.3. Each bearing pad shall be marked in indelible ink or flexible paint. The marking shall consist of order number, lot number, bearing identification number, up station, or face of abutment (tapered plates only) and elastomer type and graded. Unless otherwise specified in the contract documents, the marking shall be on a face that is visible after the bridge is erected.

4.4. Notify the Division's representative upon the completion of casting of a LOT (Refer to Table 1) of bearing pads so MCS&T may select a representative sample and witness the testing.

4.5. To conduct quality control tests in accordance with ~~(~~ASTM M251~~)~~.

5. ACCEPTANCE CRITERIA

~~5.1.~~ MCS&T will ~~:~~

5.1. ~~S~~sample and test the component materials to be used in the manufacturer of laminated elastomeric bearing pads in accordance with Sections 715.14, and 715.15 of ~~WVDOH Standards and~~the Specifications ~~Roads and Bridges Section (715.14, and 715.15)~~ and ASTM M251.

~~5.1.1. Select representative samples of the LOT to be tested and:~~

5.2. A ~~R~~representative sample of the lot shall be cut to dimensional size by the manufacturer as specified~~:~~. ~~R~~representative samples shall be cut to dimensions of no less than 5 inch-length and 2-inch width, but no greater than 7-inch length and 2.5-inch length. A total of (6) individual representative individual samples must be taken from the selected representative sample prior to the shipping process.

a) Witness MCS&T Division test sample selection to be shipped to the Division.
b) Ensure each piece comprising of the LOT is scribed as stated in 4.3

Commented [DB1]: Not sure why this is here? Consider omitting or re-wording.

6. SHIPPING REQUIREMENTS

6.1. The approved LOT of bearing pad sample portion can be shipped by the manufacturer providing the following provisions have been met:

6.1.1. The manufacturer will supply one copy of the shipping invoice to the MCS&T Division and one copy to the Division's representative at the project site. The invoice shall contain the following information.

a) Cast date of the approved LOT.
b) ~~Master laboratory reference number~~Lab number.
c) Size, class, and type of bearing pad.
d) Project number.
e) Project authorization number.
f) Number of pieces.

7. ACCEPTANCE PRACTICE

7.1. MCS&T will ~~Ensure~~ ensure the information on the shipping invoice, as required in ~~section~~ Section 6~~.1.2,~~ agrees with the shipment it accompanies. (Number of pieces, size, type, etc.).

7.2. MCS&T will ~~Check~~ check each sample of pad for the proper identification markings (Section 6~~.1.2~~) and make a visual inspection of each sample to ensure there is no evidence of damage during shipment.

8. DIVISIONAL TESTING PROCEDURE

8.1. When the bearing pad sample and T-100 Form sample identification sheet arrive in laboratory, make sure that the sample matches the T-100 form. The bearing pad should have an identifiable marking on it, such as project number, authorization number and sample number ~~of some type~~.

8.1.1. Once arrived, measurement of the sample must be taken to verify that it meets the dimensions referenced on the T-100 form.

8.1.1.1. The sample measurement must be ~~referenced~~ documented on the T-100 form. The thickness has a tolerance of 1/8 inch (3.175mm) over the specified thickness. The width and length of the bearing pad sample has a tolerance of 1/4 inch (6.35mm) over the specified values, but it may not be any smaller. Sample size should be in accordance with ~~Subsection 5.1.2 (b) of the Material Procedure~~this document.

8.1.1.2. When the paperwork and sample are shown to be in order, the bearing pad is ready to be processed for acceptance testing.

8.2. Sample Cutting- Tensile and Elongation Sets

8.2.1. ~~Specimen~~ The specimen ~~must~~ shall be cut to proper length as per AASHTO ASTM D412 Method A. The ~~Sample~~ sample must be taken from the outside edge of the bearing bad sample on both the top and bottom. The minimum width of the sample must be 1~~"~~ inch, with a minimum of 5- inch length, and the specimen thickness after cutting must be between 0.05- inch and 0.10- inch. Several test specimen strips must be cut from the sample blocks.

8.2.2. Once the specimens have been cut, clean the specimens with water. After cleaning, the specimens must be set in the specified lab condition at least 1 hour at 23 ± 2° C (73.4 ± 3.6° F) and at 50 ± 5% humidity.

8.2.3. After the proper conditioning time has been achieved, the specimens can now be cut on the arbor press with the barbell die ~~(~~as per AASHTO ASTM D412 Method A~~)~~. Do not cut more than one strip at a time. Do not pile the strips on top of each other to prevent cupping and deformation of the sample specimens.

8.2.4. A minimum of 10 total sample specimens must be cut for tensile and elongation testing. It is recommended to cut additional samples to ensure conformity of thickness of all samples selected.

8.2.5. Once cut, the specimens must be conditioned again in lab conditions for 3 hrs. at 23 ± 2° C (73.4 ± 3.6° F) and at 50 ± 5% humidity.

8.3. Thickness Measurements

8.3.1. After the 3-hour conditioning in lab ~~as specified in Subsection 9.2.4~~, the specimens shall be measured via thickness gauge. A total of 3 measurements shall be performed at the narrow section of the barbell specimen. All three readings must be with 0.003 inch of each measurement, or the specimen must be discarded.

8.3.1.1. A minimum of 5 specimens closest to thickness shall be selected for original specimens (O), and a minimum of 5 specimens closest to thickness shall be selected for oven-aged testing (OA).

8.3.2. ~~Write down~~Document the measurements and select the middle reading of the 3 measurements. Record the thickness to be assigned to the specimen. This shall be marked on each individual specimen at one end of the specimen with a silver ink pen.

8.3.3. At the opposite end of the specimen, the specimen should then be labeled O-1 through O-5, for original specimens. Additional specimens must be labeled OA-1 through OA-5 for over-aged specimens. Also label the specimen at this end with the last 2 digits of the sample lab number for identification. Record the thickness of the specimens under the original thickness, and oven aged thickness of the sample worksheet.

8.4. Oven Aging

8.4.1. Oven Aged Specimens (OA) shall be conditioned in the oven at the recommended specifications per AASHTO D412. Natural rubber specimens shall be aged at 70 ±2 °C, and Neoprene samples shall be aged at 100 ±2 °C, for 70 hrs. in accordance with AASHTO ASTM D573.

8.4.2. Oven Aged Specimens (OA) should be suspended above the oven floor from clips, also ensuring that the specimens are not in contact with each other during the oven aging process.

8.4.3. Once the 70-hour oven aging has completed, the samples must then be conditioned in the lab outside of the oven ~~as per Subsection 9.2.5~~ for 3-hours.

8.5. Tensile and Elongation Test

8.5.1. Tensile and Elongation testing shall conform to AASHTO ASTM D412 Method A. All information shall be recorded on the worksheet. A minimum of three consecutive passing tests must be completed. In case of a failing sample, all 5 oven-aged samples must be tested to meet the following test acceptance criteria:

a) Tensile Strength, minimum psi (AASHTO ASTM D412): 2250 psi combined median of all samples
b) Elongation at break, minimum % (AASHTO ASTM D412) 350% combined median of all samples.

8.5.1.1. Once testing has been completed. All information must be recorded.~~.~~

8.6. Compression Set

8.6.1. Compression set testing must conform to ~~(~~AASHTO ASTM D395, Method B-Type 1~~.)~~

8.6.1.1. Specimens for compression testing must be taken from the prepared test specimen strips ~~as laid out in Section 9.2 of this MP~~, with the exception that compression set thickness strip minimal thickness should be a thickness of 0.100 inches.

8.6.2. Specimens should be cut at the arbor press with the circular die ~~(~~as per ASTM D412~~)~~. A minimum of 10 samples should be cut. Do not cut more than one strip at a time. Do not pile the strips on top of each other to prevent cupping and deformation of the sample specimens.

8.6.3. Specimens should then be conditioned ~~as per Section 9.2.5 of this MP~~.

8.6.4. Once the minimum 3-hour conditioning ~~as described in Section 9.2.5~~ is achieved, the samples can now be measured for thickness.

8.6.4.1. Using the thickness gauge, stack each specimen to achieve a total thickness of 0.5 ±0.02 inches. A ~~Total~~ total of seven specimens can be used to achieve the minimum 0.5~~-~~ inch requirement. You may need to rearrange different sample discs to achieve the thickness requirement.

8.6.4.2. A total of two stacks should be created and labeled as Sample A, and Sample B, along with the last 2 digits of the lab number assigned to the sample. This should be marked with a silver pen to differentiate the samples. The original thickness shall be recorded on the worksheet.

8.6.5. Continue to prepare the compression set device.

8.6.5.1. Once sample original sample thickness is recorded, the samples can then be placed in the —compression device. Both spaces must be present with the hole indicator facing, and the spacer thickness (0.375 in) stamp facing upward. Place talc on the bottom and top stack plates. Next, ~~And then s~~secure the samples between the plates. Note: make sure the spacers are properly in place before tightening the plates.

8.6.5.2. ~~-~~Once the samples are secured in the compression device, the sample can now be oven aged.

8.6.5.3. Place the device in the preheated oven. Natural rubber specimens shall be aged at 70 ±2 °C, and Neoprene samples shall be aged at 100 ±2 °C, for 22 hours.

8.6.6. After the 22 hours oven aging, the samples should be ~~immediately~~ promptly removed from the compression device and then placed on a piece of wood for 30 minutes. The room must be within temperature and humidity tolerances 23 ± 2° C (73.4 ± 3.6° F) and at 50 ± 5% humidity.

8.6.7. ~~-~~Once the specimens have cooled, measure the thickness of both stack A, and stack B on the thickness gauge. Record the measurements on the worksheet. Calculate the percentage of compression as follows: The compression set passes if the result is 35% or less of the original compression thickness, if the result is higher 35%, the sample fails the compression set.

(Original Thickness-Final Thickness) / (original thickness-spacer size) x 100

The spacer is 0.375 in.

Calculation for average percent of compression

((Percent of compression of A + Percent of compression of B) /2) x 100

8.7. Durometer Hardness

8.7.1. ~~or the durometer test, unused sample blocks may be used.~~ Measure the thickness of the rubber that is on the outside edge of the metal shim plates. If the rubber is at least 6.0 mm (0.24 inches) thick, then that sample can be used. This sample will be needed for both original and oven aged durometer tests.

8.7.2. The sample must be in the specified lab condition tolerances of 23 ± 2° C (73.4 ± 3.6° F) and at 50 ± 5% humidity for 3 hours before testing is performed. Durometer device must also have been in lab condition tolerance for at lease 12 hours prior to testing.

8.7.2.1. Place test sample on firm level surface with the outside layer of the pad facing up. Write the lab number on the surface with the silver pen. Place the durometer firmly on the surface and press firmly on the top of the durometer. Do not use excessive pressure as it may affect the durometer reading. Take a total of 5 readings across the surface of the sample. Make sure the readings are at least 6.0 mm (0.24 inches) apart from each reading. Record each reading, and then determine the middle value of the five readings. This middle value shall then be recorded as the original durometer reading on the worksheet. The recorded durometer should be within ± 5 of the specification requirements of the material being tested. If outside the ± 5 range, then the durometer test shall be recorded as failing.

Commented [DB2]: 5 what?

Commented [DB3]: Or is this the number produced by the durometer?

8.7.3. Prepare the oven for oven aged test

8.7.3.1. Preheat over for the following: Natural rubber specimens shall be aged at 70 ±2 °C, and Neoprene samples shall be aged at 100 ±2 °C, for 70 hours.

8.7.3.2. After the proper time has elapsed, allow specimen to cool at room temperature at the specified laboratory tolerances of 23 ± 2° C (73.4 ± 3.6° F) and at 50 ± 5% humidity for 3 hours. After cooling repeat the procedure~~, as described in Subsection 9.7.2.1~~

8.7.3.3. To ~~figure~~ calculate the durometer change, determine the difference between the oven aged durometer value and the original durometer value. Record the change on the work sheet, recording it as a plus or minus number. Natural rubber is allowed a maximum change of ±10% (5 for 50, 6 for 60, 7 for 70 durometer material). Neoprene is allowed to change to a maximum of ±15% (7.5 for 50, 9 for 60, 10.5 for 70 durometer material). If the durometer is within the allowable limit, then the sample meets ~~specification~~ Specification requirements.

9. BEARING PAD SAMPLE TEST ACCEPTED BY CERTIFICATION

9.1. On a case-by-case basis, sample test results not performed by the ~~division~~ Division as described in Section 9 of this MP may be accepted by the certifications of the manufacturer for the following:

a) Rubber Deterioration in Ozone (ASTM D1149)
b) Low Temperature Brittleness Test (ASTM C746)
c) Adhesion (ASTM D429)
d) Shear Modulus (ASTM 4014)
e) Low Temperature Crystallization (ASTM 4014)
f) Instantaneous Thermal Stiffening (ASTM 1043)
g) Oil Swell (ASTM D471)
h) Full size bearings more than 50lbs, and not exceed 8~~-~~ inch width ~~X~~ by 12~~-~~ inch ~~Length~~length. In accordance with this MP, the manufacturer is to prepare sample sizes as described ~~in Subsection 5.1.2 (d) of this MP~~ prior to shipment to the ~~division~~Division. In rare occasions, full size bearings weighing more than 50lbs may be accepted per manufacturer certification of testing.

9.2. For the manufacturer described in ~~Section 10.1~~the previous Section to be accepted, a full test report must be submitted to the ~~division~~Division. The report must be notarized and submitted to the ~~division~~ Dvision for review and approval. The complete test report must be submitted prior to, or with the submitted test sample to the division. The report must include the following:

a) Laboratory Test Report Material Type (i.e. Natural Rubber, Neoprene)
b) Customer (i.e. Contractor, etc.)
c) Purchase Order #
d) Certification Date
e) Test Method Required and Results
f) Project Number
g) Project Authorization
h) Quantity
i) Description of material
j) Lot number
k) Notarization
l) Signature

~~l)~~ SIGNATURE BLOCK

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

AUTO ~~PAY~~ FINALIZE CONDITION OF INDUSTRY SAMPLE RECORDS

1. PURPOSE

1.1. To define the AWP auto-~~pay~~ finalize condition.

1.2. To define and standardize the criteria (metric) for gaining and keeping the AWP auto-~~pay~~ finalize condition.

2. DEFINITIONS

2.1. AWP: AASHTOWare Projects, the Division's accepted materials tracking software.

2.2. Auto-~~Pay~~ Finalize Condition: AWP sample record condition that allows ~~payment~~a sample record to count towards the payment criteria. These sample records are counted toward this criteria, even though they are~~,~~ pending District review. If these sample records are found to be incorrected, payment may be taken back until they are corrected.

2.3. Satisfactory Sample: A sample record shall be considered Satisfactory if it has been submitted in accordance with MPs 109.00.21 and 109.00.22 and it has been accepted by the District without a rejection. If a sample record has been rejected, corrected and then accepted, it does not count as a Satisfactory Sample.

3. GAINING THE AUTO-~~PAY~~ FINALIZE CONDITION

3.1. In order to gain the auto-~~pay~~ finalize condition, contractors must demonstrate their ability to submit Satisfactory Samples.

3.2. Contractors are evaluated monthly for their previous two month's performance on the "Industry District Authorization Metric" report. This report is submitted to management.

3.3. A running average is also calculated on this report. This calculation evaluates the most recent 100 samples submitted by the contractor in a one-year period.

3.4. If a contractor has submitted 100 or more samples in the past year, and if 97.00% of the most recent 100 samples are satisfactory, the Contractor gains the auto-~~pay~~ finalize condition.

4. MAINTAINING THE AUTO-~~PAY~~FINALIZE

4.1. Once a contractor has gained the auto-~~pay~~finalize, they must continue to demonstrate their ability to submit Satisfactory Samples.

4.2. Revocation of the auto-~~pay~~finalize

4.2.1. If a Contractor has less than 90% Satisfactory Samples on the monthly report for the two-month reporting period, their auto-~~pay~~ finalize condition will be reviewed by the Materials Control Section at MCS&T.

4.2.2. If the review indicates a consistent lack in performance, the auto-~~pay~~ finalize condition will be revoked.

4.2.3. If the Contractor

~~4.2.3.~~4.2.4. If a Contractor has their auto-~~pay~~ finalize condition revoked, they may re-gain the auto-~~pay~~ finalize condition in accordance with the previous Section of this document.

5. AUTO-~~PAY~~ FINALIZE CONDITION BENEFITS

5.1. Contractors who have an active auto-~~pay~~ finalize condition will automatically have their sample records marked as "Completed, Pending District Review" if they have not been reviewed and evaluated by the District ~~7~~ 1 calendar days after their submission date.

_____
Michael A. Mance, PE
Director
Materials Control, Soils & Testing Division

MP 109.00.23 Steward – Materials Control Section
MM:B

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

PROCEDURE FOR THE SUBMISSION AND DOCUMENTATION OF QUALITY CONTROL TEST RESULTS

1. PURPOSE

1.1 To provide guidance for the streamline submission of test results documentation from the Contractor to the District.

2. REFERENCED DOCUMENTS

2.1 MP 109.00.21 – Basis for Charges for Non-Submittal of Sampling & Testing Documentation by the Established Deadline

2.2 MP 109.00.23 - Auto Pay Condition of Industry Sample Records

3. DEFINITIONS

3.1 AWP: AASHTOWare Projects – The Division Approved Sampling and Testing Documentation Software.

3.2 Authorize: In AWP, the action in which a sample record is "completed" or "finished", regardless of the final sample status.

4. SCOPE

4.1 As required by MP 109.00.21, contractors must submit their Quality Control test results by the deadline specified in that document.

4.2 The submission of results includes the following steps: (A) generating the sample in the Division Approved Sampling and Testing software (SiteManager, AASHTOWare Projects, etc.), (B) entering all data into this system, (C) presenting the data to the District for review and (D) providing all testing documentation.

4.2.1 This procedure expands on each of these points.

5. GENERATION OF A SAMPLE RECORD IN AASHTOWARE PROJECTS

5.1 Test results shall be documented in AWP (or the current Division Approved Sampling and Testing Documentation Software) using the live version of the training guides available on the WVDOH MCS&T Webpage[1]. A sample of these guides is provided in Attachment 1.

6. ENTERING OF TEST DATA.

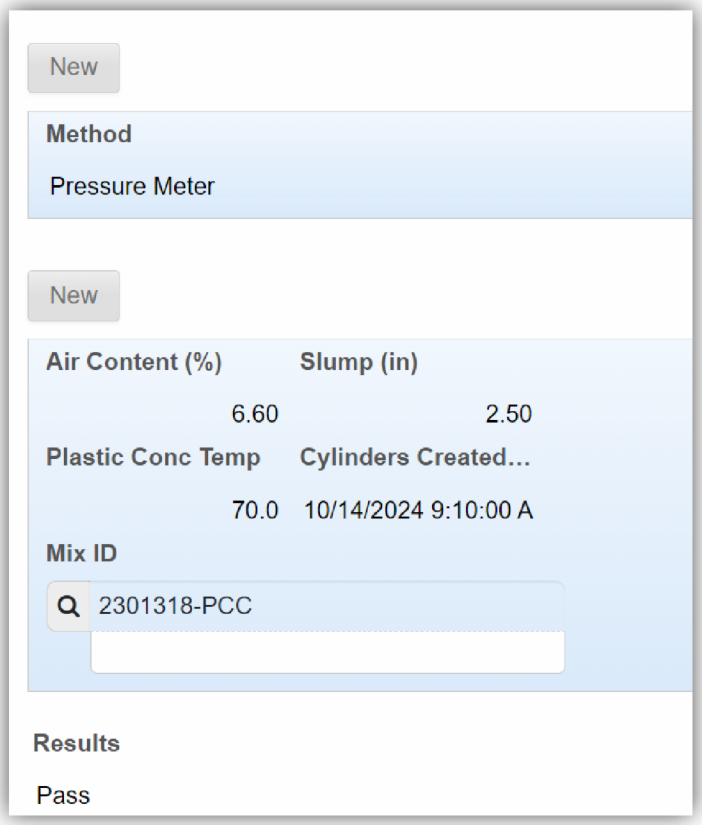
6.1 All applicable data shall be entered into AWP. This shall include all required fields as shown in the live version of the training guides available on the WVDOH MCS&T Webpage. A sample of these guides is provided in Attachment 1.

[1] https://transportation.wv.gov/highways/mcst/Pages/AWP.aspx

6.1.1 This data includes test results such as compacted density, or percentage of material passing a specific sieve.

6.1.2 Figure 1 shows an example of test data entered into AWP.

Figure 1 – An Example of Test Data Entered into AWP.



7. PRESENTING THE DATA TO THE DISTRICT FOR REVIEW AND SUBMITTING TESTING DOCUMENTATION

7.1 Once the test data has been entered, the data must be submitted to WVDOH.

7.2 An email shall be sent by the Contractor to the District Approved email submission inbox. An example of this email is shown in Attachment 2. A list of these inboxes is available on the WVDOH MCST Toolbox Webpage[2].

7.2.1 The title of the email shall contain the Contract ID and the Name of the Project, as well as "QC Test Results".

7.2.2 The email shall contain, but not be limited to the following information:

1. Contract ID
2. Name of the Project
3. Lab Reference Number
4. Sample ID
5. Material Name
6. Line Number(s)

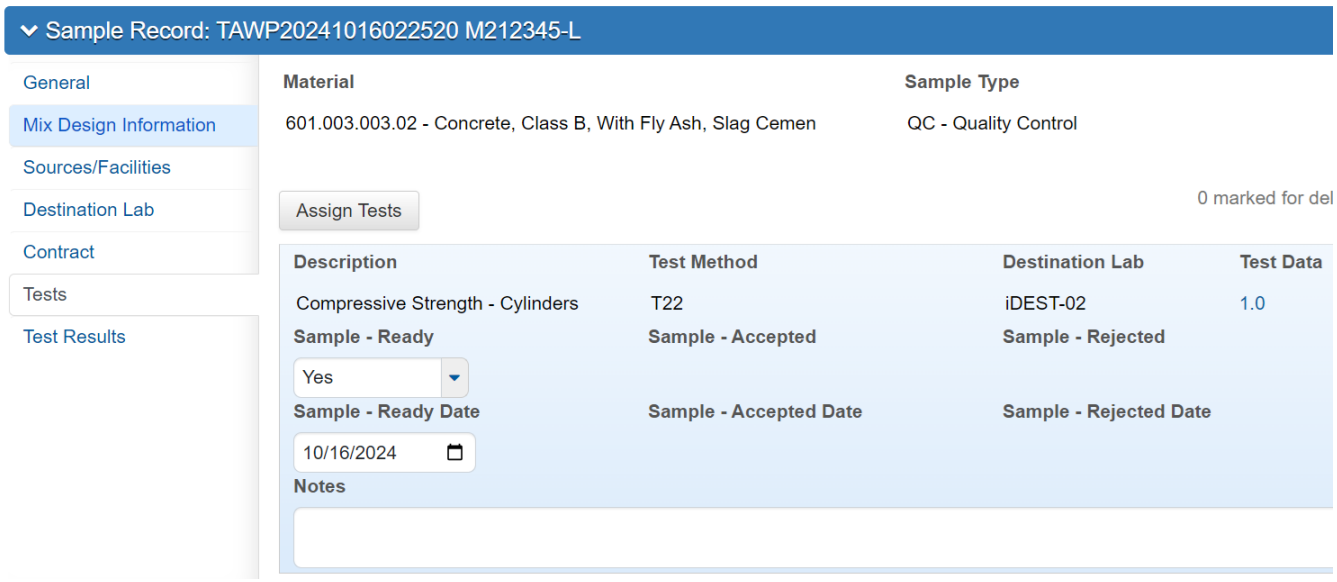
[2] https://transportation.wv.gov/highways/mcst/Pages/tbox.aspx

7. Final Status of the Material (Pass/Fail/Information Only)
8. A direct link to the AWP Sample Record
9. A PDF scan of all test data

7.3 The contractor may send multiple tests in a single email as long as each is on the same contract, for the same material and for the same testing day.

7.4 Once the sample record is ready to be submitted, the user will mark the test complete on the Sample Record. An example of this action is shown in Figure 2.

Figure 2 – An Example of a Submitted Sample Record into AWP.



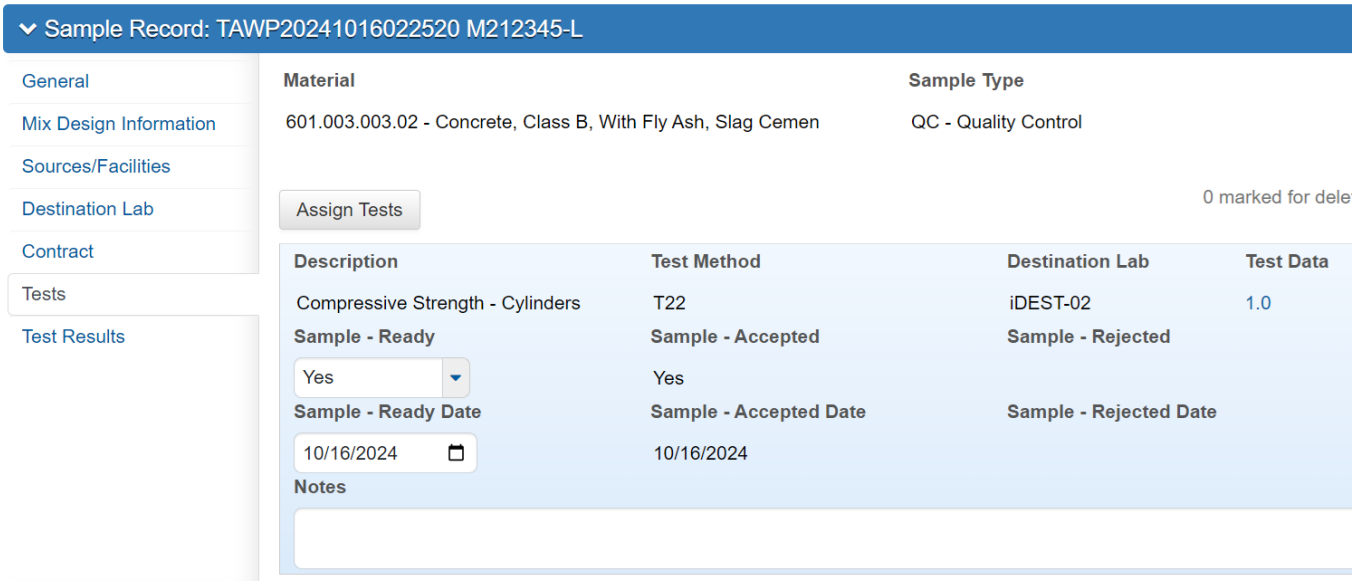
8. RECEIVING OF SAMPLES BY THE WVDOH

8.1 Once the District has received and accepted the sample record, they will "authorize" the sample. Whether the test data passes or fails, the sample record is still authorized.

8.1.1 If the sample record has been submitted to the District, and if the Contractor has an active "Auto-Pay" status as described in MP 109.00.23, the sample record will be counted toward payment if it has not been reviewed by the District after seven calendar days.

8.2 The District will also mark the sample as "Sample-Accepted" on the sample record tests tab. An example of the completed screen is shown in Figure 3.

Figure 3 – An Example of an Accepted Sample Record into AWP.



8.3 Once accepted, the District shall reply to the submission email stating that the sample record has been accepted.

8.4 If rejected, the District will mark the Sample as "rejected" with the rejection date. The District will then reply to the original email, stating the reasons for the rejection.

8.5 If a sample is rejected, the Contractor must correct the sample. Once corrected the Contractor will reply to the email stating that the sample has been corrected. The sample will then be reviewed by the District. If found acceptable, the District will process the sample.

8.6 If a sample record is once again rejected, the process shall repeat until the sample is correct.

8.6.1 In the case where a sample record has been rejected, the total number of days (timeframe) specified in MP 109.00.21 will be the sum of the days until submitted and the number of days between rejection(s) and resubmission(s).

8.6.1.1 For example, if the original submission takes 5 days and the sample is rejected, the correction(s) take an additional 5 days, the total number of days is 10. If the 10 days is greater than the allowable days in MP 109.00.21, the penalty will be applicable even if the original submission was within the allowable timeframe.

_____
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Director
Materials Control, Soils & Testing Division

MP 109.00.22 Steward – Materials Control Section
MM:B
ATTACHMENT

ATTACHEMNT 1

I1-3 GENERAL TAB

Enter all the information (in Yellow) as it is Required.

NOTE: The Green Fields **MAY** be used based on the Sample Type and your District's workflow.

If you have the information, you can fill in the Green Fields.

(I1-5)

Go to the **Next Step**.

ATTACHMENT 2 – Sample Email Submission

Subject Line: 20240001243 – Contract Name – QC Test Results

Dear Scott,

I am submitting the following Sample Record(s):

20240001243
WV 19 to Allen's Run
C1N-1234
TAWP20241016022520
Class B Concrete with Fly Ash
LN 0020, LN 0030
Pass

20240001243
WV 19 to Allen's Run
C1N-1235
TAWP20241016022530
Class B Concrete with Fly Ash
LN 0020, LN 0030
Pass

https://wvXXX-pr-prod.infotechinc.com/#/SampleRecord/44209/Summary
https://wvXXX-pr-prod.infotechinc.com/#/SampleRecord/44209/Summary
(These links are examples; they are not a live.)

Attached is the Testing Documentation (PDF)

Very Truly Yours,

Jimmy John, from Tom's Construction.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

PROCEDURE FOR THE INDEPENDENT ASSURANCE PROGRAM

1. PURPOSE

1.1 To provide a procedure for the WVDOH to meet FHWA's requirements for the Independent Assurance (IA) program.

2. SCOPE

2.1 This procedure applies to the following IA Materials:

2.1.1 Portland Cement Concrete (PCC)

2.1.2 Asphalt

2.1.3 Aggregate

2.1.4 Compacted Soil, Aggregate and Asphalt Materials

2.1.4.1 The WVDOH is in the process of evaluating the method to incorporate this testing into the IA program.

3. REFERENCED DOCUMENTS

3.1 Office of Pavement Technology Publication No. FHWA-HIF-12-001[1], October 2011. Included as Attachment 2.

3.2 23 CFR - PART 637—CONSTRUCTION INSPECTION AND APPROVAL[2]

3.3 MP 106.03.50 - General Information Guide for Technician and Inspector Certification Program (TICP).

~~3.3~~3.4 MP 700.00.54 - Procedure for Evaluating Quality Control Sample Test Results with Verification Sample Test Results

~~3.4~~3.5 AASHTO R44-07.

4. DEFINITIONS

4.1 QA – Quality Acceptance: The Division test used for the acceptance of material on a project.

4.2 IA Sampler: The employee(s) at MCS&T Division who oversees the IA program. This person may perform 1:X testing when the population (X) is not large enough to compare samples statistically or comparing samples statistically is not practical. The IA Sampler may, at the discretion of the Director of MCS&T, delegate this task to a qualified Division employee.

[1] https://www.fhwa.dot.gov/pavement/materials/hif12001.pdf
[2] https://www.ecfr.gov/current/title-23/chapter-I/subchapter-G/part-637

4.3 Evaluation Period: The calendar year in which the IA program is evaluated. This begins on January 1st and ends on December 31st of the same year.

4.4 IA Material: Each unique material that is evaluated by the IA program. These materials are listed in Section 2.1 of this document.

4.5 IA Test: A test that is performed by a QA Tester which is evaluated either directly or indirectly by the IA sampler to demonstrate both the QA Tester and their QA Testing Equipment's proficiency.

4.6 QA Tester: Each individual who performs an IA Test on an IA Material for QA, during the Evaluation Period. Each unique instance of these must be evaluated based on the frequency noted in Section 5.

4.7 QA Testing Equipment: Each primary piece of equipment used to perform an IA Test on an IA Material for QA, during the Evaluation Period. This equipment is noted in the respective sections of this document. Each unique instance of these must be evaluated based on the frequency noted in Section 5.

4.8 AASHTO: The American Association of State Highway and Transportation Officials, a nonprofit organization that sets technical standards for highway systems and acts as a liaison between state and federal transportation departments.

4.9 AASHTO re:source[3]: A technical services program that provides audits and accreditation to material testing laboratories. This program distributes proficiency samples nationally and evaluates the results. The WVDOH uses the evaluations from this program for both asphalt and aggregate IA Tests.

4.10 Proficiency Sample: A single (homogeneous) sample that is distributed by an agency or designated agent to be tested at multiple laboratories. The distributing agency will provide a "score", which statistically compares results amongst the laboratories.

4.11 Split Sample: A single sample taken by a single entity that is divided into two or more separate sub-samples for subsequent laboratory analysis. The division shall be done such that these sub-samples are equivalent.

4.12 Satisfactory Evaluation: If the results of a test fall within the guidelines established in Section 13 of this document, the test will be considered satisfactory.

4.13 Non-Satisfactory Evaluation: If the results of a test do not fall within the guidelines established in Section 13 of this document, the test will be considered non-satisfactory.

4.14 Corrective Action Report (CAR): An action report identifying the probable source of a Non-Satisfactory Evaluation. This report identifies the non-conformance, explains issues which lead to this non-conformance, and explains corrective actions to address this non-conformance.

5. SYSTEM APPROACH FOR IA SAMPLING AND TESTING

5.1 The WVDOH IA program shall operate under the system approach as described in Office of Pavement Technology Publication No. FHWA-HIF-12-001 and AASHTO R44-07.

[3] https://aashtoresource.org/

5.2 Each QA Test Equipment and each QA Tester shall be evaluated for each Evaluation Period. Redundant testing shall be avoided unless a failure or faulty testing is reported during the testing.

5.2.1 If a QA Tester is testing and the equipment fails, they shall complete the test on another piece of equipment. If this occurs, it shall be noted in a corrective action report.

5.3 The goal of the IA program is to meet a 90% evaluation threshold for each QA Tester and QA Test Equipment. Each of these entities is considered separate and independent of each other.

5.3.1 QA Testers shall be evaluated for each unique IA Material they test during the evaluation period. If a person tests multiple IA Materials during the evaluation period, they will be required to be evaluated for each material independently.

5.3.2 The evaluation procedure for tests is described in Section 13 of this document.

5.4 If the 90% evaluation threshold is not met, a corrective action summary shall be included in the IA report.

6. POPULATION OF QUALITY ACCPTANCE TESTERS AND EQUIPMENT

6.1 Once per year, before any work is performed by District QA Testers, a signed letter stating the names of each of their QA Testers shall be submitted by the District Construction Engineer to the Director of MCS&T Division. In lieu of this letter, Districts may utilize an MCS&T provided online form.

6.2 If, during the calendar year, additional QA Testers are added to the District's roster, the District Construction Engineer shall submit an amended list to the Director of MCS&T Division. This shall be done before any quality assurance work is performed by the tester.

6.3 In the event where a project incorporates non-DOH QA Testers and/or QA Testing Labs, the District Construction Engineer shall submit to the Director of MCS&T a signed letter stating the names of each of the QA Testers. As part of their duties, this person must participate in the IA program for each evaluation period.

Commented [1]: Are we doing this yet/ working on having this be the procedure?

6.4 All QA Testing Equipment shall be inventoried yearly and entered into the Division's approved equipment tracking system. If additional testing equipment is acquired, it shall be added to this system.

7. PORTLAND CEMENT CONCRETE (PCC)

7.1 Each QA Tester who tests PCC during the evaluation period shall perform an IA Test corresponding to the test they performed during that evaluation period.

7.2 The minimum required IA Sample test frequency for each QA Tester and QA Test Equipment is as follows:

PCC IA Samples Frequency	
Air – AASHTO T 152	1/Year
Compressive Strength Testing - AASHTO T 22	1 Set/Year
Slump – AASHTO T 119	1/Year

7.3 For PCC, the Division will host at least one in-house proficiency sample style test of plastic concrete. This event shall be a group event where plastic concrete is provided, and each QA Tester is present. The QA Tester will test the material using the equipment they typically use to test concrete. If a QA Tester cannot attend this event, they shall attend a make-up event or be individually evaluated by the IA sampler.

7.4 Plastic Concrete Testing:

7.4.1 For plastic concrete testing, each QA Tester, their testing equipment, as well as their results shall be recorded.

~~7.4.1~~7.4.2 Plastic concrete testing at a minimum includes AASHTO T 152 (air content) and AASHTO T 119 (slump).

~~7.4.2~~7.4.3 During the event described in Section 7.3, the IA Sampler as well as representatives from MCS&T Division will observe the QA Testers to ensure proper testing procedures are followed.

~~7.4.3~~7.4.4 If a QA Tester is observed deviating significantly from testing procedures, the IA Sampler or an MCS&T Division representative may note that test as a Non-Satisfactory Evaluation, regardless of the QA Tester's results. In this case, the test shall be considered Non-Satisfactory, and a CAR will be required. Also, the QA Tester's results shall be discarded from the population of results.

7.5 Cylinder Testing:

7.5.1 For each set of cylinders in cylinder testing, the cylinder fabricator, the Tester, testing equipment, and results shall be recorded and sent to the IA sampler.

7.5.2 Cylinder testing at a minimum includes AASHTO T 22 (compressive strength).

~~7.5.1~~7.5.3 At the event described in Section 7.3, a standard set of 4"x8" cylinders shall be created for each of the QA Testers who performs the AASHTO T22 test at each District. This set of cylinders shall be fabricated by a tester from that District, if one is present. If a District has more than 1 QA Tester or more than 1 set of testing equipment, additional sets of cylinders shall be fabricated for each instance.

~~7.5.2~~7.5.4 In the instance of a non-DOH testing laboratory, a certified individual from the lab's primary District shall fabricate the cylinders as they would for their own District testing laboratory.

~~7.5.3~~7.5.5 If a QA Tester for a particular District does not attend, a set of cylinders shall be fabricated for that District by either the IA Sampler or another District. This set of cylinders will be tested by that District but will only be considered a "back-up" case if that District cannot attend another session.

~~7.5.4 The fabricator and testing equipment shall be noted for cylinder testing.~~

~~7.5.5~~7.5.6 ~~Upon testing of the cylinders, the Tester, testing equipment and results shall be documented and sent to the IA Sampler.~~

7.6 For PCC the QA Testing Equipment is as follows:

1. Compressive Strength Testing Machine
2. Type B Pressure Meter
3. Slump Cone

8. ASPHALT CONTENT – IGNITION OVEN – BURN OFF

8.1 Each QA Tester who tests for Asphalt Content during the evaluation period shall perform a yearly burn off IA Test.

8.2 The minimum required IA Sample test frequency for each QA Tester and QA Test Equipment is as follows:

Asphalt IA Samples	
Asphalt Content by Ignition - AASHTO T 308	1/year
Percent Passing the #200 Sieve - AASHTO T 30	1/year

8.3 AASHTO re:source:

8.3.1 Each QA Tester shall participate in the AASHTO re:source proficiency program for Asphalt Mixture Ignition Oven (HMI). This shall apply to all the tests listed in Section 8.2.

8.3.2 If there are more QA Testers in a District than distributed samples, the District shall request additional AASHTO re:source aggregate samples.

~~8.1~~8.4 MCS&T Distributed Samples:

8.4.1 Since most Districts operate multiple ignition ovens, in addition to the AASHTO re:source samples, MCS&T Division shall obtain and distribute a homogeneously split sample for each of the District's ignition ovens.

8.4.2 MCS&T shall also distribute a sample of this material to Non-DOH laboratories for each QA Tester and QA testing equipment.

8.5 ~~The QA Tester, the QA Testing Equipment as well as the results shall be documented and sent to the IA Sampler.~~ For AASHTO re:source and MCS&T distributed samples, the QA Tester, QA Testing Equipment, and test results shall be recorded and sent to the IA Sampler. This shall apply to all the tests listed in Section 8.2.

8.6 For Ignition Oven Asphalt tests the QA Testing Equipment is as follows:

1. Ignition Oven

~~8.1.1~~

~~1.1 The minimum required IA Sample test frequency for each QA Tester and QA Test Equipment is as follows:~~

~~Asphalt IA Samples~~	
~~Asphalt Content by Ignition - AASHTO T 308~~	~~1/year~~
Percent Passing the #200 Sieve - AASHTO T 30	1/year

~~2.~~9. SUPERPAVE ASPHALT CONCRETE

2.19.1 Each QA Tester who tests SuperPave Asphalt Concrete during the evaluation period, in addition to the yearly burn off IA test, shall perform an IA Test corresponding to each test they performed during that evaluation period.

2.29.2 The minimum required IA Sample test frequency for each QA Tester and QA Test Equipment is as follows:

SuperPave IA Samples	
~~Air Voids - AASHTO T 269~~	~~1/year~~
~~Asphalt Content by Ignition - AASHTO T308~~	~~1/year*~~
Bulk Specific Gravity, Vacuum - AASHTO T 331	1/year
Bulk Specific Gravity, SSD - AASHTO T 166	1/year
Maximum Specific Gravity - AASHTO T 209	1/year
Asphalt Content by Ignition - AASHTO T 308	1/year*
~~Percent Passing the #200 Sieve - AASHTO T 30~~	~~1/year*~~

~~*NOTE. This burn off evaluation is in addition to that described in Section 8~~These tests are ~~included in the yearly burn off IA test described in Section 8.~~

2.39.3 Each QA Tester shall participate in the AASHTO re:source proficiency program for Asphalt Mixture Gyratory (HMG) for SuperPave Asphalt Material. This shall apply to all the tests listed in Section 9.2.

9.3.1 If a District has multiple QA Testers and/or QA Testing Equipment, that District shall request additional AASHTO re:source samples to ensure that all QA Testers and QA Testing Equipment are evaluated.

2.49.4 The QA Tester, QA Testing Equipment, and test results shall be recorded and sent to the IA Sampler. This shall apply to all the tests listed in Section 9.2.

2.59.5 For SuperPave Asphalt Concrete the QA Testing Equipment is as follows:

1. Gyratory Compactor
2. Core Lok - Asphalt Density Measurement System
3. ~~Ignition Oven~~

~~3.~~10. MARSHALL ASPHALT CONCRETE

3.110.1 Each QA Tester who tests Marshall Asphalt Concrete during the evaluation period, in addition to the yearly burn off IA test, shall perform an IA Test corresponding to each test they performed during that evaluation period.

3.210.2 The minimum required IA Sample test frequency for each QA Tester and QA Test Equipment is as follows:

Marshall IA Samples	
Bulk Specific Gravity, SSD - AASHTO T166	1/year
Maximum Specific Gravity - AASHTO T209~~Marshall Stability/Flow - AASHTO T245~~	1/year
Air Voids - AASHTO T 269	1/year
Marshall Stability/Flow - AASHTO T245~~Maximum Specific Gravity - AASHTO T209~~	1/year~~1/year~~

Commented [2]: Pretty sure this would be something for Marshall, as results for this are not included in Superpave results by AASHTO re:source, but are for their Marshall results

Commented [3]: Will add these to the Marshall evaluations in the 2025 report

~~3.3~~10.3 Each QA Tester shall participate in the AASHTO re:source proficiency program for Asphalt Mixture Marshall Design (MAR) for ~~SuperPave~~Marshall Asphalt Material. This shall apply to all the tests listed in the Table in Section 10.2.

10.3.1 If a District has multiple QA Testers and/or QA Testing Equipment, that District shall request additional AASHTO re:source samples to ensure that all QA Testers and QA Testing Equipment are evaluated.

~~3.4~~10.4 The QA Tester, QA Testing Equipment, and test results shall be recorded and sent to the IA Sampler. This shall apply to all the tests listed in Section 10.2.

~~3.5~~10.5 For Marshall Asphalt Concrete the QA Testing Equipment is as follows:

1. Marshall Hammer
2. Marshall Stabilometer ~~Ignition Oven.~~

~~4.~~11. AGGREGATE GRADATION

~~4.1~~11.1 Each QA Tester who tests Aggregate during the evaluation period shall perform an IA Test corresponding to the test they performed during that evaluation period.

~~4.2~~11.2 The minimum required IA Sample test frequency for each QA Tester and each piece of QA Testing Equipment is as follows:

Aggregate Gradation Samples	
AASHTO T27 (Sieve Analysis of Aggregates) ~~and T11~~	1/year
AASHTO T11 (Materials Finers than No. 200 Sieve)	1/year

~~4.3~~11.3 AASHTO re:source

~~4.3.1~~11.3.1 Each District QA Tester shall participate in the AASHTO re:source proficiency program for Aggregate.

~~4.3.2~~11.3.2 If there are more QA Testers in a District than distributed samples, the District shall request additional AASHTO re:source aggregate samples.

~~4.4~~11.4 MCS&T Distributed Samples:

~~4.4.1~~11.4.1 Because the Districts have multiple shakers, in addition to the AASHTO re:source samples, MCS&T shall distribute a homogeneously split sample to each testing lab for each set of QA testing equipment. Any QA Tester in the District may test these samples.

~~4.4.2~~11.4.2 MCS&T shall also distribute a sample of this material to Non-DOH laboratories for each QA Tester and QA testing equipment.

~~4.4.3~~11.4.3 The specific class and type of material shall be selected by the IA Sampler. The material shall consist of AASHTO specified gradation.

11.5 All specified sieves will be evaluated for the material passing. For the AASHTO re:source proficiency sample, all scored sieves will be evaluated.

4.511.6 For AASHTO re:source and MCS&T distributed samples, the QA Tester, QA Testing Equipment, and test results shall be recorded and sent to the IA Sampler. This shall apply to all the tests listed in Section 11.2.

4.611.7 For Aggregate Gradations the QA Testing Equipment is as follows:

1.2. Aggregate Shaker

5.12. COMPACTION

5.112.1 The WVDOH is currently evaluating the process of adding Asphalt and/or Aggregate/Soil Compaction to the IA program. The goal is to add this to the program for the 2025 evaluation period.

6.13. EVALUATION PROCEDURE

6.113.1 IA Samples will be evaluated statistically when the population of results is 5 or greater. If the IA Sample is not provided by AASHTO re:source in the form of a Proficiency Sample, it will be evaluated by the WVDOH IA Sampler. The calculation method used by ASHTO re:source shall be followed. The calculation method is shown in Attachment 3.

6.213.2 If the samples are provided by AASHTO re:source a rating of 3, 4, 5, as assigned by the testing agency, shall be considered satisfactory.

6.313.3 In the event where the population is less than 5, samples will be evaluated by averaging the tests results and using the respective AASHTO Precision and Bias Table as the acceptable range of values between the IA Sampler and the QA Tester(s). In this event, the evaluation method will be specifically described in that year's IA report.

6.3.113.3.1 For example, if the average is 5.0 and the table provides a precision and biased of 1.2, the test values must fall between 3.8 and 6.2 to be considered satisfactory.

6.413.4 If the results of an evaluation are satisfactory, the evaluation will be considered successful. A successful evaluation will verify both the QA Tester and the QA Testing Equipment used during the IA Test.

6.513.5 If the results of an evaluation are deemed non-satisfactory, the IA Test will be reviewed by the IA Sampler and/or the respective District Materials Supervisor. Within 30 days of notification of the non-satisfactory evaluation, the reviewer shall submit a Corrective Action Report to the Director of Materials Control Soils and Testing Division. This Corrective Action Report will be included in the yearly IA Report. A sample of this Corrective Action Report is provided in Attachment 1. The live version of the file is in the WVDOH MCS&T Toolbox[4].

[4] https://transportation.wv.gov/highways/mcst/Pages/tbox.aspx

~~6.5.1~~13.5.1 If possible, an additional IA Sample will be tested by the QA Tester in that calendar year, using the same QA Testing Equipment. This IA Test will be closely observed by the IA Sampler or their designee to help establish the root cause.

13.5.2 If this cannot be accomplished during the calendar year, the process will be followed for the subsequent calendar year's IA Sample.

~~6.5.2~~13.5.3 If the QA Tester's evaluation for a given test is non-satisfactory for two or more successive evaluation periods, and is not caused by QA test equipment or sampling methods, then actions outside a CAR shall be taken by the IA Sampler to confirm the Tester's proficiency for the given test.

~~6.6~~13.6 The evaluation criteria in this section shall be evaluated every three years. The most recent evaluation of this criterion was on :

_____ by _____ (Director of MCS&T)**.

** Note: This document shall be effective as per the signature date at the end of this document. However, the live version of this document will be updated as indicated above. This review date will not affect the signature nor effective date of the procedure, but rather provide documentation of WVDOH's compliance with Federal guidelines.

~~7.~~14. RECIPROCITY OF IA TESTING AND TECHNICIAN CERTIFICATION.

~~7.1~~14.1 If the practical exam portion of the technician certification program (as described in MP 106.03.50) is equivalent to that of an IA Sample, reciprocity between these tests can be applied if agreed upon by both the Technician Certification Coordinator and the IA Sampler.

~~7.2~~14.2 At the discretion of the Technician Certification and Training Coordinator, a successful IA sample may be considered the "Practical" portion of a technician's recertification for the respective material.

~~7.3~~14.3 At the discretion of the IA sampler, the practical portion of either a certification or recertification may be considered a successful IA sample.

~~8.~~15. REPORTING

~~8.1~~15.1 The evaluation period shall be the calendar year, starting with January 1st and ending December 31st.

15.2 The annual IA report shall be submitted to FHWA. The due date for the report is April 1st of the year following the evaluation year. The annual report shall include the following information: the number of certified technicians, the number of testing equipment used for QA, the number of active technicians, the number of technicians covered by the IA program, the number of IA Samples that were Non-Satisfactory, and a summary of the Corrective Action Reports along with the potential systematic solutions to reoccurring deficiencies (FHWA-HIF-12-001).

~~8.2~~1.1.1 The report shall also include the ratio of QC samples to QA samples during the evaluation period for each of the required tests for each material. These ratios shall be observed by the IA Sampler to ensure compliance with MP 700.00.54.

Michael Mance Digitally signed by Michael Mance
Date: 2025.01.06 12:43:26 -05'00'

Michael A Mance, PE
Director
Materials Control, Soils & Testing Division

MP 700.00.53 Steward – Materials Control Section
MAM:B
ATTACHMENTS

Attachment 1: Sample Corrective Action Report

WVDOH Independent Assurance Corrective Action Report		
	Form 2025-IA-CAR	
Date of Occurrence:		
Date Submitted:		
Name of Tester:		
Testing Equipment:		
Material Tested:		
Describe the issue reported:		
Sample		
What was the root cause of the issue?		
What actions have been done to correct this issue?		
Signature of QA Tester		
Signature of District Materials Supervisor		
Signature of District Construction Engineer	Review: MCST	

Attachment 2: Office of Pavement Technology Publication No. FHWA-HIF-12-001[5], October 2011.

[5] https://www.fhwa.dot.gov/pavement/materials/hif12001.pdf

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

PROCEDURE FOR EVALUATING PRODUCTS FOR USE IN HIGHWAY CONSTRUCTION

1. SCOPE

1.1 New products are frequently presented to the Division by various manufacturers, suppliers and/or producers (MS&Ps) with a request that they be considered for use in our highway program. To facilitate handling of such requests in a uniform and expeditious manner, this Materials Procedure outlines the steps necessary for such product submittal and evaluation. This Procedure covers the addition of approved submitted products to the Division's Approved Product List (APL).

1.2 This Materials Procedure outlines the review of materials for use outside of standard bid contract work. This applies to District Purchase Order Projects and outlines a path for the addition of materials to the Division's Qualified Purchase Order Materials (QPOMs).

2. REFERENCE DOCUMENTS

2.1 MP 106.00.03: Guidelines for Establishing and Maintaining Approved Product Lists of Materials, Systems and Sources.

2.2 MP 106.10.50: WVDOH Buy America Acceptance Guidelines.

3. DEFINITIONS

3.1 MCS&T Reviewing Entity: The applicable Section Supervisor at MCS&T who is responsible for the review and acceptance of a new product.

3.2 Non-MCS&T Reviewing Entity: A subject matter expert at a WVDOH division separate from MCS&T.

3.3 Project: For this Materials Procedure, this term means a traditional bid contract.

3.4 APL: Approved Product List.

3.5 MS&Ps: Material Supplier and/or Producer.

3.6 QPOM: Qualified Purchase Order Material.

3.7 QPOS: Qualified Purchase Order Submittal.

3.8 PO Project: Purchase Order Project.

4. SUBMISSION OF PRODUCT

4.1 Consideration for product evaluation shall be requested through completion by the MS&Ps of WVDOH Form HL-468, "Preliminary Information for New Product

Evaluation". Once completed, DOH Form HL-468 shall be submitted to the MCS&T via email to the New Products Evaluation email address: DOHNewProducts@wv.gov .

4.1.1 The HL-468 Form can be found on the MCS&T Division's Materials Procedures Webpage[1]. A sample of this form is shown in Attachment 1. An online form may also be used to meet this requirement.

4.2 When submitting a product, the MS&P shall indicate whether the product is being submitted for either an APL or QPOM.

4.2.1 If a MS&P wishes the product to be submitted for both the APL and QPOM, they must complete two separate HL-468s. These may be sent together.

5. REVIEW OF SUBMITED PRODUCT

5.1 Upon receipt of the completed Form HL-468, the MCS&T Division shall distribute to applicable MCS&T Reviewing Entity for preliminary evaluation.

5.1.1 Within 30 calendar days of receipt, the MCS&T Reviewing Entity shall review the submittal in accordance with the applicable material requirements and decide if the product is acceptable.

5.1.2 This MCS&T entity shall ultimately be responsible for the review of the new product, though they may reach out to Non-MCS&T Reviewing Entities for additional approving criteria.

5.1.3 A Non-MCS&T Reviewing Entity shall be given 7 calendar days to review the submission before making a final decision. If the entity does not respond within that time, their affirmation for the approval will be assumed by the MCS&T Entity.

5.2 If the preliminary review indicates that additional information is needed, the MS&P shall be notified to submit additional information. This may include but not be limited to: samples, product specifications, certified test data, or product demonstrations. Product testing shall be coordinated by the MCS&T Division with the results of any further testing/evaluation being submitted to all appropriate evaluating parties. In the case where additional information has been requested or additional testing is required, the 30-day timeframe shall be reset to the date when the additional information is provided, or the testing has been completed.

5.3 If the MS&P fails to submit the request information within 30-days, the reviewing entity may reject the request. Discretion may be given if the information request requires testing or evaluation that would exceed this time frame.

6. APPROVED PRODUCT LIST

6.1 If the review indicates that the product meets the specifications, it shall be considered accepted and added to the APL. The MS&P shall be notified via letter.

6.2 If the reviewing entity determines that the WVDOH does not currently have any specifications for the submitted product, the WVDOH shall notify the MS&P via

[1] https://transportation.wv.gov/highways/mcst/Pages/MP-100s.aspx

email that there is no specification; the MS&P may choose to submit the product for consideration as a QPOS (see Section 7.)

6.2.1 If the MS&P indicates that they do not wish to be considered a QPOS, a non-approval letter shall be sent.

6.3 If the evaluation indicates that the product is not acceptable, the MS&P shall be notified by MCS&T via letter. The MS&P shall not submit the same product for evaluation within a six-month period.

6.4 In the instance where a product has significant approved usage, the Director (or their Designee) of MCS&T may add a product to either a new or existing APL as per MP 106.00.03. If a product is a candidate for being added to the APL in this manner, the MCS&T Lab Coordinator shall contact the MS&P prior to the addition of the product to the APL to request completion of the required HL-468.

7. QUALIFIED PURCHASE ORDER MATERIALS

7.1 All products which appear on the Division's APL are approved for use on PO Projects. Under no circumstances shall an approved QPOM be used on a project without prior testing and approval.

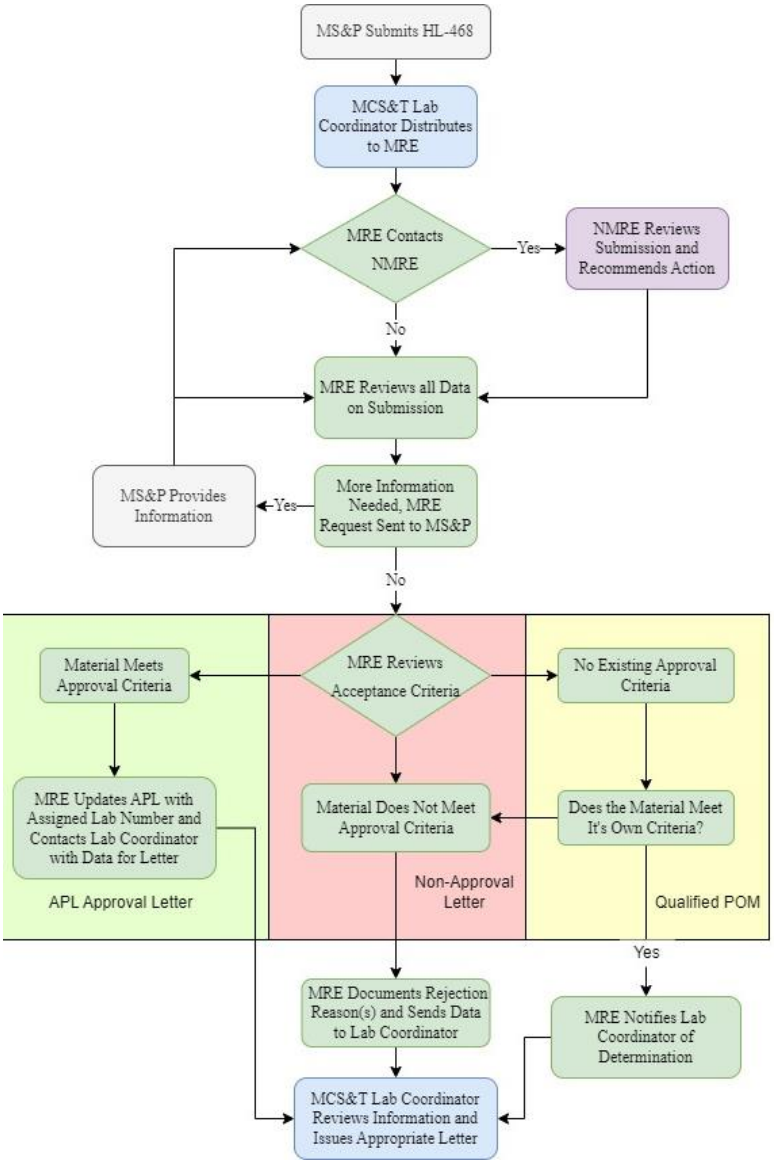
7.2 The reviewing entity shall determine if the QPOS performs as specified by the manufacturer. If this product meets those criteria, a QPOM acceptance letter shall be issued.

7.3 If the evaluation indicates that the product is not acceptable, the MS&P shall be notified by MCS&T via letter. The MS&P shall not submit the same product for evaluation within a six-month period.

8. PROCESS FLOW CHART

8.1 A flow chart for the process is provided in Figure 1

Figure 1: Flow Chart for Approved Products List Process.



Key:
MRE: MCS&T Reviewing Entity
NMRE: Non-MCS&T, WVDOH Reviewing Entity
MS&P: Manufacturers, Suppliers and/or Producers

9. NOTIFICATION LETTERS

9.1 Sample language for submission responses is shown in Attachment 2.

10. DOCUMENTATION OF REVIEWED PRODUCTS

10.1 MCS&T shall maintain a directory on the Division's APL Webpage[2] listing all the current approved products.

10.1.1 Additionally, MCS&T may evaluate the product listing after one year to determine if the performance or functionality of the product/process meets the desired results, goals, or intentions of the DOH. Any such evaluation may result in the product being removed from the APL.

10.2 MCS&T shall maintain a directory on the Division's QPOM Webpage[3] listing all products in this category.

10.2.1 Additionally, MCS&T may evaluate the QPOM listing after one year to determine if the performance or functionality of the product/process meets the desired results, goals, or intentions of the DOH. Any such evaluation may result in the product being removed from the list.

11. REMOVAL OF PRODUCTS FROM APL OR QPOM

11.1 If, at any time the reviewing entity determines that a previously approved product no longer meets the specifications, the product shall be removed from the respective list.

11.2 In this instance, the reviewing entity shall notify the MS&P via letter.

12. BUY AMERICA

12.1 Each HL-468 submission must include whether the product meets the Federal and State Buy America requirements of Section 106.1 of the Specifications. If the MS&P indicates that their product meets Buy America requirements, the company shall produce a notarized Certificate of Compliance (CoC) signed by a company official with knowledge and authority to certify the product is compliant with applicable Buy America requirements.

12.1.1 In the event where the source of materials is changed and is no longer Buy America compliant, the MS&P must notify MCS&T in writing.

12.1.2 Under no circumstance shall the CoC described above be used for Buy America compliance on a project. Each project much submit a CoC as described in MP 106.10.50 "WVDOH Buy America Acceptance Guidelines."

12.2 A notarized CoC shall contain the following information:

12.2.1 Title: Certification of Buy America compliance for Source Approval.

12.2.2 The Name, Address and Contact Information for the Company.

12.2.3 The date of the application

12.2.4 A company statement that demonstrates compliance with Buy America.

[2] https://transportation.wv.gov/highways/mcst/Pages/APL_By_Number.aspx
[3] https://transportation.wv.gov/highways/mcst/Pages/APL_By_Number.aspx

12.2.5 The name of the material and/or material code reference in the CoC. This material name shall be a clear, common name of the material that is comparable to the AWP Material Name[4]. Part Numbers etc. may also be on the document if the company wishes.

12.2.6 Signature of the Company Official and date.

12.3 The document must be notarized.

12.4 A sample of this CoC document is provided in Attachment 3.

_____
Michael A. Mance PE,
Director
Materials Control, Soils & Testing Division

MP 106.00.02 Steward – Lab Support Section
MAM:B
ATTACHMENTS

[4] See "AWP Material Codes" at https://transportation.wv.gov/highways/mcst/Pages/tbox.aspx

ATTACHMENT 1 - SAMPLE HL-468 FORM

FOR COMMITTEE SHOWN AFTER ATTACHMENT 2

Attachment 2: Sample APL Response Language

1. APL APPROVAL RESPONSE

West Virginia Division of Highways (WVDOH) Laboratory Approval Numbers 2XXXXXX has been issued to your company <Name of Company>, for the Approved Product List. The approval number, effective Date Month Day, 20XX, must appear on all shipping documentation for said product supplied to the ~~Division of Highways~~WVDOH projects.

2. NO APL RESPONSE:

The West Virginia Division of Highways (WVDOH) has evaluated your submittal of <Product Name>, <Product Material> as per Materials Procedure MP 106.00.02. This Division is not approving your material at this time for the Approved Product List; the WVDOH does not currently have a Specification or Materials Procedure which applies to your product.

This material may be evaluated for the Division's Quality Purchase Order Material List as specified in MP 106.00.02.

Designers may propose the use of this product in project plans or Contractors may propose the use of the product in projects they are constructing for the WVDOH. In either case, the WVDOH would evaluate the product and its proposed application in the specific project to make a determination on approving the use of it at that time. ~~The inclusion of the material into a contract project's design does not rest with this Division, though it may be specified at the discretion of WVDOH Designers or requested to be used by Contractors. If a contractor would propose to use it on a WVDOH project, or if the product is specified in Contract Documents, this product may be used, pending an individual evaluation on that project.~~

3. NON-APPROVAL RESPONSE (APL)

This material was submitted to the West Virginia Division of Highways for consideration in accordance with Materials Procedure 106.00.02.

This letter is to notify you that the Division ~~has elected to~~is not ~~approve~~ approving this product ~~currently~~at this time. As per Section <XXX> of the Standard Specifications Roads and Bridges, "<Description of Non-Approval Reason>."

4. QPOM ACCEPTANCE

The West Virginia Division of Highways (WVDOH) has evaluated your submittal of <Product Name>, <Product Material> as per Materials Procedure MP 106.00.02 for the Quality Purchase Order Material List.

West Virginia Division of Highways (WVDOH) Laboratory Approval Numbers Q2XXXXXX has been issued to your company <Name of Company>, for the above-mentioned product. This number, effective Date Month Day, 20XX, must appear on all shipping documentation for said product.

This product has been evaluated and meets the provided criteria. This material has been added to the Qualified Purchase Order Material List for use on Purchase Order projects only. The list is available on the Division's Webpage[5]. This material has not been added to the Division's Approved Product List and shall not be used on a contract project without prior approval.

5. NON-APPROVAL RESPONSE (QPOM)

This material was submitted to the West Virginia Division of Highways for consideration in accordance with Materials Procedure 106.00.02.

This letter is to notify you that the Division ~~has elected to not~~is not ~~approve~~ approving this product for the Qualified Purchase Order Master List currently. As per the provided criteria, this material <description of failure>."

[5] https://transportation.wv.gov/highways/mcst/Pages/Quality-Purchase-Order-Materials-List.aspx

ATTACHMENT 3: SAMPLE COMPLIANCE FORM

Certification of Buy America, Build America Compliance For Source Approval

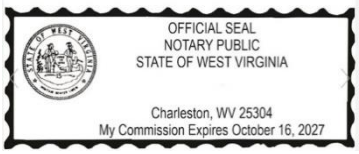
Acme Manufacturing Company
123 Main Street
Charleston, WV
25302

HL 468 Submission Date: 10/31/2022

The below listed materials and products meets all the requirements of all Federal and State Laws for Buy America, including but not limited to: Chapter 5, Article 19 and Chapter 5A, Article 3 Section 56 of the West Virginia Code; 23 U.S.C. 313 Buy America, 23 CFR 635.410 Buy America Requirements, and Build America, Buy America Act, Section 70914.

This Certification of Compliance is for the material listed below:

526.003.004 - Widget, Part Qi
596.003.004 - Widget, Part Hr



Jonathan Doe, Quality Assurance Manager

WVDOH Use Only

Reviewed by: Reviewed Date: Status:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

WVDOH BUY AMERICA ACCEPTANCE GUIDELINES

1. PURPOSE

1.1 To set forth instructions for compliance with both State and Federal Buy America Requirements (henceforth referred to as "Buy America Requirements"), as listed in this document.

2. REFERENCED DOCUMENTS

2.1 PUBLIC LAW 117–58—NOV. 15, 2021, Infrastructure Investment and Jobs Act.

2.2 Build America, Buy America Act (BABA).

2.3 23 U.S.C. 313 and 23 CFR 635.410 "Buy America Requirements".

2.4 2 CFR part 184 Buy America Preferences for Infrastructure Projects.

2.5 M-22-11 Initial Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure.

2.6 M-24-02 Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure.

2.7 Chapter 5, Article 19 and Chapter 5A, Article 3, Section 56 of the West Virginia Code, entitled "West Virginia American Steel Act of 2001."

2.8 West Virginia Notary Handbook, Current Edition.

2.9 MP 106.10.51 – WVDOH Buy America Waiver Guidelines.

3. ACCEPTANCE OF MATERIALS

3.1 This procedure applies to the following:

1. Steel and Iron
2. Manufactured Products
3. Construction Materials
4. Section 70917(c) Materials

3.2 An article, material, or supply shall only be classified into a single category listed in Section 3.1. In some cases, an article, material, or supply may not fall under any of these categories. Classification of the category must be made based on the status of article, materials, or supply at the time it is brought to the work site for incorporation into the project. The work site is generally the location of the project at which the materials will be incorporated. An article, material, or supply permanently incorporated into a project must meet the Buy America Preference for only the single category in which it is classified.

3.3 A Buy America preference only applies to articles, materials, and supplies that are consumed in, incorporated into, or affixed to a project. As such, it does not apply to

tools, equipment, and supplies, such as temporary scaffolding brought to the construction site and removed at or before the completion of the project. Nor does a Buy America preference apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished project but are not an integral part of the structure or permanently affixed to the project.[1]

3.3.1 Buy America preference does not apply to materials such as temporary paint or temporary traffic control devices.

3.3.2 Glass added to a permanent paint product requires a Certificate of Compliance.

4. STEEL AND IRON

4.1 Pursuant to Buy America Requirements, all manufacturing processes for steel and iron products must take place in the United States.

4.2 Definition

4.2.1 "Iron or steel products" means articles, materials, or supplies that consist wholly or predominantly of iron or steel or a combination of both.

4.2.1.1 "Predominantly of iron or steel or a combination of both" means that the cost of the iron and steel content exceeds 50 percent of the total cost of all its components. The cost of iron and steel is the cost of the iron or steel mill products (such as bar, billet, slab, wire, plate, or sheet), castings, or forgings utilized in the manufacture of the product and a good faith estimate of the cost of iron or steel components.

4.3 Standard

4.3.1 This includes all processes from the initial melting stage through application of coatings occurs in the United States.

5. MANUFACTURED PRODUCTS

5.1 Pursuant to Buy America Requirements, all Manufactured Materials are required to be produced in the United States. All manufacturing processes shall occur in the United States.

5.2 Definition

5.2.1 Manufactured products means articles, materials, or supplies that have been processed into a specific form and shape, or combined with other articles, materials, or supplies to create a product with different properties than the individual articles, materials, or supplies. If an item is classified as an iron or steel product, an excluded material, or other product category as specified by law or in 2 CFR part 184, then it is not a manufactured product. However, an article, material, or supply classified as a manufactured product may include components that are iron or steel products, excluded materials, or other product categories as specified by law or in 2 CFR part 184

[1] M-24-02: Memorandum for the Heads of Executive Departments and Agencies, Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure, Page 4

. Mixtures of excluded materials delivered to a work site without final form for incorporation into a project are not a manufactured product.

5.3 Standard for Projects Obligated on or after October 1st, 2025 (Final Assembly Standard)

5.3.1 Pursuant to Buy America Requirements, all manufactured products used in the project are produced in the United States; this means the final assembly of the manufactured product was manufactured in the United States.

5.4 Standard for Projects Obligated on or after October 1st, 2026 (55 Percent Standard)

5.4.1 Pursuant to Buy America Requirements, all manufactured products used in the project are produced in the United States; this means the manufactured product was manufactured in the United States; and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard that meets or exceeds this standard has been established under applicable law or regulation for determining the minimum amount of domestic content of the manufactured product.[2]

5.4.1.1 In determining whether the cost of components for manufactured products is greater than 55 percent of the total cost of all components, use the following instructions:

1. For components purchased by the manufacturer, the acquisition cost, including transportation costs to the place of incorporation into the manufactured product (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued).
2. For components manufactured by the manufacturer, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1), plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the manufactured product.

6. CONSTRUCTION MATERIALS.

6.1 Pursuant to Buy America Requirements, all Construction Materials are required to be produced in the United States. All manufacturing processes for the Construction Materials shall occur in the United States.

6.2 Definition

6.2.1 Construction materials means articles, materials, or supplies that consist of only one of the items listed in Section 6.2.1.1, except as provided in Section 6.2.1.2. To the extent one of the items listed in Section 6.2.1.1 contains as inputs other items listed in this section, it is nonetheless a construction material.

[2] M-24-02: Memorandum for the Heads of Executive Departments and Agencies, Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure, Page 15-16.

6.2.1.1 The listed items are:

1. Non-ferrous metals;
2. Plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
3. Glass (including optic glass);
4. Fiber optic cable (including drop cable);
5. Optical fiber;
6. Lumber;
7. Engineered wood; and
8. Drywall.

6.2.1.2 Minor additions of articles, materials, supplies, or binding agents to a construction material do not change the categorization of the construction material.

6.3 Standard

6.3.1 The Buy America Preference applies to the following construction materials incorporated into projects. Each construction material is followed by a standard for the material to be considered "produced in the United States."

1. Non-ferrous metals. All manufacturing processes, from initial smelting or melting through final shaping, coating, and assembly, occurred in the United States.
2. Plastic and polymer-based products. All manufacturing processes, from initial combination of constituent plastic or polymer-based inputs, or, where applicable, constituent composite materials, until the item is in its final form, occurred in the United States.
3. Glass. All manufacturing processes, from initial batching and melting of raw materials through annealing, cooling, and cutting, occurred in the United States.
4. Fiber optic cable (including drop cable). All manufacturing processes, from the initial ribboning (if applicable), through buffering, fiber stranding and jacketing, occurred in the United States. All manufacturing processes also include the standards for glass and optical fiber, but not for non-ferrous metals, plastic and polymer-based products, or any others.
5. Optical fiber. All manufacturing processes, from the initial preform fabrication stage through the completion of the draw, occurred in the United States.
6. Lumber. All manufacturing processes, from initial debarking through treatment and planing, occurred in the United States.
7. Drywall. All manufacturing processes, from initial blending of mined or synthetic gypsum plaster and additives through cutting and drying of sandwiched panels, occurred in the United States.
8. Engineered wood. All manufacturing processes from the initial combination of constituent materials until the wood product is in its final form, occurred in the United States.

6.3.2 Except as specifically provided, only a single standard under this section should be applied to a single construction material.

7. SECTION 70917(C) MATERIALS

7.1 The standards developed under BABA 70915(b) (1) shall not include cement and cementitious materials, aggregates such as stone, sand, or gravel, or aggregate binding agents or additives as inputs of the construction material. These are referred to as 70917(C) materials.

7.2 Definition

7.2.1 Section 70917(c) materials means cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives. See section 70917(c) of the Build America, Buy America Act.

7.3 These materials are exempt from Buy American Requirements.

8. BUY AMERICA COMPLIANCE.

8.1 On a given project, the Division shall not accept, approve, authorize, or make any payments to any Contractor not fully compliant with Buy America.

8.1.1 When Buy America Requirements apply, the Contractor shall furnish a notarized Certificate of Compliance signed by their official with knowledge and authority to certify that all applicable materials and products to be incorporated into the project, including those of any subcontractors and suppliers, are compliant with Buy America Requirements. This shall be done prior to the permanent incorporation of the materials into the project.

8.1.2 In the event of a change order which includes the addition of new materials, a new Certificate of Compliance shall be furnished to include the new materials.

8.1.3 The notarized Certificate of Compliance shall contain the following information:

8.1.3.1 Title: Buy America Certification of Compliance.

8.1.3.2 The Name, Address and Contact Information for the Contractor.

8.1.3.3 A contractor statement that demonstrates compliance with Buy America Requirements.

8.1.3.4 The Contract ID for the Material (if applicable).

8.1.3.5 Both the Federal and State Project Number for the Material (if applicable).

8.1.3.6 The name of the material referenced in the Certificate of Compliance. This material name shall be a clear, common name for the material as stated in the proposal. Part Numbers, etc., may also be on the document if the contractor wishes.

8.1.3.7 The Line Item for the Material (if applicable).

8.1.3.8 The Bid and/or Placed Quantity of the Material.

8.1.3.9 Signature of the Contractor and date.

8.1.3.10 A list of materials on the project that "Buy America" applies but are not Buy America compliant.

8.1.3.11 If the notarization occurs in the state of West Virginia, the document must be notarized as per the "West Virginia Notary Handbook."

8.1.3.11.1 If the notarization does not occur in West Virginia, the document must be notarized as per the respective state of origin's Notary Handbook equivalent.

8.2 Attachment 1 shows a sample Certificate of Compliance.

8.2.1 Multiple items may be listed on the Certificate of Compliance, though all the information for each line must be on the document.

8.2.2 A list of these materials may be referenced on an attached page as long as that page is also signed and notarized.

9. CERTIFICATE OF COMPLIANCE TOOL

9.1 The WVDOH has created an online tool to generate a Certificate of Compliance. This tool is available at the MCST AWP Webpage. The Contractor will select their contract, then generate the report. This report will then be signed and notarized as specified in this document, then submitted to the Project.

9.1.1 In the event of a change order which adds materials, a new Certificate of Compliance must be submitted to include any new material.

10. BUY AMERICA WAIVERS

10.1 Buy America Waivers are outlined in MP 106.10.51 as per "§ 184.7 Federal awarding agency's issuance of a Buy America Preference waiver" and "23 CFR 635.410(c)".

11. BUY AMERICA MATERIALS

11.1 Attachment 2 includes a list of materials and products used in WVDOH construction projects and the applicability of Buy America Requirements. This attachment also shows each category of each based on Section 3.1 of this document. Finally, if the material is not applicable to Buy America Requirements, justification is given. Example exemptions are as follows:

Temporary Material: Material is not permanently incorporated into the project.

11.1.1 This materials and products list may be updated by the Director of MCS&T as needed to ensure compliance with Buy America Requirements. Any update to this form will be in accordance with guidance from and through an affirmation process with FHWA.

11.1.2 Attachment 3 includes OMB Memorandum M-24-02[3], dated October 25, 2023, for additional guidance and as the source material for WVDOH's compliance.

[3] https://www.whitehouse.gov/wp-content/uploads/2023/10/M-24-02-Buy-America-Implementation-Guidance-Update.pdf

12. DOCUMENTATION OF BUY AMERICA CERTIFICATION OF COMPLIANCE

12.1 The Certificate of Compliance shall be placed in the QC Plan Folder in ProjectWise (or the current WVDOH approved document retention software) under the contract.

Michael Mance, P.E.
Director
Materials Control, Soils and Testing Division

MP 106.10.50 Steward – Materials Control Section
ATTACHMENTS

Buy America Certification of Compliance

Acme Construction Company
123 Main Street
Charleston, WV 25302

Ship Date: 10/31/2024

The below listed materials and products meets all the requirements of all Federal and State Laws for Buy America, including but not limited to: Chapter 5, Article 19 and Chapter 5A, Article 3 Section 56 of the West Virginia Code; 23 U.S.C. 313 Buy America, 23 CFR 635.410 Buy America Requirements, and Build America, Buy America Act, Section 70914.

This Certification of Compliance is for the material and project listed below:

CID: 22000005R1
Federal Number: B-0010(000)X
State Number: U002-00-1.00

Line: 0020	Widget, Part Q^{i}	500 Cubits
Line: 0025	Widget, Part H^{r}	300 Cubits

Non-Compliant Buy America Materials

Line: 0055	Widget, Part I^{z}	300 Cubits

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA

Charleston, WV 25304
My Commission Expires October 16, 2027

Janie Doe, Contractor President

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

PROCEDURE FOR DETERMINING A REDUCED UNIT PRICE TO BE PAID FOR UNDERDRAIN AGGREGATE WHICH DOES NOT CONFORM TO THE GRADING REQUIREMENTS OF THE GOVERNING SPECIFICATIONS

1. PURPOSE

1.1 This procedure will define a range of non-conformance in the grading of underdrain aggregate that would not be expected to affect its performance to an extent which would necessitate its removal from the project, and will provide a method for reducing the price to be paid for said nonconforming aggregate. Grading characteristics of underdrain aggregate shall be evaluated in accordance with MP300.00.51.

2. SCOPE

2.1 This procedure shall apply only to those aggregates specified for use for underdrains.

3. DEFINITION OF TERMS

3.1 Sublot: The quantity of material represented by a single test value. In the case where only one sample is needed for the total plan quantity, the sublot may be considered the LOT.

3.2 Lot: The quantity of material represented by an average test value. not to exceed five individual test values, calculated in accordance with MP 300.00.51.

3.3 Single test value: The results of testing a sample in accordance with AASHTO test methods T11 and T27.

4. ACCEPTANCE FOR GRADATION

The material shall be sampled and tested in accordance with MP 700.00.06. Acceptance for gradation shall be based on test results of consecutive random samples from a lot. A sublot is the quantity of material represented by a single gradation test as defined in MP 700.00.06. A lot shall be considered the quantity of material represented by an average test value, not to exceed five sublots. In the case where only one sample is needed for the total plan quantity, the sublot shall be considered the lot.

The average shall start on the second sample result. The average is continued for the third through fifth sample result, averaging all previous sample results. Thereafter, only the last consecutive five sample results will be averaged, i.e., second test value through sixth test value, third test value through seventh test value, and so forth as defined in MP 300.00.51.

4.1 When the test value of a lot and the test value of the last sublot, or when the last three consecutive individual test values of a lot fall outside the gradation limits of Table 704.6.2A in the current West Virginia Standard Specifications for Roads and Bridges, the lot of material represented will be considered nonconforming to the extent that the last of its sublots are nonconforming.

4.2 When a sublot is non-conforming and material in the sublot has been incorporated into the work, the sublot shall be tested in accordance with Section 6 to determine the necessity for removal and the price for the quantity of material represented by the nonconforming sublot shall be reduced in accordance with section 8. In no event, however, shall a sublot of material have its price adjusted more than once, and the first adjustment which is determined shall apply.

5. SAMPLING FREQUENCYAND TESTING

5.1 Sampling frequency and testing shall be in accordance MP 307.00.50.

6. ACCEPT OR REMOVE BASED ON DIAMETER OF PERCENT PASSING

6.1 When a sublot of material is nonconforming, the average value representing said sublot shall be plotted such that the relative size can be determined for the 85 percent passing (D_{85}) and the 15 percent passing (D_{15}). Plot the percent finer from the sieve analysis results on a graph with the particle size on the horizontal axis decreasing from left to right and the percent passing on the vertical axis increasing from bottom to top. Draw horizontal lines on the chart representing fifteen percent and eighty five percent passing. Draw vertical lines from the intercept of the gradation lines with fifteen and eighty five percent of the passing curve to the horizonal axis and read the diameter on the horizontal scale.

Thus determined, these values shall be entered in the following formulas:

D_{85} ~~D85~~ < 4 x D_{15}

D_{85} ~~D85~~ > size of pipe opening (perforation)

Where: D_{85} ~~D85~~ = 85 percent passing size
D_{15} ~~D15~~ = 15 percent passing size

If the above formulas are met such that the size at 85 percent passing is less than four (4) times the size at 15 percent passing, and the size at 85 percent passing is greater than the perforation size, then the following procedure shall apply. If one or both formulas are not met, then the material shall be removed from the project site at the Contractors' expense.

6.2 A sample calculation is shown in Attachment 1

7. DEGREE OF NONCONFORMANCE

7.1 When a sublot of material is to have its price adjusted, the percentage point difference between the nonconforming test value and the specification limit shall be determined for each sieve size determined to be nonconforming. The total measure of non-conformance is the sum of all non-conformances on the various sieves for that sublot

When the total degree of nonconformance has been established and it is 12.0 or less, the material will be paid for at an adjusted contract price as specified in Table 1.

Table 1

% of Non-Conformance	% Reduced Price
1.0 to 3.0	2%
3.1 to 5.0	4%
5.1 to 8.0	7%
8.1 to 12.0	11%

7.2 When the degree of nonconformance is greater than 12.0, the nonconforming sublot shall be resolved on an individual basis, requiring a special investigation by the Engineer to determine the appropriate course of action to be followed. Pending resolution of the matter, additional lifts of base or pavement shall not be placed over the nonconforming material.

8. DETERMINATION OF EQUITABLE ADJUSTMENT

8.1 When the total percent of non-conformance has been established and it is 12.0 or less, Table 1 shall be initiated. When the total percent of non-conformance is greater than 12.0, each nonconforming situation will be resolved on an individual basis, requiring a special investigation by the Engineer to determine the appropriate course of action to be followed.

8.2 Method of Equitable Reduction: Dollar reduction shall be calculated by the following formula:

$$A \times B \times C = D$$

(A) - Quantity of Nonconforming Sublot

(B) - Percent Reduction from Table 1

(C) - Unit Contract Price

(D) - Price Reduction.

Example Calculation

1. First, plot the gradation curve as shown in Figure 1.
2. On this Gradation Curve, draw a horizontal line at both 85% and 15% (the percent passing axis).
    a. These are shown in Red (85%) and Green (15%) in Figure 1.
3. Draw a vertical line at the intersection of the plot (Blue) and 85% line (Red)
4. Draw a vertical line at the intersection of the plot (Blue) and 15% line (Green)
5. Record the value along the horizontal axis as D_{85} and D_{15}.
    a. In Figure 2, these values are 21.5 mm and 3.5 mm. Excel may be used to calculate these values more precisely.

Figure 1

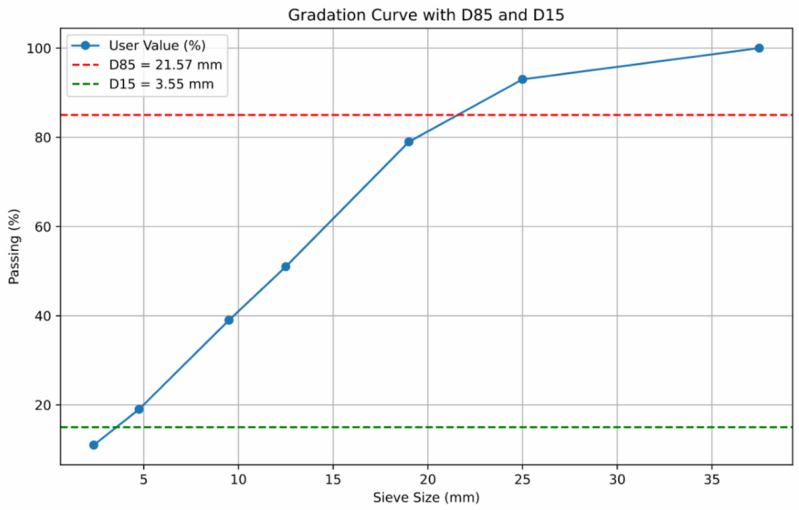
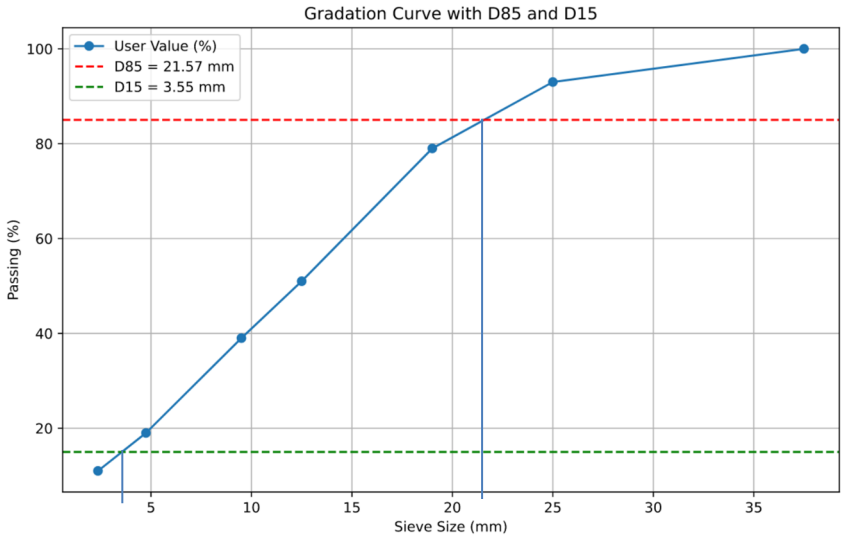


Figure 2



The calculations are as follows:

D_{85} = 21.5 mm

D_{15} = 3.5

Check 1:

Is D_{85} < 4 x D_{15}?

21.5 mm < 4 x 3.5 mm?

21.5 mm < 14 mm?

No – This does not meet.

Check 2:

Is D_{85} > Pipe Perforations

Pipe Perforations = 1.5 mm

21.5 mm > 1.5 mm?

Yes – This meets.

In order for this to remain in place both checks must be Yes. In this case, Check 1 is No, therefore this is remove and replace.