

Materials Procedures Committee Regular Meeting

Meeting Time/Date: October 26th, 10:00 AM

Meeting Location: MCS&T (Conference Rm.) - 190 Dry Branch Drive, Charleston, WV 25306

Online Meeting: Google Meet Video Conference

Online Link - (<https://meet.google.com/apa-rvti-ndx?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\2023\2023 10 26 MP Meeting](#)

Files Available on Webpage:

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

Materials Procedures – Approved at Last Meeting

1. 700.00.56 - Commercial and Potential Skid Resistant Aggregate Source Approval Procedures
2. Various QC Updates - Quality Control MPs: 307.00.50, 401.03.50, 601.03.50, 717.04.21
3. 601.03.50 - Guide for Quality Control and Acceptance Requirements for Portland Cement Concrete
4. 661.02.50 - Criteria to Approve Manufacturers of Aluminum Sheeting for Traffic Signs
5. 679.03.00 - Percent of Solids in the Latex Used in Latex Modified Compositions

Materials Procedures - Old Business

Number	Champion	Title	Description
1 - 712.21.26*	Jobes	Procedure For Determining the Random Location of Compaction Tests	Significant content changes from original document.
2 - 601.03.52*	Thaxton	Procedural Guidelines for Maintaining Control Charts for Portland Cement Concrete	Added example of control chart to match text.
3 - 106.00.02*	Brayack	Procedure for Evaluating Products for Use in Highway Construction	Update of APL stock language. Clarification of process and addition of timelines for process to occur.
4 - 715.09.20*	Mullins	Standard Method for Determining the Stability of Portable Sign Stands	New document for the testing of Temporary Traffic Signs.
5 - 106.10.50*	Brayack	WVDOH Buy America Acceptance Guidelines	Updates procedure to include the item number and description of material, not the AWP material code. Refines requirement for notarization of Certificate of Compliance (CoC). Adds Glass Beads, removes Joint Sealant, Hot-Poured for

			Concrete and Asphalt Pavements from CoC requirements
6 - 712.05.57*	Hanna	Criteria to Approve Fence Producer / Suppliers and their Materials.	Minor updates from previous version. Previous comments addressed.
7 - 100.00.00*	Brayack	Preparing Materials Procedures	Adds definitions for common terms to be used in MPs.
8 - 709.15.50*	Ratchford	Certification of Fabricators of Corrosion Resistant Coated Dowel Bars and Coated Dowel Bars in Basket Assemblies	Adds coated dowel bars; Updates acceptance criteria.
9 - 601.03.21*	Armes	Los Alamos Staining Method for Alkali Silica Reaction Gel	Defining method for identifying ASR in concrete.
10 - 601.03.22*	Armes	Damage Rating Index for Hardened Concrete	Describes quantification of damage done by ASR.
11 - 106.03.50* and Handbook (Attachment)	Harper	General Information Guide for Technician and Inspector Certification Program (TICP)	Update due to org structure (State Highway Engineer to Deputy Secretary). Other minor changes.
12 - 604.02.40*	Thaxton	Inspection and Acceptance Procedures for Precast Concrete Products	Ref docs updated, Update to requirement of final inspection and rejection, Section 7.3
13 - 658.05.06*	Whitmore	Ancillary Structure Anchor Bolt Tightening	Significant changes to update bolt tightening

Materials Procedures - New Business with Significant or Process Updates

1 - 700.00.53&	Brayack	Acceptance Procedure for Evaluating Independent Assurance Samples with Samples Used for Acceptance	Minor revision from previously approved version which moves the "Work Plan" to its own Materials Procedure.
2 - 700.00.56&	Brayack	Sampling And Testing Procedures for Independent Assurance Sampling	Work plan from 700.0053 moved to this new document.
3 - 700.00.54&	Brayack	Procedure For Evaluating Quality Control Sample Test Results with Verification Sample Test Results	Update from previously approved version which clarifies the terminology, specifically "Verification" sample which is performed by the DOH.

4 - 715.28.50&	Brayack	Seed Acceptance Criteria	Form from antiquities was referenced, but unavailable, new form created.
5 - 661.02.40&	Brayack	Inspection and Acceptance of Signing Material	Minor updates to align with general format and reference guidelines in MP 100.00.00.

Note 1: * Denotes this MP is up for Vote

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

Comments

Comments due October 19th, 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: November 1st

Meeting Time/Date: 10:00 AM, November 15, 2023

Meeting Location: MCST

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 2023:

November 15, December 13

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION
OF HIGHWAYS
MATERIALS DIVISION

MATERIALS PROCEDURE

PROCEDURE FOR DETERMINING THE RANDOM LOCATION OF COMPACTION TESTS

1. PURPOSE

- 1.1 This procedure provides methods for determining the random locations for soil and aggregate compaction tests on WVDOHT projects.
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2. SCOPE

- 2.1 This procedure is applicable for locating all compaction tests.
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3. EQUIPMENT

- 3.1 Measuring tape, approximately 50 feet.
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4. DEFINITIONS

- 4.1 Test Section- A test section is an isolated quantity of material used to determine the maximum density and optimum moisture content of the material using the roller pass method.
- 4.2 Lot- A lot is an isolated quantity of specified material from a single source or a measured amount of specified construction assumed to be produced by the same process.
-

5. PROCEDURE

- 5.1 Compaction test site locations are to shall be randomly located along the roadway centerline (length) and offset (width) randomly from this reference line. Some test site locations, such as pipe backfill, require random selection of lifts for the tests and a random determination of the side of the pipe backfill to test.
- 5.2 Selection of random numbers
- 5.2.1 Determine the number of test sites which will be required for the lot or test section.
- 5.2.2 The table of random numbers (Table 14 attached) or a calculator, which will generate random numbers, can be used.
- 5.2.3 The table of random numbers contains 5 sections with 2 columns of numbers in each section.

- 5.2.3.1 The first column of numbers in each section is for determining the test site along the centerline. The second column of numbers is for determining the distance from the centerline (offset). Either column of numbers can be used for selecting lifts to be tested.
- 5.2.3.2 To use the table, select a random point on the table by tossing a pencil upon the page or blindly pointing out a location with the finger. The selection of random numbers will consist of a pair of random numbers. Once the point is located, select the number in the first column for the length and the corresponding number in the right column for the width. When more than one pair of random numbers is needed, continue selecting the pairs of numbers down the page. If the bottom of the page is reached, go to the top of the next section to the right or to the top of the first section on the left side of the page if the bottom of the right most section of the page is reached. When selecting lifts to be tested, only single random numbers are needed and can be obtained from any of the columns of numbers.

5.2.3.3 To use a calculator, which will generate random numbers, select all numbers needed for a test site before selecting numbers for additional test sites.

5.2.3.3.52.3.4 Round to the nearest whole number when calculating the test site location.

5.3 Location of test sites

- 5.3.1 There are many variations in the required number of tests and the physical dimensions of the area to be tested.
- 5.3.2 Random location of tests on a single lift that rectangular in shape (Example 1 of Attachment).
- 5.3.2.1 Generally, the Materials Procedure used for testing a material and/or Specifications requires a lot, portion of a lot, or a test section to determine the maximum compacted density of a material to be divided into equal sublots or subsections when more than one test is required.
- 5.3.2.2 Divide the length of the area along the centerline by the number of tests to determine the length of each subplot or subsection.
- 5.3.2.3 From the beginning station number, add the length of the subsection or subplot to the station number to determine the station number for the beginning of the next subplot or subsection. Next add the length of the subsection or subplot to this station number to determine the station number at the beginning of the next subsection or subplot. Continue this procedure until the beginning station numbers for all subsections or sublots have been calculated.
- 5.3.2.4 Select the random numbers according to 4.2 through 4.2.3.3Section 4.5.2.
- 5.3.2.5 Multiply the length of the subsections or sublots by the random numbers selected for the length. Add the values to the corresponding station numbers for the beginning of each subsection or subplot. The station numbers locate the test sites along centerline.

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- 5.3.2.6 Next multiply the width of the test section or lot by the random numbers selected for the offset. The offset can be calculated from the left or right side of the test area and test location designated in relation to centerline. If the test site falls on the edge of the lot or subplot, move 2 feet into the lot and perform the test at that location. Alternatively, a new set of random numbers can be used to avoid this occurrence. ~~Determine the offset distance of the lot or test section from the centerline when the centerline is not within the area to be tested. This will usually be a constant value. Always calculate the offset by working from the side nearest the centerline. Add each of the values calculated in 4.2.7 to the constant value. The values establish the offset distance of each test site from the centerline. Designate rather the offset is left or right of centerline.~~
- 5.3.2.7 When the centerline is not contained within the area to be tested, the offset distance of the lot or test section from the centerline shall be determined. This will usually be a constant value. Always calculate the offset by working from the side nearest the centerline. Add each of the values calculated in 5.3.2.7 to the constant value. The values establish the offset distance of each test site from the centerline. Designate if the offset is left or right of centerline. ~~the offset can be calculated from the left or right side of the test area and test location designated in relation to centerline.~~
- 5.3.3 Random location of test sites on a single lift that is irregular in shape (Example 2 attached).
- 5.3.3.1 Determine the dimensions of the area to be tested.
- 5.3.3.2 Determine the minimum dimensions of a rectangle that will contain the area to be tested and has two sides parallel to centerline.
- 5.3.3.3 Divide the rectangle into the desired number of subsections or sublots and randomly locate the test sites locations as in sections 5.3.2. ~~4.3.2.8 above.~~ If a test site location falls outside the area to be tested, obtain a new set of random numbers for the test site and recalculate the test site location. Continue this procedure until the test site falls within the area to be tested.
- 5.3.4 Random selection of lifts to be tested (Example 3 attached).
- 5.3.4.1 When testing certain materials, especially backfill material, where an area to be backfilled will constitute a lot of material to be tested, a random selection of lifts shall be tested.
- 5.3.4.2 Determine the projected number of lifts to be contained within the lot. Divide the number of lifts by the number of tests in the lot. If the value is not an even number, assign an additional lift to the first subplot and continue to assign a lift to each consecutive subplot until all remaining lifts have been assigned to a subplot.
- 5.3.4.3 By starting with the bottom lift, number the lifts in the lot, select a single random number for each test site.
- 5.3.4.4 Multiply each random number by the number of lifts in each subplot and round the values to whole numbers. Each value designates which lift in each subplot that will be tested.
- 5.3.4.5 Once the lifts to be tested have been selected, the random location of the test site on the lift can be determined.
- 5.3.4.6 The test site location can be found by multiplying the length of the lot by the first column of random numbers in the section. The offset of the test site location can be calculated by

multiplying the second column of random numbers in the section by the width of the lot, if applicable.

5.3.5 Random selection of the side of backfill for pipe culverts.

5.3.5.1 When a lot of pipe backfill is being tested, tests shall be performed on both sides of the pipe. The side to be tested shall be randomly selected by using the random numbers selected for the location of the tests along the pipe. If the random number is less than 0.500, the test is on the left side and greater than or equal to 0.500 on the right side of the pipe.

5.3.5.2 The test site location's length is calculated by multiplying the denoted random number by the length of the lot of the pipe backfill.

Ronald L. Stanevich, P.E.
Director
Materials Control, Soils and Testing Division

TABLE 1 RANDOM NUMBERS

.858	.082	.886	.125	.263	.176	.551	.711	.355	.698
.576	.417	.242	.316	.960	.819	.444	.323	.331	.179
.687	.288	.835	.636	.596	.174	.866	.685	.066	.170
.068	.391	.739	.002	.159	.423	.629	.631	.979	.399
.140	.324	.215	.358	.663	.193	.215	.667	.627	.595
.574	.601	.623	.855	.339	.486	.065	.627	.458	.137
.966	.529	.757	.308	.025	.836	.200	.055	.510	.656
.608	.910	.944	.281	.539	.371	.217	.882	.324	.284
.215	.355	.645	.460	.719	.057	.237	.146	.135	.903
.761	.883	.771	.388	.928	.654	.815	.570	.539	.600
.869	.222	.115	.447	.658	.989	.921	.924	.560	.447
.562	.036	.302	.673	.911	.512	.972	.576	.838	.014
.481	.791	.454	.731	.770	.500	.980	.183	.385	.012
.599	.966	.356	.183	.797	.503	.180	.657	.077	.165
.464	.747	.299	.530	.675	.646	.385	.109	.780	.699
.675	.654	.221	.777	.172	.738	.324	.669	.079	.587
.279	.707	.372	.486	.340	.680	.928	.397	.337	.564
.338	.917	.942	.985	.838	.805	.278	.898	.906	.939
.316	.935	.403	.629	.130	.575	.195	.887	.142	.488
.011	.283	.762	.988	.102	.068	.902	.850	.569	.977
.683	.441	.572	.486	.732	.721	.275	.023	.088	.402
.493	.155	.530	.125	.841	.171	.794	.850	.797	.367
.059	.502	.963	.055	.128	.655	.043	.293	.792	.739
.996	.729	.370	.139	.306	.858	.183	.464	.457	.863
.240	.972	.495	.696	.350	.642	.188	.135	.470	.765

EXAMPLE 1-ENGLISH

Length of test section = 100 ft Width of section = 10 ft
Number of tests required = 5
4 equal subsections $100/5 = 20$ ft
Test section starts at station 5+46

Station number at the beginning of each subsection

- A. 5+46
- B. $5+46 + 20 = 5+66$
- C. $5+66 + 20 = 5+86$
- D. $5+86 + 20 = 6+06$
- E. $6+06 + 20 = 6+26$

Random Numbers

	Length	Width
A.	.869	.222
B.	.562	.036
C.	.481	.791
D.	.599	.966
E.	.464	.747

Multiply the length of each subsection by the random numbers for the length.

- A. $20 \times .869 = 17$
- B. $20 \times .562 = 11$
- C. $20 \times .481 = 10$
- D. $20 \times .599 = 12$
- E. $20 \times .464 = 9$

Add the values to the beginning station numbers of each subsection to determine the station number for each test.

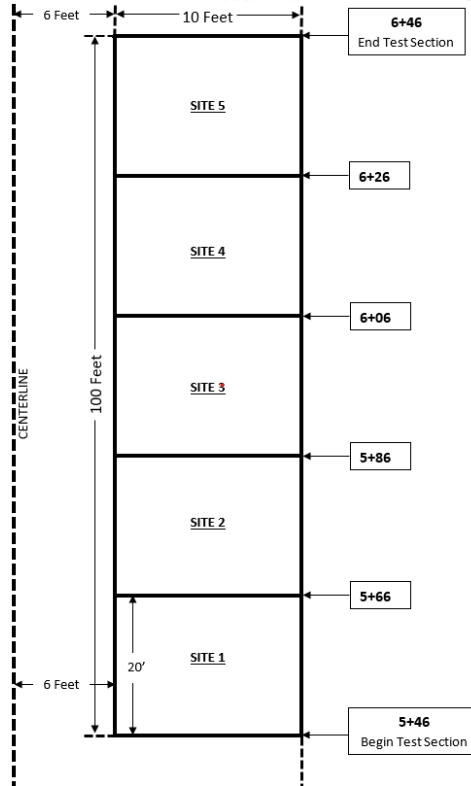
- A. $5+46 + 17 = 5+63$
- B. $5+66 + 11 = 5+77$
- C. $5+86 + 10 = 5+96$
- D. $6+06 + 12 = 6+18$
- E. $6+26 + 9 = 6+35$

Multiply the width of each subsection by the random numbers for the width.

- A. $10 \times .222 = 2$
- B. $10 \times .036 = 0$
- C. $10 \times .791 = 8$
- D. $10 \times .966 = 10$
- E. $10 \times .747 = 7$

Add the values to the constant distance the test section is from the centerline and label the values as right of centerline .

- A. $6 + 2 = 8$ ft right of centerline
- B. $6 + 0 = 0$ ft right of centerline → Test shall be taken 2 ft right of centerline
- C. $6 + 8 = 14$ ft right of centerline
- D. $6 + 10 = 16$ ft right of centerline
- E. $6 + 7 = 13$ ft right of centerline



MP 712.21.26 - ATTACHMENT
SIGNATURE DATE
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| [Metric example deleted](#)

MP 712.21.26 - ATTACHMENT
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EXAMPLE 3

21 lifts of material are required to backfill the pipe.

All of the backfill material is included in 1 lot. There are 5 tests required with 1 test in each subplot.

Divide the number of lifts by the number of sublots to determine the number of lifts in each subplot (21/5 = lifts with 1 lift left over). This includes the lift in subplot number 1.

Sublot Number 1	Lifts 1 – 5
Sublot Number 2	Lifts 6 - 9
Sublot Number 3	Lifts 10 - 13
Sublot Number 4	Lifts 14 - 17
Sublot Number 5	Lifts 18 – 21

Random numbers for lift selection.

- A. .599
- B. .464
- C. .675
- D. .279
- E. .338

Multiply the number of lifts in the subplot by the random numbers.

The values determine which lift in each subplot to test.

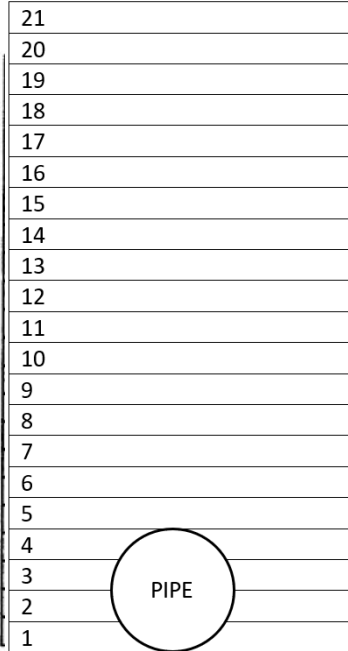
- | | |
|-----------------|---|
| A. 5 x .599 = 3 | Test lift 3 in subplot number 1, Lift number 3 |
| B. 4 x .464 = 2 | Test lift 2 in subplot number 2, Lift number 7 |
| C. 4 x .675 = 3 | Test lift 3 in subplot number 3, Lift number 12 |
| D. 4 x .279 = 1 | Test lift 1 in subplot number 4, Lift number 14 |
| E. 4 x .338 = 1 | Test lift 1 in subplot number 5, Lift number 18 |

<u>Test location</u>		
<u>Length</u>	<u>Width</u>	
<u>A. .627</u>	<u>.595</u>	
<u>B. .458</u>	<u>.137</u>	
<u>C. .510</u>	<u>.656</u>	
<u>D. .324</u>	<u>.284</u>	
<u>E. .135</u>	<u>.903</u>	

Multiply the first column of numbers by the length of the subplot. Then multiply the second column by the width of the subplot. For this example, the subplot shall be 75 ft long and 10 feet wide, with the centerline being placed on the right side of the trench.

- | | |
|-----------------------------|--|
| <u>A. .627 x 75 = 47 ft</u> | <u>.595 x 10 = 6 feet left of centerline</u> |
| <u>B. .458 x 75 = 34 ft</u> | <u>.137 x 10 = 1 foot left of centerline</u> |
| <u>C. .510 x 75 = 38 ft</u> | <u>.656 x 10 = 7 feet left of centerline</u> |
| <u>D. .324 x 75 = 24 ft</u> | <u>.284 x 10 = 3 feet left of centerline</u> |
| <u>E. .135 x 75 = 10 ft</u> | <u>.903 x 10 = 9 feet left of centerline</u> |

CROSS SECTION OF PIPE BACKFILL



CENTERLINE

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

MATERIALS PROCEDURE

PROCEDURAL GUIDELINES FOR MAINTAINING CONTROL CHARTS
FOR PORTLAND CEMENT CONCRETE

1. PURPOSE

- 1.1 To establish guidelines for developing and maintaining control charts to evaluate consistency, percent entrained air, strength characteristics, and the ~~T_{total} Solids~~ Solids ~~A-bar A~~ or optimized aggregate gradation of portland cement concrete.

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2. SCOPE

- 2.1 These procedures shall be applicable in all instances in which they can be reasonably and logically applied. For consistency, air, and strength, the applicability will normally depend on the quantity of material used, the continuity of delivery, etc. Control charts for ~~T_{total} Solids~~ A or optimized aggregate gradation shall be maintained for all concrete designs used on state work by a concrete producer.

3. REFERENCED DOCUMENTS

- 2.13.1 MP 601.03.50 Guide for Quality Control and Acceptance Requirements for Portland Cement Concrete

3.4. GENERAL PROCEDURE

- ~~3.14.1 Control charts will be maintained at locations where the test samples are taken.~~

~~Control charts shall be maintained at the project office or at the testing site where applicable.~~

- ~~3.24.2 Control charts will be prepared on a 10 x 10 cross section paper with a width of approximately 560 mm for the sheet presenting the charts for consistency, percent entrained air, and strength characteristics. A separate sheet of sufficient width shall be used to accommodate the control charts for the total solids A for concrete mix designs. A chart length of approximately 760 mm should be displayed at all times. When standard cross section sheets are used, the most recent sheet will be displayed and the previous sheets will be placed chronologically in a holder.~~

~~Charts for consistency, air, and strength shall have the item number and/or description of the material noted on the top of the chart and will be visible at all times. Charts will have the design number and class of concrete visible at all times.~~

- ~~3.34.3 Charts for consistency, air, and strength shall have the item number and/or description of the material noted on the top of the chart and will be visible at all times. charts will have the design number and class of concrete visible at all times.~~

4.5. CHART PREPARATION

~~4.15.1~~ ~~At the beginning and end of each sheet (or the length of the displayed portion), vertical red lines will be drawn between the limits of the specification or tolerance; an arrow will be placed at the end of the vertical lines; the specification limits will be written above and below the arrows and the name of the property being graphed and the scale will be indicated between the limits on the left edge of the chart. See Attachment 1 and 2 for typical arrangements.~~

~~Control charts may be prepared by hand on paper, computer generated, or as deemed appropriate by the Division.~~

~~4.1.15.1.1~~ ~~When standard cross section sheets are used, the most recent sheet will be displayed, and the previous sheets will be placed chronologically in a holder.~~

~~4.1.25.1.2~~ ~~At the beginning and end of each sheet (or the length of the displayed portion), vertical red lines will be placed between the limits of the specification or tolerance; an arrow will be placed at the end of the vertical lines; the specification limits will be noted above and below the arrows and the name of the property being graphed and the scale will be indicated between the limits on the left edge of the chart. See Appendix Attachments 1 and 2 for typical arrangements.~~

4.25.2 Scale Hand Drafted Charts

~~4.2.15.2.1~~ ~~Consistency—One division of vertical scale will represent 5.0 mm of slump, or 5.0 mm of ball penetration (25 mm – 50 mm).~~

~~Hand drafted charts will be prepared on a 10 x 10 grid with a width of approximately 22 in for the sheet presenting the charts for consistency, percent entrained air, and strength characteristics. A separate sheet of sufficient width shall be used to accommodate the control charts for the **Total Solids A** total solids A or optimized aggregate gradation for concrete mix designs. A chart length of approximately 30 in should be displayed at all times.~~

~~4.2.25.2.2~~ ~~Air Content—One division of vertical scale will represent one-tenth of a percentage point of entrained air (25 mm – 1%).~~

~~The general construction of the control charts shall be the same as described in section 4.4 and 4.5.~~

~~4.2.35.2.3~~ ~~4.2.3 Strength—One division of vertical scale will represent 1 MPa (25 mm = 10 MPa) compressive or 69 KPa (25 mm = 1 MPa) flexural strength.~~

~~4.2.45.2.4~~ ~~4.2.4 Total solids A—One division of vertical scale will represent .01 (25 mm = 0.1) when the coarse aggregate size is 57, 7, 78, or 8 and .02 (25 mm = 0.2) when the coarse aggregate size is Number 3.~~

4.35.3 Plotting Test Data Computer Generated Charts

~~4.3.15.3.1~~ Symbols and Color Code—Individual test values will be plotted in blue using the symbol "o", with the circle being approximately 2.5 mm in diameter. Average test values for consistency, percent air, and strength as well as the averages of consecutive five test values for total solids A shall be plotted in red using the symbol "o", with the square being approximately 2.5 mm on each side. Independent Assurance test values developed by the Division, including record samples, will be plotted in green using the symbol "r" with the sides of the triangle being approximately 2.5 mm.

Standard computer-generated charts allowing hand plotting, or computer plotting of individual data may be used.

~~4.3.25.3.2~~ Arrangement of Data—All data developed on a production day will be plotted on one heavy, vertical line, however, when two or more individual test values developed on the same production day have the same magnitude, the symbols may be plotted side-by-side on the same horizontal division line. All test data for a characteristic developed on a production day, exclusive of any independent testing conducted by the Division, will be averaged, and the average value plotted on the same vertical line as the individual test values. When an average value and an individual test value have the same magnitude, the plotted symbols may be superimposed.

When charts are computer generated, they shall be printed in color with data plotted to scale; and displayed as described in 4.4 and 4.5 except it shall be printed on 8 ½ "x11" paper.

~~4.3.35.3.3~~ When individual test values fall outside the specification limits, an arrow will be placed on the plotted symbol pointing in the direction of the specification limit.

~~4.3.45.3.4~~ As test data are developed on following production days, it will be plotted on successive heavy vertical lines, 25 mm apart, progressing from left to right across the control chart. As successive averages for consistency, percent air, and strength characteristic are plotted, the symbol "o" will be connected with a heavy red solid line. For total solids A control chart the moving average is the average of five consecutive test values and is determined by starting with the fifth test value and averaging it with the four preceding test values. The moving average of five symbol "o" will be connected with a heavy red solid line. Individual test values will have the symbol "o" connected with a dashed blue line.

~~4.3.55.3.5~~ At the bottom of the cross-section paper and immediately to the left of the heavy vertical line on which the test data are plotted, the date of sampling and initials of the individual plotting the test data will be recorded.

4.45.4 Scale

~~4.4.15.4.1~~ Consistency - One division of vertical scale will represent $\frac{1}{4}$ in. of slump ($\frac{1}{10}$ in. - $\frac{1}{4}$ in.)

4.4.25.4.2 Air Content - One division of vertical scale will represent one-tenth of a percentage point of entrained air (1 in. = 1%).

4.4.35.4.3 Strength - One division of vertical scale will represent 100 PSI (1 in. = 1000 PSI) compressive or 10 PSI (1 in. = 100 PSI) flexural strength.

5.4.4 ~~Total~~ Total Solids ~~A~~ or optimized aggregate gradation - One division of vertical scale will represent .01 (1 in. = 0.1) when the coarse aggregate size is 57, 7, 78, or 8 and .02 (1 in. = 0.2) when the coarse aggregate size is Number 3.

~~4.4.4 solids A or optimized aggregate gradation - One division of vertical scale will represent .01 (1 in. = 0.1) when the coarse aggregate size is 57, 7, 78, or 8 and .02 (1 in. = 0.2) when the coarse aggregate size is Number 3.~~

4.55.5 Plotting Test Data

4.5.15.5.1 Symbols and Color Code - Individual test values will be plotted in blue using the symbol "O", with the circle being approximately 0.1 in. in diameter. Average test values for consistency, percent air, and strength as well as the averages of consecutive five test values for ~~Total Solids A~~ total solids A shall be plotted in red using the symbol, "□" with the square being approximately 0.1 in. on each side. Independent Assurance test values developed by the Division, including record samples, will be plotted in green using the symbol "△" with the sides of the triangle being approximately 0.1 in..

4.5.25.5.2 Arrangement of Data - All data developed on a production day will be plotted on one heavy, vertical line, however, when two or more individual test values developed on the same production day have the same magnitude, the symbols may be plotted side-by-side on the same horizontal division line. All test data for a characteristic developed on a production day, exclusive of any independent testing conducted by the Division, will be averaged, and the average value plotted on the same vertical line as the individual test values. When an average value and an individual test value have the same magnitude, the plotted symbols may be superimposed.

4.5.35.5.3 When individual test values fall outside the specification limits, an arrow will be placed on the plotted symbol pointing in the direction of the specification limit.

4.5.45.5.4 As test data are developed on following production days, it will be plotted on successive heavy vertical lines, 1 in. apart, progressing from left to right across the control chart. As successive averages for consistency, percent air, and strength characteristic are plotted, the symbol "□" will be connected with a heavy red solid line. For total solids ~~AA~~ control chart the moving average is the average of five consecutive test values and is determined by starting with the fifth test value and averaging it with the four preceding test values. The moving average of five symbol "□" will be connected with a heavy red solid line. Individual test values will have the symbol "O" connected with a dashed blue line.

4.5.55.5.5 At the bottom of the cross section paper and immediately to the left of the heavy vertical line on which the test data are plotted, the date of sampling and initials of the individual plotting the test data will be recorded.

5.6. **FAILING TESTS**

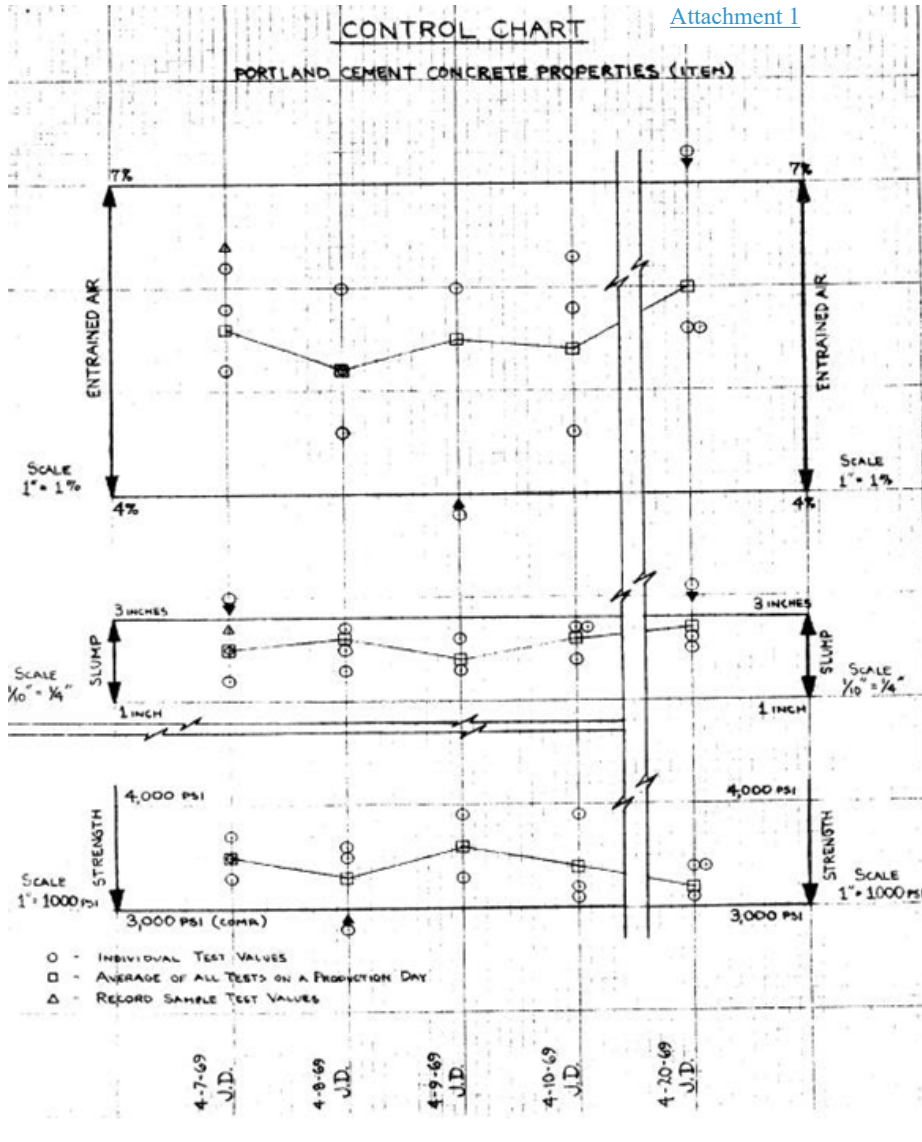
- 5.16.1 When individual test values fall outside the specification limits, this information will immediately be made available to the supervisory personnel of both the Contractor and the Division.
- 5.26.2 Should the moving average of any five consecutive gradation tests of the total solids have an Total Solids A A fall outside the specified design mix A tolerance, action required by the Specification will be taken. When appropriate action has been taken to bring the Total Solids A A back within tolerance, the first individual production sample that is within tolerance shall be used to start a new moving average.
- 5.2.1 Should the moving average of any five consecutive combined aggregate gradation tests have a working range outside of the limits sets forth on Table 601.3.2.4.1B, action required by the Specification will be taken. When appropriate action has been taken to bring the working range back within tolerance, the first individual production sample that is within tolerance shall be used to start a new moving average.

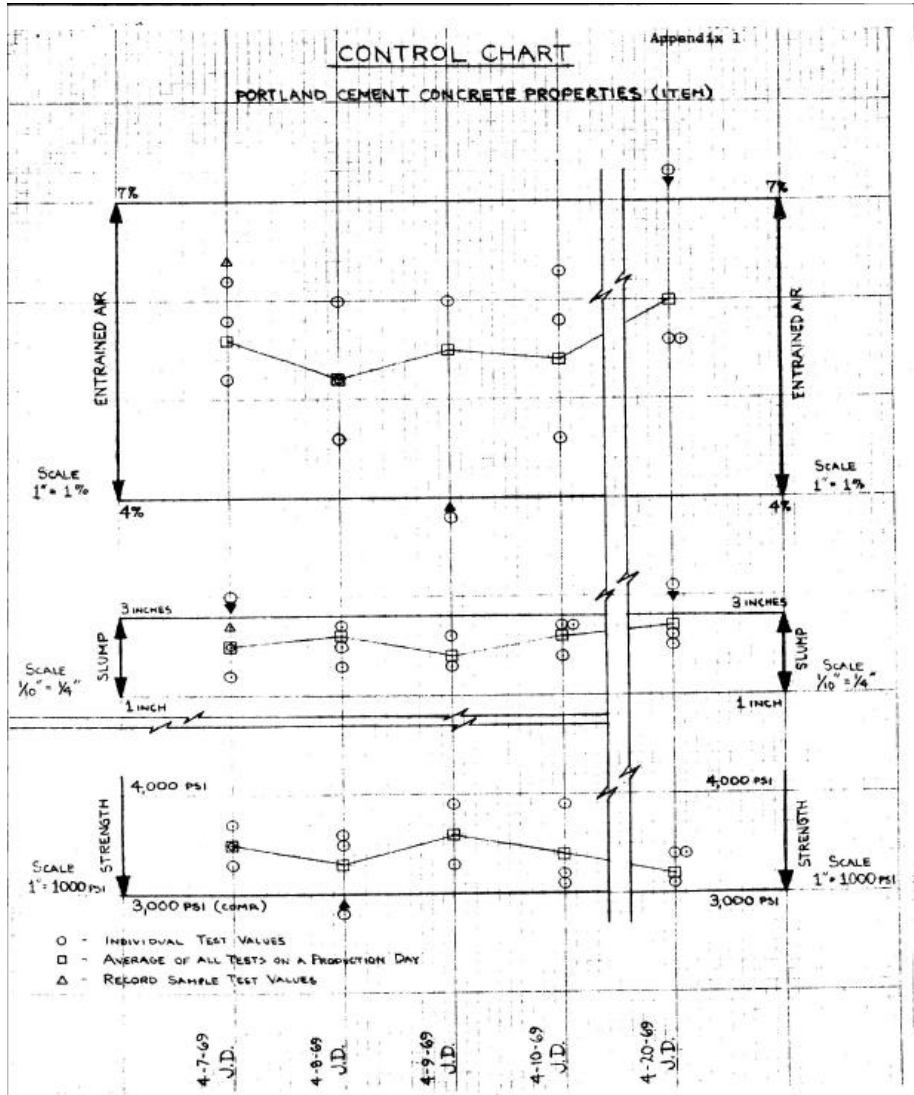
Ronald L. Stanevich, P.E.
Director
Materials Control, Soils and Testing Division

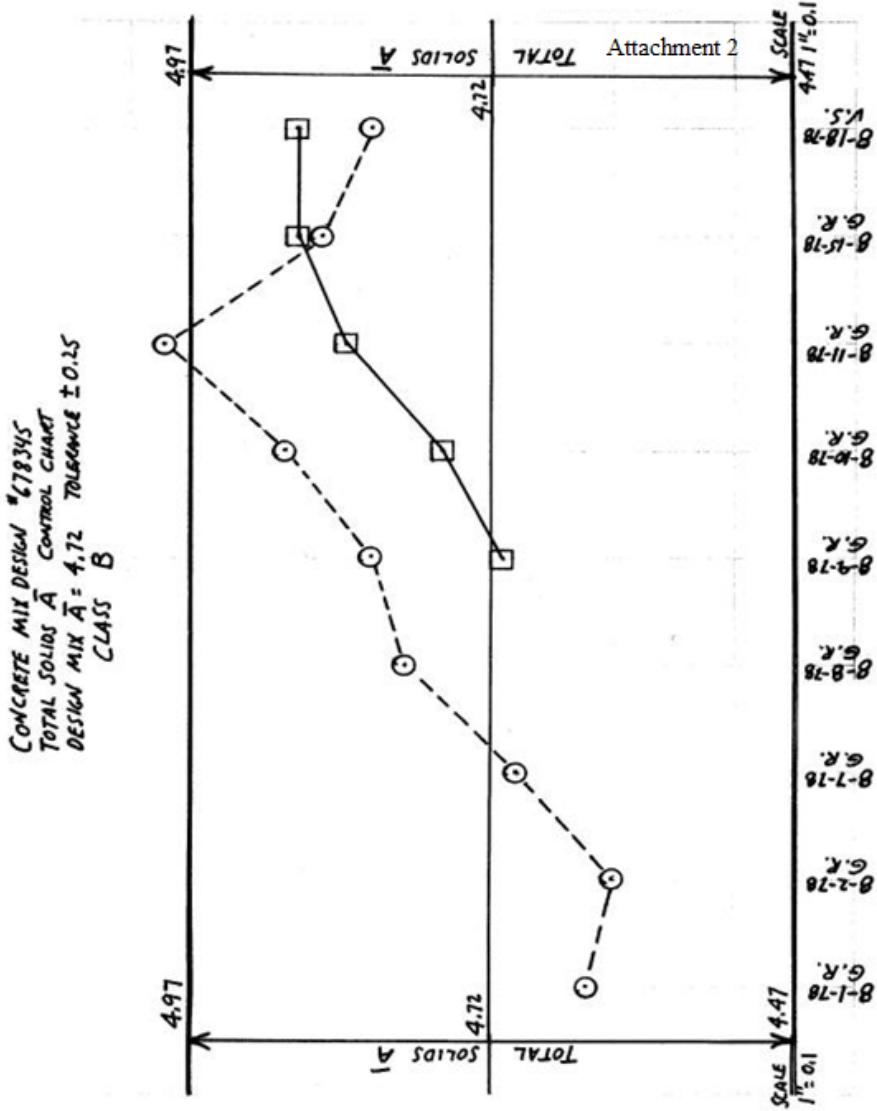
MP 601.03.52 Steward – Cement and Concrete Section
RLS:TI
ATTACHMENT

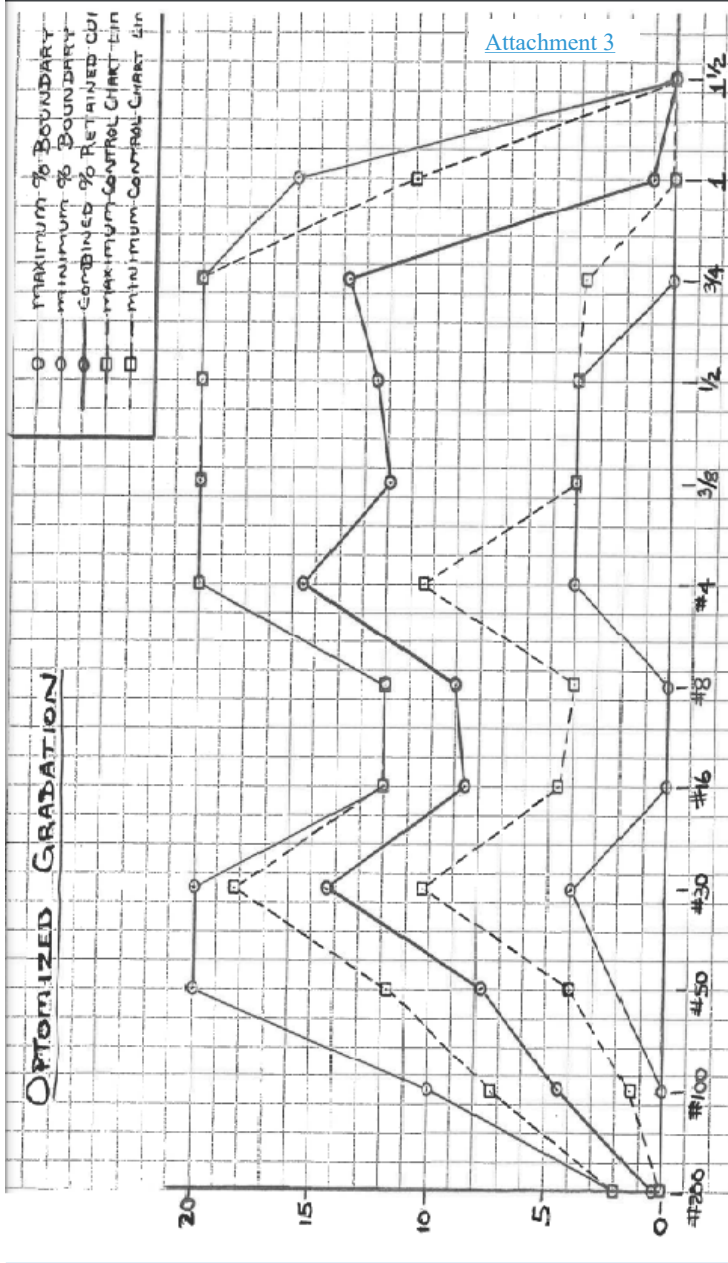
Hand Drafted Charts

Attachment 1







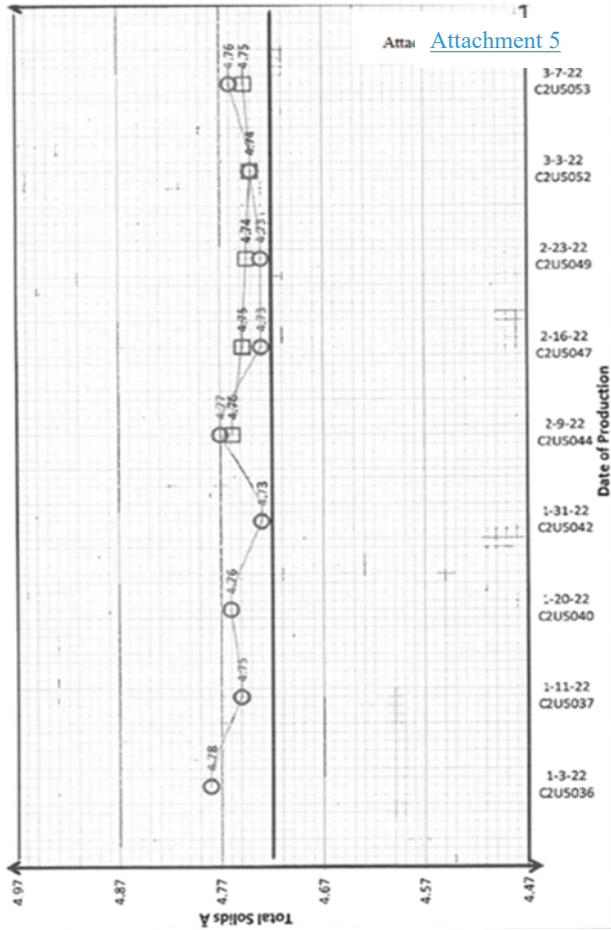


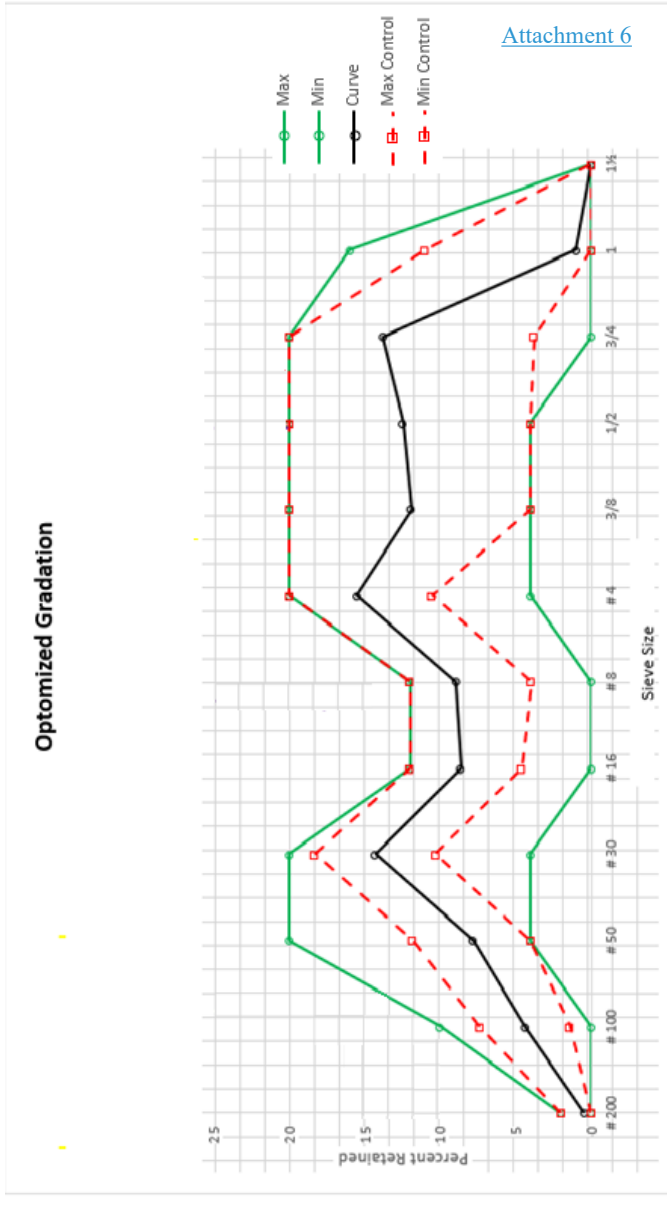
Computer Generated Charts

Att Attachment 4



A-Bar





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).
-

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.
- 2.2.3 MP 100.00.02: Method of Evaluation of Non-Standard Or Non-Conforming Materials In Construction Via St-1
-

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.
-

4. SUBMISSION OF PRODUCT

- 4.1 Consideration for new product evaluation shall be requested through completion by the MS&Ps of West Virginia Division of Highways (DOH) Form HL-468, "Preliminary Information for New Product Evaluation". Once completed, DOH Form HL-468 shall be submitted to the Materials Control, Soils and Testing Division (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.

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

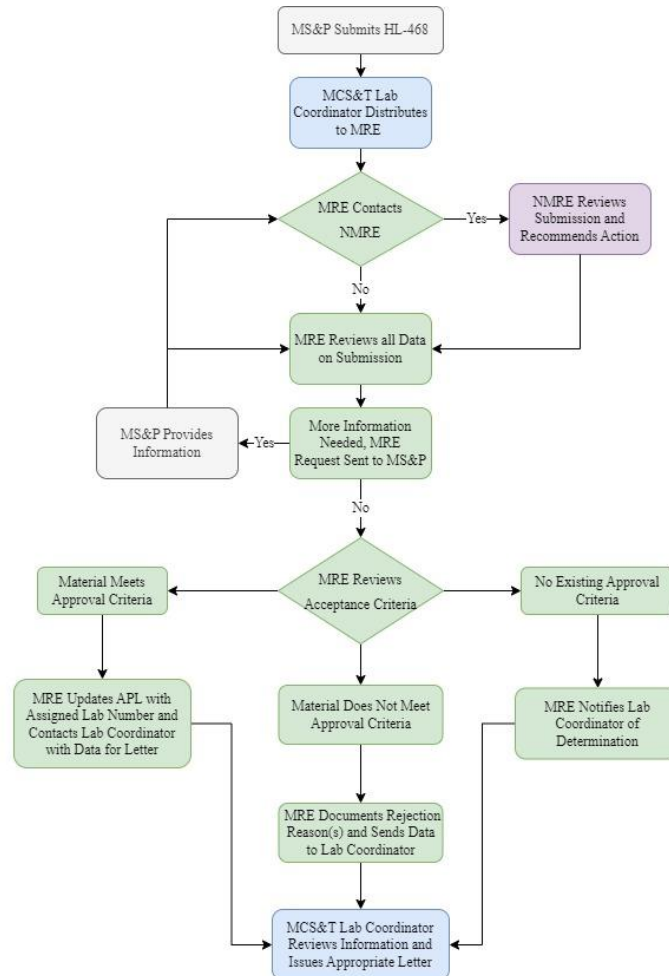
5. REVIEW OF SUBMITTED PRODUCT

- 5.1 Upon receipt of the completed Form HL-468, the Materials Control, Soils and Testing 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 approving 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 the product may be accepted without further evaluation, the Product shall be considered accepted and added to the APL.
- 5.3 If the reviewing entity determines that the WVDOH does not currently have any specifications for the submitted product, a “No-APL” letter shall be issued, ~~which is a non-approval. The issuance of this letter does not mean the product cannot be used on a project, but rather, another acceptance method may be used to accept the material. The acceptance criteria in this case is typically an ST-1 as described in MP 100.00.02.²~~
- 5.4 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.
- 5.4.1 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.
- 5.5 If the evaluation indicates that the product is not acceptable, the Manufacturer/Supplier shall be notified by MCS&T. The MS&P shall not submit the same product for evaluation during the same calendar year.
- 5.6 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.
- 5.7 Sample language for submission responses is shown in Attachment 2.

² <https://transportation.wv.gov/highways/mcst/Pages/MP-100s.aspx>

5.8 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

6. DOCUMENTATION OF APPROVED PRODUCTS

6.1 MCS&T shall maintain a directory on the [Division's APL Webpage](https://transportation.wv.gov/highways/mcst/Pages/APL_By_Number.aspx)³ listing all the current approved products.

6.1.1 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 Approved Product List.

³ https://transportation.wv.gov/highways/mcst/Pages/APL_By_Number.aspx

7. REMOVAL OF PRODUCT FROM APL

- 7.1 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 MCS&T approved product list.
- 7.2 In this instance, the reviewing entity shall notify the MS&P.

8. BUY AMERICA

- 8.1 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.
- 8.1.1 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.
- 8.1.2 Under no circumstance shall the CoC described above be used for Buy America compliance on a project. Each project must submit a CoC as described in MP 106.10.50 "WVDOH Buy America Acceptance Guidelines."
- 8.2 A notarized CoC shall contain the following information:
- 8.2.1 Title: Certification of Buy America compliance for Source Approval.
- 8.2.2 The Name, Address and Contact Information for the Company.
- 8.2.3 The date of the application
- 8.2.4 A company statement that demonstrates compliance with Buy America.
- 8.2.5 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. Part Numbers etc. may also be on the document if the company wishes.
- 8.2.6 Signature of the Company Official and date.
- 8.3 The document must be notarized.
- 8.4 A sample of this CoC document is provided in Attachment 3.

Ronald L. Stanevich, PE, Director
Materials Control, Soils & Testing Division

ATTACHMENT 1 - SAMPLE HL-468 FORM

<For Committee, No Changes to this Form>

See <https://transportation.wv.gov/highways/mcst/Pages/tbox.aspx>

Attachment 2: Sample APL Response Language

1. NO APL RESPONSE:

The West Virginia ~~Division of Highway~~Department of Transportation (WVDOH/WVDOT) 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; The the WVDOH WVDOT does not currently have a ~~specification~~ Specification or Materials Procedure which applies to your product, and therefore cannot approve this product on an “Approved Product List.

~~We do feel that the product may be beneficial for use on WVDOH projects.~~ The inclusion of the material into project designs does not rest with this Division, though it may be, but we have no objections to it being specified by at the discretion of WVDOH WVDOT Designers or requested to be used by Contractors. If a contractor would propose to use it on a WVDOH WVDOT project, or if the product is specified in WVDOH Contract Documents, this product may be used, pending an individual evaluation on that project.

2. NON-APPROVAL RESPONSE

This material was submitted to the West Virginia Department of Transportation (WVDOT) ~~Division of Highways (WVDOH)~~ for consideration in accordance with Materials Procedure 106.00.02.

This letter is to notify you that the WVDOH WVDOT has elected to not approve this product currently. As per Section <XXX> of the Standard Specifications Roads and Bridges, “<Description of Non-Approval Reason>.”

3. APPROVAL RESPONSE

Department of Transportation (WVDOT) ~~West Virginia Division of Highways (WVDOH)~~ Laboratory Approval Numbers 2XXXXXX has been issued to your company <Name of Company >, for the above-mentioned product. The approval number, effective Date 15, 20XX, must appear on all shipping documentation for said product supplied to ~~the West Virginia Department of Transportation (WVDOT), Division of Highways projects~~ WVDOT Projects.

ATTACHMENT 3: SAMPLE COMPLIANCE FORM
**Certification of Buy America, Build America Compliance
For Source Approval**

Acme Manufacturing Company
123 Main Street
Charleston, WV
25302

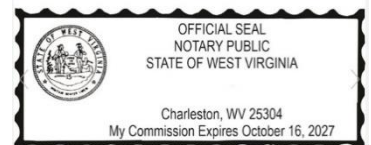
HL 468 Submission Date: 10/31/2022

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

STANDARD METHOD FOR DETERMINING THE STABILITY
OF PORTABLE SIGN STANDS

1. PURPOSE

- 1.1 To establish a procedure for determining the stability (acceptable wind resistance) for portable sign stands.
-

2. SCOPE

- 2.1 This procedure shall apply to all portable sign stands submitted for inclusion on the Division's Approved Products List (APL).
- 2.2 This testing shall be done in addition to the MASH testing as described in the Specifications.
-

3. REFERENCED DOCUMENTS

- 3.1 MP 106.00.02 - Procedure for Evaluating Products/Processes for Use in Highway Construction.
- 3.2 MP 106.00.21 - Acceptance Procedure for Mash Compliant Roadside Departure Hardware.
-

4. SUBMISSION OF PRODUCTS

- 4.1 Prospective Producers/Suppliers shall complete form [HL-468¹](#) , as per MP 106.00.02 indicating intention to be included on the WVDOH APL.
-

5. TESTING PROCEDURE

- 5.1 The manufacturer's portable sign stand shall be assembled according to the manufacturer's instructions on a firm concrete or asphalt surface with legs contracted (for 36 inch signs).
- 5.1.1 The testing technician shall inspect the device to ensure that it is functioning properly as per the manufacturer's standards.

¹ <https://transportation.wv.gov/highways/mcst/Pages/tbox.aspx>

- 5.2 Stands shall be secured such that there is no potential for sliding. This securing mechanism shall in no way alter the stability of the stand.
- 5.3 Attach the dynamometer force gauge to the top of the sign stand 60 inches above the bottom of the sign. If the stand does not have a solid mast at that height, insert a testing rod into the stand for a solid anchor point. With an even motion, parallel to the ground surface at a 90-degree angle to the back of the sign, measure the force required to “tip-over” the sign.
- 5.3.1 A final pulling force shall be recorded as the maximum force exerted before the sign becomes unstable and falls.
- 5.4 Repeat the above step two more times and calculate the average of the 3 readings.
- 5.5 The acceptable minimum value shall be 7 lbs.
- 5.6 The manufacturer’s portable sign stand shall be assembled according to the manufacturer’s instructions on a firm concrete or asphalt surface with legs fully extended (for 48 inch signs).
- 5.6.1 The testing technician shall inspect the device to ensure that it is functioning properly as per the manufacturer’s standards.
- 5.7 Stands shall be secured such that there is no potential for sliding. This securing mechanism shall in no way alter the stability of the stand.
- 5.8 Attach the dynamometer force gauge to the top of the sign stand 60 inches above the bottom of the sign. If the stand does not have a solid mast at that height, insert a testing rod into the stand for a solid anchor point. With an even motion, parallel to the ground surface at a 90-degree angle to the back of the sign, measure the force required to “tip-over” the sign.
- 5.8.1 A final pulling force shall be recorded as the maximum force exerted before the sign becomes unstable and falls.
- 5.9 Repeat the above step two more times and calculate the average of the 3 readings.
- 5.10 The acceptable minimum value shall be 18 lbs.

6. APPROVAL OF PORTABLE SIGN STANDS

- 6.1 The results of the described test as well as the MASH testing results shall be presented to the Roadway Departure Task Force. The approval of these items shall be at the discretion of this Task Force as described in MP 106.00.21.

SIGNATURE BLOCK

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 Sections 2.2, 2.3 and 2.4 of this document.
-

2. REFERENCED DOCUMENTS

- ~~2.1~~ ~~WVDOH Standard Specifications, Current Edition.~~
- ~~2.22.1~~ 23 U.S.C. 313 and 23 CFR 635.410 “Buy America Requirements.”
- ~~2.32.2~~ Chapter 5, Article 19 and Chapter 5A, Article 3, Section 56 of the West Virginia Code, entitled “West Virginia American Steel Act of 2001.”
- ~~2.42.3~~ Build America, Buy America Act, Section 70914.
- ~~2.4~~ Office of Management and Budget (OMB) Memorandum M-22-11, dated April 18, 2022.
- 2.5 West Virginia Notary Handbook, Current Edition.
-

3. ACCEPTANCE OF MATERIALS

- 3.1 This procedure applies to the following:
1. Steel and Iron
 2. Manufactured Products
 3. Construction Materials
- 3.2 Unless there is an approved exception as outlined in this MP, all applicable materials on construction projects shall conform to the requirements of Section 106.1 of the WVDOH Standard Specifications.
- 3.3 Buy America Requirements only apply to articles, materials, and supplies that are permanently incorporated into the project. It does not apply to materials brought to the construction site, and removed at, or before the completion of the infrastructure project, such as tools, equipment, temporary scaffolding, or traffic control devices.
- 3.4 For the purpose of complying with Buy America Requirements, a material or product should only be classified into one of the three categories listed in Section 3.1.
- 3.5 Steel and Iron.

- 3.5.1 Pursuant to Buy America Requirements, all manufacturing processes for steel and iron materials must take place in the United States. This includes all processes from the initial melting stage through application of coatings.
- 3.6 Manufactured Products.
- 3.6.1 Pursuant to Buy America Requirements, all Manufactured Products must be produced in the United States, and the cost of the components of the Manufactured Product that are mined, produced, or manufactured in the United States shall be greater than 55 percent of the total cost of all components of the Manufactured Product.
- 3.6.2 The Federal Highway Administration (FHWA) has a longstanding waiver in effect exempting Manufactured Products from Buy America Requirements.
- 3.7 Construction Materials.
- 3.7.1 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.
- 3.7.2 Construction Materials includes any article, material, or supply that is or consists primarily of: non-ferrous metals; plastic and polymer-based products (including PVC, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber; or drywall.
- 3.7.3 Construction Materials does not include items of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregate such as stone, sand, or gravel; or aggregate binding agents or additives.
- 3.7.4 Items that consist of two or more of the listed Construction Materials that have been combined together through a manufacturing process shall be treated as a Manufactured Product.
- 3.7.5 Items that consist of at least one of the listed Construction Materials that have been combined together through a manufacturing process with another material that is not listed shall be treated as a Manufactured Product.
- 3.8 Buy America Certification.
- 3.8.1 When Buy America Requirements apply, the Contractor shall furnish a notarized Certificate of Compliance signed by ~~a company official~~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.
- 3.8.2 The Division shall not authorize or make any payments to any Contractor not fully compliant with this requirement. Any payment made to any Contractor who did not fully comply with this requirement shall be recovered by the Division.
- 3.8.3 The notarized Certificate of Compliance shall contain the following information:
- 3.8.3.1 Title: Buy America Certification of Compliance.
- 3.8.3.2 The Name, Address and Contact Information for the ~~Company~~Contractor.

~~3.8.3.3 The Name of the Customer.~~

~~3.8.3.4 The shipping date of the material.~~

~~3.8.3.5~~ 3.8.3.3 A company contractor statement that demonstrates compliance with Buy America Requirements.

~~3.8.3.6~~ 3.8.3.4 The statement: “In the event where a supplied material does not meet applicable Buy America Requirements, any payments made for the associated material shall be returned to the Division.”

~~3.8.3.7~~ 3.8.3.5 The Contract ID for the Material (if applicable).

~~3.8.3.8~~ 3.8.3.6 Both the Federal and State Project Number for the Material (if applicable).

~~3.8.3.9~~ 3.8.3.7 The name of the material and/or material code referenced in the Certificate of Compliance. This material name shall be a clear, common name of the material that is comparable to the AWP Material Names stated in the proposal. Part Numbers, etc., may also be on the document if the company contractor wishes.

~~3.8.3.10~~ 3.8.3.8 The Line Item for the Material (if applicable).

~~3.8.3.11~~ 3.8.3.9 The Bid and/or Placed Quantity of the Material. ~~Shipped.~~

~~3.8.3.12~~ 3.8.3.10 Signature of the ~~Company Official~~ Contractor and date.

~~3.8.3.13~~ 3.8.3.11 The document must be notarized as per the “West Virginia Notary Handbook.”

3.8.4 Attachment 1 shows a sample Certificate of Compliance.

3.8.5 The project shall file this Certificate of Compliance in each respective Line-Item Folder in ProjectWise (or the current Division utilized document retention software) for the project.

3.8.6 Multiple items may be listed on the Certificate of Compliance, though all the information for each line must be on the document.

4. BUY AMERICA MINIMAL USE EXCEPTIONS

4.1 Steel and Iron Materials.

4.1.1 As provided for in 23 CFR 635.410(b)(4), an exception from Federal Buy America requirements exists for the minimal use of steel and iron materials “if the cost of such materials used does not exceed one-tenth of one percent (0.1 percent) of the total contract cost or \$2,500, whichever is greater. For the purposes of this paragraph, the cost is that shown to be the value of the steel and iron products as they are delivered to the project.”

4.1.2 Authority for determining applicability and issuance of a minimal use exception for steel and iron materials has been delegated to the West Virginia Department of Transportation through its Stewardship and Oversight Agreement with the FHWA West Virginia Division Office.

4.1.3 Procedure for granting a minimal use exception from Federal Buy America requirements for the minimal use of steel and iron materials.

4.1.3.1 The Contractor shall submit a letter to the District Construction Engineer requesting a minimal use exception for the use of foreign steel or iron materials. The letter shall demonstrate that the cost of the foreign steel or iron materials to be incorporated into

the project do not exceed one-tenth of one percent (0.1 percent) of the total contract cost or \$2,500, whichever is greater. Attached to the letter shall be documentation (e.g., invoices) which demonstrates that the cost of the foreign steel or iron materials requested to be used is the cost of the materials as they are delivered to the project.

4.1.3.2 If the District Construction Engineer determines a minimal use exception is applicable and appropriate, they will respond to the Contractor via letter granting a minimal use exception.

4.1.3.3 All documentation related to the granting of a minimal use exception shall be maintained in the project files.

4.2 Steel Products.

4.2.1 As provided for in Chapter 5A, Article 3 Section 56 of the West Virginia Code, an exception from West Virginia domestic steel preference requirements exists for the minimal use of foreign steel products, when authorized in writing by the director of Purchasing Division, if “The cost for each contract item used does not exceed one tenth of one percent of the total contract cost or \$2,500, whichever is greater. For the purposes of this section, the cost is the value of the steel product as delivered to the project.”

4.2.2 Procedure for granting a minimal use exception from West Virginia domestic steel requirements.

4.2.2.1 The Contractor shall submit a letter to the District Construction Engineer requesting a minimal use exception for the use of foreign steel products. The letter shall demonstrate that the cost of the foreign steel products to be incorporated into the project do not exceed one-tenth of one percent (0.1 percent) of the total contract cost or \$2,500, whichever is greater. Attached to the letter shall be documentation (e.g., invoices) which demonstrates that the cost of the foreign steel products requested to be used is the cost of the materials as they are delivered to the project.

4.2.2.2 If the District Construction Engineer determines a minimal use exception is applicable and appropriate, they will draft a letter to the director of Purchasing Division requesting the minimal use exception. The letter shall demonstrate that the cost of the foreign steel products to be incorporated into the project do not exceed one-tenth of one percent (0.1 percent) of the total contract cost or \$2,500, whichever is greater. Attached to the letter shall be documentation (e.g., invoices) which demonstrates that the cost of the foreign steel products requested to be used is the cost of the materials as they are delivered to the project.

4.2.2.3 If approved by the director of Purchasing Division, the District Construction Engineer will respond to the Contractor via letter granting a minimal use exception.

4.2.2.4 All documentation related to the granting of a minimal use exception shall be maintained in the project files.

4.3 Construction Materials.

- 4.3.1 There are currently no minimal use exceptions for Federal Buy America Requirements for Construction Materials.

5. BUY AMERICA WAIVERS

- 5.1 Steel and Iron Materials.
- 5.1.1 As provided for in 23 CFR 635.410(c)(1), WVDOH may request a waiver from Federal Buy America requirements for steel and iron materials if: (1) the application of Buy America requirements would be inconsistent with the public interest; or (2) steel and iron materials/products are not produced in the United States in sufficient and reasonably available quantities which are of a satisfactory quality.
- 5.1.2 A request for a Buy America waiver, accompanied by supporting information, must be submitted in writing to the FHWA West Virginia Division Administrator for consideration.

6. BUY AMERICA MATERIALS

- 6.1 Attachment 1 includes a sample Certificate of Compliance
- 6.2 Attachment 2 includes a list of materials and products used in WVDOH construction projects and the applicability of Buy America Requirements.
- 6.2.1 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.
- 6.2.16.2.2 Though the material is not addressed in the Specifications, any glass that is added to a permanent paint product requires a Certificate of Compliance.
- 6.2.3 Attachment 3 includes OMB Memorandum M-22-11, dated April 18, 2022, for additional guidance.

7. DOCUMENTATION OF BUY AMERICA CERTIFICATION OF COMPLIANCE

- 7.1 The CoC shall be placed in the QC Plan Folder in ProjectWise under the contract.

Ronald L. Stanevich, P.E.
Director
Materials Control, Soils & Testing Division

Buy America Certification of Compliance

Acme ~~Manufacturing~~
~~Company~~ Construction Company
123 Main Street
Charleston, WV 25302

Customer
~~Stark Construction Company~~
~~413 Kanawha Boulevard~~
~~Charleston, WV 25305~~

Ship Date: 10/31/2023

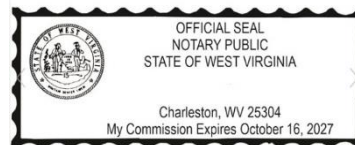
The below listed materials and products meets all the requirements of all Federal and State Laws for Buy America, including but not limited to: Chapter 5, Article 19 and Chapter 5A, Article 3 Section 56 of the West Virginia Code; 23 U.S.C. 313 Buy America, 23 CFR 635.410 Buy America Requirements, and Build America, Buy America Act, Section 70914. In the event where a supplied material does not meet applicable Buy America Requirements, any payments made for the associated materials shall be returned to the Division.

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	526.003.004 —Widget, Part Qi	500 Cubits
Line: 0025	596.003.004 —Widget, Part Hr	300 Cubits

~~Jonathan Janie~~ Doe, Quality Assurance
~~Manager~~ Contractor President



Attachment 2: A sample from M-22. Full document is available at the [WVDOH MCST Toolbox](#)¹.

¹ <https://transportation.wv.gov/highways/mcst/Pages/tbox.aspx>

Attachment 3 – M-22-11 –

Link to file: <https://www.whitehouse.gov/wp-content/uploads/2022/04/M-22-11.pdf>

DOH-M-22 WVDOH Buy America Requirement Materials

AWP Material Code	Material Description	CoC Required	Notes
211.004.000	Unclassified, Borrow Excavation	No	
211.005.000	Rock Borrow Excavation	No	
212.002.000	Select Material for Backfill	No	
218.003.003	Riprap, Grouted	No	
218.003.006	Slope Protection, Concrete	No	
219.003.000.OX	CLSM -Type A,B,C - Controlled Low Strength Material	No	
311.002.000.X	Free Draining Base Course, Open Graded - Asphalt/Cement	No	
401.002.00X	Asphalt Mix, All Types	No	
405.002.001.X	Type A,B,C - Chip Seal Aggregate	No	
406.PSP.000	High Friction Surface Treatment	No	
412.002.001	Bituminous Patching Winter Grade	No	
420.001.001	Asphalt, Micro Surfacing	No	
420.002.002.X	Aggregate, 2,3FA, Fine, Micro-Surfacing	No	
494.PSP.001	Asphalt, Cold In-Place Recycled	No	
601.003.00X.OX	Concrete, All Classes	No	
601.PSP.001	Polymer, Fiberglass Reinforced (FRP)	No	
603.006.002.2	Concrete, Class S-P, Self Consolidating	No	
604.002.000	Concrete for Pipe Culvert	No	
605.002.000	Concrete Manholes & Inlets (Precast)	No	
610.002.000	Asphalt Curb	No	
614.007.000	Lagging, Concrete	No	
616.009.000	Piles, Concrete (Precast)	No	
622.001.000	Timber Bridges-delete	No	
623.002.000	Shotcrete, Monofilament Polypropylene Fibers for Pneumatically Applied Mortar	No	
627.PSP.001	Expansion Joint, Foam	No	
633.004.000	Gutter, Concrete	No	
633.006.000	Gutter, Dumped Rock	No	
636.002.001.01	Traffic Control Devices	No	
636.002.001.02	Warning Lights	No	
636.002.001.03	Traffic Cones	No	
636.004.000	Dust Palliatives	No	
645.002.002	Backfill Material	No	
651.002.000	Topsoil	No	
661.002.001.1	Signs, Aluminum, Flat Sheet Finished	No	
662.002.007.1	Luminaires, Roadway, Area, Underpass, Sign Light	No	
662.002.007.2	Signs, Internally Illuminated LED	No	
662.002.014	Navigation Lighting System	No	
667.PSP.000	LED Dynamic Message Sign	No	
679.002.002.1	Concrete, Latex Modified	No	
679.002.002.2	Concrete, Microsilica	No	
688.005.004	Soluble Salt Removers	No	
701.001.000.7	Cement, Type UHR	No	
701.001.000.8	Cement, Portland, Type 1 Low - Alkali	No	
701.001.000.X	Cement, Portland, All Types	No	
701.003.000	Cement, Type 1L - Blended Hydraulic	No	
701.004.000	Cement, Masonry	No	
704.00X.00X.OX	Aggregate - All Types/Classes	No	
705.004.000.OX	Asphalt, Emulsion, All Types	No	
705.005.000.OX	Asphalt, Liquid, All Types	No	
705.007.000	Asphalt, Dampproofing and Water-Proofing	No	
705.008.000	Asphalt, Dampproofing and Water-Proofing, Primer	No	
705.011.000.OX	Asphalt, Liquid, All Types	No	
707.001.001	Type M Admixture, Concrete, Air-Entraining	No	
707.002.002.01.1	Type D Admixture, Concrete Water-Reducing And Retarding	No	
707.002.002.01.2	Type G Admixture, Concrete Water-Reducing And Retarding,	No	
707.002.002.01.3	Admixture, Citric Acid (Retarder)	No	
707.003.001.1	Type A Admixture, Concrete, Water-Reducing	No	
707.003.001.2	Type F Admixture, Concrete, Water-Reducing	No	
707.004.001	Fly Ash - SCM, Supplementary Cementitious Material	No	
707.004.002	Slag Cement - SCM, Supplementary Cementitious Material	No	
707.004.003	Silica Fume - SCM, Supplementary Cementitious Material	No	
707.004.004	Natural - SCM, Supplementary Cementitious Material	No	
707.005.000	Admixture, Latex	No	

DOH-M-22 WVDOH Buy America Requirement Materials

AWP Material Code	Material Description	CoC Required	Notes
707.006.000	Burlap, Polyethylene Coated	No	
707.007.000	Burlap, Jute or Kenaf	No	
707.008.000	Curing, Concrete, Waterproof Paper	No	
707.009.000	Curing, Concrete, Liquid Membrane Compound	No	
707.010.000	Curing, Concrete, White Poly Sheeting	No	
707.013.001	Type C Admixture, Concrete, Accelerating	No	
707.014.001	Admixture, Concrete, Water-Reducing & Accelerating, Type E	No	
707.015.001	Type D - Admixture, Concrete, Hydration Control Stabilizing	No	
707.017.001	Type S Admixture, Concrete, Specialized	No	
707.018.001	Admixture, Concrete, Foaming Agent	No	
708.001.001	Expansion Joint, Cork	No	
708.001.002	Expansion Joint, Bituminous Fiber	No	
708.002.002	Expansion Joint, Sponge Rubber	No	
708.004.002	Joint, Back-up Material	No	
708.009.000	Bitumen Sealant, Concrete and Masonry	No	
708.PSP.001	Neoprene Sheet for Semi-Integral Abutments	No	
710.002.004	Graded Material	No	
710.003.000	Preservative Treatment	No	
711.040.000	Paint, Temporary, White, Yellow Traffic	No	
715.001.000	Chloride, Calcium	No	
715.002.000	Chloride, Sodium	No	
715.004.001	Cementitious Materials, PCC Concrete Repair Materials	No	
715.004.002	Non-Cementitious Materials, Concrete Repairs	No	
715.005.000	Cement Grout, Pakaged Dry, Hydraulic, Non-Shrink	No	
715.005.000.1	Plant Produced Grout	No	
715.006.000	Lime, Hydrated	No	
715.007.000	Water for Hydraulic Cement	No	
715.009.003.6	Delineator Post, Soil Mounted Plastic	No	
715.009.003.7	Delineator Post, Guardrail Mounted Plastic	No	
715.009.003.8	Delineator - Type B1	No	
715.011.010	Engineering Fabric for Pumped Sediment and Erosion Control (Dewatering Device)	No	
715.012.000	Concrete, Miscellaneous Uses	No	
715.016.000.001	Brick, Clay or Shale, Sewer Brick	No	
715.016.000.002	Brick, Clay or Shale, Building Brick	No	
715.017.000	Brick, Concrete	No	
715.018.000	Concrete Units, Masonry	No	
715.025.000	Limestone, Ground Agricultural	No	
715.026.001	Fertilizer, Seeding	No	
715.026.002	Fertilizer, Landscape Planting	No	
715.027.001.1	Mulch, Straw, Seeding	No	
715.027.001.2	Mulch, Wood Cellulose, Seeding	No	
715.027.001.3	Mulch Binder, Chemical, Seeding	No	
715.027.002	Mulch Materials, Landscape Plantings	No	
715.028.000	Seed	No	
715.029.000	Inoculating Bacteria	No	
715.033.000	Vines and Ground Cover Plants	No	
715.034.000	Seedling Plants	No	
715.035.000	Trees and Shrubs	No	
715.036.000	Asphaltum Base Paint for Tree Surgery	No	
715.037.003	Hose, Guying and Staking Plants	No	
715.037.004	Twine, Tying Wrapped Tree Trunks	No	
715.037.005	Tree Wrap	No	
715.037.006	Anti-Desiccant - Emulsion Protective Film	No	
715.040.002	Pavement Preformed Marking Material, Type V	No	
715.041.001.02	Channelizer Cones	No	
715.045.000	Bentonite	No	
716.001.001	Random Material	No	
716.001.001.1	Soil	No	
716.001.001.2	Granular Material	No	
716.001.001.3	Shale, Soft	No	
716.001.002	Rock	No	
716.001.003	Shale, Hard	No	
716.001.004	Borrow Material	No	

DOH-M-22 WVDOH Buy America Requirement Materials

AWP Material Code	Material Description	CoC Required	Notes
206.003.003.X	Base Reinforcement, Geogrid, Type 1,2	Yes	
501.003.001.0X	Concrete, Pavement, All Types	Yes	*1
514.003.000	Concrete, Roller Compacted	Yes	*1
601.008.009	Stay-in-Place Fabricated Metal Forms	Yes	
601.PSP.002	Epoxy Resin Injection System	Yes	
601.PSP.003	Epoxy Bonding Compound	Yes	
602.002.000.3	Reinforcing Bars, Uncoated Corrosion Resistant Rebar	Yes	
602.007.003	Reinforcing Bars, Splice Connector	Yes	
603.002.000.0X	Concrete Members (All Precast/Prestressed)	Yes	*1
603.PSP.001	Post Tension Rod, Steel	Yes	
604.PSP.001	Pipe, Polyethylene Liner	Yes	
605.002.000	Concrete Manholes & Inlets (Precast)	Yes	*1
605.002.000.01	Steel, Welded Grates for Inlets	Yes	
605.002.000.0X	Manhole, All Types	Yes	*1
605.002.000.0X	Inlet, All Types	Yes	*1
605.002.000.14	Slot Inlet Riser, Perforated	Yes	
605.002.000.16	Lift Station & Valve Vault	Yes	
607.002.000.01	End Terminal, Flared or Tangent Steel	Yes	
607.002.000.02	Blockout, Polymer	Yes	
607.002.000.03	Blockout, Non Plastic	Yes	
607.PSP.000	High Tension Cable Barrier	Yes	
607.PSP.001	Cable End Terminal	Yes	
609.002.000	Concrete, Sidewalk	Yes	*1
609.002.001	Detectable Warning Surface	Yes	
612.002.001.X	Tunnel Liner, Steel Plate Pipe, 2/4 Flange	Yes	
615.000.000.01	Steel Superstructure, Truss/Arch	Yes	
615.000.000.02	Steel Superstructure	Yes	
615.000.000.03	Expansion Dam, Steel, Tooth Type	Yes	
615.000.000.04	Expansion Dam, Steel, Strip Seal Type	Yes	
615.000.000.05	Expansion Dam, Steel, Modular Type	Yes	
615.000.000.06	Bearing Assemblies, Steel	Yes	
615.000.000.07	Steel Girders	Yes	
615.000.000.08	Steel Crossframes	Yes	
615.000.000.09	Steel Diaphragms	Yes	
615.003.003	Shear Stud Connector, Steel	Yes	
617.004.000	Pipe Railing, Steel	Yes	
617.005.000	Railing, Steel, Ferrous Metal	Yes	
617.006.000	Railing, Aluminum, Pedestrian	Yes	
620.000.000.01	Culvert, Concrete, Reinforced, Cast In Place, All Types	Yes	*1
620.000.000.02	Culvert, Concrete, Three-Sided Structure (Precast)	Yes	*1
620.000.000.03	Culvert, Concrete, Arch-Topped, (Precast)	Yes	*1
620.000.000.04	Culvert, Concrete, Flat-Topped, (Precast)	Yes	*1
620.000.000.05	Culvert, Concrete, Reinforced, Two Piece, (Precast)	Yes	*1
621.002.001	Flooring Steel Grid, Open Type	Yes	
621.002.002	Flooring, Steel Grid, Filled	Yes	
625.004.003	Steel, Casing Pipe for Drilled Caissons	Yes	
625.004.004	CSL (Crosshole Sonic Logging) Testing Tubes for Caissons	Yes	
626.004.003	Retaining Wall, Cast In Place	Yes	*1
626.005.001	Retaining Wall (Precast)	Yes	*1
626.005.001.01	Retaining Wall, MSE, Wall Panels	Yes	*1
626.005.001.02	Retaining Wall, MSE Modular Block	Yes	*1
626.005.001.03	Retaining Wall, MSE Wire Face	Yes	*1
626.005.001.123	Modular Block Sealant	Yes	
626.006.001.3	Retaining Wall, Granular Backfill	Yes	*1
626.006.002	Retaining Wall, Concrete, Cast in Place	Yes	*1
631.002.000	Electrical, Miscellaneous	Yes	*1
632.002.001	Horizontal Drain	Yes	
633.002.000	Gutter, Invert Pipe	Yes	
634.002.000	Cribbing, Concrete	Yes	*1
638.002.000	Survey Marker	Yes	
638.006.000	Outlet Marker	Yes	
642.006.000	Compost Filter Sock	Yes	
645.001.001	Elasticized Expanded Polystyrene - E-EPS	Yes	

DOH-M-22 WVDOH Buy America Requirement Materials

AWP Material Code	Material Description	CoC Required	Notes
645.001.003	Impervious Membrane	Yes	
645.002.001	Soil Reinforcement, Geosynthetic	Yes	
657.002.001	Supports, Beams	Yes	
657.002.006	Supports, Pipe, Steel	Yes	
657.002.008	Support, Sign, Steel, Anchor Bolt, Roadway	Yes	
657.002.010	Supports, Tubular, Steel	Yes	
657.002.011.1	Supports, Steel, Channel Bar (U Channel)	Yes	
657.002.011.2	Supports, Steel, Breakaway Splice Devices	Yes	
658.002.000	Sign Support, Steel, Overhead	Yes	
658.002.007	Sign Support, Steel, Anchor Bolt O-H	Yes	
661.002.001.2	Signs, Aluminum, Extruded Panel Finished	Yes	
661.002.001.3	Sign Hardware	Yes	
661.002.015	Delineators, XS1 Bicycle Rail	Yes	
662.002.013.1	Pole, Steel, Lighting Support	Yes	
662.002.013.1.6	Lighting Support, Steel, Anchor Bolt	Yes	
662.002.013.2	Lighting Support, Steel, High Mast Type	Yes	
662.002.013.4	Luminaire Support Arm, Steel, Type 1 & 2	Yes	
662.002.013.5	Luminaire Support Arm, Steel, Type 3	Yes	
662.002.013.6	Lighting Pole, Aluminum	Yes	
662.002.013.7	Luminaire Support Arm, Aluminum	Yes	
689.000.000	Metalizing, Steel Coating	Yes	
707.011.000	Coating, Epoxy Resin Protection, Type 3, Grades 1 or 2, Class B or C	Yes	
707.012.002	Sealer, Concrete	Yes	
707.016.001	Coating Materials, Concrete Protection	Yes	
708.002.001	Joint Seals, Preformed Elastomeric, Neoprene	Yes	
708.003.000	Joint Sealant, Hot-Poured for Concrete and Asphalt Pavements	No	
708.004.001.X	Sealant, Silicone Joint, All Types	Yes	
708.010.001	Waterstops (Elastomer Material), Polyvinylchloride	Yes	
708.010.002	Waterstops (Elastomer Material), Rubber	Yes	
709.000.000	Steel, Miscellaneous	Yes	
709.000.000.0	Welding Electrodes, Piles	Yes	
709.001.000.1	Reinforcing Bar, Steel Rebar	Yes	
709.001.000.2	Reinforcing Bar, Steel, Epoxy Coated, Coaters Rebar	Yes	
709.001.000.3	Epoxy Powders for Rebar	Yes	
709.002.000.1	Reinforcement, 7-Wire Strand, Prestressing	Yes	
709.002.000.2	Reinforcement, Steel Bar, High Strength, Prestressing	Yes	
709.003.000	Bolt, Steel, Wire Mesh, Hook, Expansion	Yes	
709.004.000.1	Wire, Steel, Reinforcement	Yes	
709.004.000.2	Welded Wire, Steel, Reinforcement	Yes	
709.005.000	Pavement Reinforcement, Expanded Metal	Yes	
709.006.000	Bar or Rod Mats, Steel, Fabricated	Yes	
709.007.000	Bolt, Joint Tie Bolt Assembly, (J-Hook)	Yes	
709.008.000	Structural Metal, Steel, High Strength Low Alloy	Yes	
709.010.000.1	Gray Iron Castings	Yes	
709.010.000.2	Iron Castings, Ductile Iron Castings	Yes	
709.012.000.1	Structural and Eyebar, Steel, (Piling)	Yes	
709.012.000.2	Lagging, Steel	Yes	
709.015.000	Dowel Bars and Dowel Baskets, Assemblies, Coated	Yes	
709.017.000	Pipe, Steel, Welded & Seamless	Yes	
709.018.002	Copper Alloy Castings for Name Plates For Bridges	Yes	
709.021.000	Pipe, Steel, Floor Drains & Down-Spouts	Yes	
709.024.002	Bolt, Steel, High Strength A325 / A449	Yes	
709.024.003	Nut, Steel, High Strength	Yes	
709.024.004	Washer, Steel, High Strength	Yes	
709.036.000	Aluminum Alloy, Bolts, Nuts, and Set Screws	Yes	
709.037.000	Aluminum Alloy, Washers	Yes	
709.042.000	Steel, Galvanized Pipe or Tubing for Horizontal Drains	Yes	
709.045.000	Guardrail Posts, Galvanized Steel	Yes	
709.046.000	Post, Braces & Grate Frames, Fence, Steel	Yes	
709.046.000.1	Post, Studded Tee	Yes	
709.050.000	Pile Points, Steel (Piling)	Yes	
709.051.000	Sign Support Surface Mount Bracket, Breakaway Device	Yes	
709.052.000	Sign Support, Omni-Directional Breakaway Device, Steel Beam,	Yes	

DOH-M-22 WVDOH Buy America Requirement Materials

AWP Material Code	Material Description	CoC Required	Notes
709.053.000	Supports, Steel, Tubular	Yes	
709.054.000	Sign Support Back to Back U-Channel, Breakaway Device	Yes	
709.055.000	Sign Support Bracket - Barrier Wall	Yes	
710.002.002	Hardwood, Structural	Yes	
710.002.003	Hardwood, Bridge Decking	Yes	
710.004.000	Wood Preservers	Yes	
710.005.000	Post, Wood, Guardrail, Rectangular	Yes	
710.005.000.4	Post, Wood for Fence and Signs	Yes	
710.006.000	Plywood	Yes	
710.007.000	Common Lumber	Yes	
710.008.000	Poles, Service and Lighting, Wood	Yes	
711.005.000	Concrete Protective Coatings And Stain	Yes	
711.006.000.1	Paint, Zinc Primers, Organic	Yes	**2
711.006.000.2	Paint, Zinc Primers, Inorganic	Yes	**2
711.012.000	Paint, Epoxy Coatings	Yes	**2
711.022.000	Paint, Zinc Rich Low VOC System	Yes	**2
711.022.003	Paint, Intermediate Coat	Yes	**2
711.022.004	Paint, Top Coat	Yes	**2
711.041.000.1	Paint, White or Yellow, Fast-Dry Traffic	Yes	**2
711.041.000.2	Paint, Yellow, Fast-Dry Traffic	Yes	**2
712.004.000	Guardrail, Fasteners and Anchor Bolts, Stains for Galvanized Steel	Yes	
712.004.001	Guardrail Splice Bolt	Yes	
712.004.002	Guardrail Post Bolt	Yes	
712.004.003	Guardrail Nuts	Yes	
712.004.004	Guardrail Washers	Yes	
712.004.005	Guardrail Beam, Steel	Yes	
712.004.007	Guardrail End, Steel	Yes	
712.005.000	Guardrail, Fasteners and Anchor Bolts, Zinc-Aluminum-Magnesium Alloy Coating	Yes	
712.008.001	Fence, Steel, Chain-Link	Yes	
712.009.000.1	Fence, Wire, Steel, Right of Way, Zinc Coated (Galvanized) Class 1 Coating	Yes	
712.009.000.2	Fence, Wire, Steel, Right of Way, Zinc Coated (Galvanized) Class 3 Coating	Yes	
712.010.000	Barbed Wire, Coated Steel	Yes	
712.011.000	Fence, Safety	Yes	
713.002.000	Pipe and Pipe Arch, Metallic Coated Corrugated Steel	Yes	
713.003.000	Pipe and Pipe Arch, Asphalt Coated Corrugated Steel	Yes	
713.005.001	Pipe, Fiber Bonded Full Bituminous Coated Steel	Yes	
713.018.000	Box Culvert, Aluminum Alloy Structural Plate	Yes	
713.020.000	Pipe, End Sections for Corrugated Steel Pipe and Pipe Arch	Yes	
713.024.000	Pipe and Pipe Arch, Aluminum Coated Corrugated Steel	Yes	
714.002.000	Pipe, Reinforced Concrete Culvert, Storm Drain & Sewer, Class III, IV, V	Yes	*1
714.003.000	Pipe, Concrete, Arch, Storm Drain & Sewer	Yes	*1
714.004.000	Pipe, Reinforced Concrete, Elliptical Culvert, Storm Drain & Sewer	Yes	*1
714.005.000	Pipe, Perforated Concrete	Yes	*1
714.007.000	Box Culverts, Reinforced Concrete, Precast	Yes	*1
714.008.000	Concrete End Sections	Yes	*1
714.017.000	Pipe, Polypropylene, Dual Wall, 12-60 Inches	Yes	
714.018.000	Pipe, High Density Polyethylene, Steel Reinforced	Yes	*1
714.019.000.1	3-6 inches Perforated Pipe, High Density Polyethylene, Profile Wall	Yes	
714.019.000.2	3-10 inches Non Perforated Pipe, High Density Polyethylene, Profile Wall	Yes	
714.019.000.3	12-60 inches Pipe, High Density Polyethylene, Profile Wall	Yes	
714.020.000	Pipe, Perforated Plastic Semicircular	Yes	
714.022.000	Pipe, Polyvinyl Chloride (PVC)	Yes	
714.023.000	Box Culverts, Concrete, Precast Reinforced	Yes	*1
714.024.000	Pipe, Storm Drain, Non-Asbestos, Fiber-Cement	Yes	
715.008.000	Fabric, Waterproofing	Yes	
715.011.00X	Geotextile - Eng Fabric, All Types	Yes	
715.013.000	Fabric Pads, Preformed	Yes	
715.014.000	Bearing Pads, Elastomeric, Plain & Reinforced	Yes	*1
715.015.000	Neoprene Sheeting for Miscellaneous Items	Yes	
715.019.000.01	Concrete Units, Manholes and Inlets (Precast) Special	Yes	*1
715.019.000.04	Inlet, All Types	Yes	*1
715.019.000.0X	Manhole, All Types (Precast)	Yes	*1
715.019.000.14	Lift Station & Valve Vault (Precast)	Yes	*1

DOH-M-22 WVDOH Buy America Requirement Materials

AWP Material Code	Material Description	CoC Required	Notes
715.020.000	Precast Concrete Median Barriers (Temporary)	Yes	*1
715.022.000	Precast Concrete Median Barriers (Permanent)	Yes	*1
715.023.000	Gabion Baskets	Yes	*1
715.024.002.X	Matting for Erosion Control, All Types	Yes	
715.037.001	Tree Stakes	Yes	
715.037.002	Wire, Guying and Staking Plants	Yes	
715.038.000	Manhole Steps	Yes	
715.039.000	Elastomeric Gasket & Sealing Material	Yes	
715.040.006.1	Raised Pavement Markers, Type P-2, RPM	Yes	*1
715.040.006.2	Raised Pavement Marker, Type R-4, RPM	Yes	*1
715.041.001	Traffic Safety Devices, Attenuating Type V	Yes	*1
715.041.001.01	Reflective U-Channel Strips	Yes	
715.041.00X	Traffic Safety Devices, Attenuating All Types	Yes	*1
715.042.000.1	Traffic Signal Materials & Equipment	Yes	*1
715.042.000.2	Traffic Signals, Miscellaneous	Yes	*1
715.042.005.2	Loops (LPS)	Yes	*1
715.042.005.3	Closed Circuit Television (PAS-CCTV)	Yes	*1
715.042.005.4	Pedestrian Detector with Audible	Yes	*1
715.042.005.5	Radar Advance Digital Detection (RADD)	Yes	*1
715.042.005.6	Video Detection Cameras (VTDS)	Yes	*1
715.042.006.2	Signal Sections (V12) (V12P) (G16)	Yes	*1
715.042.009.1.2	Signal Supports, Mast Arm	Yes	
715.042.009.1.3	Supports, Signal, Video Arm	Yes	
715.042.009.2	Signal Supports, Strain Types C1, C1L, C2 and C2L	Yes	
715.042.009.2.2	Signal Supports, Anchor Bolts	Yes	
715.042.009.4.1	Signal Supports, Aluminum, Pedestal E-1	Yes	
715.042.009.4.2	Signal Support, Steel, Pedestal E-2	Yes	
715.042.009.4.3	Signal Support, Steel, Pedestal E-3	Yes	
715.042.010.1	Conduit, Rigid, Type R	Yes	
715.042.010.2	Conduit, Flexible, PVC Cover	Yes	
715.042.010.3	Conduit, Type P (Polyvinyl Chloride)	Yes	
715.042.011.X	Junction Box, All Types, All Duty, Cast in Place	Yes	*1
718.000.000.1	Waterline Items	Yes	
718.000.000.2	Sewerline Items	Yes	
718.001.000	Pipe, Ductile Iron	Yes	
718.005.000	Pipe, Plastic (PVC) Waterline	Yes	
718.007.000	Pipe, Plastic (Polyethylene) Waterline	Yes	
718.009.000	Service Line, Copper	Yes	
718.010.000	Gate Valves	Yes	*1
718.011.000	Valve Box	Yes	*1
718.012.000	Pipe, Casing, Water/Sewer	Yes	*1
718.013.000	Fire Hydrants	Yes	*1
718.014.000	Meters	Yes	*1

Note *1 - Only Steel/Iron<DELETE>/Non-Ferrous Components<DELETE> in this Material are Subject to Buy America Requirements.

Note **2 - Glass Beads in Paint Require a CoC

Note: A CoC is only required if the material is permanently incorporated into the project.

Note: AWP Material Code is for internal use only.

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

MATERIALS PROCEDURE

CRITERIA TO APPROVE FENCE PRODUCER/SUPPLIERS AND THEIR MATERIALS.

1. PURPOSE

- 1.1 To establish procedures for ~~qualifying reviewing and approving~~ Producer/Suppliers of fence materials acceptable for use on ~~West Virginia Division of Highways (WVDOH)WVDOT~~ projects.
- 1.2 To establish a procedure for maintaining a record of such information.
- ~~1.3 To establish a procedure for transmitting such information to the WVDOH Districts and contractors on WVDOH projects.~~

2. SCOPE

- 2.1 This procedure shall apply to all suppliers who supply fence materials such as chain link fence, farm field fence, fence posts, tie wire, bolts, nuts, gate latches, barb wire, and other related fence materials.
- 2.2 This procedure shall apply to all fence products used by ~~WVDOH-WVDOT~~ projects unless project plans state otherwise.

3. APPLICABLE DOCUMENTS

- 3.1 ~~WVDOH Standard Specifications for Roads and Bridges and Supplemental Specifications.MP 106.00.02 - Procedure for Evaluating Products for Use in Highway Construction~~
- ~~3.2 UL - Underwriters Laboratories Specifications~~

4. ACCEPTANCE PROCEDURE

- 4.1 With each shipment of fence material to a ~~WVDOT~~ project, the fence Supplier shall provide shipping documents which contain an APL source number reflecting materials meeting quality specified by the WVDOH.

5. ACCEPTANCE PROCEDURE (APPROVED SOURCE)

- 5.1 For a Producer/Supplier to be considered an approved source of fence items as stated in Section 2.1 the supplier must comply with the following requirements where applicable.

- 5.2 ~~Prospective Producers/Suppliers shall complete form HL-468¹, as per MP 106.00.02 indicating their intention to be included on the WVDOH APL.~~
- 5.2 ~~The Producer/Supplier is to complete and submit form HL-468 attainable from the website² and be submitted to the WVDOH Materials Control, Soils and Testing Division(MCS&T).~~
- 5.3 Once form HL-468 form is correctly submitted, an on-site investigation evaluation will be conducted by an ~~Evaluator~~ evaluator from the WVDOH at the supply distribution location, to determine if the proposed location should be listed as an approved source for fence items.
- 5.4 The initial evaluation and yearly renewal of the Producer/Supplier shall be conducted using guidelines set forth in Attachment 1 where applicable. Each supplier's approval status will be analyzed at the time of APL reapproval.
- 5.5 At the initial and subsequent annual investigation evaluations, all appropriate management, sales, and warehousing personnel will be made aware of specifications, shipping policies and requirements to sell and ship fence materials to ~~WVDOH~~ ~~WVDOT~~ projects.
- 5.6 After the initial investigation evaluation has been completed, ~~the WVDOH MCS&T personnel evaluator~~ shall document the findings in an inspection report, indicating that the location was evaluated and whether it met the criteria to be included on an APL for fence items. If the report notes that the Producer/Supplier didn't meet the required criteria, then the reasons why will be stated in the inspection report.
- 5.7 Providing the evaluation was found to meet specifications, the inspection report shall be signed by ~~the MCS&T personnel Evaluator~~ and shall be given a laboratory approval number. This laboratory approval number will be the APL number used by the WVDOH. An example of the inspection report can be seen in Attachment 2.
- 5.8 The signed inspection report is a certification from ~~MCS&T Division~~ ~~the Evaluator~~ that the Producer/Supplier has met the criteria to be included on the APL for Fence Producer/Suppliers. This report will be filed under the Producer/Supplier's name in the WVDOH electronic filing system.
- 5.9 Once the above requirements are met, Producer/Supplier approval status can be verified by accessing the ~~WVDOH online APL~~³ for fence items.
- 5.10 If a Producer/Supplier is removed from approved source status for not meeting specification requirements, then the Producer/Supplier will be removed from the APL listing for one year. After a year, the Producer/Supplier may be reevaluated to ensure corrective measures have been met.

Commented [DB1]: Standard Text

¹ <https://transportation.wv.gov/highways/mcst/Pages/tbox.aspx>

² <https://transportation.wv.gov/highways/mcst/Pages/tbox.aspx>

³ https://transportation.wv.gov/highways/mcst/Pages/APL_By_Number.aspx

6. ACCEPTANCE PROCEDURES (NON-APPROVED SOURCE)

- 6.1 Any fence materials not supplied by an approved source are to be accepted or rejected by the direct coverage process.
- 6.2 If direct coverage inspection is required, the inspection or evaluation will conclude with a 7-digit Laboratory reference number indicating approval or rejection.

7. DOCUMENTATION REPORT

- 7.1 The approved source list for Producer/Suppliers of fence items used on **WVDOH** **WVDOT** projects may be updated at any time with the addition of a new facility, or with the removal of a facility.

Ronald L. Stanevich, P.E.
Director
Materials Control, Soils and Testing Division

MP 712.05.57 Steward – Metals Section
RLS:H
ATTACHMENTS

Attachment 1

Below is a summary of topics that the prospective Producer/Supplier of fence materials will be evaluated in accordance with.

- 1 To ascertain if the supply location is a business or a storage lot, meaning is the location a bare storage lot with material or a location with an office building with salespeople.
- 2 To determine if the location is an industrial Producer/Supplier or a homeowner quality Producer/Supplier. Meaning does the location supply for industrial applications or residential applications.
- 3 To determine if the location is a wholesaler/retailer or just a retailer, meaning does the location provide material to business or to retail customers.
- 4 To inform sales personnel that materials supplied such as barbed wire, chain link fence, farm field fence, steel posts, post braces, gate frames come from established APL lists, and where to find them online if necessary. All gates must have padlock hardware equipped prior to shipment.
- 5 To inform sales personnel of shipping procedures, meaning documents must have lab numbers, CID numbers, if direct coverage. If shipped from an approved source, then sales tracking numbers and APL numbers must be listed for WVDOH District personnel.
- 6 Informing sales personnel of what materials are covered under buy American requirements and what materials are not subject to buy American. This is done mostly during the outdoor evaluation at inventory during the initial evaluation.
- 7 An outside and inside inventory evaluation of materials describing what materials have their own APL and what do not. Informing what materials are not covered by locations with an APL number.
- 8 Discuss with sales personnel how to ship backorder material and partial material, also drop shipped materials, or how materials may be obtained by other sources, such as other approved sources or other non-approved sources.
- 9 Discuss with sales personnel about grounding kits, and that they are to be approved by location APL and not by other means.
- 10 Discuss with sales personnel that all items shall be coated by hot dip galvanizing or may be aluminumized by deposit coatings, all requiring 20 yr. minimum guarantee unless project plans indicate otherwise
- 11 All right of way fence shall meet requirements of WVDOH Specification Section 608.
- 12 Discuss with sales personnel that silt fence is not covered by location APL but is covered by other means.

- 13 Discuss with sales personnel that all right of way fence posts, braces and grate frames shall meet AASHTO M181 requirements and be on their own APL number covered by other means.
- 14 Discuss with sales personnel that all studded tee posts shall meet AASHTO M281/ASTM A702 requirements and be approved on their own APL number
- 15 Discuss with sales personnel that bolts and hardware must be hot dipped galvanized or be cadmium coated to ASTM B766 specifications. And be of industrial quality.
- 16 Discuss with sales personnel that chain link fence shall be approved only if material meets AASHTO M181
- 17 Discuss with sales personnel that all barbed wire shall meet AASHTO M280 for the correct classification of barbed wire, class 1 unless otherwise specified by contractor.

Attachment 2

Below is an example of the report from the evaluator to certify that the location is suitable to be included on an APL for fence materials.

REPORT NUMBER	1112458
LOCATION EVALUATION REPORT	
SUBJECT:	Location evaluation of: Wombat Fence Products, Producer/Suppliers of fence items, located in Metropolis, Illinois
DATE OF REPORT:	October 27, 2021

1. INTRODUCTION

- 1.1 The purpose of this evaluation is to affirm confidence in the ability of Wombat Fence Products, of Metropolis, Illinois to supply industrial fence materials in accordance with WVDOH and ASTM international standards used in ~~West Virginia Department of Transportation, Division of Highways (WVDOT/DOH) construction~~ projects.

2. INVESTIGATION

- 2.1 In January 2022, Mr. Brice Banner of the WVDOH Materials Control, Soils and Testing Division traveled to Wombat Fence Products, in Metropolis, Illinois, to meet with Mr. Cecil Kent, General Manager, and Billy Wayne industrial sales coordinator, to discuss specifications and supply demands required by the WVDOH. Additionally, an extensive evaluation tour of the entire manufacturing facility was conducted.

3. CONCLUSION

- 3.1 After the meeting and the supply location evaluation were completed, it was determined that fence materials provided by Wombat Fence Products, of Metropolis Illinois, did meet the requirements for fence materials used in highway construction on WVDOH projects where specified and the criteria noted in Attachment 1 of MP 712.05.57. It is recommended that Wombat Fence Products be added to the approved source list (APL) for fence materials.

Nicholas Fury
Evaluator

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

MATERIALS PROCEDURE

PREPARING MATERIALS PROCEDURES

1. PURPOSE

- 1.1 To set forth instructions for drafting Materials Procedures (MP) concerning sampling, testing, reporting, and inspection.
 - 1.1.1 To establish a numbering system for MPs.
 - 1.1.2 To establish a styles guideline for MPs.
- 1.2 To establish a workflow for the creation, acceptance, and approval for MPs.
 - 1.2.1 To setup a reconfirmation schedule for existing MPs.
- 1.3 To provide further guidance and clarification from that set forth in DD-105.

2. REFERENCED DOCUMENTS

- ~~2.1~~ ~~WVDOH Specifications Roads and Bridges¹.~~
- ~~2.2.1~~ [AASHTO Publications Style Manual and Process Guide²](https://materials.transportation.org/), current edition.
- ~~2.3.2~~ [WVDOH Design Directives DD-105³.](https://transportation.wv.gov/highways/engineering/Pages/Design-Directives.aspx)

3. NUMBERING GUIDELINES

- 3.1 A MP consists of a sequence of numbers such as 120.20.01.
 - 3.1.1 The first set (three digits) of an MP are taken from the WVDOH Specifications Roads and Bridges to denote the general area to which the procedure applies.
 - 3.1.2 The second set (two digits) of an MP are taken from the WVDOH Specifications Roads and Bridges denotes the particular area to which the procedure applies.

¹ ~~<https://transportation.wv.gov/highways/contractadmin/specifications/Pages/default.aspx>~~

² <https://materials.transportation.org/>

³ <https://transportation.wv.gov/highways/engineering/Pages/Design-Directives.aspx>

3.1.3 The third set (two digits) is defined by this Division thus:

- .00 - .09 Field Sampling
- .10 - .19 Pre-sampling (Source or Intermediate Points)
- .20 - .29 Testing
- .30 - .39 (For future designation)
- .40 - .49 Inspection
- .50 - .59 Quality Assurance System
- .60 - .69 Reporting (laboratory)
- .70 - .79 Reporting (issuance under master control)
- .80 - .89 (For future designation)
- .90 - .99 Miscellaneous

4. COMMON DEFINITIONS

4.1 Often, different entities use different terminology to describe certain entities. To stay consistent, this section will define some commonly used terms and specify the term that is to be used in Materials Procedures.

4.2 Authors may choose to spell out these terms in titles, sections, or headers.

4.3 Specific Terms:

4.3.1 DWR: When referring to a Daily Work Report that is performed on a WVDOT project, the term to be used is “DWR”.

4.3.2 Coverage: When referring to coverage for a material, traditionally referred to as “Direct Coverage” or “Master Coverage”, the term to be used is “coverage”.

4.3.3 Specifications: When referring to the WVDOH Standard Specifications, Roads and Bridges, current edition including supplementals, the term to be used is “Specification(s)” with a capital “S”. There is no need to list the Specifications in the referenced document, this link is assumed. Specific references to aid in navigation are encouraged.

4.3.4 WVDOT project: When referring to any construction project in the state that is governed by the Specifications, the term to be used is “WVDOT project(s).” DOT is used instead of DOH because DOT includes road and bridge contracts that are not under the DOH such as the turnpike.

4.3.5 MS&P: When referring to Manufacture and/or a Supplier and/or a Producer, the term to be used is: “MS&P”. This author may choose to define this in the first instance of use in the document as this is not a common, industry wide term.

4.3.6 Deputy Secretary: When referring to the final approving entity, the term “Deputy Secretary” shall be used. This position was previously the State Highway Engineer.

4.3.7 Division: When referring to the Department of Transportation, Division of Highways as an entire entity, the term: “Division” shall be used with a capital “D”. There is no need to spell out the name in any materials procedure.

4.3.8 MCS&T Division: When referring to the Materials Control, Soils and Testing Division, the term: “MCS&T Division” shall be used. There is no need to spell out the name in any materials procedure, though the author may chose to do so.

- 4.3.9 TED Division: When referring to the Traffic Engineering Division, the term: “TED Division” shall be used. There is no need to spell out the name in any materials procedure.
- 4.3.10 All other Divisions shall be spelled out once and then given an appropriate abbreviation. For example, Engineering Division “Engr Division”
- 4.3.11 APL: When referring to MCS&T Approved Product List, the term to be used is “APL”, with all letters capitalized.
- 4.3.11.1 When referring to an APL submission, the following text shall be used: Prospective Producers/Suppliers shall complete form HL-468 , as per MP 106.00.02 indicating their intention to be included on the WVDOH APL.

4.5. FORMAT GUIDELINES

- 4.1.5.1 The style guides for MPs shall follow the general guidelines established in “Section 6.4.3” of [AASHTO Publications Style Manual and Process Guide Typography in Design](#). These guidelines are further refined in this document.
- 4.1.15.1.1 The font shall be Times New Roman, size 12, fully justified for all text except for the section title. The section title shall be all capital letters, fully justified, Times New Roman, size 12 and bold. There shall also be a horizontal line above this text.
- 4.1.25.1.2 The line numbering shall be as follows: “x.” For a section title and “x.x” for a section paragraph. From here, follow the format of “x.x.x...” for additional layers of sub paragraphs. This document provides an example of the formatting.
- 4.1.35.1.3 Links shall be [blue and clickable](#)⁴. The link path shall also be included as a footnote. An example of this is demonstrated by the “blue and clickable” text and link above and the footer at the bottom of this page.
- 4.1.3.15.1.3.1 Any instances of an email address shall also be clickable and adhere the guidelines for a link.
- 4.1.45.1.4 Figure labels shall follow the guidelines of “Section 2.1.4” of AASHTO Publications Style Manual and Process Guide Typography in Design. This section states: “The title should be succinct noun or noun phrase that describes the figure, but does not provide unnecessary background information, nor repeat information found in the text.” Do not abbreviate “Figure” and capitalize key words such; an example of this is as follows: “Conditions Determined to Be Pre-Existing.”
- 4.1.4.15.1.4.1 Formatting for labels shall be the same as normal body text, except that “Figure X.” shall be bold. All figure text shall be centered and located below the figure.

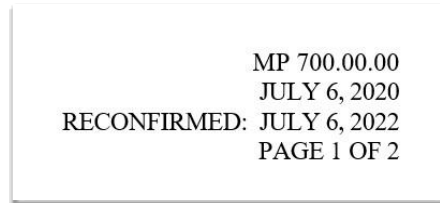
5.6. HEADER GUIDELINES

- 5.16.1 A standard numbering and indexing system shall appear in the upper right-hand corner shall of pages of all MPs. All header text shall be in “All Caps” format.

⁴ <https://transportation.wv.gov/highways/mcst/Pages/default.aspx>

5.1.16.1.1 The letters MP shall appear first, denoting Materials Procedure. The number of the MP shall follow that text and be in the header of every page. The numbering of the MP shall follow the format as described in this document.

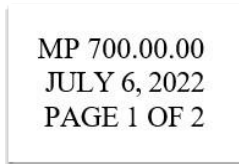
5.1.26.1.2 All MPs shall contain headers in manner described in this section. There are two instances of a header. If an MP has been reconfirmed, the header will follow the example in Figure 1. This includes the date the latest date the MP was approved, and the date of confirmation.



MP 700.00.00
JULY 6, 2020
RECONFIRMED: JULY 6, 2022
PAGE 1 OF 2

Figure 1 – MP Header with Approval Date and Reconfirmation Date

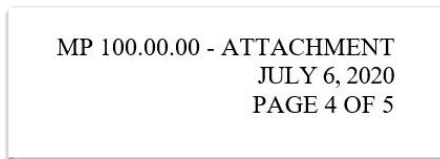
5.1.36.1.3 In the instance of either a new MP or an approved update to a MP, only the Director signature date (located at the end of the body section of the document) is in the header. A sample is provided in Figure 2.



MP 700.00.00
JULY 6, 2022
PAGE 1 OF 2

Figure 2 – MP Header With Approval Date

5.1.46.1.4 In the instance of an attachment, the first line of the MP header shall be in the format: MP XXX.XX.XX – ATTACHMENT. All other lines shall follow the guidelines previously described. This is demonstrated in Figure 3.



MP 100.00.00 - ATTACHMENT
JULY 6, 2020
PAGE 4 OF 5

Figure 3 – MP Attachment Header

5.1.4.16.1.4.1 In all instances, on all pages (do not use different first page), the text “PAGE X1 to X2” shall be last, with X1 being the current page and X2 being the total pages in the section. The main body and each attachment shall be considered a separate section; numbering shall be restarted on any new attachment instance.

6.7. MP APPROVAL PROCESS

6.17.1 In the instance of any MP Committee work, the champion is a person defined as the person who is the primary author, editor and/or liaison for the document. The champion is responsible for introducing and presenting the document. The champion is also responsible for addressing comments on the document.

6.27.2 Attachment 1 provides an overview of the approval process of an MP. First the document is brought to the MP committee chair (chair) by the champion. The document is distributed by the chair and discussed at the next MP committee meeting. After the document has been at a minimum of two consecutive MP meetings, the document may be approved by vote. The document is then reviewed, and if approved, signed by the Director of Materials Control, Soils and Testing Division (Director, MCS&T). The signed document is sent through DOH management for review and approval. Once the review is complete, the document is reviewed and affirmed by Federal Highways (FHWA). Once the document is affirmed by FHWA, the document is posted and distributed. If at any step an approving authority makes comments, the document is cycled back to the MP Committee meeting for review and another approval vote.

6.2.17.2.1 In the instance where a document has no content changes (editorial changes only), the MP committee may choose to vote to approve the document after one meeting.

In this case, any voting member of the MP committee or the FHWA representative may veto this decision.

6.2.27.2.2 The details of the MP committee, including the submission process, distribution practices, and current voting members is available for review in Design Directive 105 and available at the [WVDOH Engineering Webpage](#)⁵

7.8. RECONFIRMATION PROCESS

7.18.1 Each MP shall be periodically reviewed for both relevancy and accuracy. At a minimum frequency, each MP shall be reviewed every 4 years by the applicable MCS&T Section Supervisor (Reconfirmation Champion). In the instances where there is no obvious Section Supervisor, the delegation of the review shall be the responsibility of the chair in liaison with the Director of MCS&T.

7.28.2 After reviewing the document, if the Reconfirmation Champion determines that no changes are required, they will submit the document to chair for reconfirmation. The reconfirmation shall be done by the voting members.

7.38.3 If approved by the Committee, the MCS&T Director shall review the document and if accepted, sign the document. Because no changes were made to this document, once the document is signed, it shall be posted and distributed.

8.9. POSTING AND DISTRIBUTION OF MPS

8.19.1 Active MPs are available on the [WVDOH MCST MP Webpage](#)⁶. The webpage shows the MP number, the title of the MP and the latest approval or reconfirmation date.

⁵ <https://transportation.wv.gov/highways/engineering/Pages/Design-Directives.aspx>

⁶ <https://transportation.wv.gov/highways/mcst/Pages/WVDOH-Materials-Procedures.aspx>

[8.1.19.1.1](#) For each document (if applicable), an archived link is available to provide a documented history of updates. Figure 4 provides an example.

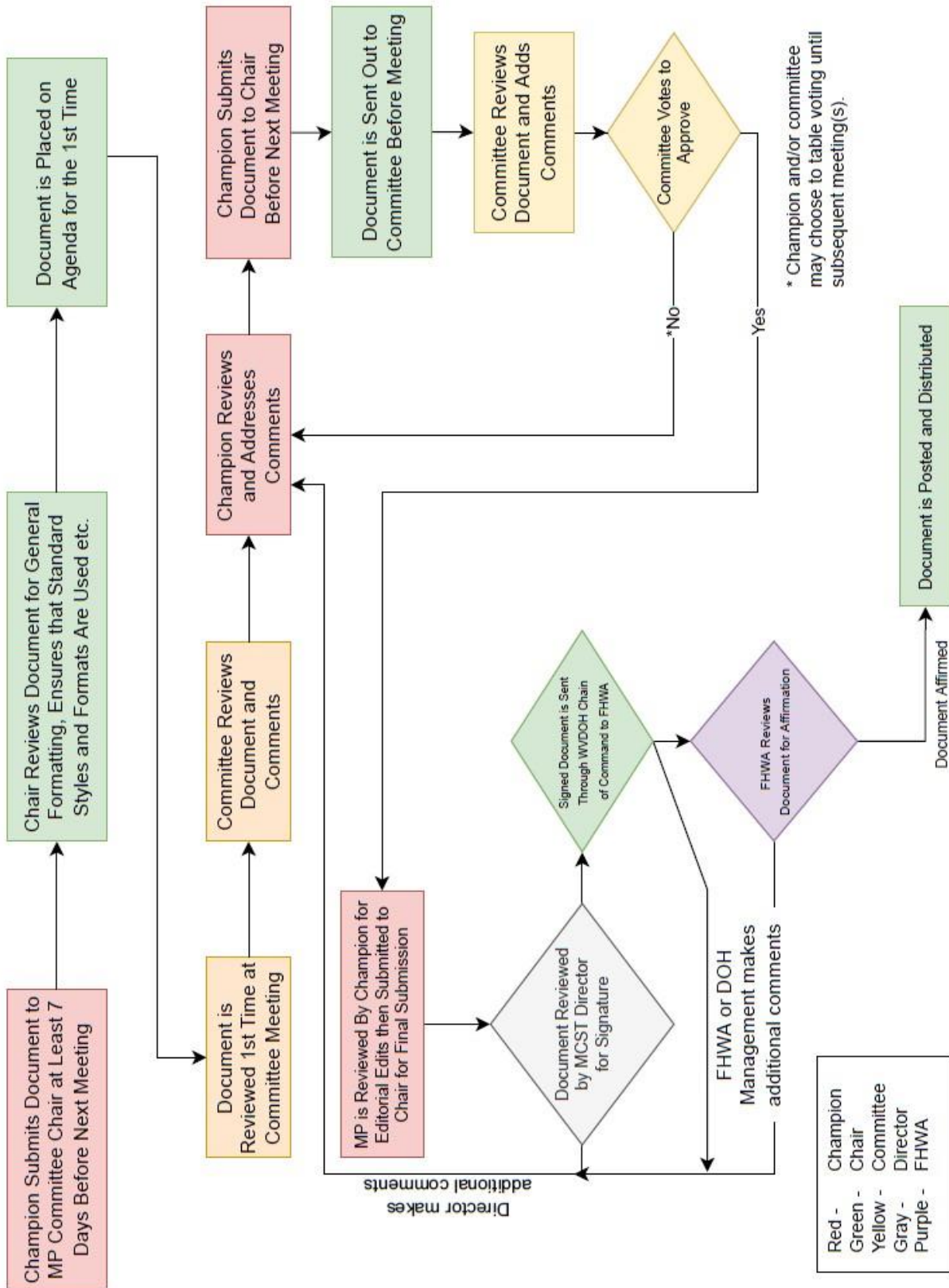
106.00.02	Procedure for Evaluation of New Products for Use In Highway Construction	November 2016
Archive		

Figure 4 – MP Committee Webpage Example

[8.29.2](#) When a document is affirmed by FHWA, the documents will be distributed to applicable Division Directors, District Engineer/Managers and District Material Supervisors.

Ronald L. Stanevich, PE
Director
Materials Control, Soils & Testing Division

MP 100.00.00 Steward – Materials Control Section
RLS:B
ATTACHMENT



ATTACHMENT 1 – MP Committee Meeting Flowchart

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

MATERIALS PROCEDURE

CERTIFICATION OF FABRICATORS OF CORROSION RESISTANT COATED DOWEL
BARS IN BASKET ASSEMBLIES AND COATED DOWEL BARS

1. PURPOSE

- 1.1 To establish a procedure for Certification of Fabricators of corrosion resistant coated dowel bars in basket assemblies and coated dowel bars, to set fort conditions for certification and to establish inspection and procedures for certified fabricators.
- 1.2 This procedure shall apply to fabricators of corrosion resistant coated dowel bars in basket assemblies and coated dowel bars who furnish material to WVDOT projects and purchase orders.

2. REFERENCED DOCUMENTS/SPECIFICATIONS

- 2.1 The coated dowel bars in basket assemblies and coated dowel bars shall meet the requirements of Section 709.15 of West Virginia Division of Highways Standard the Specifications for Road and Bridges as amended by the Supplemental Specifications.

3. DOCUMENTATION OF CERTIFIED COATER

- 3.1 The fabricator shall obtain the following information from the certified coater:
 - 3.1.1 Source ~~off~~ for Each Steel Used ~~Steel~~
 - 3.1.2 WV Laboratory Number for the Steel
 - 3.1.3 Source of Coating
 - 3.1.4 Type of Coating
 - 3.1.5 WV Laboratory Number for the Coating
 - 3.1.6 Dry Film Thickness of the Coating
 - 3.1.7 Total Number of Linear ~~Linear~~ Meters ~~(-)Feet of Steel Used.~~

Commented [1]: Should this be "dowel bar" instead of "steel", or does this include the wire for the baskets also?

4. WORKMANSHIP AND INSPECTION

- 4.1 The load transfer unit shall be made in accordance with the applicable WVDOH Standard Detail Sheet.
- 4.2 The fabricator shall inspect the coating for the following items:
 - 4.2.1 Saw cut ends of the dowel shall be free of burns and projections.

- 4.2.2 Flaws, such as perforations, cracks, and holidays.
- 4.2.3 Damage from welding or mechanical fixation shall not extend more than ~~26~~
~~millimeter~~ 1.0 inches from the weld or point of fixation.

Commented [2]: changing from Metric to English Units

5. DIVISION SAMPLING AND TESTING

- 5.1 The Division may obtain samples at the fabricator's shop and/or at the project site to ensure Specification compliance.
- 5.1.1 ~~The Division may elect to use other methods of verification, such as material, Division laboratory testing, and/or third-party laboratory testing.~~
- 5.1.2 ~~An inspection of the fabricator shall be conducted every two years to verify the ability of the facility to produce products that meet Specification requirements.~~

6. APPROVED PRODUCT/SOURCE LIST

- 6.1 ~~The Division will maintain an Approved Product/Source List APL for Coated Dowel Bars and Coated Dowel Bars in basket assemblies.~~
- 6.1.1 ~~Prospective Producers/Suppliers shall complete form HL-468, as per MP 106.00.02 indicating their intention to be included on the WVDOH APL.~~
- ~~The An updated APLs for Coated Dowel Bars and Coated Dowel Bars in basket assemblies each material shall will be updated a minimum of once a year ~~issued once a year~~ or as often as deemed necessary. The list may be~~
- 6.1.2 ~~updated at any time with the addition of a new facility or with the removal of a facility.~~
- 6.1.1 ~~If for any reason a fabricator plant fails to meet the requirements as set forth above or in the WVDOH sSpecifications, the fabricator plant will be removed from the APL Division's approved~~
- 6.1.3 ~~status until such time as corrective action is taken to meet the acceptance criteria.~~
- ~~6.1.26.1.4~~ 1.4 The acceptance criteria for the Approved Product/Source List APL for Coated Dowel Bars and Coated Dowel Bars in basket assembly shall meet WVDOH Specs 709.15 and MP 709.01.51.

Commented [3]: agree

7. DOCUMENTATION

- 7.1 For DOT projects, The Tthe fabricator will submit the information contained on Attachment 1 with each shipment. Two copies will be required. One copy is sent with the shipment to the project: the other is sent to the following address:

Materials Control, Soils & Testing Division
190 Dry Branch Drive

Charleston, WV 25306

- 7.2 Upon receipt of the coated dowel bars and coated dowel bars in basket assembly from a certified source, ~~coverage will be obtained by entering on form HL-440,~~ the project shall note the lab number for that MS&P on the DWR, the laboratory number for the source which is found on the list of approved suppliers.

RLS:MprPr

Attachment

Commented [4]: Need to check with the Control Group and Dan to see if this is still applicable

Commented [5]: Agree. I am not familiar with form HL-440.

Attachment 1

COATED DOWEL BARS AND COATED DOWEL BARS IN BASKET ASSEMBLY

PROJECT:

FABRICATOR:

LOCATION:

SOURCE OF STEEL BARS:

WV LABORATORY APPROVAL NO. FOR STEEL BARS:

SOURCE OF STEEL WIRE:

WV LABORATORY APPROVAL NO. FOR STEEL WIRE:

COATER:

LOCATION:

SOURCE OF COATING:

WV LABORATORY APPROVAL NUMBER FOR COATING:

QUANTITY OF BASKET ASSEMBLIES:

NO. OF LINEAL METERSFEET:

SHIPPED TO:

DATE SHIPPED:

SIGNED _____

DATE _____

Commented [6]: Is there an APL for steel wire, or where does this lab number come from?

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

MATERIALS PROCEDURE

LOS ALAMOS STAINING METHOD FOR ALKALI SILICA REACTION GEL

1. PURPOSE

- 1.1. To provide a staining method of testing to detect the gel, that is a byproduct of alkali silica reactions, on concrete that may have been affected by alkali silica reactivity.
- 1.2. While this method provides a way to detect such reaction gels, it is not intended to be a standalone diagnostic, but an aide. Other factors could present the same staining, so it is recommended that a more in-depth look is made with magnification to confirm or deny the results obtained.

2. SCOPE

- 2.1. This method is applicable to fractured concrete in the field, or with concrete cores in the laboratory.
- 2.2. For our intent of testing this method will be applied to concrete cores in the laboratory.

3. REFERENCES AND APPLICABLE DOCUMENTS

- 3.1. Guthrie, G. D., and Carey, J. W., Geochemical Methods for the Identification of ASR Gel, Transportation Research Board, July 1998, [Link to Webpage](#)¹.
- 3.2. Farny, A. James., and Kerkhoff, Beatrix., Diagnosis and Control of Alkali-Aggregate Reactions in Concrete, https://www.cement.org/docs/default-source/fc_concrete_technology/is413-02---diagnosis-and-control-of-alkali-aggregate-reactions-in-concrete.pdf[Link to Webpage](#)².
- 3.3. Dr. Berry, Micheal, Alkali Silica Reactivity in the State of Montana, February 2019, https://www.mdt.mt.gov/other/webdata/external/research/docs/research_proj/Alkali/Task_1_Report.pdf[Link to Webpage](#)³.

[3-3-3.4. MP 601.03.22: Damage Rating Index for Hardened Concrete](#)

¹ <https://www.osti.gov/servlets/purl/762098>

² https://www.cement.org/docs/default-source/fc_concrete_technology/is413-02---diagnosis-and-control-of-alkali-aggregate-reactions-in-concrete.pdf

³ https://www.mdt.mt.gov/other/webdata/external/research/docs/research_proj/Alkali/Task_1_Report.pdf

4. APPARATUS

1. Safety glasses, rubber gloves, apron, respirator
2. Saturated Solution of Sodium Cobaltinitrite
3. Saturated solution of rhodamine B base
4. Large Stone Saw
5. Concrete Wet Polisher (50 – 3000 grit pads)
6. Distilled water

5. SAMPLE PREPERATION

- 5.1. Secure a concrete core in accordance with ASTM C856, under section 8 (Samples). Generally, a core shall have a size minimum of 6 inches in diameter and 1 foot in length, however the sizes can be different due to the specific nature of the coring location.
- 5.2. The concrete specimens should be cut on the large stone saw so as to bisect the cylinder along its longitudinal axis. Care should be taken in avoiding, if possible, the steel reinforcing bars encountered in bridge deck cores.
- 5.3. Select the better half of the core for the next step, however, set the second half to the side for possible later inspection.
- 5.4. The half chosen for inspection is now wet polished. Using a concrete wet polisher start with the coarsest grit (50) and work your way to the finest grit (3000). Complete this step until the surface is sufficiently polished.

6. PROCEDURE

- 6.1. Take the polished concrete slab and rinse the surface of it with gas free, distilled water, making sure to remove any residue from the surface
- 6.2. Cover the rinsed surface with the sodium cobaltinitrite solution and allow this to sit for 30 to 60 seconds. After allowing the reaction sufficient time to happen rinse the surface again with gas free distilled water.
- 6.3. After the rinse cover the surface with the rhodamine compound, allow to sit for 30 to 60 seconds. Once the reaction has had time to happen rinse the surface again with gas free distilled water.

7. OBSERVATIONS

- 7.1. Reaction gel that is present with alkali silica reactions is rich in potassium. The sodium cobaltinitrite reacts with this free potassium creating a yellow stain.
- 7.2. The rhodamine solution reacts with deterioration by products in concrete. One of which is a modified composition of the ASR that migrates away from the reacted aggregate

- and replaces its alkali constituents with calcium. This change will cause a reaction with the rhodium that causes a pink stain.
- 7.3. When all of the staining on the surface has been completed make notes of the extent of staining present on the surface.
 - 7.4. Record any visual damage or deterioration that is seen on the concrete. This includes the amount of cracking present and the severity of the cracking.
 - 7.5. Observations of any damage present on the concrete and the staining that is seen can be a good indicator of the presence (or absence) of ASR. The person making these observations must use their good judgement and knowledge to interpret their findings.
 - 7.6. Further investigation can be made on the stained core using magnification to strengthen the findings from this test, as staining is made possible through other factors that can be ruled out through further investigation. (See **Damage Rating Index MPMP 601.03.22**)

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Director
Materials Control, Soils & Testing Division

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

MATERIALS PROCEDURE

DAMAGE RATING INDEX FOR HARDENED CONCRETE

1. PURPOSE

- 1.1. To obtain visual observations of characteristics in hardened concrete that can be interpreted to help quantitate the severity of alkali silica reactivity.

2. SCOPE

- 2.1. By observing the hardened concrete under magnification characteristics associated with alkali silica reactivity can be identified and counted. Through interpretations of the information collected, along with the process of elimination, determination of the presence or severity of alkali silica reactions can be quantified.

3. EQUIPMENT

1. Stone Saw
2. Safety glasses, gloves
3. Concrete Wet Polisher
4. Ruler
5. Stereomicroscope
6. Photomicrograph equipment

4. REFERENCED AND APPLICABLE DOCUMENTS

- 4.1. Fournier, B., Tremblay, S., Thomas, M. D. A., & Folliard, K. J. (2011). (publication). Evaluation of Pine Bluff Bypass Concrete Pavement in Pine Bluff, Arkansas. Federal highway Administration. Retrieved August 14, 2023, ~~Webpage from Link~~¹.

- 4.2. Fournier, B., Thomas, M. D. A., & Folliard, K. J. (2010). (publication). Evaluation of Bibb Graves Bride in Wetumpka, Alabama. Federal highway Administration. Retrieved August 14, 2023, ~~from Webpage Link~~².

- 4.2.4.3. MP: 601.03.21: Los Alamos Staining Method for Alkali Silica Reaction Gel.

¹ <https://www.fhwa.dot.gov/pavement/concrete/asr/petrographic/arkansas.pdf>

² <https://www.fhwa.dot.gov/pavement/concrete/asr/petrographic/alabama.pdf>

5. SAMPLE PREPERATION

- 5.1. If the core being examined has already been used for the staining method begin this procedure with step 4.6.
- 5.2. Secure a concrete core in accordance with ASTM C856, under section 8 (Samples). Generally, a core shall have a size minimum of 6 inches in diameter and 1 foot in length, however the sizes can be different due to the specific nature of the coring location.
- 5.3. The concrete specimens should be cut on the large stone saw so as to bisect the cylinder along its longitudinal dimension. Care should be taken in avoiding, if possible, the steel reinforcing bars encountered in bridge deck cores.
- 5.4. Select the better half of the core for the next step, however, set the second half to the side for possible later inspection.
- 5.5. The half chosen for inspection is now wet polished. Using a concrete wet polisher start with the coarsest grit (50) and work your way to the finest grit (3000). Complete this step until the surface is sufficiently polished.
- 5.6. Use a ruler to outline a grid of 1 cm X 1 cm squares on the surface of the concrete. There are no restrictions on the length or width of the grid, however, a minimum of 100 squares is required. The layout of the grid will depend on the working surface available.

6. PROCEDURE

- 6.1. Observe each square under a stereomicroscope with a magnification of at least 15X.
- 6.2. Count and write down the characteristics that are associated with alkali silica reactions that present themselves in each square. Attached at the end of document is a table with each characteristic and their respective weighing factors (figure 1) (Shrimer, F.).
- 6.3. While ~~look documenting for~~ these characteristics, take note of the particles that are in the core, especially ~~the ones that are those~~ associated with the presence of gel and/or cracking.
 - 6.3.1. NOTE – there are several resources available to aid in identification of the different characteristics, and some aggregate particles. ~~Some of these documents are attached~~ See the referenced documents.

7. RESULTS

- 7.1. Multiply the number of each feature tallied to their respective weighing factor.
- 7.2. Sum all of the calculations of each feature to get the Damage Rating Index (DRI).
- 7.3. The DRI gives a good indication of the severity of ASR if it is present. While there is no standard system for rating, generally values less than 250 a low degree of reaction,

500 is moderate, and 1000 is high. Values exceeding 1000 are a very high reaction and deterioration.

Petrographic feature	Abbreviation	Weighing factor
Coarse aggregate with cracks	CrCA	x 0.75
Open crack in coarse aggregate	OCrCA	x 4.0
Coarse aggregate with cracks and reaction products	Cr + RPCA	x 2.0
Coarse aggregate debonded	CAD	x 3.0
Reaction rims around aggregate	RR	x 0.5
Cement paste with cracks	CrCP	x 2.0
Cement paste with cracks and reaction products	Cr+RPCP	x 4.0
Air voids lined or filled with reaction products	RPAV	x 0.50

Figure 1 (Fournier, B., Tremblay, S., Thomas, M. D. A., & Folliard, K. J. (2011))

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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 embankments, subgrades, base course, asphalt and Portland cement concrete 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~~ Specifications.

3. SCOPE

- 3.1 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.

4. POLICIES AND ADMINISTRATION

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

1. ~~Deputy Secretary State Highway Engineer~~
2. Human Resources Director
3. Materials Control Soils and Testing (MCS&T)-~~Division~~'s Director
4. Quality Assurance Training Program Administrator
5. Applicable MCS&T Supervisors

- 4.1.1 The Certification Board will meet upon call of the MCS&T-~~Division~~'s Director.

- 4.2 Administration - The program will be administered by the Director of the MCS&T ~~Division~~ (hereafter referred to as "Director"). The Director will have the assistance of an Implementation Committee appointed by the ~~Deputy Secretary State Highway Engineer~~ as follows:

1. Quality Assurance Training Program Administrator
2. Applicable MCS&T ~~Division~~ Supervisors
3. A representative of the WVDOH Human Resources Division.

- 4.2.1 In addition the Certification Board may jointly select representatives of producers and contractors to work with the Implementation Committee at such times and on such matters as the Director and the representatives mutually agree. These representatives shall not be candidates for certification.
- 4.2.2 The Implementation Committee will meet upon call of the Director, or person authorized by the Director. The board shall have a minimum of three (3) members in order to form a quorum for a meeting.
- 4.2.3 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.

5. REQUIREMENTS

- 5.1 Where applicable, quality control representatives of a contractor or producer will be certified in one (or more) of the certifications listed in Section 6.0, depending upon the individual's duties or responsibilities. Responsibilities and qualification requirements are listed in appropriate support documents such as Materials Procedures, Quality Control Plans and others.
- 5.2 For purposes of the WVDOH Quality Assurance Program, a non- WVDOH certified technician/Inspector represents the company of which he/she is a full-time employee on the WV DOT 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 Deputy Secretary~~State Highway Engineer~~ makes an exception. Exceptions will be granted only when it can be proven that the certified Technician/Inspector actually performs the duties of the technician/inspector for all of the subsidiary or affiliated organizations.
- 5.3 Designated WVDOH personnel will be certified where applicable in one (or more) of the certifications listed in Section 6.0 depending upon the individual's duties and responsibilities.

6. CERTIFICATIONS

6.1 All certifications listed in the sections below require written examinations. Some of the listed certifications require a practical examination after successful completion of the written examination. It is the responsibility of the applicant to determine which certification is applicable to his/her assignment. Following is a description of the certifications listing relevant information about each:

6.2 AGGREGATE CERTIFICATIONS

6.2.1 Aggregate Sampling Inspector - 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. Gradations
5. T11 Wash Test

The Aggregate Sampling Inspector requires the successful completion of an online examination. Certification as an Aggregate Sampling Inspector qualifies the employee, either Industry or Division, to perform sampling of aggregates relevant to the Quality Control Program or Acceptance Program respectively.

6.2.2 Aggregate Technician - 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

After successful completion of the written examination, the applicant will be required to pass a practical examination consisting of his/her demonstration of testing common to normal aggregate quality requirements. Certification as an Aggregate Inspector qualifies the employee, either Industry or Division, to perform sampling and/or testing of aggregates relevant to the Quality Control Program or Acceptance Program respectively.

6.3 COMPACTION CERTIFICATIONS

6.3.1 Soils and Aggregate Compaction Inspector - The written examination for a Compaction Inspector consists of the following areas:

1. Specifications
2. Soil Compaction Test Procedures

3. Radiation Safety and Nuclear Gauge
4. Test Procedure Problems

After successful completion of the written examination, the applicant will be required to pass a practical examination demonstrating his/her proficiency in using the testing equipment. Certification of the Compaction Inspector qualifies the employee, either Industry or Division, to conduct tests on all Soil construction materials that require compaction testing.

6.4 CONCRETE CERTIFICATIONS

6.4.1 Concrete Technician - The written examination for a Concrete Technician consists of the following areas:

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

The Concrete Technician requires only the successful completion of the written examination; no practical examination test is required. Certification of the Concrete Technician qualifies the employee, either Industry or Division, to make plant and mix adjustments, proportioning, and other duties.

6.4.2 Concrete Inspector - The written examination for a Concrete Inspector consists of the following areas:

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

After successful completion of the written examination, the applicant will be required to pass a practical examination demonstrating his/her proficiency in conducting tests common to concrete quality control. Certification as a Concrete Inspector qualifies the employee, either Industry or Division, to perform sampling and/or testing of concrete relevant to the Quality Control Program or Acceptance Program respectively.

6.5 ASPHALT MIXTURE CERTIFICATIONS

6.5.1 Asphalt Plant Technician - The written examination for an Asphalt Plant Technician consists of the following areas:

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

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. Certification of the Asphalt Technician qualifies the employee, either Industry or Division, 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.

6.5.2 Asphalt Field Technician – The written examination for an Asphalt Field Technician consists of the following areas:

1. Specifications
2. Surface Preparation
3. Mix Delivery and Placement
4. Joint Construction
5. PWL
6. Asphalt Compaction

The successful completion of the written examination and a practical examination test is required. Certification as an Asphalt Field Technician qualifies the employee, either Industry or Division, 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.

6.5.2.1 Asphalt Field Technicians must also be evaluated by qualified District personnel on the first ~~WVDOH-WVDOT~~ paving project in which they perform this testing. 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 WVDOH-~~s~~Specifications. The District will also complete an evaluation form and send it to the MCS&T ~~Division~~ for processing. A technician that does not demonstrate proper nuclear density testing techniques 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 evaluation standards must provide proof of additional WVDOH approved radiation safety training before another evaluation will be conducted.

6.5.3 Inertial Profiler Operator- The written examination for the inertial profiler operator covers of the following areas:

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

This certification covers an employee of either a contractor, consultant, or DOH staff to operate a lightweight/low-speed and high-speed inertial profiler.

6.5.4 Radiation Safety

6.5.4.1 This certification is required by the Nuclear Regulatory Commission (NRC) before operating a portable nuclear gauge. The training consists of 3 - 4 hours class room instruction and has a 25-50 question closed book exam. A minimum score of 70% is required for passing 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

7. TRAINING

7.1 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.

7.2 The purpose of the schools is to provide helpful information and instruction for persons preparing to take the WVDOH Technician/Inspector examinations. These courses are designed to provide instruction for persons with a basic foundation in the subject matter.

8. EXAMINATIONS

8.1 Examinations, both written and practical, will be coordinated by the MCS&T ~~Division of the WVDOH~~. The locations and dates of the examinations will be announced on the ~~Division's MCS&T's website~~ [Webpage¹](http://transportation.wv.gov/highways/mcst/Pages/techcert.aspx). The examinations may be held on a regional basis when feasible. Most written examinations will be an 'open-book' type, with a time limit. Practical examinations require performance of the tests required by the ~~specifications~~ Specifications for the material type involved.

¹ <http://transportation.wv.gov/highways/mcst/Pages/techcert.aspx>

- 8.2 To pass the written examinations, the applicant must obtain a score of at least 70 percent. The Inertial Profiler Operator exam requires a minimum of 75% to pass. The applicant will be allowed two attempts within a 12-month period to obtain a passing score per each certification class attended.
- 8.3 After the applicant passes the written examination, he/she will have two attempts within a 12-month period to pass the practical exam. (Where applicable)
- 8.4 Certificate Non-Transferable - The status of the certification for a Technician or an Inspector is not transferable and is valid only for the quality control procedures designated by the bearer's certificate.
- 8.5 Revocation of Certificate - 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 ~~Deputy Secretary State Highway Engineer~~ upon recommendation of the Implementation Committee and/or the Board.
- 8.6 Renewal and Certification – Certifications shall be renewed as required in the Technician Inspector Certification Program (TICP) handbook. General guidance and information for renewal will be recommended by the Board as required by the ~~Deputy Secretary State Highway Engineer~~. All certifications shall terminate on December 31st of the year of expiration. There may be written, and practical examination required for recertification where applicable. More recertification information can be found in the Technician Inspector Certification Program (TICP) handbook available on the ~~MCS&T Division's Webpage~~².
- 8.6.1 The responsibility for obtaining re-certification shall lie with the certified individual.
- 8.6.2 The Implementation Committee or other designated party shall establish internal criteria for renewal. The Technician Certification Handbook with the current rules and requirements shall be posted on the ~~MCS&T Division's Webpage~~.
- 8.6.3 Upon obtaining renewal of certification, a renewal card may be printed from the ~~MCS&T Division's website Webpage~~.
- 8.7 For further information on classes, recertification, schedules, class calendars and other helpful information please visit the ~~Division's MCS&T's website Webpage~~.

² <http://transportation.wv.gov/highways/mest/Pages/techcert.aspx>

9. FUNCTIONS AND RESPONSIBILITIES

- 9.1 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 of Highways for approval.
- 9.1.1 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.
- 9.2 The WVDOH - The WVDOH is responsible for all acceptance decisions.
- 9.2.1 District Materials Supervisor - District Materials activities are the responsibility of the District Materials Supervisor.
- 9.2.2 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.

Ronald L. Stanevich, P.E., Director
Materials Control, Soils and Testing Division

RLS:BBEh
ATTACHMENT

WEST VIRGINIA TECHNICIAN INSPECTOR CERTIFICATION PROGRAM HANDBOOK

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1. INTRODUCTION

The purpose of the West Virginia Division of Highways (WVDOH) Technician and Inspector Certification Program (TCIP) is to improve the quality assurance of embankments, subgrades, base course, asphalt and Portland cement concrete by the certification of industry and Division of Highways personnel. This document is to establish guidelines for this purpose.

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

This document, along with MP 106.03.50, is applicable to all requirements, guidelines, and other support documents of the Division of Highways that reference conditions, methods, and levels of qualification specific to the Division of Highways' training and certification program.

There are often changes and additions to the TICP, so please, thoroughly review this document as well as the ~~Materials Division MCS&T Website Webpage~~ to find out about any applicable changes. ~~changes that may pertain to you~~

2. CERTIFICATION BOARD

As per MP 106.03.50 the certification board members are:

1. ~~State Highway Engineer Deputy Secretary~~
2. Human Resources Director
3. Materials Control Soils & Testing Director
4. Quality Assurance Training Program Administrator
5. Applicable Materials Control Soils and Testing Group Supervisors

3. APPLICATION AND CLASS SIGN-UP INSTRUCTIONS

For course registration, instructions, please visit the [WVDOH MCST Webpage](#)¹ for Instructions:

4. CERTIFICATIONS

The TICP offers certification classes in the following disciplines:

1. Aggregate Technician
2. Aggregate Sampling Inspector
3. Soils & Aggregate Compaction Technician
4. Portland Cement Concrete Technician
5. Portland Cement Concrete Inspector
6. Asphalt Plant Technician

¹ <https://transportation.wv.gov/highways/mcst/Pages/techcert.aspx>

7. Asphalt Field & Compaction Technician
8. Radiation safety

****EXCEPT AS NOTED HEREIN ALL CERTIFICATIONS ARE VALID FOR A THREE-YEAR PERIOD****

5. CLASS SUPPLY LIST

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~~ Specification book and the latest supplemental to the ~~specification~~ Specification book. You will need this during the test. These are also available in printable PDF format on the [WVDOH Webpage](#).²
4. Hand held calculator (No electronic devices other than a Hand held calculators are allowed to be used during testing.)
5. Hi-lighters
6. Sticky Notes
7. Ruler / Straight edge

6. SPECIAL NEEDS AND REQUESTS

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.

7. RECIPROCAL CERTIFICATIONS

The West Virginia Division of Highways may recognize reciprocity certifications from other states. ~~Please s~~See MP 106.03.51 for detailed instructions.

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 will be issued.

Acceptance of WVDOH Certifications by other state agencies is at the sole discretion of the other agency.

8. 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

² <https://transportation.wv.gov/highways/contractadmin/specifications/Pages/default.aspx>

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.

The purpose of the schools is to provide helpful information and instruction for persons preparing to take the technician/inspector examinations. These courses are designed to provide instruction for persons with a basic foundation in the subject matter.

9. CERTIFICATIONS

All certifications listed in the sections below require written examinations. Some of the listed certifications require a practical examination after successful completion of the written examination. Applicants are responsible to determine which certification is applicable to their assignment. The following is a description of the certifications listing relevant information about each:

10. AGGREGATE CERTIFICATIONS

10.1 Aggregate Sampling Inspector

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

1. Specifications
2. Sampling Fundamentals
3. Sampling Methods and Equipment
4. Gradations
5. T11 Wash Test

There is no in-person class for the Aggregate Sampling Inspector Certification; the class is online-only and on-demand. The Aggregate Sampling Inspector Certification requires the successful completion of the examination. Certification as an Aggregate Sampling Inspector qualifies the employee, either industry or Division, to perform sampling of aggregates relevant to the quality control program or acceptance program respectively.

The test will be available online throughout the year but may only be attempted twice per year. A score of 70 is required for passing Aggregate Sampling Inspector.

10.2 Aggregate Technician

The written examination for an Aggregate Technician consists of the following areas:

1. Specifications
2. Aggregate Specifications and Procedures

3. Aggregate Fundamentals
4. Sampling, Control, and Inspection of Aggregates
5. Aggregate Testing

After successful completion of the written examination, applicants will be required to pass a practical examination consisting of their demonstration of procedures common to normal aggregate quality requirements. Certification as an Aggregate Technician qualifies the employee, either industry or Division, to perform sampling and/or testing of aggregates relevant to the quality control program or acceptance program respectively.

11. COMPACTION CERTIFICATIONS

11.1 Soils & Aggregate Compaction Technician (SACT) - The written examination for the Soils & Aggregate Compaction Technician consists of the following areas:

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

After successful completion of the written examination, the applicant will be required to pass a practical examination demonstrating his/her proficiency in using the testing equipment. Certification of the Compaction Technician qualifies the employee, either industry or Division, to conduct tests on all soil construction materials that require compaction testing.

12. CONCRETE CERTIFICATIONS

12.1 Portland Cement Concrete Technician

The written examination for a Portland Cement Concrete Technician consists of the following areas:

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

The Portland Cement Concrete Technician certification requires only the successful completion of the written examination; no practical examination is required. Certification of the Portland Cement Concrete Technician qualifies the employee, either industry or Division, to make plant and mix adjustments, proportioning, and other duties.

12.2 Portland Cement Concrete Inspector

The written examination for a Portland Cement Concrete Inspector consists of the following areas:

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

After successful completion of the written examination, applicants will be required to pass a practical examination demonstrating their proficiency in conducting tests common to concrete quality control. Certification as a Portland Cement Concrete Inspector qualifies the employee, either industry or Division, to perform sampling and/or testing of concrete relevant to the quality control program or acceptance program respectively.

13. ASPHALT CERTIFICATIONS

13.1 Asphalt Plant Technician

The written examination for the Asphalt Plant Technician consists of the following areas:

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

After successful completion of the written examination, applicants will be required to pass a practical examination demonstrating their proficiency in conducting tests common to Asphalt quality control. Certification of the Asphalt Technician qualifies the employee, either industry or Division, 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.

13.2 Asphalt Field and Compaction Technician (AFCT) –

The written examination for the Asphalt Field and Compaction Technician consists of the following areas:

1. Specifications
2. Compaction Test Procedures
3. Radiation Safety and Nuclear Gauge
4. Test Procedure Problems
5. Testing Forms

After successful completion of the written examination, applicants will be

required to pass a practical examination demonstrating their proficiency in using the testing equipment. Certification of the Asphalt Field & Compaction Technician qualifies the employee, either industry or Division, to conduct tests on all asphalt materials that require compaction testing.

14. RADIATION SAFETY

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% is required for passing 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 gage

15. EXAMINATIONS

All participants are required to furnish their own laptop or tablet to take the final course exams. Examinations, both written and practical, will be coordinated by the ~~Materials Control, Soils & Testing Division (MCS&T) of the Division of Highways.~~ The locations and dates of the examinations will be announced at least two weeks prior to being given. All written examinations will be a one-part, 'open-book' type, with a time limit.

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

If the re-test examination is not passed, the applicant must attend the certification school. Practical examinations require performance of the tests required by the ~~specifications~~ Specifications for the material type involved.

After the applicant passes the written examination, they will be granted two attempts within a 12-month period to pass the practical exam. All practical examinations are pass / fail. If an applicant fails the practical twice, the applicant may not take another practical test in the same 12-month period without first attending the certification school. The scheduling of the practical examination and re-examination is established by the MCS&T section running the certification class.

16. CERTIFICATION AND RE-CERTIFICATION

16.1 Certification

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

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

Upon successfully completing the requirements for certification, applicants may print their certification card from the divisions ~~w~~Web-site page.
<http://dotftp.wv.gov/materialsdir/>

This certification is not transferable. A certification is valid for up to Three years and expires December 31, of the 3rd year of certification.

16.2 Re-Certification

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

Applicants will be given two scheduled attempts to pass the 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 ~~the~~ WVD OHMCS&T.

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.

The certification holder is responsible updating their personal information on the online learning website. <http://www.onlinelearning.wv.gov/student/home.html>

Certification holders are responsible to ensure that their certifications stay current. The West Virginia Division of Highways will no longer mail reminder letters to certification holders.

If an applicant seeking recertification disagrees with a recertification decision, they may file a written appeal with the board. (See Appealing a Decision).

17. TESTING PROTOCOL

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. REVOCATION OF CERTIFICATION

The Certification Board grants certification upon satisfactory completion and maintenance of certain conditions and may be revoked upon any breach of

these conditions.

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:

- Deliberate falsification of field or quality control test results or records.
- Deliberate falsification of calculations, test results or materials
- Cheating on certification/re-certification exams.
- Submittal of false information on certification applications.
- 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.

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 review board will notify the individual in writing of intent to revoke certification(s).

19. APPEALING A DECISION

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.

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

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 believe that revocation of the certification is warranted, the appellant may file a written appeal to the ~~State Highway Engineer~~Deputy Secretary for review. All information including any letter(s) of explanation from the appellant will accompany the documents submitted to the Deputy Secretary~~State Highway Engineer~~. The board will mail the decision of the Deputy Secretary~~State Highway Engineer~~ to the appellant. The decision by the Deputy Secretary~~State Highway Engineer~~ is final.

20. THE LENGTH OF REVOCATION:

20.1 First Offense

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.

20.2 Second Offense

This may include revocation of all certifications for up to for 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 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.

20.3 Third Offense

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

21. CONTACT INFORMATION

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

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. REFERENCED DOCUMENTS

- a. ACI R5.3 – Proportioning on Basis of Field Experience or Trail Mixtures, or Both
- b. AASHTO T 22 - Standard Method of Test for Compressive Strength of Cylindrical Concrete Specimens
- c. AASHTO M 6 - Standard Specification for Fine Aggregate for Hydraulic Cement Concrete
- d. AASHTO - R 100 - Standard Practice for Making and Curing Concrete Test Specimens in the Field
- e. AASHTO - T 280 - Standard Method of Test for Concrete Pipe, Manhole Sections, or Tile
- f. AASHTO T 303 - Standard Method of Test for Accelerated Detection of Potentially Deleterious Expansion of Mortar Bars Due to Alkali-Silica Reaction
- g. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

- h. ASTM C497-20e1- Standard Test Methods for Concrete Pipe, Concrete Box Sections, Manhole Sections, or Tile
- i. ASTM C1577-20 - Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers Designed According to AASHTO LRFD
- j. ASTM C1610/C1610M-10 - Standard Test Method For Static Segregation Of Self-Consolidating Concrete Using Column Technique
- k. ASTM A1064/A1064M-10e1 - Standard Specification for Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
- l. ASTM C1611 – Standard Test Method for Slump Flow of Self-Consolidating Concrete
- m. ASTM C1621 – Standard Test Method for Passing Ability of Self-Consolidating Concrete by J-Ring
- n. ASTM C642-21 - Standard Test Method for Density, Absorption, and Voids in Hardened Concrete
- o. MP 603.02.10 - Guide For Approval Of Component and Ship Loose Materials Pertaining To Precast And Prestressed Concrete Items
- p. MP 642.03.50 - Contractors Quality Control for Surface Water and Sampling Procedures for Quality Determination
- q. MP 700.00.01 - Sampling and Testing of Materials at the Source (Coverage)
- r. MP 703.00.22 - Soundness of Aggregates Using Sodium Sulfate
- s. MP 703.00.25 - Method of Determination of Percent of Thin or Elongated Pieces in Coarse Aggregate
- t. MP 700.00.30 - Certification of Batch Scales and Calibration of Standard 50 Pound Test Weights
- u. MP 703.00.25 - Method of Determination of Percent of Thin or Elongated Pieces in Coarse Aggregate
- v. MP 703.01.20 - Standard Method of Test for Friable Particles in Aggregates

- w. [MP 709.04.40 - Acceptance Criteria for Steel Wire Reinforcement Used in Concrete](#)
- x. [MP 711.03.23 - Mix Design for Portland Cement Concrete](#)
- y. [MP 714.03.30 - Quality Assurance of Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe](#)
- z. [West Virginia Department of Transportation, Division of Highways, Standard Specifications Roads & Bridges](#)

4. FABRICATOR APPROVAL

- 4.1 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.
- 4.2 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.
- 4.3 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.
 - 4.3.1 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.
 - 4.3.1.1 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.
 - 4.3.2 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.
- 4.3.3 The Fabricator must submit the Quality Control Manual/Plan for review at this meeting.
- 4.4 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 classes 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.
- 4.5 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.
- 4.6 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.

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

- 5.1 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.
- 5.1.1 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.
- 5.1.2 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.
- 5.2 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.
- 5.3 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.
- 5.3.1 For both conventional wet cast concrete and SCC mixes, a minimum of one set of compressive strength cylinders shall be fabricated from every 7 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.
- 5.3.2 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 compressive strength cylinders shall be fabricated for each item fabricated. 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.
- 5.4 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.
- 5.5 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%.
- 5.6 Unless otherwise specified, for conventional wet cast and SCC mixes, plastic concrete shall have an air content measured at $7.0 \pm 2.0\%$. For dry cast concrete, the air content test requirement is waived.
- 5.6.1 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 \leq 1.0
Passing Ability (ASTM C1621)	J-Ring Value \leq 1 inch
Segregation Resistance (ASTM C1610)	Segregation \leq 12%
Unit Weight and Yield	\pm 2% of Theoretical

5.6.2 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 ≤ T ≤ 7 seconds Visual Stability Index ≤ 1.0
Concrete Temperature	<90°F
Unit Weight and Yield	±2% of Theoretical

- 5.6.3 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.
- 5.6.4 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.

6. FINAL INSPECTION

- 6.1 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.
- 6.2 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.
- 6.2.1 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.
- 6.2.2 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.

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

The maximum gap between the adjacent pieces shall not exceed ½ inch (13 mm), unless otherwise stated in the construction plans.

7. ACCEPTANCE & REJECTION

- 7.1 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.
- 7.2 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.
- 7.2.1 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.
- 7.2.2 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 $\pm 1/4''$ 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.

- 7.2.3 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)

\bar{X} – Average 28 – day Compressive Strength (psi)

IC - The invoiced cost of the precast item only.

Formula 1 (Constructed by Contractor)

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

Formula 2 (Constructed by Division)

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

- 7.3 If a fabricator fails to request a final inspection to MCS&T and final inspection is not completed prior to delivery; MCS&T will reject the precast items. Contractors may seek acceptance of the precast items by the District through a DMIR. If the District chooses to accept the precast items through DMIR, the District may apply a price adjustment of \$700 per shipment of the precast items.

8. PROCEDURE FOR APPROVED SOURCE OF PRECAST CONCRETE LAGGING

- 8.1 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 WVDOT 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.
- 8.2 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.

- 8.3 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.
- 8.3.1 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.
- 8.3.2 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.
- 8.3.2.1 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)

- 8.4 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.

- 8.5 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.

Ronald L. Stanevich, P.E.
Director
Materials Control, Soils and Testing Division

MP 604.02.40 Steward – Cement and Concrete Section
RLS:MT
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: _____

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)
1 st			
2 nd			
3 rd			
4 th			
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:	

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

MATERIALS PROCEDURE

ANCILLARY STRUCTURE ANCHOR BOLT TIGHTENING

1. PURPOSE

- 1.1 To establish equipment, procedure, documentation, and documentation transmittal requirements for the tightening of anchor bolt nuts associated with signing, signal, lighting, and intelligent transportation systems (ITS) related roadway ancillary structures.
- 1.1.1 This Materials Procedure is specifically focused on the procedure to be followed when tightening anchor bolt nuts and does not address all requirements and procedures pertaining to the installation of ancillary structures. Individual component pre-inspection and repair, structure pre-assembly, structure installation preparation, pre-application of protective coatings, overall installation procedure, and proper tightening of structural connection bolts are included as part of the Standard Specifications.

2. MATERIALS AND EQUIPMENT

- 2.1 The mandatory materials and equipment required to properly tighten the anchor bolts include lubricant, ~~snug tightening wrenches~~, and a hydraulic fastener tightening wrench.
- ~~2.1.1 Wrenches used for a snug tightening are to have an appropriate handle length in order to achieve a level of initial snug tightening as predictable and uniform as possible. The handle length used for fasteners 3/4-inch to 1-1/4 inches in diameter is to be 23 inches. The handle length used for fasteners 1-1/2 inches to 2-1/4 inches in diameter is to be 36 inches.~~
- 2.1.2.1.1 Beeswax or toilet ring wax may be used as lubricant.
- 2.1.3.2.1.2 Hydraulic wrenches and accompanying documentation are to meet the requirements herein.
- 2.1.3.1.2.1 The wrenches are to be capable of generating the necessary torque in order to tighten the anchor bolt nuts as described herein.
- 2.1.3.2.1.2.2 The hydraulic wrench consists of a wrench and a hydraulic power pack to power and operate the wrench.
- 2.1.3.2.1.2.3 Hydraulic wrenches are to have the wrench and the pressure or torque readout gauge associated with the power pack calibrated regularly. Prior to the tightening of any anchor bolt nuts, the project Engineer is to be provided with separate calibration

certificates for the wrench and the gauge. The dates of the calibrations are to be one year or less prior to the date that the bolt tightening is performed. The certificates are to be from a calibration lab that is International Organization for Standardization (ISO) 17025 accredited, with the certificate indicating as such. The certificate for each is to display a serial number matching that shown on the wrench or gauge. If the gauge does

not provide readings directly in torque values, the calibration certificate is to be accompanied by calibration charts which equate gauge pressure readings to torque values. Example calibration certificates and charts are included as part of attached ATTACHMENT 2.

3. DOCUMENTATION

- 3.1 The tightening of all anchor bolt nuts is to be documented using the form “WVDOH ANCILLARY STRUCTURE ANCHOR BOLT TIGHTENING RECORD” (documentation form) attached as ATTACHMENT 1, [and available at the MCS&T DOH Webpage.](#)¹

4. PROCEDURES

- 4.1 Install the top nuts and washers and verify that the top nuts & washers, as well as the leveling nuts & washers, are all in firm contact with the base plate. Snug tighten the top nuts and leveling nuts utilizing the hydraulic wrench and the following procedure:
- 4.1.1 Use a permanent marker to indicate on the base plate the sequence of tightening to be followed. The sequence shall be a star pattern, examples of which are provided in Figures 1 and 2 below.
- 4.1.2 Snug tighten the top nuts to approximately 50% of the snug tightened condition torque values specified in Table 1 below following the star pattern.
- 4.1.3 Snug tighten the bottom nuts to approximately 50% of the snug tightened condition torque values specified in Table 1 below following the star pattern.
- 4.1.4 Snug tighten the top nuts to 100% of the snug tightened condition torque values specified in Table 1 below following the star pattern.
- 4.1.5 Snug tighten the bottom nuts to 100% of the snug tightened condition torque values specified in Table 1 below following the star pattern.
- ~~4.1 snug tighten the top nuts using the appropriate handle length wrench. Snug tightening is to proceed from nut to nut in a star pattern and the specific sequence chosen is to be indicated on the base plate by numbering the sequence using a permanent marker (see Figures 1 and 2 below). Snug tightness is considered to be the tightness which exists due to the full effort of a person using a spud wrench with the appropriate length handle for the bolt being tightened.~~

¹ <https://transportation.wv.gov/highways/mcst/Pages/tbox.aspx>

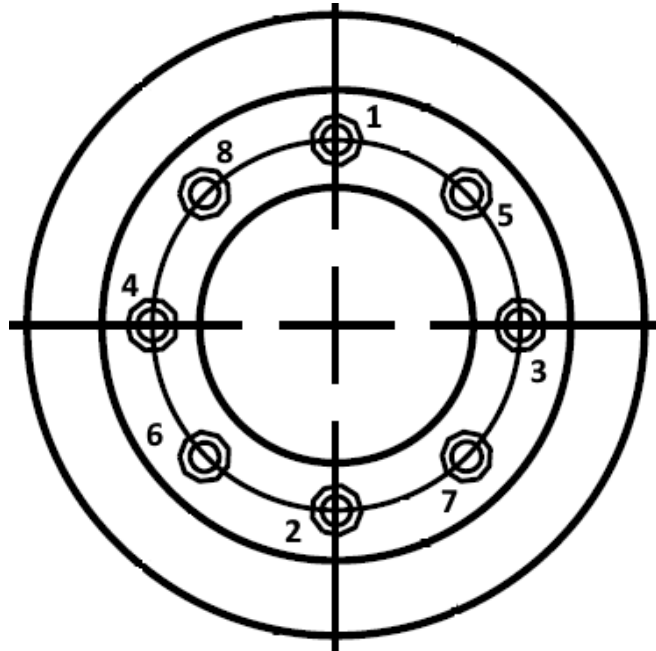


FIGURE 1 - EXAMPLE NUT TIGHTENING SEQUENCE FOR 8 BOLT BASE PLATE



FIGURE 2 -SNUG TIGHTENING SEQUENCE NUMBERING ON BASE PLATE

<u>Diameter (in.)</u>	<u>Threads/inch</u>	<u>Snug Torque Value (ft-lbf)</u>
<u>1-1/4</u>	<u>7</u>	<u>140</u>
<u>1-1/2</u>	<u>6</u>	<u>240</u>
<u>1-3/4</u>	<u>5</u>	<u>380</u>
<u>2</u>	<u>4.5</u>	<u>570</u>

2-1/4	4.5	830
-------	-----	-----

TABLE 1 – SNUG TIGHTENED TORQUE VALUES FOR ASTM F1554 GRADE 55 ANCHORS (CONTACT TRAFFIC ENGINEERING DIVISION FOR ANCHORS OUTSIDE THOSE COVERED BY THIS TABLE)

4.1.1 ~~Snug tighten the leveling nuts following a star pattern.~~

4.2 After ~~verifying that~~ all nuts ~~and washers~~ have been ~~brought into firm contacts~~ snug tightened and the necessity or unnecessary for repeating the snug tightening procedure with beveled washers has been determined and performed if required, snug tight condition reference marks are to be placed on the nut and base plate using a permanent marker to prepare for the full tightening procedure (see Figure 3 below). One reference mark is to be placed on the top of the nut at one of the corners. One reference mark is to be placed on the base plate such that this reference mark and the reference mark on top of the nut will be aligned when the nut is rotated one half of the amount specified in Section 4.3.1. An additional reference mark is to be placed on the base plate such that this reference mark and the reference mark on top of the nut will be aligned when the nut is rotated the complete amount specified in Section 4.3.1. All reference marks are to be placed such that they will remain visible when the tightening wrench is placed on the nut.

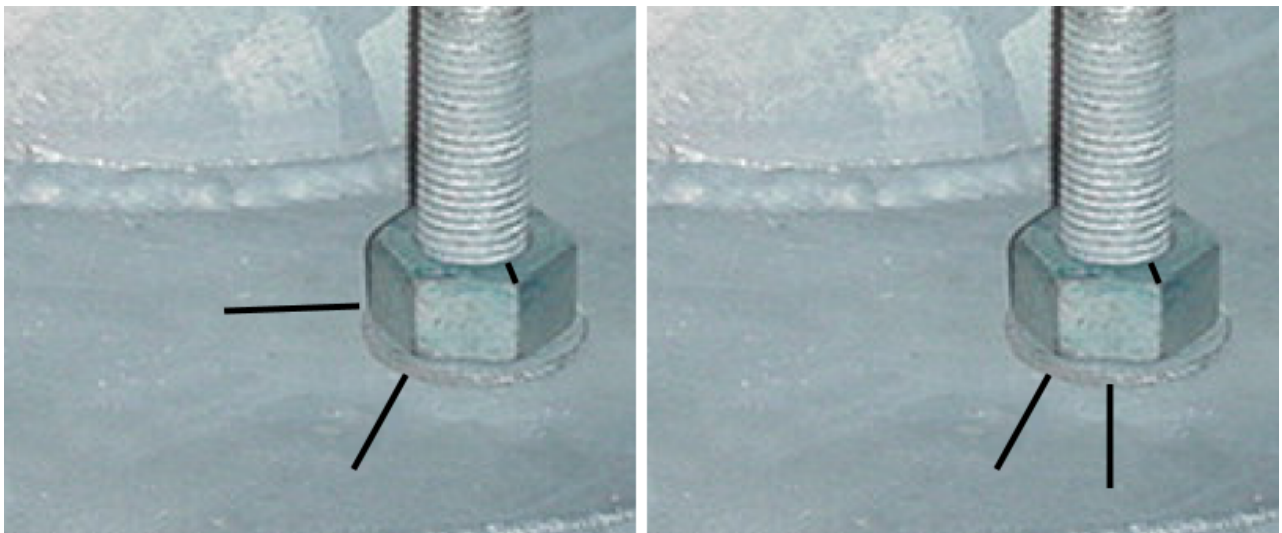


FIGURE 3 - SNUG TIGHT CONDITION REFERENCE MARKS FOR BOLTS 1-1/2" DIAMETER OR LESS (LEFT) AND BOLTS GREATER THAN 1-1/2" DIAMETER (RIGHT)

4.3 Fully tighten the top nuts using the hydraulic wrench.

4.3.1 Full tightness of each nut is achieved by rotating the nut a prescribed number of flats beyond the reference position. Rotation is to be 1/3 (2 flats) beyond the reference

position for bolts 1-1/2-inches in diameter or less. Rotation is to be 1/6 (1 flat) beyond the reference position for bolts greater than-1-1/2 inches in diameter.

4.3.2 Tightening is to proceed from nut to nut in the same star pattern that was used for the snug tightening procedure and is to be achieved over two cycles. Using a structure with 2-inch anchor bolts as an example, each nut is to be tightened ½ flat. Each nut is to then be tightened an additional ½ flat. ~~The amount of torque, as indicated on the power pack gauge, at the point when the full rotation of each nut is achieved is to be recorded on the documentation form. If the gauge associated with the power pack does not provide a torque readout, the pressure readout is to be recorded and the associated torque is to be determined from the power pack calibration charts and recorded on the documentation form.~~

4.4 Upon completion of the tightening of all nuts, a verification torque (Tv) is to be applied to each nut using the same hydraulic wrench and power pack that was used to tighten the nuts. ~~This step is necessary to verify threads have not been stripped and is not intended to tighten the nuts further. The verification torque should be insufficient to further turn and tighten the nuts.~~ The required verification torque is to be calculated using the following formula and documented on the documentation form: based on Table 2 below. **The applied torque is not to exceed this value.**

$$T_v = 0.12 (D_b) F_i$$

Where:

~~Tv = verification torque (inch-kips)~~

~~Db = nominal body diameter of the anchor bolt (inches)~~

~~Fi = 60% of the anchor bolt minimum tensile strength (kips.) For the commonly specified ASTM F1554 Grade 55 bolts, this calculated value is equal to 45~~

~~Multiply Tv by 83.3 to calculate Tv in ft-lbs~~

<u>Diameter (in.)</u>	<u>Threads/inch</u>	<u>Tv Value (ft-lbf)</u>
<u>1-1/4</u>	<u>7</u>	<u>550</u>
<u>1-1/2</u>	<u>6</u>	<u>950</u>
<u>1-3/4</u>	<u>5</u>	<u>1500</u>
<u>2</u>	<u>4.5</u>	<u>2250</u>
<u>2-1/4</u>	<u>4.5</u>	<u>3290</u>

TABLE 2 – VERIFICATION TORQUE VALUES FOR ASTM F1554 GRADE 55 ANCHORS (CONTACT TRAFFIC ENGINEERING DIVISION FOR ANCHORS OUTSIDE THOSE COVERED BY THIS TABLE)

If the gauge associated with the power pack does not provide a torque readout, the pressure readout required to achieve the verification torque is to be determined from the power pack calibration charts.

4.4.1 The documentation form is to be marked where indicated to indicate that ~~application of the verification torque did not result in further turning of each nut~~ a torque value of at least that provided in Table 2 would be required to further tighten the nuts. ~~If the application of the verification torque results in further turning of any nuts, the Traffic Engineering Division should be notified of this issue.~~ If the nuts further tighten prior to achieving the verification torque, the Traffic Engineering Division is to be notified of this issue.

4.5 ~~At least 48-hours after the tightening and verification torque procedures are completed, and after all attachments (signs, lighting, etc.) have been installed on the structure, a torque equal to 110% of the Tv torque (1.10Tv) is to be applied to each nut using the same hydraulic wrench and power pack that was used to tighten the nuts. This step is necessary to verify threads have not been stripped and is not intended to tighten the nuts further. The 1.10Tv torque should be insufficient to further turn and tighten the nuts. The 110% Tv torque is to be based on Table 3 below. The applied torque is not to exceed this value.~~

<u>Diameter (in.)</u>	<u>Threads/inch</u>	<u>110% Tv Value (ft-lbf)</u>
<u>1-1/4</u>	<u>7</u>	<u>605</u>
<u>1-1/2</u>	<u>6</u>	<u>1045</u>
<u>1-3/4</u>	<u>5</u>	<u>1650</u>
<u>2</u>	<u>4.5</u>	<u>2475</u>
<u>2-1/4</u>	<u>4.5</u>	<u>3619</u>

TABLE 2 – 110% VERIFICATION TORQUE VALUES FOR ASTM F1554 GRADE 55 ANCHORS (CONTACT TRAFFIC ENGINEERING DIVISION FOR ANCHORS OUTSIDE THOSE COVERED BY THIS TABLE)

4.5 If the gauge associated with the power pack does not provide a torque readout, the pressure readout required to achieve a torque of ~~1.10~~ 110% Tv is to be determined from the power pack calibration charts.

4.5.1 ~~The documentation form is to be marked where indicated to indicate that a torque value of at least that provided in Table 3 would be required to further tighten the nuts. The documentation form is to be marked where indicated to indicate that application of the 1.10Tv torque did not result in further turning of each nut. If the nuts further tighten prior to achieving the 110% Tv torque, the Traffic Engineering Division is to be notified of this issue. If the application of the 1.10Tv torque results in further turning of any nuts, the Traffic Engineering Division should be notified of this issue.~~

5. DOCUMENTATION TRANSMITTAL

5.1 Upon completion of all procedures described herein and the documentation form being completed in its entirety, the Engineer is to transmit an electronic copy of the documentation form to the email address DOH.OS.AnchorNutTightening@wv.gov, which is established by the Traffic Engineering Division for this purpose. Prior to

transmittal, the calibration certificates for the wrench and power pack pressure or torque readout gauge, as well as the calibration charts for the gauge, should be attached to the documentation form and included with the submittal. The subject line of the email should be named using the following format: D(*District Number*)-(Contract ID Number)-(Sign, Signal, Lighting, or ITS) Structure (*Structure Number as indicated on the project Plans*). Examples of this would be D4-2016000994-Sign Structure 6 and D7-2006001093-Lighting Structure HML1. An example of all documents that should be included as part of a complete transmittal is attached as ATTACHMENT 2.

Ronald L. Stanevich, P.E.
Director
Materials Control, Soils and Testing Division

MP 658.05.06 Steward – Traffic Certification Section
RLS:W
ATTACHMENTS

Base Plate 4 Diagram

Mark Each Box to Indicate Nuts were Numbered and Top and Bottom Nuts were Snug Tightened

1	2	3	4	5	6	7	8
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Mark Each Box to Indicate Nut and Base Plate Indicator Lines were Placed and each Top Nut was Rotated the Number of Required Turns

1	2	3	4	5	6	7	8
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Mark Each Box to Indicate Required Torque to Further Tighten each Top Nut would be at least Tv

1	2	3	4	5	6	7	8
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Mark Each Box to Indicate Required Torque to Further Tighten each Top Nut would be at least 1.10Tv

1	2	3	4	5	6	7	8
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

_____ Date of Tightening

_____ Date of Application of 1.10Tv

_____ Installation Contractor

_____ Bolt Tightening WVDOH Rep. (Print)

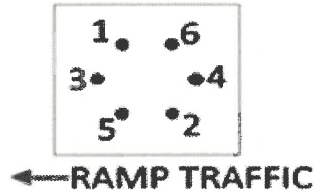
_____ Contractor Rep. (Print)

_____ Application of 1.10Tv WVDOH Rep. (Print)

_____ Contractor Rep. (Signature)

_____ WVDOH Project Engineer (Print)

Base Plate 2 Diagram



Mark Each Box to Indicate Nuts were Numbered and Top and Bottom Nuts were Snug Tightened

1	2	3	4	5	6	7	8
x	x	x	x	x	x	x	x

Mark Each Box to Indicate Nut and Base Plate Indicator Lines were Placed and each Top Nut was Rotated the Number of Required Turns

1	2	3	4	5	6	7	8
x	x	x	x	x	x	x	x

Mark Each Box to Indicate Required Torque to Further Tighten each Top Nut would be at least Tv

1	2	3	4	5	6	7	8
x	x	x	x	x	x	x	x

Mark Each Box to Indicate Required Torque to Further Tighten each Top Nut would be at least 1.10Tv

1	2	3	4	5	6	7	8
x	x	x	x	x	x	x	x

Base Plate 3 Diagram

Mark Each Box to Indicate Nuts were Numbered and Top and Bottom Nuts were Snug Tightened

1	2	3	4	5	6	7	8

Mark Each Box to Indicate Nut and Base Plate Indicator Lines were Placed and each Top Nut was Rotated the Number of Required Turns

1	2	3	4	5	6	7	8

Mark Each Box to Indicate Required Torque to Further Tighten each Top Nut would be at least Tv

1	2	3	4	5	6	7	8

Mark Each Box to Indicate Required Torque to Further Tighten each Top Nut would be at least 1.10Tv

1	2	3	4	5	6	7	8

Base Plate 4 Diagram

Mark Each Box to Indicate Nuts were Numbered and Top and Bottom Nuts were Snug Tightened

1	2	3	4	5	6	7	8

Mark Each Box to Indicate Nut and Base Plate Indicator Lines were Placed and each Top Nut was Rotated the Number of Required Turns

1	2	3	4	5	6	7	8

Mark Each Box to Indicate Required Torque to Further Tighten each Top Nut would be at least Tv

1	2	3	4	5	6	7	8

Mark Each Box to Indicate Required Torque to Further Tighten each Top Nut would be at least 1.10Tv

1	2	3	4	5	6	7	8

Date of Tightening

Date of Application of 1.10Tv

Installation Contractor

Bolt Tightening WVDOH Rep. (Print)

Contractor Rep. (Print)

Application of 1.10Tv WVDOH Rep. (Print)

Contractor Rep. (Signature)

WVDOH Project Engineer (Print)

EXAMPLE WRENCH CALIBRATION CERTIFICATE



CERTIFICATE INDICATES LAB IS ISO 17025 ACCREDITED

CERTIFICATE OF CALIBRATION

CERTIFICATE # TW-01193

certifies that the instrument below has been calibrated in accordance with calibration procedures under the conditions noted below using laboratory standards which are traceable to SI units.

The uncertainty represents an expanded uncertainty at approximately the 95% confidence level using a coverage factor of k=2.

The information on this certificate applies only to the identified instrument and may not be reproduced, except in full, without the written consent of

WRENCH MODEL AND SERIAL NUMBER

MODEL	2503MFRMH
SERIAL #	0916506063
TYPE	Comb
CAL DATE	9/2/2021
CAL DUE	3/2/2022
ACCURACY	(+/-) 4%
RANGE MAX	260
RANGE MIN	48

Customer: [REDACTED]

Address: [REDACTED]

Tech:	Temp (°F)	RH %
[REDACTED]	75.2	52
Test Method:		TI-CAL-1

CALIBRATION DATE

AS FOUND			
PERCENT OF RANGE	WRENCH SETTING	AS FOUND	TOLERANCE
100%	250 FTLB	251.56 FTLB	(+/-) 4%
60%	150 FTLB	147.14 FTLB	(+/-) 4%
20%	50 FTLB	47.596 FTLB	(+/-) 4%

AS LEFT			
PERCENT OF RANGE	WRENCH SETTING	AS LEFT	TOLERANCE
100%	250 FTLB	248.38 FTLB	(+/-) 4%
60%	150 FTLB	147.98 FTLB	(+/-) 4%
20%	50 FTLB	48.286 FTLB	(+/-) 4%

STANDARDS USED FOR CALIBRATION

MODEL USED	MFGR	SERIAL #	CERT #	EXPIRES	RANGE
MTMDP-4L-100	AWS	10963-1	25300-1	7/23/2022	10-100 IN-LBS
MTMDP-4L-500	AWS	10963-2	25501-1	7/23/2022	50-500 IN-LBS
MTMDP-4L-250	AWS	10963-3	25502-1	7/23/2022	25-250 FT-LBS
MTMDP-4L-750	AWS	10963-4	25503-1	7/23/2022	75-750 FT-LBS

Expanded Uncertainty	
Range	k=2
10-100 inlb	1.08 inlb
50-500 inlb	4.98 inlb
25-250 ftlb	7.44 ftlb
75-750 ftlb	8.86 ftlb

SIGNATURE 9/2/2021
DATE

EXAMPLE GAUGE CALIBRATION CERTIFICATE AND CHARTS



CERTIFICATE INDICATES LAB IS ISO 17025 ACCREDITED

Certificate of Calibration

CERTIFICATE # 14-03066

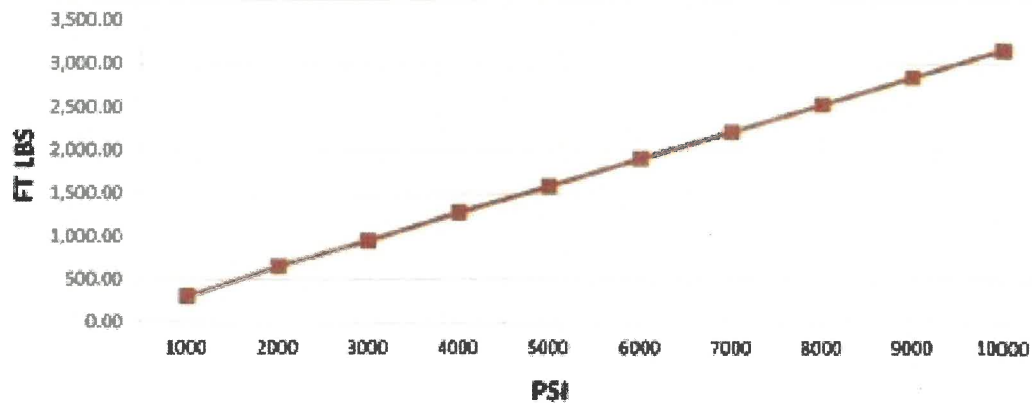
Calibration Date:	August 18, 2021
Calibration Due:	February 18, 2022
Temperature (F):	74.3
Relative Humidity(%):	57
Test Method:	TI-CAL-7, TI-CAL-8

Model Number:	3MD
Serial Number:	353228
Type:	hydraulic
Technician:	[REDACTED]
Signature:	[REDACTED]

Customer:	[REDACTED]
Address:	[REDACTED]

GAUGE MODEL AND SERIAL NUMBER

CALIBRATION DATE



TEST EQUIPMENT

	AKO	AKO
Manufacturer	AKO	AKO
Model Number	TSD20011	TSD10KPT
Serial Number	6240	127064
Accuracy (+/-)	0.5%	0.1%
Calibration Certificate #	21238-1	21239-1
Calibration Due Date	10/15/2021	10/15/2021

CALIBRATION CHART



Calibration Date:	8/18/2021	Model Number:	3MD
Calibration Due:	2/18/2022	Serial Number:	353228

PSI	FT/LBS	PSI	FT/LBS	PSI	FT/LBS	PSI	FT/LBS	PSI	FT/LBS
100	2	2100	692	4100	1307	6100	1940	8100	2573
200	52	2200	721	4200	1337	6200	1971	8200	2605
300	93	2300	752	4300	1368	6300	2003	8300	2637
400	125	2400	776	4400	1401	6400	2035	8400	2669
500	163	2500	797	4500	1434	6500	2067	8500	2702
600	195	2600	836	4600	1465	6600	2098	8600	2732
700	228	2700	880	4700	1496	6700	2131	8700	2764
800	259	2800	903	4800	1527	6800	2163	8800	2797
900	287	2900	924	4900	1560	6900	2194	8900	2828
1000	306	3000	956	5000	1591	7000	2225	9000	2860
1100	351	3100	987	5100	1622	7100	2257	9100	2891
1200	397	3200	1017	5200	1654	7200	2289	9200	2923
1300	426	3300	1048	5300	1685	7300	2321	9300	2954
1400	458	3400	1081	5400	1717	7400	2353	9400	2986
1500	491	3500	1113	5500	1749	7500	2384	9500	3018
1600	524	3600	1145	5600	1780	7600	2416	9600	3049
1700	556	3700	1177	5700	1812	7700	2447	9700	3081
1800	589	3800	1222	5800	1844	7800	2479	9800	3112
1900	623	3900	1267	5900	1876	7900	2511	9900	3143
2000	659	4000	1288	6000	1908	8000	2542	10000	3177

Tv = 2250 ft-lbs
=7,078 psi*

1.10Tv = 2475
ft-lbs = 7787 psi*

Snug=570
ft-lbs=1742
psi*

certifies that the above instrument has been calibrated in accordance with calibration procedures under the conditions noted above using laboratory standards which are traceable to SI units. The uncertainty represents an expanded uncertainty at approximately the 95% confidence level using a coverage factor of k=2.

*DETERMINED USING LINEAR INTERPOLATION BETWEEN ADJACENT DATA POINTS

Expanded Uncertainty

Range	k = 2	Units
0-20,000	78.52	FT/LBS

The information on this certificate applies only to the identified instrument and may not be reproduced, except in full, without the written consent of

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

MATERIALS PROCEDURE

ACCEPTANCE PROCEDURE FOR EVALUATING INDEPENDENT ASSURANCE
SAMPLES WITH SAMPLES USED FOR ACCEPTANCE

1. PURPOSE

- 1.1 To provide a procedure for the immediate evaluation of Independent Assurance (IA) Samples with samples used for acceptance.
-

2. SCOPE

- 2.1 This procedure is intended to apply to the following materials:
- 2.1.1 Aggregate
 - 2.1.2 Asphalt Concrete
 - 2.1.3 Portland Cement Concrete
-

3. REFERENCED DOCUMENTS

- 3.1 Office of Pavement Technology Publication No. [FHWA-HIF-12-001](#)¹, October 2011. Included as Attachment 32.
- 3.1.3.2 [MP 700.00.56 – Sampling and Testing Procedures for Independent Assurance Sampling.](#)
-

4. DEFINITIONS

- 4.1 Quality Assurance Samples and Tests - All of the samples and tests performed by the Division of Highways (DOH) or its designated agent used to validate the quality and acceptability of the materials and workmanship which have been used or are being incorporated in the project.
- 4.2 Quality Control Samples and Tests - All the samples and tests performed by the contractor that are performed or conducted to fulfill the contract requirements.
- 4.3 Independent Assurance Samples and Tests - Independent and unbiased samples or other activities performed by the DOH or its designated agent who do not normally have direct responsibility for quality control or quality assurance sampling and testing. IA samples and tests are taken to evaluate the sampling and testing procedures used in the acceptance program.
- 4.4 Split Sample - One of two selected samples that have been halved, quartered, etc. from a single sample taken in the field. The field sample must be of adequate size to render each "split sample" sufficient material for test.

¹ <https://www.fhwa.dot.gov/pavement/materials/hif12001.pdf>

- 4.5 Adjacent Sample - One of two field samples taken in close proximity to each other in both time and space. Adjacent samples must represent the same material, production process, and other activity through the point of sampling.
- 4.6 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”, statistically comparing results amongst the laboratories.
- 4.7 Active Tester – A person who has performed a material test for acceptance in a calendar year.
- 4.8 Active Test Equipment – A piece of equipment which has been used to perform acceptance testing in a calendar year.
- 4.9 Satisfactory Evaluation – If the results of a test fall within the guidelines established in Section 11 of this document, the test will be considered satisfactory.
- 4.10 Non-Satisfactory Evaluation – If the results of a test do not fall within the guidelines established in Section 11 of this document, the test will be considered non-satisfactory.

5. SYSTEM APPROACH FOR IA SAMPLING AND TESTING

- 5.1 Personnel and equipment will be verified on a system basis as per [FHWA-HIF-12-001](#). The system approach evaluates each Active Tester and each Active Testing Equipment once per calendar year.
- 5.2 If possible, all IA samples shall be the result of a split/adjacent sample. If this is not achieved, a proficiency sample may be used to satisfy the yearly IA requirement.

6. POPULATION OF QUALITY ASSURANCE TESTERS

- 6.1 Once per year, before any work is performed by District Technicians, a signed letter stating the names of each of their quality assurance testers shall be submitted by the District Construction Engineer to the Director of MCS&T. In lieu of this letter, Districts may utilize a MCS&T provided online form.
- 6.2 If, during the calendar year, additional testers are added to the District’s roster, the Construction Engineer shall submit an amended list to the Director of MCS&T. This shall be done before any quality assurance work is performed by the technician.
- 6.3 In the event where a project incorporates non-DOH acceptance testers, the District Construction Engineer shall submit to the Director of MCS&T a signed letter stating the names of each of the quality assurance testers.

7. PORTLAND CEMENT CONCRETE

7.1 The means and methods of meeting the yearly IA requirement for PCC are outlined in [MP 700.00.56 Attachment 1: IA Work Plan](#).

7.2 The IA frequency goal for each tester and each piece of testing 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 T119	1/Year

7.3 The evaluation of these tests shall be described in Section 11 of this document.

8. SUPERPAVE ASPHALT CONCRETE

8.1 The means and methods of meeting the yearly IA requirement for Superpave HMA is outlined in [Attachment 1: IA Work Plan](#) [MP 700.00.56](#).

8.2 The IA frequency goal for each tester and each piece of testing 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 T331	1/year
Bulk Specific Gravity, SSD - AASHTO T166	1/year
Maximum Specific Gravity - AASHTO T209	1/year
Percent Passing the #200 Sieve - AASHTO T30	1/year

8.3 The evaluation of these tests shall be described in Section 11 of this document.

9. MARSHALL ASPHALT CONCRETE

9.1 The means and methods of meeting the yearly IA requirement for Marshall HMA is outlined in [MP 700.00.56 Attachment 1: IA Work Plan](#).

9.2 The IA frequency goal for each tester and each piece of testing equipment is as follows:

Marshall IA Samples	
Asphalt Content by Ignition - AASHTO T308	1/year
Bulk Specific Gravity, SSD - AASHTO T166	1/year
Marshall Stability/Flow - AASHTO T245	1/year
Maximum Specific Gravity - AASHTO T209	1/year
Percent Passing the #200 Sieve - AASHTO T30	1/year

9.3 The evaluation of these tests shall be described in Section 11 of this document.

10. AGGREGATE GRADATION

10.1 The means and methods of meeting the yearly IA requirement for Aggregate Gradation is outlined in [MP 700.00.56 Attachment 1: IA Work Plan](#).

10.2 The IA frequency goal for each tester and each piece of testing equipment is as follows:

Aggregate Gradation Samples	
Class 1,3, or 10	1/year

10.3 The following sieves will be evaluated:

1. 1.5" Sieve
2. 3/4" Sieve
3. #4 Sieve
4. #40 Sieve
5. #200 Sieve

10.4 The evaluation of these tests shall be described in Section 11 of this document.

11. EVALUATION PROCEDURE

11.1 Samples will be evaluated statistically when the population of results is 5 or greater. If the sample is not provided by AASHTO resource, they will be evaluated by the WVDOH IA sampler. A sample that falls within 2 standard deviations of the population will be considered satisfactory.

11.2 If the samples are provided by AASHTO resource a rating of 3, 4, 5 as assigned by the testing agency shall be considered satisfactory.

11.3 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.

11.3.1 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.

11.3.2 For Portland Cement Concrete, the acceptable range for the average of all results is as follows:

1. Slump: +/- 1.5 in
2. Air: +/- 1.5 in
3. Cylinders: +/- 10%

- 11.4 If the results of an evaluation are satisfactory, the evaluation will be considered successful. A successful evaluation will verify both the Active Tester and the Active Testing Equipment used during the material test.
- 11.5 If the results of an evaluation are deemed non-satisfactory, the material test will be reviewed by the respective District or Managing Office Representative. Within 30 days of notification, the District Construction Engineer or Managing Office Representative 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 ~~21~~. The live version of the file is in the [WVDOH MCS&T Toolbox](#)².
- 11.5.1 If a Concrete Slump and Air IA test is determined to be unsatisfactory, the IA sampler shall perform another 1-1 test with the testing technician to determine the root cause. The IA sampler may have the technician use either the IA testing equipment or another previously satisfactory test equipment to isolate the issue.
- 11.5.2 If the Technician is determined to be satisfactory using another piece of equipment, the IA sampler shall perform additional testing with the errant devices to determine if the testing equipment is the root cause of the unsatisfactory result.
- 11.5.3 In the above-described instance, all pertinent information shall be provided in a corrective action report.

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MP 700.00.53 Steward – Materials Control Section
RLS:B
ATTACHMENTS

² <https://transportation.wv.gov/highways/mcst/Pages/tbox.aspx>

Attachment 21: Sample Corrective Action Report

Commented [DB1]: Attachment 1 moved to a new MP

WVDOH Independent Assurance Corrective Action Report			
Form 2023-IA-CAR			
Date of Occurrence:			
Date Submitted:			
Name of Tester:			
Testing Equipment:			
Material Tested:			
Describe the issue reported:			
What was the root cause of the issue?			
What actions have been done to correct this issue?			
Signature of Testing Technician	Date		
Signature of District Materials Supervisor	Date		
Signature of District Construction Engineer	Date	Review: MCST	

MP 700.00.53 – ATTACHMENT 32
SIGNATURE DATE
PAGE 1 OF 1

Attachment 32: Office of Pavement Technology Publication No. [FHWA-HIF-12-001](#)³,
October 2011

³ <https://www.fhwa.dot.gov/pavement/materials/hif12001.pdf>

TechBrief

The Construction and Materials Quality Assurance Program is an integrated, national effort to improve the effectiveness of the State acceptance of materials both in the inspection, sampling and testing. The program is designed to provide tools and guidance in implementing Quality Assurance programs. The program is designed to provide tools and guidance in implementing Quality Assurance programs.



U.S. Department of Transportation
Federal Highway Administration

Office of Pavement Technology

Publication No.
FHWA-HIF-12-001

October 2011

INDEPENDENT ASSURANCE PROGRAMS

This Technical Brief provides information regarding independent assurance as it relates to activities for the evaluation of the sampling and testing procedures used in a materials and quality acceptance program.

Introduction

23 CFR 637 defines an Independent Assurance Program as: Activities that are an unbiased and independent evaluation of all the sampling and testing procedures used in the acceptance program.

An Independent Assurance Program ensures the sampling and testing is performed correctly and the testing equipment used in the program is operating correctly and remains calibrated. It involves a separate and distinct schedule of sampling, testing and observation.

Qualified sampling and testing personnel, other than those performing the verification and quality control (QC) sampling and testing, should perform the Independent Assurance (IA) tests. Likewise, equipment other than that used for verification and QC should be used for IA sampling and testing. By regulation IA sampling and testing is conducted by agency personnel or an accredited laboratory designated by the agency.

The regulation requires IA specifically be designed to include testing performed on project produced materials. Since the testing of project produced materials are tested in multiple locations and by multiple personnel it is necessary to have some assurance the testing is being performed accurately. Manufactured products are typically tested in the State's central laboratory or by a designated consultant laboratory. Testing in the central laboratory is considered to be covered by the laboratories accreditation and participation in proficiency testing.

Background

In the early sixties Congressional investigation uncovered improper testing and fraud in some of the federally funded highway projects. To address the issue of improper testing a separate sampling and testing program was developed. The program was operated by personnel different than project personnel on different equipment. The samples were split with project personnel and the test results were compared. In addition, testing procedures were also observed. This was done to ensure sampling procedures were performed correctly and equipment stayed in calibration. In later rewrites of the regulation this program became the Independent Assurance program.

Scope

The regulation, 23 CFR 637, only covers projects that are on the National Highway System (NHS). The regulation requires testing personnel that perform any verification testing or QC testing used in the acceptance decision be covered by an IA program regardless of the agency, including a local agency or a toll authority administering a project.

Some States have IA testing personnel perform other duties such as: (1) instructing other testers, (2) obtaining samples for the verification of manufactured products,(3) obtaining samples of aggregate, cement, binder samples at production facilities for purposes other than IA, (4) inspecting precast or other facilities. Even though these functions are a necessary part of an overall Quality Assurance (QA) program they will not be discussed in this Tech Brief since the purpose of this Tech Brief is to discuss the IA functions as defined in the regulation.

Regulation 23 CFR 637

The text of the entire regulation can be found at this website:

http://www.access.gpo.gov/nara/cfr/waisidx_03/23cfr637_03.html

The following is a summary of the elements of the IA program:

1. Establish IA sampling and testing frequencies;
2. Evaluate testing equipment by using one or more of the following: calibration checks, split samples, or proficiency samples.
3. Evaluate testing personnel by observations and results from testing split samples or proficiency samples.
4. Prompt comparison and documentation of test results obtained by the tester being evaluated and the IA tester.
5. Develop guidelines including tolerance limits for the comparison of test results.

6. Provide an annual report to the FHWA when the system approach is used.

The rest of the Tech Brief will discuss best practices for each of the above requirements.

System versus Project Approach

The Independent Assurance Program can be set up on a project basis, which is the traditional approach, or on a system basis. The difference in the two approaches is the basis of the frequency of testing (cover all projects versus cover all personnel).

Some States have moved away from having testing personnel on all projects and are moving toward centralizing testing away from the project level. As this occurs testers may perform testing on several projects and it becomes more efficient to have a frequency based on the testers instead of projects quantities. In addition, the project approach does not always include all the testing personnel.

As States have moved toward the system approach they have also incorporated the IA program results as part of the technician qualification program.

Frequency of Independent Assurance Testing

Project Approach - The State establishes the frequency for the IA testing based on the testing frequency performed on the project or on a time frequency on a project. Typically, the States use a frequency of 10 percent of the verification/acceptance testing. For example if the verification testing is performed at the rate of 1 per 500 tons the IA frequency would be 1 per 5000 tons.

System Approach - An alternative method to basing frequency on project testing frequencies is to base the IA frequency on a time basis for all testers and equipment. In this case, the personnel and equipment would be verified on a "system" basis. The purpose is to cover all the testers and equipment over a period of a year. While States strive to reach all testers, it is not always possible. States typically set a goal of reaching 90% of the active testers. Active testers are defined as those testers that are performing testing in a given year, in most States this is a subset that is smaller than all "qualified" testers since some qualified personnel may have retired, move to other jobs or resigned. The system approach can be a more effective means of performing IA since it ensures that most testers are reviewed and that the same testers are not continually reviewed.

One challenge is to determine the active testers. For States that have an electronic materials management system it is very easy to determine the active testers since these systems indicate who is performing a given test. The IA testers will run reports periodically (monthly) to

determine the testers that need to be reviewed. For those States that do not have an electronic materials management system it becomes more challenging to determine the active testers. A good practice under these circumstances is to require the project personnel to identify the personnel that are going to perform testing, state, consultant, and contractor, at the beginning of the project along with any changes to the IA personnel. The IA testers will then know the active testers along with the testers that they have already been reviewed and will thus know the testers that need to be reviewed in the future.

Mixed Approach - It is permissible to separate the verification of equipment and personnel, i.e., one method to check equipment is to require a calibration and inspection frequency. Personnel can be checked by sending out proficiency samples. It is permissible to use a mixed approach, i.e. where some test procedures and or some testers are covered by a project approach where the remaining procedures are covered by a system approach.

Equipment and Personnel

Testing equipment may be evaluated by using one or more of the following: calibration checks, split samples, or proficiency samples.

Testing personnel may be evaluated by observations and split samples or proficiency samples.

The typical approach for performing IA is to check equipment and personnel at the same time. This is performed by IA personnel visiting a job site to observe the sampling and testing on site and to also test a split of the sample on site with equipment the IA personnel brought or to take the split to another laboratory for testing. When the test results are compared it checks both the equipment and tester. If a set of samples do not compare further analysis is required to determine if the source of the error is in procedure or equipment.

Some States send out proficiency samples to district, other subsidiary laboratories as well as consultants and contractors. Some of these States develop their own samples, while others require the laboratories to subscribe to the AASHTO Materials Reference proficiency samples. Proficiency samples are a way to address equipment and test procedures. Some States are preparing enough proficiency samples for all the active testers. In cases where all the testers are covered by the proficiency samples additional IA work would only need to review those that did not compare. If the proficiency program did not cover all the testers additional IA work would also be required.

Another method that covers just the equipment is performed by frequent standardization and or calibration. The frequency for standardization and/or calibration differs by equipment due to the unique nature of each testing device. AASHTO R-18 and some of the test procedures contain a frequency for standardization/calibration of the testing equipment. However, if standardization/calibration is the only check on the equipment (no split samples or proficiency samples) the standardization/calibration should probably be run frequently.

As some States move toward the system approach the States are checking testers in a central location. This allows the IA inspectors to cover numerous testers at one time. This has worked especially effectively in States where the projects and or laboratories are spread across a large geographic area. The States that use this approach are also including this data for requalification of testing personnel. When this approach is used the equipment needs to also be covered by standardization/calibration, split sample or proficiency sample testing.

Some States will suspend and/or revoke a technician's qualification/certification for repeated poor performance on IA evaluations. These are in addition to suspensions and/or revocation due to fraudulent activities. Some States will also perform testing on 3 way split-samples. In this approach one split is tested by project personnel, one split is tested by the contractor personnel and the third split is tested by the IA personnel. This is typically performed at the beginning of production to ensure that all testing personnel and equipment are performing correctly.

Prompt Comparison and Documentation

It is essential the IA Program compare results and detect deficiencies in State or contractor testing procedures in a timely manner. This improves the reliability of sampling and testing. The timely comparison of data may be restricted by the resources of an agency including personnel, facilities, and geographical constraints. These resource needs must be considered in an agency program.

Deviations from the established tolerances will require an engineering audit of the respective sampling and testing procedures, and the equipment used. When comparison of QC and verification data reveals significant differences in test values, the variables involved should be evaluated by the IA personnel to determine whether further testing and investigation is needed to establish the source of the discrepancy.

Corrective actions should be incorporated as appropriate under the direction of IA personnel.

Tolerances for Comparison of Test Results

A common place to start in establishing comparison tolerances are the D2S limits in the published test procedures. However, as States reduce the options in published test procedures and as testers become more proficient, the tolerances should be reduced. When split samples are used, the materials and sampling variability are eliminated from the analysis and only the variability due to the testing procedures and the equipment are included.

The comparison of split sample test results should be based on established deviation values or tolerances that are representative of the testing procedures and materials used. AASHTO and ASTM have published precision statements for some test methods. However, many of these procedures have multiple methods and or options inside the procedure. In order to reduce

testing variability most States have specified the particular options within the test procedures. Therefore the agency should develop Independent Assurance tolerances based on their specific options that the State is requiring. Care must be taken when historical data are used in establishing these limits to ascertain that the data are not biased; i.e., they were obtained in a random manner and that all test results have been reported. Otherwise, the variability may be underestimated and the limits too restrictive.

Many States distribute proficiency samples to their district laboratories. This data can be analyzed to determine IA tolerances. The formula for D2S is $D2S = 2\sqrt{2}(1S)$ where

1S = the standard deviation of the results .

Established tolerances should be periodically evaluated and modified to ensure that the goals of IA are being met; that is, it assures the reliability of contractor and agency test results. Some States are evaluating their tolerance every year. As a minimum the tolerances should be evaluated every 5 years.

In situations where multiple split tests are performed on a project a paired t-test can also be used to analyze data.

Annual Reports

The regulation requires those States that use a system approach to prepare and submit an annual report to the FHWA Division Office.

The annual report should include the following information: the number of certified technicians, the number of active technicians, the number of technicians covered by the IA program, the number of IA reports that had deviations, and a summary of how the deviations were addressed along with the potential systematic solutions to reoccurring deficiencies.

Alternate Approach

One State is statistically analyzing State and Contractor data in an innovative manner to accomplish both verification and IA.

An example of this approach is shown in Figure 1. In this approach the contractor performs sampling and testing at the rate of 4 samples per lot. The State takes verification samples, at the beginning of production; a minimum of 4 samples are taken the first week of production and at least 1 per lot. The State's verification samples are taken at the plant by contractor personnel under the direction of the State personnel. The verification samples are split and one split is given to the contractor. Analysis is performed in two ways. First, for IA, the split results are compared using IA comparison tolerances. In the figure below; IA1 is compared to the contractor split of that sample, sample 4 of lot 1. For validation, the State verification

samples are made independent by removing the corresponding contractor splits. In the figure below samples 1, 2, 3 from lot 1; samples 1, 2, 4 from lot 2; samples 1, 2, 3 from lot 3; and samples 1, 3, 4 from lot 4 are compared to the State's IA1, IA2, IA3, and IA4 with the F& t tests.

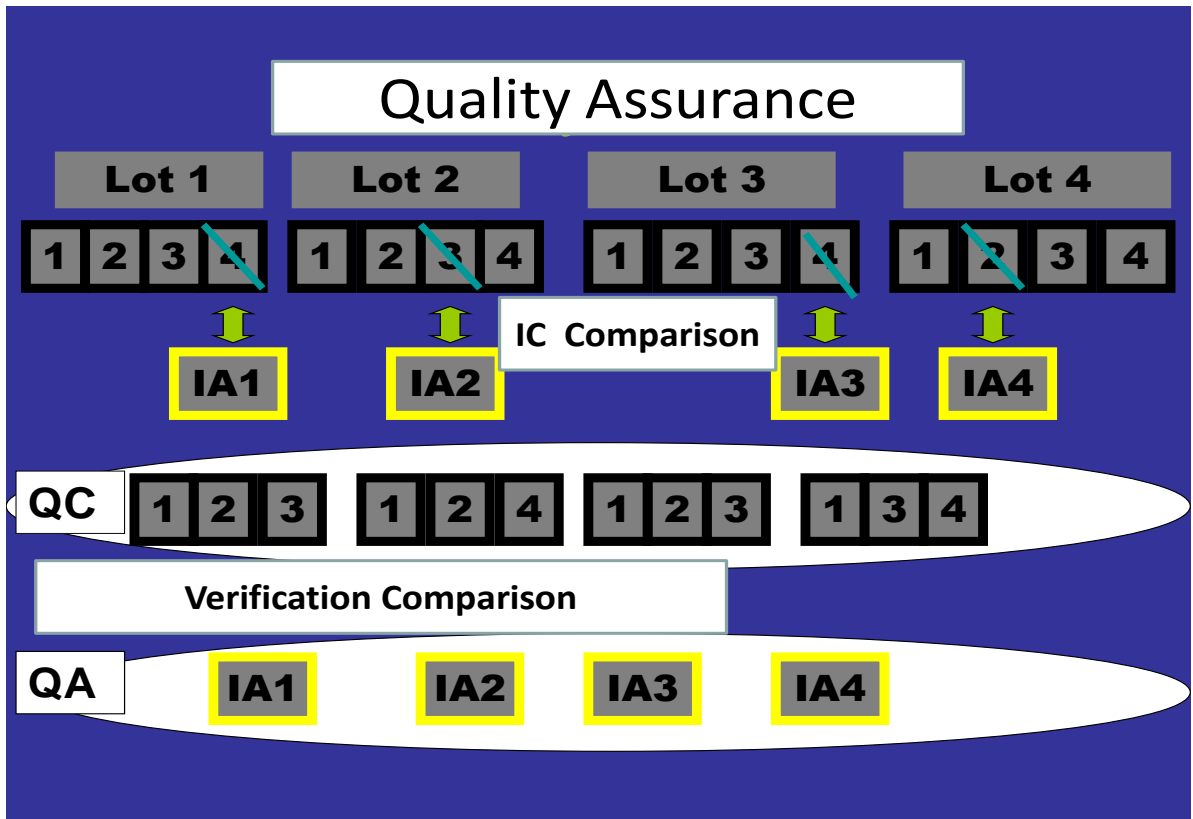


Figure 1. Example of Alternate Approach.

Conclusion - Commonly Noted Areas of Concern

- Test results from the IA program should only be compared to split test results or results from others testing the same set of proficiency samples.
- IA results are not to be used in the acceptance decision.
- IA should be based on split samples or proficiency samples not independent samples so that data can be compared without material variability.
- All tests that are performed in the field to determine the final acceptability of the materials should be covered by the IA program.

- All technicians that are performing testing that is used in the acceptance decision need to be covered by the IA program.
- Observation of sampling and testing procedures should be included as part of an IA system to evaluate sampling and testing personnel and ensure that testing and sampling procedures are performed correctly.

Further Information:

- "23 CFR Part 637," Subpart B - Quality Assurance Procedures for Construction, Federal Highway Administration, *Federal Register*, Washington, DC published on June 29, 1995, and amended on December 10, 2002, and September 24, 2007, http://www.access.gpo.gov/nara/cfr/waisidx_03/23cfr637_03.html
- Non-regulatory supplement for 23 CFR Part 637, Subpart B - Quality Assurance Procedures for Construction, Federal Highway Administration. The non-regulatory supplement was updated on July 19, 2006. <http://www.fhwa.dot.gov/legsregs/directives/fapg/0637bsup.htm>
- Frequently asked questions (FAQ) on the Quality Assurance Regulation. The FAQs were updated on November 26, 2006. <http://www.fhwa.dot.gov/pavement/materials/matnote11.cfm - qaa>
- AASHTO Standard Practice R 44, "Independent Assurance Programs" has been published in the 2007 AASHTO Standards. This guide will assist the States in developing Independent Assurance Programs
- NHI Course 134042, "Materials Control and Acceptance –Quality Assurance." The course is four days long and covers the basic essentials of QA. A two-day version of the course is also available. http://www.nhi.fhwa.dot.gov/training/brows_catalog.aspx
- NHI Course 134064 – "Transportation Construction Quality Assurance"

For information related to the Materials Quality Assurance Program, please contact the following:

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This **TechBrief** was developed as part of the Federal Highway Administration's (FHWA's) Materials Quality Assurance Program.

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

MATERIALS PROCEDURE

SAMPLING AND TESTING PROCEDURES
FOR INDEPENDENT ASSURANCE SAMPLING.

1. PUPROSE

- 1.1 This procedure will provide the guidelines for the Sampling and Testing of Independent Assurance Samples. The acceptance of these samples are described in MP 700.00.53.
-

2. REFERENCED DOCUMENTS

- 2.1 MP 700.00.53: Procedure for Evaluating Independent Assurance Samples With Acceptance Samples
-

3. SCOPE

- 3.1 The following materials are to be sampled by the District and tested by both the District and MCS&T for IA sampling compliancy requirements.
- a) Asphalt – Superpave and Marshall
 - b) Aggregate – Class Material
 - c) Concrete – Cylinders, Slump and Air.
-

4. TESTERS

- 4.1 The District is required to identify testing quality assurance testing technicians who perform the tests and provide this information to MCS&T at the start of the season. This needs to be updated on a regular basis, specifically when testing technicians are added. This includes the following personnel:
- a) QAM / Consultant Testing Technicians
 - b) District Testing Technicians
-

5. TESTS

- 5.1 The following tests will be evaluated for the IA Program:
- a) Superpave Mixture Testing
 - b) Marshall Mixture Testing
 - c) Class Aggregate Gradation
 - i) Only Class 1,3,10
 - d) PCC Cylinder Testing
 - i) Only 4x8 cylinders

- ii) Only 28-day breaks
- e) PCC Field Testing (Slump and Air)

6. SAMPLING

- 6.1 The samples are to be prepared by the District as a split sample from project acceptance testing.
 - 6.1.1 The District will collect one IA sample per test, per testing technician, per year. Example: In the occurrences where a District has two Aggregate Testers, they will need two samples per year.
 - 6.1.2 The samples will be labeled, and all documentation shall be provided with the sample, including the District Lab Number, Project Information, etc.
 - 6.1.3 The District will test the sample as per normal guidelines and provide the IA sampler with the Sample ID for the test results.
 - 6.1.4 The District will enter a note on the sample record in AWP that an IA sample was taken with this sample.

7. PLASTIC CONCRETE TESTING

- 7.1 In the occurrences of tests done on plastic concrete, there will be no change in the current procedure. IA sampler will visit each District and perform testing with each. Each testing technician shall bring their testing equipment for this evaluation.

8. SAMPLE PICKUP

- 8.1 The District will notify the IA sampler that a sample has been created and is available for pickup. The IA sampler will be responsible for the transportation of the sample to MCS&T.
- 8.2 No sample will be dropped off at MCS&T unless specifically instructed by the IA sampler.
- 8.3 In the occurrences of a PCC cylinder, the District will notify the IA sampler of the creation date of the sample within 3 days of the sample creation. The District will also notify the IA sampler of the intended break date.

9. TESTING AT MCS&T

- 9.1 The IA sampler will be responsible for coordinating testing of the IA sample with the respective MCS&T Section Supervisor.
- 9.2 The IA sampler will be responsible for entering the test results into AWP.

10. PROFICIENCY SAMPLES

- 10.1 Proficiency samples shall be considered a second layer of assurance for the WVDOH IA program. Though these are still required, the results of these should only be used in extenuating circumstances where a split/adjacent sample could not be obtained.

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MP 700.00.56 Steward – Materials Control Section
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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

PROCEDURE FOR EVALUATING QUALITY CONTROL SAMPLE TEST
RESULTS WITH VERIFICATION SAMPLE TEST RESULTS

1. PURPOSE

- 1.1 To provide a procedure for the comparison of quality control sample test results with verification sample test results ~~(similarity)~~.
-

2. SCOPE

- 2.1 This procedure is used to review and evaluate contract quality control samples.

2.2 Materials and Tests

2.2.1 Aggregate Gradations

2.2.2 Asphalt (Marshall)

1. Asphalt Content
2. Air Voids
3. Stability
4. Flow
5. Gradation

2.2.3 Asphalt (SuperPave)

1. Asphalt Content
2. Air Voids
3. Gradation

2.2.4 Portland Cement Concrete

1. Air Content
 2. Consistency
-

3. PROCEDURE

- 3.1 The following procedure will be implemented by the District Materials Supervisor.

- 3.2 After completion of the ~~similarity~~ verification sample test, the data will be entered into the Division approved materials tracking program. This data will be compared by the software to the applicable quality control sample test results for the same item. Note that all samples being compared must be taken from the same sampling location, e.g., stockpile, roadway, etc., and sampled and tested in the same manner.

3.2.1 If there are more than ten quality control samples, a verification sample shall be done for the first ten samples. Additional similarityverification samples shall be done at the frequency of one in ten. For example, if 16 QC samples are taken, there shall be a similarityverification for samples 1-10 and then another for 11-16.

3.2.1.1 If there are only five to nine quality control samples available, determine the average of all the available consecutive quality control test results. When comparing the grading characteristics of an aggregate, the average (\bar{X}) for each sieve will be determined.

3.2.2 In the unlikely event that there are less than five quality control samples available when the similarityverification sample is complete, the District Materials Supervisor will make an informal review of the data. If the data is such that a dissimilarity appears obvious (even without a formal comparison) then Section 4.1 of this procedure would apply. If, however, the verification sample results appear to be similar to the quality control sample results then the verification sample would be judged similar at this point by the District Materials Supervisor ~~to be similar~~, and the applicable portions of Section 5.1 of this procedure would apply with the following statement: "This verification sample (verification sample number recorded here) has been judged to be similar in accordance with Section 3.2.2 of MP 700.00.54." This statement shall be on the sample record.

3.2.3 Determine the range (R) of the quality control samples used in Section 3.2.1 by subtracting the smallest test value from the largest test value.

~~3.2.2.1~~3.2.3.1 When comparing the grading characteristics of aggregate, the range (R) for each sieve will be determined.

~~3.2.3~~3.2.4 Compute the interval (I) by substituting the values calculated in Sections 3.2.1 and Section 3.2.3 into the proper equation below. When comparing the grading characteristics of aggregate, the interval(I) for each sieve will be determined.

No. of Samples Used in Calculating the Average in Section 3.2.1	Equation for Computing the Interval (I)
10	$I = \bar{X}_{10} \pm 0.91 \times R$
9	$I = \bar{X}_9 \pm 0.97 \times R$
8	$I = \bar{X}_8 \pm 1.05 \times R$
7	$I = \bar{X}_7 \pm 1.17 \times R$
6	$I = \bar{X}_6 \pm 1.33 \times R$
5	$I = \bar{X}_5 \pm 1.61 \times R$

~~3.2.4~~3.2.5 The interval (I) is determined by first adding the average (\bar{X}_n) to the product of the range (R) times the given constant. This determines the upper limit of the interval. Note that for gradings, if the result obtained is greater than 100, it will be recorded as 100. And second, subtract the product of the range (R) times the given constant

from the average (\bar{X}_n). This determines the lower limit of the interval. Note here that if the result is less than zero, it will be recorded as zero.

3.2.6 Compare the verification sample test result with the calculated interval.

~~3.2.5~~3.2.6.1 When comparing the grading characteristics of aggregates, a comparison for each sieve will be determined.

~~3.3~~ If the verification sample is an aggregate and all sieve results coincide with or lie between the upper and lower limits of the interval, the quality control sample test results will be ~~considered~~ similar to the verification ~~sample test results~~sample. If

~~3.3.13.3~~ ~~If the similarity sample is an aggregate and~~ any one of the compared values (on any sieve) does not coincide with or lie between the upper and lower limits of the interval, the ~~quality control~~ samples test results will be ~~considered~~ dissimilar ~~to the verification sample~~.

3.4 If the ~~similarity~~verification sample is an asphalt mix, and the asphalt content and air voids coincide with or lie between the upper and lower limits of their interval, the quality control samples will be ~~considered to be~~ similar to the verification sample. If any one of the compared values does not coincide with or lie between the upper and lower limits of the interval, the samples test results will be dissimilar.

~~3.4~~

~~3.4.1~~ ~~If the similarity sample is an asphalt mix, and any one of the compared values is not similar to the quality control data, the quality control samples will be considered to be dissimilar.~~

3.5 If the ~~similarity~~verification sample is Portland Cement Concrete, and both the air content and consistency coincide with or lie between the upper and lower limits of their interval, the quality control samples (~~tests~~) will be ~~considered~~ similar. If any one of the compared values does not coincide with or lie between the upper and lower limits of the interval, the samples test results will be dissimilar.

~~3.5~~

4. EVALUATION

4.1 If the quality control sample data is dissimilar to the verification sample the following action will be taken where appropriate.

4.1.1 Review the quality control sampling procedure.

4.1.2 Review the quality control testing procedures.

4.1.3 Check testing equipment.

4.1.4 Review computations.

4.1.5 Review documentation.

- 4.1.6 Perform any additional investigations that may clarify the dissimilarity.

5. REPORTING AND SAMPLE SUBMISSION

- 5.1 If the quality control samples are found to be similar to the verification sample, the sample shall be marked as “Similar Passed” and submitted to the respective Materials Regional Coordinator for final evaluation using the currently materials tracking software.
- 5.2 If the quality control samples are dissimilar to the verification sample, the sample shall be marked as “Non-Similar” and submitted to the respective Materials Regional Coordinator for final evaluation using the currently materials tracking software.
- 5.2.1 If the Sample is not similar, a note will be made on the sample record including a brief statement of the action taken to correct the deficiency. In the event other documentation is needed, such as a District Materials Inspection Report, to explain and/or support the final resolution of the dissimilarity, the dissimilar verification sample number should be referenced therein.
- 5.3 The results of the investigation as reported will be noted by District Materials in their email submission.
- 5.4 The test agency view shall contain the information: "Issued by District (Number) per MP 700.00.54, (Date)."
- 5.5 When the sample is completed, it shall be authorized by the respective Materials Regional Coordinator.
- 5.6 The testing technician shall be listed on each sample.

Ronald L. Stanevich, PE
Director
Materials Control, Soils & Testing Division

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

MATERIALS PROCEDURE

SEED ACCEPTANCE CRITERIA

1. PURPOSE

- 1.1 To provide an interpretation of existing Specifications governing seed used on Division projects.
 - 1.2 The interpretation set forth herein shall apply to all seeding operations.
 - 1.3 To provide instructions for use by Division field personnel as to acceptance and documentation of material.
-

2. REFERENCED DOCUMENTS

- 2.1 Section 715.28 – of the Specifications.
 - 2.2 West Virginia Seed Law, West Virginia Department of Agriculture, Agricultural Materials. Agricultural Materials : West Virginia Department of Agriculture (wv.gov) West Virginia Code Chapter 19, Article 16 - West Virginia Seed Law. West Virginia Code | §19-16 (wvlegislature.gov).
-

3. CRITERIA FOR ACCEPTANCE

- 3.1 Specifications governing seed varieties as set forth in the ~~West Virginia Division of Highways Standard Specifications Roads and Bridges~~ shall be interpreted to mean that all seeds utilized on Division projects shall be a commercial variety meeting the definitions and requirements of the West Virginia Seed Law as well as any applicable Federal laws and regulations.
 - 3.2 Each container of any variety of seed used on Division projects will bear a "vendors tab" of analysis. Said tag will contain such information as LOT number, germination, purity, weed seed, etc.
 - 3.3 Seed bearing a vendor tag with a test analysis date in excess of twelve (12) months (excluding the month of test) is not to be used and shall be removed from the project.
 - 3.4 All stored material shall be inspected. Those containers exhibiting improper storage shall not be used and are to be removed from the project.
 - 3.5 If the claimed analysis, listed on the vendors tag, is below that set forth in Specification requirements, then adjustments to the application rate shall be made. Such adjustments shall be in accordance with Section 4.
-

4. ADJUSTING FOR APPLICATION RATE

4.1 Subsequent to receipt of seed at job site, the project engineer or supervisor will compare the test results shown on the vendor tags with those of the governing Specification requirements.

4.1.1 If the percent germination and/or percent purity of each seed is below that of the project Specification requirements, the seed weight per acre shall be computed for adjustments as follows. (The equation yielding the maximum pound of seed per acre shall govern).

$$(GS) (WS) / Gt = W_n$$

GS = Percent germination specified.

Gt = Percent germination on vendor tag.

WS = Pounds of seed per acre as specified on plans, or special provisions.

W_n = The required pounds of seed per acre.

$$(PS) (WS) / Pt = W_n$$

PS = Percent purity specified.

Pt = Percent purity on vendor tag.

WS = Pounds of seed per acre as specified on plans or special provisions.

W_n = The required pound of seed per acre.

4.1.2 If the percent germination and percent purity indicated on the vendor tags exceed the governing Specification requirements, the above formula does not apply.

4.1.3 If a maximum ~~percent~~percent of weed seed content is specified, and the percent weed seed stamped on the vendor tag exceeds the specified limit, the seed is not to be used, and shall be removed from the project.

~~4.1.3~~ **DOCUMENTATION OF SEED**

5. CRITERIA FOR ACCEPTANCE

5.1 ~~Coverage for seed shall be obtained by entering the~~The following information from the vendors tag on ~~shall be documented on the inspector's DWR. Form HL-440.~~

5.1.1 Name of vendor.

5.1.2 Lot number.

5.1.3 Type of Seed.

~~5.1.4~~ Quantity.

~~5.1.4~~5.2 For difficult calculations, Form JH-715 is available for calculating placement (Sample Attached). The live version of this worksheet is available on the WVDOH MCS&T Toolbox Webpage¹.

Ron L. Stanevich, P.E.
Director
Materials Control, Soils and Testing Division

RLS:Pr
ATTACHMENT

¹ <https://transportation.wv.gov/highways/mcst/Pages/tbox.aspx>

West Virginia Division of Highways

Batch Ticket for Seed, Mulch, and Fertilizer

Project _____ Date _____
 Month _____ Day _____ Year _____
 Batch Number _____ Type of Mix **D** Acres Batched **10.00**
 Station(s) _____

NOTE:
 Type of Seed Mix Choices
B **C-1** **C-2**
D **L** **Wetland**
Temp

(See applicable Specifications for amount of components required.)

A. Check to insure germination conforms to Specifications.

B. Check to insure analysis of fertilizer conforms to Specifications.

If A or B does not conform, show calculations here and amount required to add to each acre. See MP. 715.28.50 and MP. 700.05.10

Permanent(652)
 Temp. Permanent(642)

Hay Mulch
 Paper Mulch

Seed :

Fertilizer:

Type of Seed	LB/AC	LB	CT Numbers	Fertilizer (LB)	Urea (LB)	
Kentucky 31 Fescue	20	200	Lot #			
			Purity			
			Germin.			
			Test Date			
Red Fescue	20	200	Lot #			
			Purity			
			Germin.			
			Test Date			
Crownvetch	20	200	Lot #			
			Purity			
			Germin.			
			Test Date			
Annual Ryegrass	7	70	Lot #			
			Purity			
			Germin.			
			Test Date			
	0	0	Lot #			
			Purity			
			Germin.			
			Test Date			
	0	0	Lot #			
			Purity			
			Germin.			
			Test Date			

Material	Application Rate Per Acre	Payment
Seed Added (if low germination)	LB/AC	LB
Fertilizer Added (if nutrient low)	0.15 TN/AC	1.50 TN
Ounces of Inoculant Used	OZ/AC	OZ
Agricultural Limestone	0.50 TN/AC	5.00 TN
Fertilizer	0.40 TN/AC	4.00 TN
Seed Mix Type D	67.00 LB/AC	670.00 LB
Wood Cellulose Mulch	0.75 TN/AC	7.50 TN
Straw or Hay Mulch	2.00 TN/AC	TN

	Temporary	
	Spring Summer F & W	
FALSE	FALSE	FALSE
FALSE	FALSE	FALSE
FALSE	FALSE	FALSE
FALSE	FALSE	FALSE
FALSE	FALSE	FALSE
FALSE	FALSE	FALSE

_____ LB (Average weight of 5 hay/straw bales)

Remarks:

 Inspector

 Foreman for Contractor

West Virginia Division of Highways
Batch Ticket for Seed, Mulch, and Fertilizer

NOTE:
Type of Seed Mix Choices
B C-1 C-2
D L Wetland
Temp

Project S320-51/1-0.21 Date 8 12 2011
Batch Number 1 Type of Mix D Acres Batched 1.48
Station(s) Sta. 11+50 to Sta. 15+00 Rt.

(See applicable Specifications for amount of components required.)

A. Check to insure germination conforms to Specifications.

B. Check to insure analysis of fertilizer conforms to Specifications.

If A or B does not conform, show calculations here and amount required to add to each acre. See MP. 715.28.50 and MP. 700.05.10

2nd or 3rd
step >50%

<input checked="" type="checkbox"/>
<input type="checkbox"/>

Permanent(652)
Temp. Permanent(642)

Erosion
Issue

<input type="checkbox"/>
<input checked="" type="checkbox"/>

Hay Mulch
Paper Mulch

This sheet is used for 2nd and 3rd step seeding with >50% growth and slight to moderate erosion. Apply one half original seed and mulch. If erosion problem, then apply half wood mulch.

Seed :

Fertilizer:

Type of Seed	LB/AC	LB	CT Numbers		Fertilizer (LB)	Urea (LB)
Kentucky 31 Fescue	20	29.6	Lot #			
			Purity			
			Germin.			
			Test Date			
Red Fescue	20	29.6	Lot #			
			Purity			
			Germin.			
			Test Date			
Crownvetch	20	29.6	Lot #			
			Purity			
			Germin.			
			Test Date			
Annual Ryegrass	7	10.36	Lot #			
			Purity			
			Germin.			
			Test Date			
	0	0	Lot #			
			Purity			
			Germin.			
			Test Date			
	0	0	Lot #			
			Purity			
			Germin.			
			Test Date			

Material	Application Rate Per Acre	Payment
Seed Added (if low germination)	LB/AC	LB
Fertilizer Added (if nutrient low)	0.15 TN/AC	0.22 TN
Ounces of Inoculant Used	OZ/AC	OZ
Agricultural Limestone	0.50 TN/AC	0.74 TN
Fertilizer	0.50 TN/AC	0.74 TN
Seed Mix Type D	67.00 LB/AC	99.16 LB
Wood Cellulose Mulch	0.75 TN/AC	1.11 TN
Straw or Hay Mulch	2.00 TN/AC	TN

	Spring	Summer	Temporary	F & W
FALSE	FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	FALSE	FALSE
FALSE	FALSE	TRUE	TRUE	FALSE
FALSE	FALSE	TRUE	TRUE	FALSE
TRUE	TRUE	TRUE	TRUE	FALSE

_____ LB (Average weight of 5 hay/straw bales)

Remarks:

Inspector

Foreman for Contractor

West Virginia Division of Highways
Batch Ticket for Seed, Mulch, and Fertilizer

Project NFA-0035(149) Date 8 Month 29 Day 2008 Year
 Batch Number 1 Type of Mix Stream Acres Batched 2.00
 Station(s) US 35 Sta. 6552+00 to Sta. 6634+00 L & R

(See applicable Specifications for amount of components required.)

A. Check to insure germination conforms to Specifications.

B. Check to insure analysis of fertilizer conforms to Specifications.

If A or B does not conform, show calculations here and amount required to add to each acre. See MP. 715.28.50 and MP. 700.05.10

<input type="checkbox"/>	Permanent(652)
<input checked="" type="checkbox"/>	Temp. Permanent(642)
<input type="checkbox"/>	Hay Mulch
<input checked="" type="checkbox"/>	Paper Mulch

Seed :

Fertilizer:

Type of Seed	LB/AC	LB	CT Numbers	Fertilizer (LB)	Urea (LB)
Redtop	6	12	Lot #		
			Purity		
			Germin.		
			Test Date		
Fowl Bluegrass	6	12	Lot #		
			Purity		
			Germin.		
			Test Date		
Virginia Wild Rye	6	12	Lot #		
			Purity		
			Germin.		
			Test Date		
Alkali Grass	6	12	Lot #		
			Purity		
			Germin.		
			Test Date		
Fox Sedge	4.8	9.6	Lot #		
			Purity		
			Germin.		
			Test Date		
Autumn Bentgrass	0.6	1.2	Lot #		
			Purity		
			Germin.		
			Test Date		
Ticklegrass	0.6	1.2	Lot #		
			Purity		
			Germin.		
			Test Date		
Annual Rye	10	20	Lot #		
			Purity		
			Germin.		
			Test Date		

Material	Application Rate Per Acre	Payment
Seed Added (if low germination)		LB
Fertilizer Added (if nutrient low)		TN
Ounces of Inoculant Used		OZ
Agricultural Limestone	0.50 TN/AC	1.00 TN
Fertilizer	0.40 TN/AC	0.80 TN
Seed Mix Type Stream	40.00 LB/AC	80.00 LB
Wood Cellulose Mulch	0.75 TN/AC	1.50 TN
Straw or Hay Mulch	2.00 TN/AC	TN

45 LB (Average weight of 5 hay/straw bales)

Remarks :

Hydro - SEEDED bare areas throughout project per punchlist

Inspector

Foreman for Contractor

West Virginia Division of Highways

Batch Ticket for Seed, Mulch, and Fertilizer

Project _____ Date _____
 Batch Number _____ Type of Mix _____ Acres Batched _____
 Station(s) _____

(See applicable Specifications for amount of components required.)

A. Check to insure germination conforms to Specifications.

B. Check to insure analysis of fertilizer conforms to Specifications.

If A or B does not conform, show calculations here and amount required to add to each acre. See MP. 715.28.50 and MP. 700.05.10

	Permanent(652)
	Temp. Permanent(642)
	Hay Mulch
	Paper Mulch

Seed :

Fertilizer:

Type of Seed	LB/AC	LB	CT Numbers	Fertilizer (LB)	Urea (LB)
			Lot #		
			Purity		
			Germin.		
			Test Date		
			Lot #		
			Purity		
			Germin.		
			Test Date		
			Lot #		
			Purity		
			Germin.		
			Test Date		
			Lot #		
			Purity		
			Germin.		
			Test Date		
			Lot #		
			Purity		
			Germin.		
			Test Date		
			Lot #		
			Purity		
			Germin.		
			Test Date		

Material	Application Rate Per Acre	Payment
Seed Added (if low germination)		LB
Fertilizer Added (if nutrient low)		TN
Ounces of Inoculant Used		OZ
Agricultural Limestone	TN/AC	TN
Fertilizer	TN/AC	TN
Seed Mix Type	LB/AC	LB
Wood Cellulose Mulch	TN/AC	TN
Straw or Hay Mulch	TN/AC	TN

_____ LB (Average weight of 5 hay/straw bales)

Remarks:

Inspector

Foreman for Contractor

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

MATERIALS PROCEDURE

INSPECTION AND ACCEPTANCE
OF SIGNING MATERIAL

1. PURPOSE

- 1.1 To establish procedures for approving finished aluminum roadway signs or project markers acceptable for use on West Virginia Division of Highways (WVDOH) projects. And to establish a procedure for maintaining a record of such information

2. SCOPE

- 2.1 This procedure shall apply to all fabricators who assemble and produce aluminum roadway signs "henceforth referred to as Fabricator" either flat sheet or extruded and related hardware used in installation.

3. APPLICABLE DOCUMENTS

- ~~3.1 WVDOH Specifications for roads and bridge / Supplemental Specifications Section 661~~
~~3.23.1 WVDOH Sign Fabrication Manual.~~
~~3.33.2 WVDOH Design Guide for Signing.~~
~~3.4 WVDOH Approved products list "APL" for Aluminum Sheeting for traffic signs.~~
~~3.5 WVDOH Approved products list "APL" for retroreflective sign sheeting~~

4. ACCEPTANCE PROCEDURE

- 4.1 For sign materials to be evaluated for acceptance, the Fabricator must comply with the following requirements.
- 4.2 With each shipment, of aluminum signs or sign hardware to a ~~WVDOH~~ WV DOT project, the sign fabricator supplier shall provide shipping documents which contain a laboratory approval number reflecting materials have been inspected meeting quality specified by the WVDOH.
- 4.3 An on-site investigation and evaluation will be conducted by a WVDOH Inspector at the Fabricator's distribution location prior to materials being shipped.
- 4.4 All bare aluminum blank sign material shall be obtained from the WVDOH APL for aluminum sheeting for traffic signs.
- 4.5 All retroreflective materials shall be obtained from the WVDOH APL for retroreflective sign sheeting.
- 4.6 The Inspector shall verify the finished sign to be free of any visible defects to the reflective sheeting in the form of bubbling or misaligned borders or any defect in

Commented [DB1]: Find Links

relation to the WVDOH Sign Fabrication Manual or the Design Guide for Signing issued by the WVDOH Traffic Engineering Division.

- 4.7 The Inspector is to verify that the finished sign matches the approved shop drawings from Traffic Engineering Division of the WVDOH
- 4.8 The Inspector will examine the workorder or invoice to verify items and quantities are correctly listed, and the Inspector will verify the document has listed the contract ID number to which the materials will be delivered
- 4.9 The Inspector will examine the work order or invoice to verify APL numbers used for aluminum sheeting and retroreflective sheeting are listed, plus for tracking purposes the workorder or invoice must have a unique date or invoice number from the Fabricator.
- 4.10 If the evaluation of sign materials meets the above requirements, the Inspector shall approve the work order or invoice and issue a seven-digit Laboratory approval number indicating all sign materials and or hardware have been inspected.
- 4.11 If the evaluation of sign materials does not meet the above requirements, the Inspector shall issue a failing Laboratory number, plus report the reasons for not meeting ~~specifications~~Specifications. Also, the Inspector shall inform the Fabricator not to ship items until the failing issues have been resolved.

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