

Materials Procedures Committee Regular Meeting

Meeting Time/Date: December 18th, 10:00 AM

Meeting Location: MCS&T (Library) - 190 Dry Branch Drive, Charleston, WV 25306
Charleston WV, 25301

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\2024\2024 12 18 MP Meeting](#)

Files Available on Webpage:

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

Materials Procedures – Approved at Last Meeting

1. 700.00.53 - Procedure for the Independent Assurance Program
2. 106.10.51 - WVDOH Buy America Waiver Guidelines
3. 603.10.40 - Inspection and Acceptance Procedures for Prestressed Concrete Bridge Members
4. 720.10.01 - Guide for Using a High-Speed Inertial Profiler to Measure the Longitudinal Profile of Pavement
5. 700.00.54 - Procedure for Evaluating Quality Control Sample Test Results with Verification Sample Test Results
6. 212.01.21 - Test Method for Unconfined Compressive Strength of Rock Core Specimens
7. 212.02.20 - Procedure For Determining a Reduced Unit Price to Be Paid for Select Material for Backfilling Which Does Not Conform to Grading Requirements of Governing Specifications
8. 401.07.21 - Sampling Compacted Asphaltic Mixtures from The Roadway

Materials Procedures - Old Business

Number	Champion	Title	Description
1& -106.10.50	Brayack	WVDOH Buy America Acceptance Guidelines	Removes waiver for Manufactured Materials in anticipation of FHWA Update.
2* - 106.10.51	Brayack/ Boothroyd	WVDOH Buy America Waiver and Exception Guidelines	Clarifying updates, including flow chart for additional guidance
3* - 700.04.22	Allison	Method for Approving Devices Used for Testing Density and/or Moisture Content of In-Place Material	Process for creating approved list for Density/Moisture Devices

4* - 106.03.51	Harper	Policy for Materials Certification Reciprocity	Adds PCC technician reciprocity.
5* - 109.00.21	Brayack	Basis For Charges for Nonsubmittal of Sampling & Testing Documentation by The Established Deadline	References new document – MP 109.00.22 listed next.
6* - 109.00.22	Brayack	Procedure for the Submission and Documentation of Quality Control Test Results	Defines the submission of QC samples by the contractor
7* - 604.02.40	Gillispie	Inspection and Acceptance Procedures for Precast Concrete Products	Revised the cylinder fabrication frequency for dry cast concrete in Section 4.3.2
8* - 712.21.26	Ross/ Brayack	Procedure For Determining the Random Location of Compaction Tests	Previously approved MP with minor updates.
9* - 106.00.03	Brayack	Guidelines For Establishing and Maintaining Approved Product Lists of Materials, Systems and Sources	Removal of NTPEP reference.
10* - 212.02.20	Brayack	Procedure For Determining a Reduced Unit Price To Be Paid For Select Material For Backfilling Which Does Not Conform To Grading Requirements Of Governing Specifications	Removal of Table 1

Materials Procedures – Editorial Edits

None on this agenda

Materials Procedures - New Business with Significant or Process Updates

1& - 718.00.00	Titus	Sewer and Waterline Materials Procedure	Define the specifications, standards, and requirements for materials used in sewer and waterline construction projects
2& - 715.14.01	Gum	Quality Assurance of Laminated Elastomeric Bridge Bearing Pads with Internal Shims	To set forth the procedures which govern the Quality Assurance testing of laminated (with internal shims) elastomeric bridge bearing pads.
3& - 401.02.29	Jack	Guide For Quality Control and Acceptance Requirements For Superpave Asphalt Mixtures	Removal of VFA Calculation
4& - 100.00.00	Boothroyd	Preparing Materials Procedures	Addition of Definition

Note 1: * Denotes this MP is up for Vote

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

Comments

Comments due December 17th, 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 2-weeks before the next meeting: February 5th

Meeting Time/Date: 10:00 AM, February 19, 2025

Meeting Location: MCS&T (Tentative)

Online Meeting: Google Meet Video Conference (Link TBD)

Additional MP Committee Meeting Information

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

Tentative MP Committee Dates for 2025:

February 19, April 16, June 18, August 20, October 15, December 17

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

MATERIALS PROCEDURE

WVDOH BUY AMERICA ACCEPTANCE GUIDELINES

1. PURPOSE

- 1.1 To set forth instructions for compliance with both State and Federal Buy America Requirements (henceforth referred to as “Buy America Requirements”), as listed in this document.

2. REFERENCED DOCUMENTS

- 2.1 PUBLIC LAW 117–58—NOV. 15, 2021, Infrastructure Investment and Jobs Act.
2.2 Build America, Buy America Act (BABA).
2.3 23 U.S.C. 313 and 23 CFR 635.410 “Buy America Requirements”.
2.4 2 CFR part 184 Buy America Preferences for Infrastructure Projects.
2.5 M-22-11 Initial Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure.
2.6 M-24-02 Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure.
2.7 Chapter 5, Article 19 and Chapter 5A, Article 3, Section 56 of the West Virginia Code, entitled “West Virginia American Steel Act of 2001.”
2.8 West Virginia Notary Handbook, Current Edition.
2.9 MP 106.10.51 – WVDOH Buy America Waiver Guidelines.

3. ACCEPTANCE OF MATERIALS

- 3.1 This procedure applies to the following:
1. Steel and Iron
 2. Manufactured Products
 3. Construction Materials
 4. Section 70917(c) Materials
- 3.2 An article, material, or supply shall only be classified into a single category listed in Section 3.1. In some cases, an article, material, or supply may not fall under any of these categories. Classification of the category must be made based on the status of article, materials, or supply at the time it is brought to the work site for incorporation into the project. The work site is generally the location of the project at which the materials will be incorporated. An article, material, or supply permanently incorporated into a project must meet the Buy America Preference for only the single category in which it is classified.
- 3.3 A Buy America preference only applies to articles, materials, and supplies that are consumed in, incorporated into, or affixed to a project. As such, it does not apply to

tools, equipment, and supplies, such as temporary scaffolding brought to the construction site and removed at or before the completion of the project. Nor does a Buy America preference apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished project but are not an integral part of the structure or permanently affixed to the project.¹

3.3.1 Buy America preference does not apply to materials such as temporary paint or temporary traffic control devices.

3.3.2 Glass added to a permanent paint product requires a Certificate of Compliance.

4. STEEL AND IRON

4.1 Pursuant to Buy America Requirements, all manufacturing processes for steel and iron materials must take place in the United States.

4.2 Definition

4.2.1 “Iron or steel products” means articles, materials, or supplies that consist wholly or predominantly of iron or steel or a combination of both.

4.2.1.1 “Predominantly of iron or steel or a combination of both” means that the cost of the iron and steel content exceeds 50 percent of the total cost of all its components. The cost of iron and steel is the cost of the iron or steel mill products (such as bar, billet, slab, wire, plate, or sheet), castings, or forgings utilized in the manufacture of the product and a good faith estimate of the cost of iron or steel components.

4.3 Standard

4.3.1 This includes all processes from the initial melting stage through application of coatings occurs in the United States.

5. MANUFACTURED PRODUCTS

5.1 Pursuant to Buy America Requirements, all Manufactured Materials are required to be produced in the United States. All manufacturing processes shall occur in the United States.

~~5.1 The Federal Highway Administration (FHWA) has a longstanding waiver in effect exempting Manufactured Products from Buy America Requirements.~~

5.2 Definition

5.2.1 Manufactured products means:

1. Articles, materials, or supplies that have been:
 - A. Processed into a specific form and shape;
 - B. or Combined with other articles, materials,
 - C. or supplies to create a product with different properties than the individual articles, materials, or supplies.
2. If an item is classified as an iron or steel product, or a construction material, then it is not a manufactured product. However, an article, material, or supply

¹ M-24-02: Memorandum for the Heads of Executive Departments and Agencies, Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure, Page 4

classified as a manufactured product under 2 CFR 184.4(e) and paragraph (1) of this definition may include components that are construction materials, iron or steel products, or Section 70917(c) materials.

5.3 Standard

5.3.1 Pursuant to Buy America Requirements, all manufactured products used in the project are produced in the United States; this means the manufactured product was manufactured in the United States; and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard that meets or exceeds this standard has been established under applicable law or regulation for determining the minimum amount of domestic content of the manufactured product.²

5.3.1.1 In determining whether the cost of components for manufactured products is greater than 55 percent of the total cost of all components, use the following instructions:

1. For components purchased by the manufacturer, the acquisition cost, including transportation costs to the place of incorporation into the manufactured product (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued).
2. For components manufactured by the manufacturer, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1), plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the manufactured product.

6. CONSTRUCTION MATERIALS.

6.1 Pursuant to Buy America Requirements, all Construction Materials are required to be produced in the United States. All manufacturing processes for the Construction Materials shall occur in the United States.

6.2 Definition

6.2.1 Construction materials means articles, materials, or supplies that consist of only one of the items listed in Section 6.2.1.1, except as provided in Section 6.2.1.2. To the extent one of the items listed in Section 6.2.1.1 contains as inputs other items listed in this section, it is nonetheless a construction material.

6.2.1.1 The listed items are:

1. Non-ferrous metals;
2. Plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
3. Glass (including optic glass);
4. Fiber optic cable (including drop cable);
5. Optical fiber;
6. Lumber;

² M-24-02: Memorandum for the Heads of Executive Departments and Agencies, Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure, Page 15-16.

- 7. Engineered wood; and
 - 8. Drywall.
- 6.2.1.2 Minor additions of articles, materials, supplies, or binding agents to a construction material do not change the categorization of the construction material.
- 6.3 Standard
- 6.3.1 The Buy America Preference applies to the following construction materials incorporated into projects. Each construction material is followed by a standard for the material to be considered “produced in the United States.”
- 1. Non-ferrous metals. All manufacturing processes, from initial smelting or melting through final shaping, coating, and assembly, occurred in the United States.
 - 2. Plastic and polymer-based products. All manufacturing processes, from initial combination of constituent plastic or polymer-based inputs, or, where applicable, constituent composite materials, until the item is in its final form, occurred in the United States.
 - 3. Glass. All manufacturing processes, from initial batching and melting of raw materials through annealing, cooling, and cutting, occurred in the United States.
 - 4. Fiber optic cable (including drop cable). All manufacturing processes, from the initial ribboning (if applicable), through buffering, fiber stranding and jacketing, occurred in the United States. All manufacturing processes also include the standards for glass and optical fiber, but not for non-ferrous metals, plastic and polymer-based products, or any others.
 - 5. Optical fiber. All manufacturing processes, from the initial preform fabrication stage through the completion of the draw, occurred in the United States.
 - 6. Lumber. All manufacturing processes, from initial debarking through treatment and planing, occurred in the United States.
 - 7. Drywall. All manufacturing processes, from initial blending of mined or synthetic gypsum plaster and additives through cutting and drying of sandwiched panels, occurred in the United States.
 - 8. Engineered wood. All manufacturing processes from the initial combination of constituent materials until the wood product is in its final form, occurred in the United States.
- 6.3.2 Except as specifically provided, only a single standard under this section should be applied to a single construction material.

7. SECTION 70917(C) MATERIALS

- 7.1 The standards developed under BABA 70915(b) (1) shall not include cement and cementitious materials, aggregates such as stone, sand, or gravel, or aggregate binding agents or additives as inputs of the construction material. These are referred to as 70917(C) materials.
- 7.2 Definition

7.2.1 Section 70917(c) materials means cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives. See section 70917(c) of the Build America, Buy America Act.

7.3 These materials are exempt from Buy American Requirements.

8. BUY AMERICA COMPLIANCE.

8.1 On a given project, the Division shall not accept, approve, authorize, or make any payments to any Contractor not fully compliant with Buy America.

8.1.1 When Buy America Requirements apply, the Contractor shall furnish a notarized Certificate of Compliance signed by their official with knowledge and authority to certify that all applicable materials and products to be incorporated into the project, including those of any subcontractors and suppliers, are compliant with Buy America Requirements. This shall be done prior to the permanent incorporation of the materials into the project.

8.1.2 The notarized Certificate of Compliance shall contain the following information:

8.1.2.1 Title: Buy America Certification of Compliance.

8.1.2.2 The Name, Address and Contact Information for the Contractor.

8.1.2.3 A contractor statement that demonstrates compliance with Buy America Requirements.

8.1.2.4 The Contract ID for the Material (if applicable).

8.1.2.5 Both the Federal and State Project Number for the Material (if applicable).

8.1.2.6 The name of the material referenced in the Certificate of Compliance. This material name shall be a clear, common name for the material as stated in the proposal. Part Numbers, etc., may also be on the document if the contractor wishes.

8.1.2.7 The Line Item for the Material (if applicable).

8.1.2.8 The Bid and/or Placed Quantity of the Material.

8.1.2.9 Signature of the Contractor and date.

8.1.2.10 A list of materials on the project that “Buy America” applies but are not Buy America compliant.

8.1.2.11 The document must be notarized as per the “West Virginia Notary Handbook.”

8.2 Attachment 1 shows a sample Certificate of Compliance.

- 8.2.1 Multiple items may be listed on the Certificate of Compliance, though all the information for each line must be on the document.
- 8.2.2 A list of these materials may be referenced on an attached page as long as that page is also signed and notarized.

9. BUY AMERICA WAIVERS

- 9.1 Buy America Waivers are outlined in MP 106.10.51 as per “§ 184.7 Federal awarding agency's issuance of a Buy America Preference waiver” and “23 CFR 635.410(c)”.

10. BUY AMERICA MATERIALS

- 10.1 Attachment 2 includes a list of materials and products used in WVDOH construction projects and the applicability of Buy America Requirements. This attachment also shows each category of each based on Section 3.1 of this document. Finally, if the material is not applicable to Buy America Requirements, justification is given. Example exemptions are as follows:
1. Historic Waiver: Manufactured Product is waived by FHWA as per Section 5 of this Document.
 2. Temporary Material: Material is not permanently incorporated into the project.
- 10.1.1 This materials and products list may be updated by the Director of MCS&T as needed to ensure compliance with Buy America Requirements. Any update to this form will be in accordance with guidance from and through an affirmation process with FHWA.
- 10.1.2 Attachment 3 includes [OMB Memorandum M-24-02](https://www.whitehouse.gov/wp-content/uploads/2023/10/M-24-02-Buy-America-Implementation-Guidance-Update.pdf)³, dated October 25, 2023, for additional guidance and as the source material for WVDOH's compliance.

³ <https://www.whitehouse.gov/wp-content/uploads/2023/10/M-24-02-Buy-America-Implementation-Guidance-Update.pdf>

11. DOCUMENTATION OF BUY AMERICA CERTIFICATION OF COMPLIANCE

- 11.1 The Certificate of Compliance shall be placed in the QC Plan Folder in ProjectWise (or the current WVDOH approved document retention software) under the contract.

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

MP 106.10.50 Steward – Materials Control Section
ATTACHMENTS

Buy America Certification of Compliance

Acme Construction Company
123 Main Street
Charleston, WV 25302

Ship Date: 10/31/2023

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.

This Certification of Compliance is for the material and project listed below:

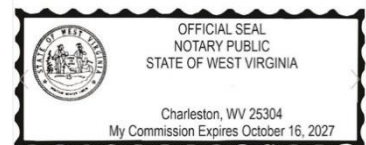
CID: 22000005R1

Federal Number: B-0010(000)X

State Number: U002-00-1.00

Line: 0020	Widget, Part Q ⁱ	500 Cubits
Line: 0025	Widget, Part H ^r	300 Cubits

Non-Compliant Buy America Materials		
Line: 0055	Widget, Part I ^z	300 Cubits



Janie Doe, Contractor President

Attachment 2: Full document is available at the [WVDOH MCST Toolbox](#)⁴.

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

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

MATERIALS PROCEDURE

WVDOH BUY AMERICA EXCEPTION
AND WAIVER GUIDELINES

1. PURPOSE

1.1. To set forth instructions for Waivers and Exceptions for Buy America Materials requirements as defined in MP 106.10.50.

1.1.1.2. Unless an exception or waiver exists, materials must meet all requirements of MP 106.10.50.

~~If material does not meet the requirements for an exception as specified in Section 3, under certain circumstances a waiver may be granted. These waivers are specified in Sections 4-8.~~

2. REFERENCED DOCUMENTS

2.1. MP 106.10.50 – WVDOH Buy America Acceptance Guidelines.

2.2. [West Virginia Code | §5A-3-56](#)¹

2.3. [West Virginia Code | §5-19](#)²

3. DEFINITIONS

3.1. Buy America Exception: An Buy America Exception is when, if certain conditions are met, the contractor may incorporate foreign materials without regard to the restrictions of the Buy American statute.

2.3.1.3.1.1. General Applicability Waiver (General Waiver): ~~The g~~General applicability wW waivers are ~~waiver~~exclusions that apply generally across multiple projects. A general applicability waiver can be “product-specific” (e.g., applies only to a product or category of products) or “non-product specific” (e.g., applies to all “manufactured products”).

2.3.2.3.1.2. Project Specific Waiver: The Project-Specific Waivers are ~~waiver~~exclusions on a project-by-project basis, and they are not transferable. Therefore, a waiver that is approved for one particular project cannot be used on another project. WVDOH may

¹ http://www.legis.state.wv.us/Bill_Status/bills_text.cfm?billdoc=hb2207%20intr.htm&yr=2001&sesstype=RS&i=2207

² <https://code.wvlegislature.gov/5-19/>

request a project-specific waiver based on non-availability or inconsistent with ~~the~~ Public Interest.

4. SCOPE

4.1. For each Buy America required material as described in MP 106.10.50, a separate waiver and/or exception process is described.

These Buy America required materials are as follows:

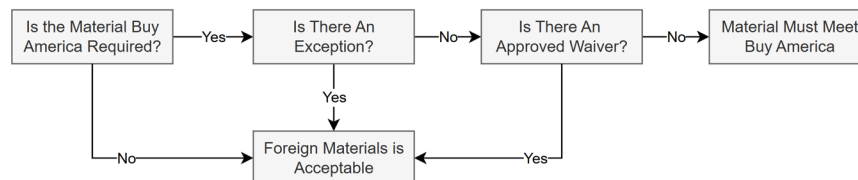
1. Steel and Iron
2. Manufactured Products
3. Construction Materials

4.2. If the material does not meet the requirements for an Exception as specified in Section 5, under certain circumstances a waiver may be granted. These waivers are specified in Sections 6-9.

4.3. If the material is Buy America required and neither an exception or nor waiver exists, the material must meet the requirements of MP 106.10.50.

4.4. A flowchart of the process is shown in Figure 1:

Figure 1: Overview of Buy America Exceptions and Waivers



3.5. OVERVIEW OF BUY AMERICA EXCEPTIONS

3.1.5.1. The Federal Minimal Use Exception may be granted for Steel and Iron Materials.

3.1.1.5.1.1.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”.

3.2. State Minimal Use Exception

3.2.1. 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.”~~

~~3.3.5.2.~~ There are no Buy America exceptions for Manufactured Products or Construction Materials.

~~3.4.5.3.~~ If these conditions are not met, foreign material shall not be used on a project unless a waiver is granted. The conditions for these waivers are described in the following sections for each of the Buy America required materials.

~~4.6.~~ OVERVIEW OF BUY AMERICA WAIVERS

~~6.1.~~ In certain circumstances, waivers (either General or Project-Specific) may be applied to materials exempting them from both Federal and State Buy America requirements.

~~6.2.~~ These are described in the following sections for each of the Buy America required materials.

~~4.1.~~ _____

~~4.2.~~ **~~FOR EACH BUY AMERICA REQUIRED MATERIAL AS DESCRIBED IN MP 106.10.50, A SEPARATE PROCESS IS DESCRIBED.~~**

~~THESE BUY AMERICA REQUIRED MATERIALS ARE AS FOLLOWS:~~

~~1.~~ **~~STEEL AND IRON~~**

~~2.~~ **~~MANUFACTURED PRODUCTS~~**

~~3.~~ **~~CONSTRUCTION MATERIALS~~**

~~4.3.~~ **~~THERE ARE TWO DIFFERENT TYPES OF WAIVERS~~**

~~5.7.~~ **~~FEDERAL~~ BUY AMERICA WAIVERS FOR STEEL AND IRON**

~~7.1.~~ If the contractor chooses to use foreign material for steel and iron, aluminum and glass and no exemptionexception applies, both Federal and State laws require Buy America waivers. These waivers are independent of each other. Compliance and acceptance of one waiver does not in any way shape or form demonstrate compliance with the other waiver.

~~7.2.~~ General Waiver:

~~7.2.1.~~ There are no General Waivers for Steel and Iron.

~~5.1.~~ Project-Specific Waiver:~~If the contractor chooses to use foreign material for steel and iron, aluminum and glass and no exemption applies, both Federal and State laws require Buy America waivers. These waivers are independent of each other. Compliance and~~

~~acceptance of one waiver does not in any way shape or form demonstrate compliance with the other waiver.~~

7.3.

7.3.1. Federal Requirements

~~5.1.1.1.7.3.1.1.~~ A Project-Specific Waiver~~waiver~~ from Federal Buy America requirements for steel and iron materials may be requested for the following instances~~based on~~:

- (1) Public Interest: the application of Buy America requirements would be inconsistent with the public interest; or
- (2) Non-Availability: steel and iron materials/products are not produced in the United States in sufficient and reasonably available quantities which are of a satisfactory quality.

~~5.1.1.2.7.3.1.2.~~ If a contractor wishes to apply for a Project-Specific Waiver, they will contact the ~~Division WVDOH~~ with justification and ~~Relevant-relevant~~ supporting information. ~~This will be reviewed by the WVDOH~~ If found acceptable, this ~~and~~ will be sent to FHWA for approval.

5.1.2.7.3.2. State Buy America waivers for Steel and Iron Requirements

7.3.2.1. As provided for in H.B. 2207, West Virginia Code | §5A-3-56, the Director of the West Virginia State Purchasing Division may authorize in writing the use of a Project-Specific Waiver for a minimal amount of foreign steel products if either of the following is true:

- (1) The cost for each contract item used does not exceed one tenth of one percent of the total contract cost, or two thousand five hundred dollars, whichever is greater. For the purposes of this section, the cost is the value of the steel product as delivered to the project.
- (2) The director of the purchasing division determines that specified steel materials are not produced in the United States in sufficient quantity or otherwise are not reasonably available to meet contract requirements.

6.8. **FEDERAL BUY AMERICA WAIVERS FOR MANUFACTURED PRODUCTS**

~~6.1.8.1.~~ There is a ~~federal-Federal general-General applicability-w~~ Waiver for Manufactured Products. Due to ~~the Manufactured Products General Waiver~~ this waiver, manufactured products permanently incorporated into FHWA-funded projects do not need to be produced domestically, apart from predominantly iron or steel manufactured products and predominantly iron or steel components of manufactured products.

~~6.2.~~ There are currently no additional waivers (including Project-Specific) for Federal Buy America Requirements for Manufactured Products.

7.9. FEDERAL BUY AMERICA WAIVERS FOR CONSTRUCTION MATERIALS

9.1. If the contractor chooses to use foreign material for construction materials and no exception applies, Federal law requires Buy America waivers.

9.2. General Waiver:

9.2.1. There is no General Waiver for Construction Materials.

~~7.1. If the contractor chooses to use foreign material for construction materials and no exemption applies, Federal law requires Buy America waivers.~~

7.2.9.3. Project-Specific Waiver:

~~7.2.1.~~9.3.1. WVDOH may request a waiver from Federal Buy America requirements for construction materials based on:

- (1) Public Interest: the application of Buy America requirements would be inconsistent with the public interest; or
- (2) Non-Availability: construction materials/products are not produced in the United States in sufficient and reasonably available quantities which are of a satisfactory quality.

9.3.2. If a contractor wishes to apply for a Project-Specific Waiver, they will contact the WVDOH with justification and relevant supporting information. If found acceptable, this will be sent to FHWA for approval.

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

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

MATERIALS PROCEDURE

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

1. PURPOSE

- 1.1. The WVDOH has a long history of using nuclear moisture/density gauges and is familiar with the test procedures, reliability, maintenance, and calibration procedures of such devices. In recent years, more devices have come to the market that are low or non-nuclear, which do not require an NRC license. :
- 1.1.1.2. This MP is in place To establish procedures used to approve the use of any testing devices for Density and/or Moisture of in-place material on WVDOH projects for material acceptance.

2. DEFINITIONS

- 2.1. Moisture/Density Gauge (gauge(s)): A Division approved device for testing the density and/or the moisture content of in-place material.
- 2.2. Nuclear Gauge
- 2.3. Non-Regulated Nuclear Gauge
- 2.4. Non-Nuclear Gauge

2.3. SCOPE

- 3.1. This MP applies to moisture and density testing devicesgauges used for acceptance testing, as well as any time such devices might be used when quality control testing results are used for acceptance.To establish procedures used to approve the use of testing devices for Density and/or Moisture of in-place material on WVDOH projects.
- 3.—

4. REFERENCED DOCUMENTS

- 4.1. AASHTO T343 – Standard Method....Vince to look up....
- 4.1.4.2. ASTM D2216 - Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- 4.2.4.3. ASTM D4959 – Standard Test Method for Determination of Water Content of Soil by Direct Heating

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

- 4.3.4.4. ASTM D8167/D8167M – Standard Test Method for Density of Asphalt Mixtures in Place by Nuclear Methods
- 4.5. MP 106.00.02 - Procedure for Evaluation of New Products for Use in Highway Construction
- 4.4.4.6. MP 207.07.20 – Nuclear Field Density – Moisture Test for Random Material Having less than 40% of +3/4 Inch Material
- 4.7. MP 700.00.24 – Nuclear Density Test by Roller Pass Methods
- 4.5.4.8. MP 717.04.21 – Guide for Quality Control of Compaction Add MPs from BW email

5. DEVICE APPROVAL CRITERIA

- 5.1. Prospective new candidates for approval shall be submitted to the WVDOH following the applicable guidelines established in MP 106.00.02 which outlines the submittal process.
- 5.2. The testing device/gauge must meet Specifications, as well as conform to the needs of the above referenced MPs and ASTM procedures.
- 5.3. The testing device/gauge must provide accurate and precise results that are repeatable and comparable to other typical testing procedures.
- 5.4. The testing device/gauge must be reasonably suitable for each application.
- 5.5. The testing device/gauge must be capable of providing wet density, dry density, and moisture.
- 5.6. The testing device/gauge must be capable of providing the above-mentioned results in one single test, without the need for other devices.
- 5.7. The testing device/gauge must deliver reasonably rapid results, suitable for the application. Maximum of one minute per test.
- 5.8. The testing device/gauge and its method of use must not allow the introduction of bias into test results, i.e., the device must test once and provide a reliable result, rather than test multiple times to find the best result.
- 5.9. The testing device/gauge must not interfere with, nor be susceptible to interference from, any other typical device that is expected to be on a project.
- 5.1.5.10. The WVDOH will evaluate each brand/model of moisture/density testing device as needed/requested according to the above listed requirements and reserves the right to reject or remove any brand or model without further explanation. Upon satisfactory evaluation and demonstrated field performance, the brand-and-/model of the device will be listed in section 5 below-added to the approved list of devices.

6. APPROVED LIST

- 6.1. The approved list for gauges will be maintained by the Director of MCS&T or their designee.
- 6.2. The list is available on the WVDOH MCS&T Webpage.

[Tracking Block/SIGNATURE BLOCK](#)

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

MATERIALS PROCEDURE

POLICY FOR MATERIALS CERTIFICATION RECIPROCITY

Commented [DB1]: List what the equivalent certification is. Its in 106.03.50. If we do not decide to combine these.

1. PURPOSE

- 1.1 This Materials Procedure is for certifying applicants who do not hold current materials certifications from West Virginia. Details for the Technician program can be found in MP 106.03.50 on the Materials Division [Website](#)¹.
- 1.2 This Materials Procedure establishes a path for those applicants who wish to become certified PCC Inspectors, **PCC Technicians**, and/or Aggregate Technicians in the state of West Virginia. For those who currently hold certifications in surrounding states or recognized industrial certifications the Provisional Path is available. This path is available only if the West Virginia Division of Highways deems the certification(s) transferable into the West Virginia certification program.

2. REFERENCED DOCUMENTS

- [2.1 MP 106.03.50](#)

2.3. PROVISIONAL PATH

- ~~2.13.1~~ This certification path is for applicants who hold a current, applicable certification from another state, or recognized industrial certification and wish to become a certified West Virginia Inspector/Technician. To become certified through this path, the applicant must take the West Virginia provisional certification exam. The applicant will be given only one (1) attempt to test-out and receive a passing score. The applicant may only test-out for disciplines that the West Virginia Division of Highways deems as a comparable certification.
- ~~2.23.2~~ If a passing score is not obtained on the test-out, the Provisional Certification will not be provided, and applicant will be required to take the respective class and pass the certification exams to be certified in West Virginia. If a passing score is obtained the applicant will become a West Virginia certified inspector and be bound by the rules of the West Virginia Certification Program.
- ~~2.33.3~~ To request a Provisional Certification, the following steps are required:

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

2.3.13.3.1 The applicant must provide copies of all current, applicable certification cards / certificates.

2.3.23.3.2 Email these attachment(s) to qaschoolscoordinator@wv.gov

2.3.33.3.3 The West Virginia Division of Highways will review the application and will notify the applicant within 30 days by email if the application has been approved or rejected. The applicant shall then be required to create an online learning account. (See Section 3.)

3.4. CREATING AN ACCOUNT AND SCHEDULING THE EXAM

3.14.1 To create an online learning account, visit the How to create an online learning account² [webpage](#) at the Materials Control, Soils and Testing Division website and follow the instructions. The applicant shall notify qaschoolscoordinator@wv.gov by email that the account has been established.

3.24.2 After passing the exam, the Provisional Applicant may go to The technician certification search [portal](#)³ at the Materials Control, Soils and Testing Division website and print out the Provisional Certification Card. The card may also be saved as a screenshot on a smart phone, which may be used in-lieu of a printed card.

Ronald L. Stanevich, P.E.

Director

Materials Control, Soils and Testing Division

MP 106.03.51 Steward – Personnel, Payroll Section
RLS:Eb

² https://transportation.wv.gov/highways/mcst/Documents/Technician_School_Documents/Coursemill_new_account_instructions.pdf

³ <https://transportation.wv.gov/highways/mcst/Pages/Technician-Directory-Portal.aspx>

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

MATERIALS CONTROL, SOILS AND TESTING DIVISION
MATERIALS PROCEDURE

BASIS FOR CHARGES FOR NON-SUBMITTAL OF SAMPLING &
TESTING DOCUMENTATION BY THE ESTABLISHED DEADLINE

1. PURPOSE

- 1.1 To provide a unit cost per test to be assessed to the Contractor when testing documentation or samples are not submitted by the Contractor by the established deadline. Periodic updates of this Attachment shall be the responsibility of the Director of Materials Control, Soils and Testing Division or their designee (Director).

2. REFERENCED DOCUMENTS

- 2.1 MP 109.00.22 – Procedure for the Submission and Documentation of Test Results
-

3. SCOPE

- 3.1 This procedure is applicable to circumstances where a construction item's testing documentation or samples are not submitted by the deadline established in this document. In the case of a general item, this timeframe is seven (7) days from the sampling date. The timeframe for special-case items such as gradations and cylinder breaks is noted in Attachment 1.
- 3.1.1 All of the following requirements shall be met to meet the above-defined timeframe:
- 3.1.1.1 Documentation submission includes: (A) generating the sample in the Division Approved Sampling and Testing software (SiteManager, AASHTOWare Projects, etc.), (B) entering all data into this system, (C) presenting the data to the District for review and (D) providing all testing documentation. The process for the submittal of test results is documented in MP 109.00.22.
- 3.2 The penalty for an infraction as described in Section 23.1 is \$700 per test. In the instance where a single test comprises of a prescribed series of sub-tests (typically 5), the cost of each infraction will be the standard rate divided by the total number of required sub-tests. This is only applicable in the certain circumstances as noted in Attachment 1.
- 3.2.1 This procedure is not limited to tests listed in Attachment 1, but applicable to any material test required by the Standard Specifications and/or Materials Procedures. For this case, the Director will establish the timeframe for the test or may utilize the standard timeframe as described in Section 23.1. The rate shall follow Section 23.2.

4. ABSENT TESTING DOCUMENTATION OR FAILURE TO TEST

- 4.1 In no case shall this Materials Procedure allow for the acceptance of non-tested material. In the case where no testing was performed, or no documentation was submitted for the material, the resolution for the acceptance of the material shall be in accordance with the applicable section(s) of the Standard Specifications and Materials Procedures. Additionally, and regardless of the outcomes of this resolution, a price assessment in accordance with Attachment 1 shall also be assessed.

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

MP 109.00.21 Steward – Materials Control Section
MM:B
ATTACHMENT

Cost Penalties Per Test

Material Category	Test and Rate	Testing Time Frame (Days)	#Cost/Sub Test Cost
Soil and Aggregate	In-Place Density (5 tests)	*T	*Rate
	Gradation (Each Test)	14	*Rate
	Liquid and Plastic Limits	*T	*Rate
	Crushed Particle Analysis	14	*Rate
Asphalt	Asphalt Mixture Test	*T	*Rate
	In-Field Density Testing	*T	0.2 (*Rate)
Chip Seal	Gradation (Each Test)	*T	*Rate
Concrete	Abar	14	*Rate
	Optimized Gradation	14	*Rate
	Cylinder Test	35	*Rate
	Rapid Chloride Permeability	*T	*Rate
	Air and Slump (1 test)	*T	*Rate
Grout	Grout Break Report (Each Test)	*T	*Rate
	Grout Strength Report	*T	*Rate
CLSM	Cylinder Test	35	*Rate
	Flow Test	35	*Rate

*T - Standard timeframe as described in Section 2.1

*Rate - Standard rate as described in Section 2.2

#Cost/Ea - Unless there is rate in this column, each infraction results in the full rate

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

PROCEDURE FOR THE SUBMISSION AND DOCUMENTATION
OF QUALITY CONTROL TEST RESULTS

1. PURPOSE

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

2. REFERENCED DOCUMENTS

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

3. DEFINITIONS

- 3.1 AWP: AASHTOWare Projects – The Division Approved Sampling and Testing Documentation Software.
- 3.2 Authorize: In AWP, the action in which a sample record is “completed” or “finished”, regardless of the final sample status.

4. SCOPE

- 4.1 As required by MP 109.00.21, contractors must submit their Quality Control test results by the deadline specified in that document.
- 4.2 The submission of results includes the following steps: (A) generating the sample in the Division Approved Sampling and Testing software (SiteManager, AASHTOWare Projects, etc.), (B) entering all data into this system, (C) presenting the data to the District for review and (D) providing all testing documentation.
- 4.2.1 This procedure expands on each of these points.

5. GENERATION OF A SAMPLE RECORD IN AASHTOWARE PROJECTS

- 5.1 Test results shall be documented in AWP (or the current Division Approved Sampling and Testing Documentation Software) using the live version of the training guides available on the WVDOH MCS&T [Webpage](https://transportation.wv.gov/highways/mcst/Pages/AWP.aspx)¹. A sample of these guides is provided in Attachment 1.

6. ENTERING OF TEST DATA.

- 6.1 All applicable data shall be entered into AWP. This shall include all required fields as shown in the live version of the training guides available on the WVDOH MCS&T [Webpage](https://transportation.wv.gov/highways/mcst/Pages/AWP.aspx). A sample of these guides is provided in Attachment 1.

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

- 6.1.1 This data includes test results such as compacted density, or percentage of material passing a specific sieve.
- 6.1.2 Figure 1 shows an example of test data entered into AWP.

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

Air Content (%)	Slump (in)
6.60	2.50

Plastic Conc Temp	Cylinders Created...
70.0	10/14/2024 9:10:00 A

Mix ID

Q 2301318-PCC

Results

Pass

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

- 7.1 Once the test data has been entered, the data must be submitted to WVDOH.
- 7.2 An email shall be sent by the Contractor to the District Approved email submission inbox. An example of this email is shown in Attachment 2. A list of these inboxes is available on the WVDOH MCST Toolbox [Webpage](https://transportation.wv.gov/highways/mcst/Pages/tbox.aspx)².
- 7.2.1 The title of the email shall contain the Contract ID and the Name of the Project, as well as “QC Test Results”.
- 7.2.2 The body of the email shall contain, but not be limited to the following information:
1. Contract ID
 2. Name of the Project
 3. Lab Reference Number
 4. Sample ID
 5. Material Name
 6. Line Number(s)
 7. Final Status of the Material (Pass/Fail/Information Only)
 8. A direct link to the AWP Sample Record
 9. A PDF scan of all test data
- 7.3 Unless otherwise directed by the District, only one complete test (AWP link) may be entered per email.

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

- 7.3.1 For example, if you have two sets of cylinder breaks, they must be sent on two separate emails.
- 7.3.2 If there are multiple tests associated with one sample record (for example slump and air), these can be submitted in one email.
- 7.4 Once the sample record is ready to be submitted, the user will mark the test complete on the Sample Record. An example of this action is shown in Figure 2.

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

The screenshot shows the 'Sample Record: TAWP20241016022520 M212345-L' interface. The left sidebar contains navigation tabs: General, Mix Design Information, Sources/Facilities, Destination Lab, Contract, Tests, and Test Results. The main content area is divided into sections for Material (601.003.003.02 - Concrete, Class B, With Fly Ash, Slag Cemen) and Sample Type (QC - Quality Control). Below these is an 'Assign Tests' button and a status bar indicating '0 marked for deletion' and '0 changed'. A table displays test data for 'Compressive Strength - Cylinders' with Test Method 'T22', Destination Lab 'iDEST-02', and Test Data '1.0'. The 'Sample - Ready' status is set to 'Yes' with a dropdown arrow. Below this, there are fields for 'Sample - Ready Date' (10/16/2024) and 'Notes'.

8. RECEIVING OF SAMPLES BY THE WVDOH

- 8.1 Once the District has received and accepted the sample record, they will “authorize” the sample.
- 8.2 The District will also mark the sample as “Sample-Accepted” on the sample record tests tab. An example of the completed screen is shown in Figure 3.

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

This screenshot is identical to Figure 2, showing the 'Sample Record: TAWP20241016022520 M212345-L' interface. The 'Sample - Ready' status is still 'Yes'. However, the 'Sample - Accepted Date' field now displays '10/16/2024', indicating the record has been accepted.

- 8.3 Once accepted, the District shall reply to the submission email stating that the sample record has been accepted.
- 8.4 If rejected, the District will mark the Sample as “rejected” with the rejection date. The District will then reply to the original email, stating the reasons for the rejection.

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

MP 109.00.22 Steward – Materials Control Section
MM:B
ATTACHMENT

ATTACHEMNT 1 (from Webpage)

ATTACHMENT 2 – Sample Email Submission

Subject Line: 20240001243 – Contract Name – QC Test Results

Dear Scott,

I am submitting the following Sample Record:

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

<https://wvdot-pr-prod.infotechinc.com/#/SampleRecord/44209/Summary>

Attached is the Testing Documentation (PDF)

Very Truly Yours,

Jimmy John, from Tom's Construction.

ATTACHMENT

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

MATERIALS PROCEDURE

INSPECTION AND ACCEPTANCE PROCEDURES
FOR PRECAST CONCRETE PRODUCTS

1. PURPOSE

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

2. SCOPE

- 2.1. This procedure will apply to all precast concrete products supplied for use on West Virginia Division of Highways projects and to all precast concrete product fabricators that supply material for use on West Virginia Division of Highways projects.
- 2.2. For prestressed concrete members refer to MP 603.10.40 "Inspection and Acceptance Procedure for Prestressed Concrete Bridge Beams."

3. FABRICATOR APPROVAL

- 3.1. All precast concrete product fabricators (hereafter referred to as the Fabricator) shall be approved by Materials Control Soils and Testing MCS&T Division prior to the start of any work for the WVDOH. If not listed on the WVDOH Approved List of Precast Concrete Fabricators, a Fabricator shall contact MCS&T Division a minimum of six weeks prior to the planned date on which fabrication is to begin to initiate the approval process.
- 3.2. In order for a Fabricator to be approved and listed on the WVDOH Approved List of Precast Concrete Fabricators, they must be NPCA (National Precast Concrete Association) certified, QCAST (American Concrete Pipe Association) Certified, or have an equivalent type of certification.
- 3.2.1. All fabricators must set up their invoicing as an E-Ticket that meets the requirements of Section 109.20.1 of the Standard Specification prior to approval.
- 3.3. The process for approving a Fabricator shall include, but not be limited to, an on-site visit to the fabrication plant by a WVDOH representative from MCS&T Division. During this visit, the WVDOH Quality Assurance (QA) personnel shall inspect the fabrication facility, the Quality Control (QC) lab, and meet with QC and other key personnel from the Fabricator. Component materials which will be used in the fabrication of precast items shall be sampled for testing. Batch scales shall be calibrated in accordance with MP 700.00.03 at a minimum once per year.

- 3.3.1. Sampling and testing of component materials shall be done in accordance with MP 603.02.10. Copies of recent component delivery tickets should be presented on the day of sampling. All component materials must be approved prior to the start of fabrication.
- 3.3.1.1. Any Fabricator which does not produce for the WVDOH for a period of 2 years shall be removed from the Approved Fabricator list. After removal from the approved list, before a Fabricator can again produce for the WVDOH, they must repeat the approval process. Sampling of component materials will not continue when the plant is not listed on the Approved Fabricator list.
- 3.3.2. Personnel from the Fabricator required to be present during the initial on-site visit and meeting between WVDOH and Fabricator shall include representatives from Production and Quality Control. Any questions and concerns regarding WVDOH requirements, including applicable Specifications, Materials Procedure (MP's), Standard Details, and QC/QA Inspections shall be addressed at this meeting.
- 3.3.3. The Fabricator must submit the Quality Control Manual/Plan for review at this meeting.
- 3.4. All Concrete Mix Designs which will be used on products fabricated for the WVDOH must be submitted for review & approval, prior to the start of fabrication. Any design mix with an aggregate(s) that has a reactivity 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.
- 3.5. The Fabrication Plant QC Personnel, as a minimum, shall be a certified ACI Grade I Concrete Field Testing Technician and/or a WVDOH PCC Inspector. In addition, if Self-Consolidating Concrete (SCC) is used, Fabrication Plant QC Personnel shall be a certified ACI SCC Testing Technician.
- 3.6. All Precast Concrete items shall be accepted by Direct or Master Coverage except when a Fabricator is certified as an Approved Source of concrete lagging as defined in Section 7.

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

- 4.1. Prior to beginning fabrication of any precast concrete products, the Fabricator shall provide written or email notification to MCS&T Division at least one calendar week in advance of the date on which fabrication is to begin.
- 4.1.1. Depending upon the precast items being fabricated, MCS&T Division may choose to monitor fabrication. Fabrication of structurally significant products such as box

culverts and 3-sided bridge units shall be monitored. Other items may be monitored at the discretion of MCS&T.

- 4.1.2. After fabrication has begun, the Fabricator shall keep MCS&T Division and the Inspector (whether a WVDOH employee or a contract employee representing the WVDOH) informed in advance of the days on which fabrication will take place.
- 4.2. Shop Drawings must be approved by the West Virginia Division of Highways prior to the start of any work by the Fabricator. The Inspector must have a copy of these approved shop drawings prior to start of any work by the Fabricator.
- 4.3. Concrete cylinders shall be made for compressive strength testing with 6-inch by 12-inch or 4-inch by 8-inch molds. The cylinders are to be cured in the same area as the products for which they represent (Field Cured as outlined in AASHTO R100) until tested to create a curing environment similar to the product that they represent. A compressive strength test shall consist of the average result of a set of cylinders, which is at least two cylinders. Form removal for wet cast concrete is not permitted until concrete has reached 50% of the design strength, unless otherwise specified. If forms are stripped from box culverts at 50% of the design strength, another curing method from section 601.12, or ASTM C1577 must be used until 70% of the design strength is obtained. Form removal limitations do not apply to elements fabricated with dry cast concrete. Dry cast concrete is defined as concrete with a slump less than 1-inch.
 - 4.3.1. For both conventional wet cast concrete and SCC mixes, a minimum of one set of compressive strength cylinders shall be fabricated from every 7 cubic yards of concrete, or fraction thereof, with a minimum of one set per day per mix design. Both the form removal strength and the 28-day strength must be confirmed by a set of cylinders. Cylinders shall be the same size as those used in the initial approved mix design. For conventional concrete, slump, temperature, and air content tests shall be conducted on the first batch of concrete each day and every time that cylinders are fabricated. For SCC mixes, spread, temperature, and air content tests shall be conducted on every batch. For all types of concrete, unit weight and yield tests shall be conducted on the first batch of concrete each day and thereafter as deemed necessary by Quality Control and Quality Assurance Personnel.
 - 4.3.2. For dry cast mixes, the 28-day strength shall be confirmed by a set of compressive strength cylinders. Compressive strength testing for form removal is not required for dry cast mixes. A minimum of one set of 28-day compressive strength cylinders shall be fabricated from every 1420 cubic yards of concrete, or fraction thereof, with a minimum of one set per day per mix design. The cylinders are to be fabricated in the molds on the vibration table in accordance with ASTM C497. For dry cast mixes, slump testing is not required, and concrete temperature testing shall be performed on the first batch of concrete each day and every time that cylinders are fabricated.
- 4.4. For precast manholes fabricated with wet cast and SCC mixes, absorption tests are to be conducted in accordance with ASTM C642. Tests should be conducted on a weekly basis for each mix design used, at a minimum, unless otherwise specified.

- 4.5. For precast products fabricated with dry cast mixes, absorption tests are to be conducted in accordance with ASTM C642, and tests should be conducted on a weekly basis for each mix design used. The maximum allowable absorption shall be 9%.
- 4.6. Unless otherwise specified, for conventional wet cast and SCC mixes, plastic concrete shall have an air content measured at $7.0 \pm 2.0\%$. For dry cast concrete, the air content test requirement is waived.
- 4.6.1. Prior to the use of Self-Consolidating Concrete in precast items all mix designs must be submitted to MCS&T for approval and meet the requirements of the following table. Test results from trial batches produced by the laboratory which designed it shall be included in the submittal. The compressive strength of the design mix shall be at least 15% above the specified design strength.

Table 4.6.1 - SCC Mix Design Acceptance

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

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

Table 4.6.2 - SCC Production Acceptance

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

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

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

5. FINAL INSPECTION

- 5.1. After fabrication is completed and prior to shipment, the precast items will be stored on dunnage. The Fabricator shall provide MCS&T Division with a written or email request for final inspection a minimum of one calendar week prior to the desired date of inspection. Effective communication from the Fabricator to MCS&T Division and Consultant Inspection Agency is the key to avoiding any scheduling conflicts regarding final inspection.
- 5.2. At the final inspection, the fabricator shall provide the inspector with documentation of required data pertinent to the product(s) being produced. Attached to this document is a sample inspection sheet to be used as a guide for presenting this information. This documentation is also available on the [MCS&T Division Website](#)¹.
- 5.2.1. For the final inspection, the Inspector may witness compressive strength tests if required, inspect repairs as needed, and conduct a thorough visual examination of each member. A copy of the Inspector's daily reports, a copy of the final inspection report, and all other pertinent information provided to the Inspector by the Fabricator shall be kept on file by MCS&T Division.
- 5.2.2. For box culverts, trial fitting of adjacent pieces, prior to shipping, will be required as part of the final inspection process. Each adjacent box culvert will be trial fitted in pairs horizontally or vertically; the gaps between each pair will be measured. Dunnage will be placed on a smooth level surface below the bottom of the culvert to prevent damage. The maximum gap between the adjacent pieces shall not exceed ½ inch (13 mm), unless otherwise stated in the construction plans.

6. ACCEPTANCE & REJECTION

- 6.1. Upon completion of final inspection, if a precast product meets all specification requirements and does not contain any defects, the Inspector will stamp the precast product as accepted by MCS&T Division and provide a 7-digit Laboratory Reference Number for shipment.
- 6.1.1. Shipping invoices shall document the assigned Laboratory Reference Number, type of material, number of pieces, size, and cast dates. All Division invoicing must be submitted as an E-Ticket to the project that meets the requirements of Section 109.20.1 of the Specifications.
- 6.2. If, however, the precast product does not meet all specification requirements due to damage, defect, or dimensional tolerance, the product must be further evaluated before potential acceptance by the MCS&T Division as described in the following subsections.

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

- 6.2.1. Minor defects may be repaired in accordance with the pre-approved repair procedures which should be incorporated within the Fabricator QC Plan. Cracks 4 mils or less shall be sealed by silane; and cracks between 4 mils and 16 mils shall be repaired by epoxy injection in accordance with Section 603.10.2. Any crack exceeding 16 mils shall be considered a major defect and the item shall be rejected by MCS&T. If repairs have been approved, and appear satisfactory and all other specifications are met, the Inspector shall stamp the product as approved for shipment and issue a 7-digit Laboratory Reference Number for acceptance.
- 6.2.2. Major defects shall include dimensions that exceed tolerances, failure to reach required compressive strength, cracks greater than 16 mils, and any defect that could be considered structural. Lagging dimensions shall be within $\pm \frac{1}{4}$ " 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.
- 6.2.3. When an item does not achieve the specified 28-day compressive strength prior to shipment, and if it is accepted by a DMIR, the following formula for the price adjustment shall be used in the DMIR, plus any administrative fee.

f_c 28 Day Compressive Strength (psi)
 $\bar{X}$ 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. PROCEDURE FOR APPROVED SOURCE OF PRECAST CONCRETE LAGGING

- 7.1. Precast concrete Fabricators may be classified as an Approved Source of precast concrete lagging if they have met the requirements of Section 3 and are producing lagging which is made in accordance with the relevant 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.

- 7.2. MCS&T Division may perform regular quality assurance inspections prior to shipment and/or, monitor fabrication of lagging from a Fabricator that is an Approved Source. The Approved Source Lab Number shall be noted on all shipping documents from the fabricator, and material coverage will be requested under the assigned Approved Source Lab Number. All relevant concrete test data, component material information, QC inspection data, and shipping information shall be kept on file at the Fabricator for the last three years of fabrication and shall be available upon request by the Division. Failure to produce requested documentation may result in revocation of the Fabricator's Approved Source certification status.
- 7.3. Approved Sources will be evaluated by the Division by random audits. Audits will be conducted on the material that is available to the Inspector at the time of the audit. All documentation and records for the pieces must be made available to the Inspector on the day of the audit and must be complete, current, and accurate. Failure to produce records shall be a cause for decertification.
- 7.3.1. All shipping documentation, concrete test data, and component material certifications shall be made available to the Inspector for review. These documents shall include all documents from material that has been shipped to state projects since the last audit. If data indicates that any material did not conform to this MP, the applicable Specifications, or Standard Detail; and was used in a state project, then the Fabricator will be de-certified as an Approved Source of precast concrete lagging.
- 7.3.2. In addition to documentation, the audit will consist of fabrication monitoring, test observance, and a visual inspection of material that is stocked for shipping on the day of the audit.
- 7.3.2.1. Each material test monitored during the audit must be performed in accordance with the applicable Standards, and Specifications. Visual inspection of stocked material will include quality checks of surface finish for cracks, spalls, and other surface blemishes after all repairs have been performed and dimensional checks. The material shall be properly stored to avoid handling damage and be accessible to the Inspector. Audits shall be graded on a point system deducted from 100 and weighted based on the Non-Conformance Points found per Table 7.3. A minimum score of 75 shall be considered passing.

TABLE 7.3

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

- 7.4. When a Fabricator, which is an Approved Source, fails an audit, the Fabricator must submit a written corrective action plan to bring their QC program back into compliance with this MP and corresponding Specifications during a probationary period of one month during which time the fabricator must prove they have fulfilled the corrective actions they submitted before supplying the material again. If the Fabricator fails to bring their material back into compliance within the probationary period, the Approved Source status will be revoked for a minimum of one year from the date of the end of the probationary period, or until the Fabricator has corrected the nonconformances listed during the failed audit. Two failing audits in a year shall result in revocation of the Fabricator's Approved Source status for one year from the date of the last failed audit. Any evidence of document falsification shall result in immediate loss of Approved Source status, and removal from the Approved List of Concrete Fabricators for a minimum 2 years. Depending on the severity and the legality of the falsified documents the removal may be permanent.
- 7.5. Non-Conforming material received by WVDOH projects and reported to MCS&T shall result in an immediate failing audit and will require the Fabricator to submit corrective actions. If the Fabricator fails the subsequent audit, it will result in the loss of their Approved Source status.

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

**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: _____

POST POUR WORK

Repair Witnessed: _____

[illegible]

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:	

Sample Inspection Sheet

Inspection Date _____ QC Personnel _____ QC Signature _____

Fabricator _____ Location _____

Project Name _____ WV State Project # _____ Federal Project # _____

Authorization # _____ Inspection done by _____
Steel Reinforcement

Reinforcement Supplier _____

Description _____ Approved Lab # _____

Description _____ Approved Lab # _____

Description _____ Approved Lab # _____

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

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.
-

2. SCOPE

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

3. EQUIPMENT

- 3.1 Measuring tape, approximately 50 feet.
-

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.
- 3.14.2 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.
-

4.5. PROCEDURE

- 4.15.1 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.
- 4.25.2 Selection of random numbers:
- 4.2.15.2.1 Determine the number of test sites which will be required for the lot or test section.
- 4.2.25.2.2 The table of random numbers (Table 14 attached) or a calculator, which will generate random numbers, can be used.
- 4.2.35.2.3 The table of random numbers contains 5 sections with 2 columns of numbers in each section.
- 4.2.3.15.2.3.1 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.

4.2.3.25.2.3.2 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.

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

4.35.3 Location of test sites:

4.3.15.3.1 There are many variations in the required number of tests and the physical dimensions of the area to be tested.

4.3.25.3.2 Random location of tests on a single lift that rectangular in shape (see Example 1 of Attachment).

4.3.2.15.3.2.1 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.

4.3.2.25.3.2.2 Divide the length of the area along the centerline by the number of tests to determine the length of each subplot or subsection.

4.3.2.35.3.2.3 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.

4.3.2.45.3.2.4 Select the random numbers according to 4.2 through 4.2.3.3sSection 45.2.

4.3.2.55.3.2.5 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.

Commented [DB1]: Check all references

~~4.3.2.6~~ 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.~~

~~4.3.2.7~~ 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.~~

~~4.3.3.3~~ 5.3.3 Random location of test sites on a single lift that is irregular in shape (see Example 2 attached):

~~4.3.3.1~~ 5.3.3.1 Determine the dimensions of the area to be tested.

~~4.3.3.2~~ 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.

~~4.3.3.3~~ 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 (see 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~~ each 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.

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 11 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.

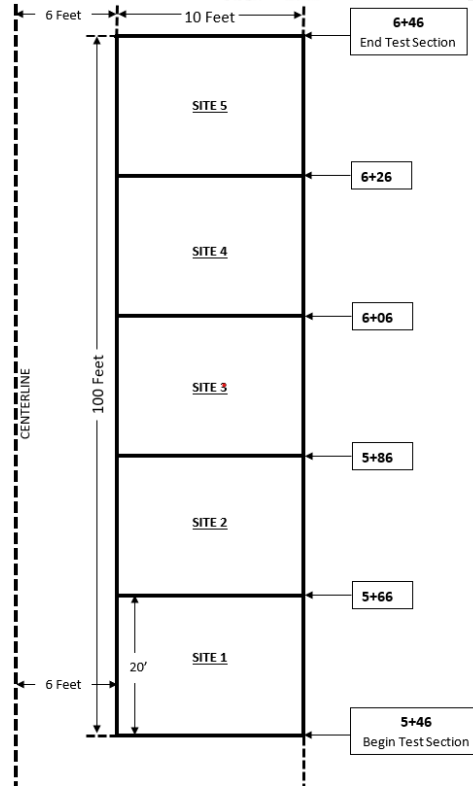
- A. $5+46 + 17 = 5+63$
- B. $5+66 + 11 = 5+77$
- C. $5+86 + 10 = 5+96$
- D. $6+06 + 12 = 6+18$
- E. $6+26 + 9 = 6+35$

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. $6 + 0 = 6$ ft right of centerline → Test shall be taken 28 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



[Metric example deleted](#)

EXAMPLE 2

The shaded area designates the lift to be tested. For this example, 2 sublots are required with 1 test in each subplot.

Since the area to be tested is not rectangular in shape, place the smallest rectangle around the area that will include all the shaded area.

Divide the rectangle into 2 equal areas (160 feet long by 90 feet wide).

Since the centerline is located within the area to be tested, the offset can be calculated and measured from either side.

For this example, work from the right side.

Determine the station number for the beginning of each subplot.

Sublot No. 1 2+00
Sublot No. 2 2+00 + 80 = 2+80

Random Numbers

Since there is the possibility that the location of a test site may fall outside the area to be tested, an additional set of random numbers was selected.

Length	Width
A. .902	.850
B. .275	.023
C. .794	.850

Multiply the random number by the length of the subplot ($80 \times .902 = 72$ feet). Add the value of the beginning station number ($2+00 + 72 = 2+72$). Multiply the width of the subplot by the random number ($90 \times .850 = 76$ feet). By working from the right side, it is 30 feet to the centerline, therefore the test site is $76 - 30 = 46$ feet to the left of centerline. The test site falls outside the test area.

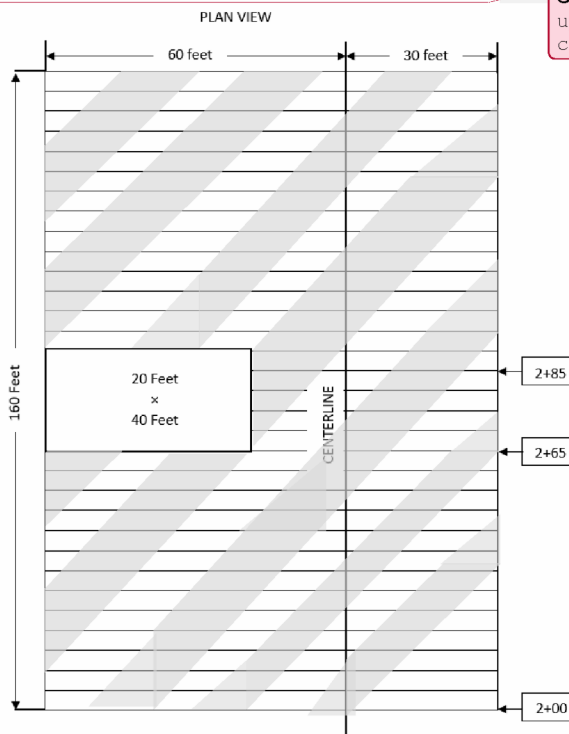
By using the next set of random numbers, calculate the test site location.

$80 \times .275 = 22$ feet $90 \times .023 = 2$ feet
 $2+00 + 22 = 2+22$ $30 - 2$ feet = 28 feet right of centerline

The test site for subplot 1 now falls within the test area.

Calculate the test location for subplot 2.

$80 \times .794 = 64$ feet $90 \times .850 = 76$ feet
 $2+80 + 64 = 3+44$ $76 - 30 = 46$ feet left of centerline



Commented [DB2]: Adam O to work on updating this example with compaction coordinator.

MP 712.21.26 - ATTACHMENT
SIGNATURE DATE
PAGE 5 OF 8

[Metric Example Removed](#)

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. $5 \times .599 = 3$	Test lift 3 in subplot number 1, Lift number 3
B. $4 \times .464 = 2$	Test lift 2 in subplot number 2, Lift number 7
C. $4 \times .675 = 3$	Test lift 3 in subplot number 3, Lift number 12
D. $4 \times .279 = 1$	Test lift 1 in subplot number 4, Lift number 14
E. $4 \times .338 = 1$	Test lift 1 in subplot number 5, Lift number 18

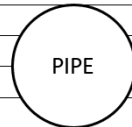
Test location		
Length	Width	
A. .627	.595	
B. .458	.137	
C. .510	.656	
D. .324	.284	
E. .135	.903	

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.

A. $.627 \times 75 = 47$ ft	$.595 \times 10 = 6$ feet left of centerline
B. $.458 \times 75 = 34$ ft	$.137 \times 10 = 1$ foot left of centerline
C. $.510 \times 75 = 38$ ft	$.656 \times 10 = 7$ feet left of centerline
D. $.324 \times 75 = 24$ ft	$.284 \times 10 = 3$ feet left of centerline
E. $.135 \times 75 = 10$ ft	$.903 \times 10 = 9$ feet left of centerline

CROSS SECTION OF PIPE BACKFILL

21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1



CENTERLINE

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

MATERIALS PROCEDURE

GUIDELINES FOR ESTABLISHING AND MAINTAINING
APPROVED PRODUCT LISTS OF
MATERIALS, SYSTEMS AND SOURCES

1. PURPOSE

- 1.1 To establish general guidelines for establishing and maintaining approved product lists of material producers, distributors and sources, commonly known as the Approved Product List (APL), which are frequently on WVDOH projects.
- 1.2 This Materials Procedure (MP) is distinguished from MP 106.00.02 "Procedure for Evaluating Products/Processes for Use in Highway Construction" which outlines the procedure for considering completely new products that have not yet been specified, considered in construction plans, notes, or other construction documents. This MP outlines the creation of an APL for a material which already has significant usage on DOH projects and havehas been accepted using other methods as defined further in this document.

2. SCOPE

- 2.1 This procedure shall apply to all sources and materials that are suitable for acceptance with a reduced testing frequency. Because of the uniqueness or complexity of some products, additional MPs may be necessary to supersede the requirements of this procedure.

3. REFERENCED DOCUMENTS

- 3.1 Materials Procedure 106.00.02 - Procedure for Evaluating Products/Processes for Use in Highway Construction.

4. DEFINITIONS

- 4.1 ST-1: Special Testing Form 1, this is the acceptance method for a material which does not otherwise have an acceptance method such as being on an APL, being designate by the Specifications, or a MP.
- 4.2 Historic Usage: Documentation of a positive acceptance record of the product via the usage of ST-1.
- 4.3 AASHTO: American Association of State Highway and Transportation Officials
- 4.4 APEAS: AASHTO Product Evaluation and Audit Solutions, formerly known as NTPEP.

5. REQUISITES FOR THE CREATION OF AN NEW APL

- 5.1 A clear acceptance criterion, such as those listed in the following sections shall be established to govern the acceptance of the product. In order for a product or system to be considered as a candidate for a new APL, one or more of the following acceptance criteria shall be met:
- 5.1.1 The Specifications, Materials Procedures or other State Acceptance Criteria.
- 5.1.2 Approval by a WVDOH Committee, or Applicable Task Force, such as the “Roadway Departure Task Force.”
- 5.1.3 Testing and or approval via information gathered from national testing or auditing agencies.
- 5.1.4 Historic usage and approval on DOH projects by ST-1s, Special Provisions, etc.
- 5.1.5 Consistent satisfactory compliance of the product with the Specifications.

6. APPROVAL CRITERIA

6.1 A material may not be added to an approved list if it does not meet the Specifications.

6.1.6.2 Approval shall be granted by the Director, to a material or source ~~providing~~ provided at least one of the following criteria are met:

6.1.16.2.1 The manufacturer of the material has developed and operates under a Division approved Quality Control Plan that sufficiently controls the quality of the material to the extent that the possibility of a substandard material being produced and shipped is substantially reduced, if not eliminated.

6.1.26.2.2 The record of Specification compliance of the material or source is satisfactory to the Division.

6.1.36.2.3 The manufacturer has successfully undergone an evaluation of manufacturing and quality control processes that ~~has~~have led to certification or accreditation by a Division recognized accreditation agency.

6.1.46.2.4 Acceptance or approval of a particular material by an AASHTO national and/or regional test program.

6.1.4.16.2.4.1 In the instance where a producer/supplier has a product which has a satisfactory audit from ~~AASHTO Product Evaluation and Audit Solutions~~APEAS, has national usage and the test data falls within the applicable specification limits of ASTM or AASHTO, at the discretion of the Director, this product may be added to its respective approved product list.

6.1.56.2.5 Acceptable evaluation by field-testing of a material or product design analysis.

- ~~6.26.3~~ Unless otherwise directed by the Director, acceptance criteria shall be documented and maintained by the Materials Lab Coordinator. These acceptance criteria shall be available in the MCS&T ProjectWise folder so other employees will be able to consistently review the approval criteria and duplicate the approval process.

7. RETENTION OF APPROVED STATUS

- 7.1 All approved materials or sources shall be subject to validation through periodic inspection and/or review to determine if the approved product(s) maintains the same characteristics and quality as those originally approved.
- 7.1.1 This inspection and validation shall be performed at a frequency determined by the respective MCS&T Section Supervisor. Once the process has been completed, each re-approved source shall retain its issued approval/lab number unless the product has changed from its original state enough to warrant a new number (For example, a new, updated version of the product.)
- 7.1.2 If a product is not validated within the guidelines established above, the product will be removed from the APL and a letter issued to the company.
- 7.1.3 Re-approval verification shall be based on one or more of the following criteria:
- 7.1.3.1 Satisfactory results from testing random samples collected at the source, supplier, or from a DOH project.
- 7.1.3.2 Re-inspection of the manufacturing and quality control processes.
- 7.1.3.3 Satisfactory statistical evaluation of routine quality control test data supplied by the manufacturer.
- 7.1.3.4 Certified statement from the manufacturer that the approved product is being manufactured under the same design, formulation, manufacturing process and quality control processes that were in effect when product or source was originally approved.
- 7.1.3.5 Continued presence on an accepted national/regional program such as ~~AASHTO Product Evaluation and Audit Solutions~~APEAS.
- 7.2 In the instance where a company has changed its name, but retains the originally approved product, including the same design, formulation, manufacturing process and quality control processes, the product shall retain the original approval number. The Approved Product List shall be updated to include the new name with the original approval number.
- 7.2.1 If the product is changed in any physical way (aside from a different name label or stamp), the product shall be treated as a completely new product.

8. DOCUMENTATION AND AVAILABILITY OF APLS

- 8.1 The new or updated APL shall be submitted to the Director for approval. Once approved, the APL will be uploaded to the [MCS&T Webpage](#)¹ and distributed to the District Materials Supervisors and any other interested parties.
- 8.1.1 All manufacturers or distributors of approved materials shall be required to reference their approval/lab number on the shipping documents (typically invoices) that accompany the approved material to the DOH project.

SIGNATURE BLOCK

MP 106.00.03 Steward – Lab Support Section
MM:B

¹ https://transportation.wv.gov/highways/mcst/Pages/APL_By_Number.aspx

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

MATERIALS PROCEDURE

PROCEDURE FOR DETERMINING A REDUCED UNIT PRICE TO BE PAID FOR SELECT
MATERIAL FOR BACKFILLING WHICH DOES NOT CONFORM TO GRADING
REQUIREMENTS OF GOVERNING SPECIFICATIONS

1. PURPOSE

- 1.1 To define a range of nonconformance in the grading of aggregates used for Select Material for backfilling which would require a special investigation (DMIR) of the aggregate or its removal from the project and provide a procedure for reducing the price to be paid for said aggregate. When more than one sample is taken in succession, this procedure is applicable to MP 300.00.51: "Procedural Guidelines for Maintaining Control Charts". In some cases, however, because of the nature of the item, only one sample is taken. In this regard a control chart may not be necessary, and conformance will be based on the results of the single sample.
-

2. SCOPE

- 2.1 This procedure shall apply only to those aggregates specified for use as Select Material for Backfilling.
-

3. REFERENCED DOCUMENTS

- 3.1 MP: 300.00.51 – Procedural Guidelines for Maintaining Control Charts
3.2 Section 212 of the Specifications
-

4. DEFINITION OF TERMS

- 4.1 LOT - The quantity of material represented by an average test value.
4.2 Sublot - The quantity of material represented by a single test value.
4.3 In those cases where only one sample is taken to represent the total quantity the subplot and LOT will be considered the same.
-

**5. DESIGNATION OF QUANTITIES FOR EQUITABLE PRICE
ADJUSTMENT**

- 5.1 When an average gradation test value, or three individual test values, fall outside the limits of the Specifications, the LOT of material represented thereby is considered to be nonconforming to the extent that the last of its sublots is nonconforming. When a lot of material is nonconforming, then the last subplot contained therein shall have its price adjusted in accordance with Table 212.12.1 of the Specifications.

In no event, however, shall a subplot of material have its price adjusted more than once, and the first adjustment which is determined shall apply.

- 5.2 When only one sample is taken to represent the total quantity of material used, and any sieve value falls outside the limits of the specification, the material represented thereby is considered to be nonconforming. This material shall have its price adjusted in accordance with Table 1.

6. DEGREE OF NONCONFORMANCE

- 6.1 When a subplot of material is to have its price adjusted, the percentage point difference between the nonconforming test value and the specification limit shall be determined for each sieve determined to be nonconforming (nonconforming as described in 4.1 above), and this value shall be compared to Table 212.2.5.3. The total measure of the degree of nonconformance is, therefore, the sum of nonconformance on the two sieve sizes of the subplot.

<u>Table 1</u>	
<u>Degree of Nonconformance</u>	<u>Percent of Contract Price to be Reduced</u>
<u>to 3.0</u>	<u>2</u>
<u>3.1 to 5.0</u>	<u>4</u>
<u>5.1 to 8.0</u>	<u>7</u>
<u>8.1 to 12.0</u>	<u>11</u>
<u>Greater than 12.0</u>	<u>*</u>

7. DETERMINATION OF EQUITABLE ADJUSTMENT

- 7.1 When the total degree of nonconformance has been established and it is 12.0 or less, the designated action shall be initiated from Table 212.12.1 of the Specifications. When the degree of nonconformance for a subplot is greater than 12.0, a special investigation (DMIR) shall be performed within 14 calendar days of determining the degree of nonconformance. If the special investigation is not performed in 14 calendar days, said subplot will not be incorporated into the project, and in fact, removed from the project as soon as possible.

8. METHOD OF ACCOUNTING AND CHANGE ORDER PREPARATION

- 8.1 Equitable reductions for nonconformance will be determined, for each lot or subplot. These adjustments may be processed with a single change order when the item is complete by tabulating the data for all nonconforming sublots, and preparing the change order for the total dollar adjustment shown on the tabulation. A copy of the tabulation should accompany and be made a part of the change order.
- 8.2 Dollar reduction shall be calculated by (A) quantity $\times$ (B) % reduction from Table 212.2.5.3 $\times$ (C) unit contract price. (A sample tabulation sheet is attached).

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

MP 212.01.21 Steward – Aggregate Section
MM:R
ATTACHMENT

Equitable Reduction Procedure

TABULATION OF EQUITABLE REDUCTIONS (partial, Imperial Units)

Sublot Identity (Note 1)	Quantity (A)	Degree of Nonconformance	Price Reduction (B)	Unit Contract Price (C)	Dollar Reduction From Contract (A)×(B)×(C)
	800 FT ³	7.5	7%	3.50	196.00
	200 FT ³	2.6	2%	3.50	14.00
	500 FT ³	5.0	4%	3.50	<u>70.00</u>

Subtotal (1) (Note 2) \$280.00

	1000 FT ³	1.2	2%	3.50	70.00
	1000 FT ³	11.7	11%	3.50	<u>385.00</u>

Subtotal (2) (Note 2) \$455.00

Total Reduction (Note 3) \$735.00

Note 1: Station numbers may also be used to identify sublots.

Note 2: These subtotals should be made at the end of contract pay periods, and the subtotal amounts deducted from contract payments on a current basis.

Note 3: This total reduction should be processed in one change order when the construction of the item is complete.

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

SEWER AND WATERLINE MATERIALS PROCEDURE

1. PURPOSE

- 1.1. Define the specifications, standards, and requirements for materials used in sewer and waterline construction projects managed by the West Virginia Division of Highways (WVDOH).
 - 1.2. Establish procedures for reviewing and approving Producer/Suppliers of sewer and waterline materials acceptable for use on WVDOH projects.
 - 1.3. Ensure materials meet industry standards to guarantee durability, performance, and safety in the construction and operation of sewer and waterline systems.
 - 1.4. Maintain a record of approved suppliers and their compliance with established standards.
-

2. SCOPE

- 2.1. This procedure applies to the acceptance, approval, and use of materials for sewer and waterline construction, including, but not limited to, pipe materials, valves, hydrants, service lines, meters, and other related materials.
 - 2.2. This procedure applies to all sewer and waterline products used on WVDOH projects unless otherwise specified in the project plans.
 - 2.3. It applies to all producers/suppliers who provide sewer and waterline materials for use on WVDOH projects, ensuring compliance with specifications outlined in referenced standards.
-

3. REFERENCED DOCUMENTS

The following documents provide standards and specifications for materials covered by this procedure:

- 3.1. AWWA C151 - Ductile Iron Pipe
- 3.2. AWWA C104 - Cement Lining for Ductile Iron Pipe
- 3.3. AWWA C110 - Ductile Iron and Gray Iron Fittings
- 3.4. AWWA C153 - Ductile Iron Compact Fittings
- 3.5. AWWA C111 - Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings

- 3.6. AWWA C115 - Flanged Ductile Iron Pipe with Rubber Gasket Joints
- 3.7. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe
- 3.8. AWWA C905 - Polyvinyl Chloride (PVC) Pressure Pipe for Water Distribution
- 3.9. ASTM D2241 - Polyvinyl Chloride (PVC) Pipe for Pressure Systems
- 3.10. ASTM D3034 - Polyvinyl Chloride (PVC) Sewer Pipe
- 3.11. ASTM D2239 - Polyethylene (PE) Pipe
- 3.12. AWWA C800 - Copper Service Line Fittings
- 3.13. AWWA C502 - Fire Hydrants
- 3.14. ASTM A53 - Steel Pipe
- 3.15. ASTM A139 - Electric-Fusion (Arc) Welded Steel Pipe
- 3.16. ASTM A252 - Steel Pipe Piles
- 3.17. ASTM B88 - Seamless Copper Water Tubing
- 3.18. AWWA C700 - Water Meters

4. MATERIAL REQUIREMENTS

The following are the material specifications for sewer and waterline construction:

- 4.1. 718.1 - DUCTILE IRON PIPE
 - 4.1.1. 718.1.1: Ductile iron pipe used for waterline applications shall conform to AWWA C151.
 - 4.1.2. 718.1.2: Cement lining for ductile iron pipe shall conform to AWWA C104.
 - 4.1.3. 718.1.3: Fittings for ductile iron pipe shall conform to AWWA C110 or AWWA C153.
 - 4.1.4. 718.1.4: Joints for ductile iron pipe shall conform to AWWA C111; flanged joints shall conform to AWWA C115.
- 4.2. 718.5 - PVC PIPE
 - 4.2.1. PVC pipe used in water and sewer applications must meet the following requirements unless specified otherwise by the utility:
 - 4.2.2. Pipe Size:
 - Less than 4 inches (100 mm):
 - Pressure applications: ASTM D2241, SDR 21
 - Non-pressure applications: ASTM D3034
 - 4 inches (100 mm) to 12 inches (300 mm):
 - Pressure applications: AWWA C900, DR 14
 - Non-pressure applications: ASTM D3034
 - 14 inches (350 mm) to 16 inches (400 mm):

- Pressure applications: AWWA C905, DR 14
- Non-pressure applications: ASTM D3034

4.2.3. Joint Requirements:

- Pressure Applications: ASTM D3139
- Non-Pressure Applications: ASTM D3212

4.3. 718.7 - POLYETHYLENE PIPE

4.3.1. Polyethylene pipe shall conform to ASTM D2239 “PE3408.”

4.3.2. For potable water use, polyethylene pipe must be approved by the National Sanitation Foundation (NSF) for transmitting liquids intended for human consumption.

4.4. 718.9 - COPPER SERVICE LINE

4.4.1. Copper service lines shall conform to ASTM B88.

4.4.2. Fittings used in copper service lines shall conform to AWWA C800.

4.5. 718.10 - GATE VALVES

4.5.1. Gate valves shall conform to AWWA C500 or AWWA C509.

4.6. 718.11 - VALVE BOXES

4.6.1. Valve boxes shall be specified on the construction plans.

4.7. 718.12 - STEEL CASING PIPE

4.7.1. Steel casing pipe shall conform to one of the following:

- ASTM A53, Grade B
- ASTM A139, Grade B
- ASTM A252, Grade 2
- Hydrostatic test requirements for waterline and sewer line applications are waived for these steel casing pipes.

4.8. 718.13 - FIRE HYDRANTS

4.8.1. Fire hydrants shall conform to AWWA C502. Specific details for fire hydrants should be referenced in the construction plans.

4.9. 718.14 - WATER METERS

4.9.1. Meters shall conform to AWWA C700, with the type specified in the construction plans.

5. ACCEPTANCE PROCEDURE

5.1. With each shipment of sewer and waterline materials to a WVDOH project, the producer/supplier shall provide shipping documents that include an APL approval number confirming that the materials meet WVDOH quality specifications.

6. ACCEPTANCE PROCEDURE (APPROVED SOURCE)

- 6.1. To become an approved source, producers/suppliers must comply with the following requirements
- 6.2. Submit completed [Form HL-4681](#), as outlined in [MP 106.00.02](#), indicating intent to be listed on the WVDOT APL.
- 6.3. Undergo an on-site evaluation conducted by MCS&T or Approved consultants to verify compliance with material standards and storage practices.
- 6.4. Initial and annual evaluations are guided by criteria in Section 9 where applicable, including compliance with shipping policies and technical specifications.
- 6.5. MCS&T personnel will document evaluation findings in an inspection report. Approved suppliers will be assigned a laboratory approval number, which becomes the APL number.
- 6.6. Suppliers removed from the approved source list for non-compliance may reapply after one year, provided corrective measures are implemented.

7. ACCEPTANCE PROCEDURES (NON-APPROVED SOURCE)

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

8. DOCUMENTATION

- 8.1. The approved source list for sewer and waterline materials will be updated as new producers/suppliers are added or removed.

9. EVALUATION CRITERIA FOR SEWER AND WATERLINE MATERIAL SUPPLIERS

- 9.1. Establish if the supply location is a business or a storage facility. Is the location primarily a storage yard, or does it include an office building with personnel capable of sales inquiries?
- 9.2. Determine if the location supplies industrial-quality sewer and waterline materials or residential-grade products. Does the supplier primarily cater to industrial and municipal applications?
- 9.3. Determine whether the supplier operates as a wholesaler, retailer, or both. Assess whether the location primarily provides materials for business-to-business transactions or serves retail customers.

- 9.4. Inform sales personnel that materials supplied, such as ductile iron pipe, valve boxes, and plastic pipe (poly),ect. must come from established APL ([Approved Products List](#)) sources and where to find these lists online.
- 9.5. Inform sales personnel of shipping procedures. Documents must include laboratory approval numbers, CID numbers for direct coverage, and tracking numbers. For approved sources, APL numbers must be included for WVDOT District personnel.
- 9.6. Inform sales personnel on materials subject to "Buy American" requirements.
- 9.7. An outside and inside inventory evaluation of materials to identify those covered by their own APL versus those not covered. Ensure that sales personnel are aware of which materials require additional certifications or approvals.
- 9.8. Inform sales personnel how to manage backordered, partial, or drop-shipped materials and the proper procedures for sourcing from other approved producers/suppliers.
- 9.9. Ensure that all sewer and waterline systems meet the requirements of applicable WVDOT specifications, such as those outlined in Section 718.
- 9.10. To ensure that all valves, hydrants, and related hardware comply with AWWA standards (e.g., C500, C502)
- 9.11. Confirm that polyethylene pipes, copper service lines, and other specialty items meet ASTM and AWWA standards
- 9.12. To confirm that all steel casing pipes, valves, and water meters comply with applicable AWWA and ASTM standards (e.g., ASTM A53, AWWA C700), ensuring suitability for the project's specifications.

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

MATERIALS PROCEDURE

**QUALITY ASSURANCE OF LAMINATED ELASTOMERIC BRIDGE BEARING PADS
WITH INTERNAL SHIMS**

1. PURPOSE

- 1.1. To set forth the procedures which govern the Quality Assurance testing of laminated (with internal shims) elastomeric bridge bearing pads.
- 1.2. To set forth manufacturer's Quality Control requirements.
- 1.3. To set for acceptance procedures.
- 1.4. To set forth documentation and shipping procedures.

2. SCOPE

- 2.1. This procedure will apply to all manufacturers of laminated elastomeric bridge bearing pads.
- 2.2. This procedure will establish the basis for acceptance of laminated elastomeric bridge bearing pads.
- 2.3. This procedure will establish MCS&T Division's acceptance test procedures of laminated elastomeric bridge bearing pads.
- 2.4. This procedure will establish accepted dimensions of sample size submitted to MCS&T.

3. REFERENCED DOCUMENTS

- 3.1. All standard types of elastomeric bridge bearing pads with shims are to be manufactured and tested in accordance with Sections 715.14, of the WVDOH Specifications for Roads and Bridges.
- 3.2. Each production lot of laminated elastomeric bearing pads shall be tested and conform to AASHTO M251, section 4 and WVDOT Roads and Bridges 2024, specification 106.3, and specification sub-section 715.14.1

A production "LOT" is defined as follows:

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

Commented [MM1]: Need to come up with an MP number for this MP.

Commented [JG2]: 715.014.01 was selected. Added proper page number, and date as per MP platform

Commented [MM3]: Is this for Plain and Elastomeric Pads or Pads with and without shims?

Commented [JG4]: This is for Elastomeric with internal shims only. Plain pads are accepted via certification documentation as per specification 715.14.2

Commented [MM5]: What about Plain bearing pads? Need to include that if it's going to be referenced in the title. Also, need to explain the difference between Plain and Elastomeric bearing pads. I don't see Plain Bearing Pads outlined in the Specs, just Elastomeric Bearing Pads.

Commented [JG6]: Reference title changed to Elastomeric Bearing Pads with Shims (Laminated).

Commented [JG8]: Changed format to Referenced Documents

Commented [MM7]: I think the format that Dan is currently using for all of the MPs has this section titled as "Referenced Documents".

Commented [MM9]: A spec change will also need to be written that references this MP in Sections 715.14 & 715.15. Also, 715.14 needs to include which AASHTO standard the pads need to meet. Also, by referencing 715.5, we are including bearing pads for bridge railing posts. Is that the intent?

Commented [JG10]: This MP was intended for Laminated Bearing Pads with internal shims only. 715.15 reference has been removed.

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

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

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

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

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

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

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

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

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

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

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

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

4. SAMPLING AND TESTING FREQUENCY FOR LAMINATED ELASTOMERIC BEARING PADS

5. QUALITY CONTROL REQUIREMENTS

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

Commented [MM11]: Need to define LOT. How many pieces, batch, days of production, etc.

Commented [JG12]: Included LOT definition as per WVDOT specification 106.3 and AASHTO M251, section 4

Commented [MM13]: Reject the pad or the entire LOT?

Commented [JG14]: Bearing sample only, changed to reflect

Commented [GH15]: Should we not reject the entire lot?

Commented [JG16]: Yes sir, changed to lot

Commented [MM17]: How many samples per LOT?

Commented [JG18]: Added quantity description, based on 106.3 and 715.14.1 specifications

Commented [MM19]: Original or Oven Aged?

Commented [JG20]: Added both original and oven aged to define

Commented [MM21]: This method isn't referenced in AASHTO M251. Is this a WVDOT specific requirement? If so, it's not currently required in our specs.

Commented [JG22]: Redacted. Cut and paste error.

Commented [MM23]: Looks like a letter is missing in front of this number.

Commented [JG24]: Appropriate letter designation added

Commented [JG26]: Typo was removed. Lot description was moved to 3.2 No table intended (typo)

Commented [MM25]: I don't see a table. Shouldn't this be in Section 3.2? What about Plain Bearing Pads?

- 5.1.1. Ensure all component materials used in fabrication of the bearing pads have been sampled, tested, and approved in accordance with WVDOH Standards and Specifications for Roads and Bridges (Section 715.14, and (ASTM M251).
- 5.2. Ensure quality workmanship as well as a quality product throughout production.
- 5.3. Each bearing pad shall be marked in indelible ink or flexible paint. The marking shall consist of order number, lot number, bearing identification number, up station, or face of abutment (tapered plates only) and elastomer type and graded. Unless otherwise specified in the contract documents, the marking shall be on a face that is visible after the bridge is erected.
- 5.4. Notify the Division's representative upon the completion of casting of a LOT (Refer to Table 1) of bearing pads so [MCS&T](#) may select a representative sample and witness the testing.
- 5.5. To conduct quality control tests in accordance with (ASTM M251).

6. ACCEPTANCE CRITERIA

[MCS&T](#) will:

- 6.1. Sample and test the component materials to be used in the manufacturer of laminated elastomeric bearing pads in accordance with WVDOH Standards and Specification Roads and Bridges Section (715.14, and 715.15) and ASTM M251.
 - 6.1.1. Select representative samples of the LOT to be tested and:
Representative sample shall be cut to dimensional size by the manufacturer as specified: representative sample shall be cut to dimension of no less than 5 inch-length and 2-inch width, but no greater than 7-inch length and 2.5-inch length. A total of (6) individual representative individual samples must be taken from the selected representative sample prior to the shipping process.
 - a) Witness [MCS&T](#) Division test sample selection to be shipped to the Division.
 - b) Ensure each piece comprising of the LOT is scribed as stated in 4.3

7. SHIPPING REQUIREMENTS

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

Commented [GH27]: Do we test these? These are for railing posts.

Commented [JG28]: Must have been cut and paste from a referenced document, it has been removed

7.1.1. The manufacturer will supply one copy of the shipping invoice to the [MCS&T](#) Division and one copy to the Division's representative at the project site. The invoice shall contain the following information.

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

8. ACCEPTANCE PRACTICE

8.1. [MCS&T will](#) Ensure the information on the shipping invoice, as required in section 6.1.2, agrees with the shipment it accompanies. (Number of pieces, size, type, etc.).

8.2. [MCS&T will](#) Check each sample of pad for the proper identification markings (Section 6.1.2) and make a visual inspection of each sample to ensure there is no evidence of damage during shipment.

9. DIVISIONAL TESTING PROCEDURE

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

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

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

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

9.2. Sample Cutting- Tensile and Elongation Sets

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

- 9.2.2. Once the specimens have been cut, clean the specimens with water. After cleaning, the specimens must be set in the specified lab condition at least 1 hour at $23 \pm 2^{\circ}\text{C}$ ($73.4 \pm 3.6^{\circ}\text{F}$) and at $50 \pm 5\%$ humidity.
- 9.2.3. After the proper conditioning time has been achieved, the specimens can now be cut on the arbor press with the barbell die (AASHTO ASTM D412 Method A). Do not cut more than one strip at a time. Do not pile the strips on top of each other to prevent cupping and deformation of the sample specimens.
- 9.2.4. A minimum of 10 total sample specimens must be cut for tensile and elongation testing. It is recommended to cut additional samples to ensure conformity of thickness of all samples selected.
- 9.2.5. Once cut, the specimens must be conditioned again in lab conditions for 3 hrs. at $23 \pm 2^{\circ}\text{C}$ ($73.4 \pm 3.6^{\circ}\text{F}$) and at $50 \pm 5\%$ humidity.
- 9.3. Thickness Measurements
 - 9.3.1. After the 3-hour conditioning in lab as specified in Subsection 9.2.4, the specimens shall be measured via thickness gauge. A total of 3 measurements shall be performed at the narrow section of the barbell specimen. All three readings must be within 0.003 inch of each measurement, or the specimen must be discarded.
 - 9.3.1.1. A minimum of 5 specimens closest to thickness shall be selected for original specimens (O), and a minimum of 5 specimens closest to thickness shall be selected for over aged testing (OA).
 - 9.3.2. Write down the measurements and select the middle reading of the 3 measurements. Record the thickness to be assigned to the specimen. This shall be marked on each individual specimen at one end of the specimen with a silver ink pen.
 - 9.3.3. On the opposite end of the specimen, the specimen should then be labeled O-1 through O-5, for original specimens. Additional specimens must be labeled OA-1 through OA-5 for over-aged specimens. Also label the specimen at this end with the last 2 digits of the sample lab number for identification. Record the thickness of the specimens under the original thickness, and oven aged thickness of the sample worksheet.
- 9.4. Oven Aging
 - 9.4.1. Oven Aged Specimens (OA) shall be conditioned in the oven at the recommended specifications per AASHTO D412. Natural rubber specimens shall be aged at $70 \pm 2^{\circ}\text{C}$, and Neoprene samples shall be aged at $100 \pm 2^{\circ}\text{C}$, for 70 hrs. in accordance with AASHTO ASTM D573.
 - 9.4.2. Oven Aged Specimens (OA) should be suspended above the oven floor from clips, also ensuring that the specimens are not in contact with each other during the oven aging process.

- 9.4.3. Once the 70-hour oven aging has completed, the samples must then be conditioned in the lab outside of the oven as per Subsection 9.2.5 for 3-hours.
- 9.5. Tensile and Elongation Test
- 9.5.1. Tensile and Elongation testing shall conform to AASHTO ASTM D412 Method A. All information shall be recorded on the worksheet. A minimum of three consecutive passing tests must be completed. In case of a failing sample, all 5 oven aged samples must be tested to meet the following test acceptance criteria:
 - a) Tensile Strength, minimum psi (AASHTO ASTM D412): 2250 psi combined median of all samples
 - b) Elongation at break, minimum % (AASHTO ASTM D412) 350% combined median of all samples
- 9.5.1.1. Once testing has been completed. All information must be recorded on the worksheet.
- 9.6. Compression Set
- 9.6.1. Compression set testing must conform to (AASHTO ASTM D395, Method B-Type 1)
- 9.6.1.1. Specimens for compression testing must be taken from the prepared test specimen strips as laid out in Section 9.2 of this MP, with the exception that compression set thickness strip minimal thickness should be a thickness of 0.100 inches.
- 9.6.2. Specimens should be cut at the arbor press with the circular die (ASTM D412). A minimum of 10 samples should be cut. Do not cut more than one strip at a time. Do not pile the strips on top of each other to prevent cupping and deformation of the sample specimens.
- 9.6.3. Specimens should then be conditioned as per Section 9.2.5 of this MP.
- 9.6.4. Once the minimum 3-hour conditioning as described in Section 9.2.5 is achieved, the samples can now be measured for thickness.
- 9.6.4.1. Using the thickness gauge, stack each specimen to achieve a total thickness of 0.5 ± 0.02 inches. A Total of seven specimens can be used to achieve the minimum 0.5-inch requirement. You may need to rearrange different sample discs to achieve the thickness requirement.
- 9.6.4.2. A total of two stacks should be created and labeled as Sample A, and Sample B, along with the last 2 digits of the lab number assigned to the sample. This should be marked with a silver pen to differentiate the samples. The original thickness shall be recorded on the worksheet.
- 9.6.5. Continue to prepare the compression set device.
- 9.6.5.1. Once sample original sample thickness is recorded, the samples can then be placed in the compression device. Both spaces must be present with the hole indicator facing, and the spacer thickness (0.375) stamp facing upward. Place talc on the bottom and top stack plates. And then secure the samples in between the plates. Note: make sure the spacers are properly in place before tightening the plates.

- 9.6.5.2. Once the samples are secured in the compression device, the sample can now be oven aged.
- 9.6.5.3. Place the device in the preheated oven. Natural rubber specimens shall be aged at $70 \pm 2^\circ\text{C}$, and Neoprene samples shall be aged at $100 \pm 2^\circ\text{C}$, for 22 hours.
- 9.6.6. After the 22 hours oven aging, the samples should be immediately removed from the compression device and then placed on a piece of wood for 30 minutes. Room must be within temperature and humidity tolerances $23 \pm 2^\circ\text{C}$ ($73.4 \pm 3.6^\circ\text{F}$) and at $50 \pm 5\%$ humidity.
- 9.6.6.1. Once the specimens have cooled, measure the thickness of both stack A, and stack B on the thickness gauge. Record the measurements on the worksheet. Calculate the percent of compression as follows:

$$(\text{Original Thickness} - \text{Final Thickness}) / (\text{original thickness} - \text{spacer size}) \times 100$$

The spacer is 0.375 in.

Calculation for average percent of compression

$$((\text{Percent of compression of A} + \text{Percent of compression of B}) / 2) \times 100$$

The compression set passes if the result is 35% or less of the original compression thickness, if the result is higher 35%, the sample fails the compression set.

- 9.7. Durometer Hardness
- 9.7.1. or the durometer test, unused sample blocks may be used. Measure the thickness of the rubber that is on the outside edge of the metal shim plates. If the rubber is at least 6.0mm (0.24 inches) thick, then that sample can be used. This sample will be needed for both original and oven aged durometer tests.
- 9.7.2. Sample must be in the specified lab condition tolerances of $23 \pm 2^\circ\text{C}$ ($73.4 \pm 3.6^\circ\text{F}$) and at $50 \pm 5\%$ humidity for 3 hours before testing is performed. Durometer device must also have been in lab condition tolerance for at least 12 hours prior to testing.
- 9.7.2.1. Place test sample on firm level surface with the outside layer of the pad facing up. Write the lab number on the surface with the silver pen. Place the durometer firmly on the surface and press firmly on the top of the durometer. Do not use excessive pressure as it may affect the durometer reading. Take a total of 5 readings across the surface of the sample. Make sure the readings are at least 6.0mm (0.24 inches) apart from each reading. Record each reading, and then determine the middle value of the five readings. This middle value shall then be recorded as the original durometer reading on the worksheet. The recorded durometer should be within ± 5 of the specification requirements of the material being tested. If outside the ± 5 range, then the durometer test shall be recorded as failing.
- 9.7.3. Prepare the oven for oven aged test

- 9.7.3.1. Preheat over for the following: Natural rubber specimens shall be aged at 70 ± 2 °C, and Neoprene samples shall be aged at 100 ± 2 °C, for 70 hours.
- 9.7.3.2. After the proper time has elapsed, allow specimen to cool at room temperature at the specified laboratory tolerances of 23 ± 2 °C (73.4 ± 3.6 °F) and at $50 \pm 5\%$ humidity for 3 hours. After cooling repeat the procedure as described in Subsection 9.7.2.1
- 9.7.3.3. To figure the durometer change, determine the difference between the oven aged durometer value and the original durometer value. Record the change on the work sheet, recording it as a plus or minus number. Natural rubber is allowed a maximum change of $\pm 10\%$ (5 for 50, 6 for 60, 7 for 70 durometer material). Neoprene is allowed to change to a maximum of $\pm 15\%$ (7.5 for 50, 9 for 60, 10.5 for 70 durometer material). If the durometer is within the allowable limit, then the sample meets specification requirements.

10. BEARING PAD SAMPLE TEST ACCEPTED BY CERTIFICATION

- 10.1. On a case-by-case basis, sample test results not performed by the division as described in Section 9 of this MP may be accepted by the certifications of the manufacturer for the following:
 - a) Rubber Deterioration in Ozone (ASTM D1149)
 - b) Low Temperature Brittleness Test (ASTM C746)
 - c) Adhesion (ASTM D429)
 - d) Shear Modulus (ASTM 4014)
 - e) Low Temperature Crystallization (ASTM 4014)
 - f) Instantaneous Thermal Stiffening (ASTM 1043)
 - g) Oil Swell (ASTM D471)
 - h) Full size bearings more than 50lbs, and not exceed 8-inch width X 12-inch Length.
In accordance with this MP, the manufacturer is to prepare sample sizes as described in Subsection 5.1.2 (d) of this MP prior to shipment to the division. In rare occasions, full size bearings weighing more than 50lbs may be accepted per manufacturer certification of testing.
- 10.2. For the manufacturer described in Section 10.1 to be accepted, a full test report must be submitted to the division. The report must be notarized and submitted to the division for review and approval. The complete test report must be submitted prior to, or with the submitted test sample to the division. The report must include the following:
 - a) Company Letterhead
 - b) Laboratory Test Report Material Type (i.e. Natural Rubber, Neoprene)
 - c) Customer (i.e. Contractor, etc.)
 - d) Purchase Order #
 - e) Certification Date
 - f) Test Method Required and Results
 - g) Project Number
 - h) Project Authorization

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- i) Quantity
- j) Description of material
- k) Lot number
- l) notarization

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

MATERIALS PROCEDURE

GUIDE FOR QUALITY CONTROL AND ACCEPTANCE REQUIREMENTS
FOR SUPERPAVE ASPHALT MIXTURES

1. PURPOSE

- 1.1 To provide a method for daily monitoring and quality assurance of Superpave asphalt mixtures.
 - 1.2 To provide guidelines for adequate acceptance plans.
 - 1.3 To provide plant personnel with criteria upon which to base decisions of continuing or ceasing plant production.
 - 1.4 To provide field personnel with criteria upon which to base decisions of accepting or rejecting material.
 - 1.5 To provide an equitable and uniform method for determining price adjustments in those instances where adequate production control has not been maintained and non-specification material has found its way into the completed work.
-

2. SCOPE

- 2.1 This acceptance procedure shall be applicable to all Superpave asphalt mixture types relative to compliance with job mix formula (JMF) acceptance limits as specified in the governing specifications.
-

3. DEFINITIONS

- 3.1 Job Mix Formula – The specification for a single mix produced at a single plant. This mix may be used on a single project or on multiple projects if the basic design criteria (design compaction level and PG Binder grade) are the same.
- 3.2 Lot - The quantity of material represented by the average of four (4) consecutive test values.
- 3.3 Sublot – The quantity of material represented by an individual test value within the Lot.
- 3.4 Field Design Verification Samples and Tests - Those samples taken, and tests conducted by the contractor to verify that a mix design can be produced within the limits of the criteria set forth by this Materials Procedure. These samples are taken during the initial use of each mix design or whenever circumstances described in this MP require a new field design verification. These samples should not be confused

with the Division verification samples that are used to determine specification compliance.

- 3.5 Quality Control Samples and Tests - Those samples taken and tests conducted by the Producer/Contractor to monitor and control the production of this product.
- 3.6 Verification Samples and Tests - Those samples taken and tests conducted by the Division to determine specification compliance.

4. DOCUMENTATION

- 4.1 The Contractor shall maintain adequate records of all testing and records of any production changes required to control their product. The records shall indicate the nature and number of observations made, the number and types of deficiencies found, and the nature of corrective actions taken. The Contractor's documentation procedures will be subject to the review and approval of the Division and shall be available to the Division at any time during the progress of the work being performed.
- 4.2 Forms and Distribution: All test data shall be documented on forms provided by the Division. The original copy of the form shall be delivered to the District Materials Supervisor. One copy of each completed form is to be retained by the contractor until the project is completed. Testing shall be conducted using only the approved test methods listed in Section 401.5.1 of the Specifications unless specified otherwise in contract documents. Asphalt content and gradation test results shall be recorded on form T417. Mix design property test results shall be recorded on form T419. To maintain an effective quality control program, tests shall be completed in a regular and timely manner. If QC test results are not completed and submitted within 2 working days, the Division will reserve the right to stop further production until tests are completed, submitted, and reviewed by District Materials staff. Field design verification test results must be performed and submitted daily during production.
- 4.3 The Contractor shall take prompt action to correct conditions that have resulted, or could result, in the submission to the Division of materials and products that do not conform to the requirements of the applicable Specifications, Materials Procedures, or Contract documents. The Contractor shall establish a detailed plan of action regarding the disposition of non-specification material. In the event that non-specification material is incorporated into the project, the Division shall be notified immediately.
- 4.4 All asphalt mixture component materials shipped to the plant must have proper documentation which identifies the type and source of each material. This information shall be made accessible to the Division for review at any time.

5. JOB MIX FORMULA FIELD DESIGN VERIFICATION

- 5.1 For each JMF, a field design verification shall be conducted during the first days of plant production for the purpose of demonstrating that the mix can be produced within the specified tolerances set forth in this MP.

- 5.2 This field design verification shall consist of a randomly selected HMA sample taken in accordance with AASHTO T 168 for each three hours of production, with no more than three samples in one day. A minimum of three samples are required for verification, however, three additional samples are required if none of the first three samples are completely within the specification limits. Samples used for gradation analysis during the verification process shall be obtained from the asphalt ignition oven samples (AASHTO T 308). If there is a problem with major aggregate breakdown affecting the gradation test results when using the ignition oven, gradation samples may be obtained from hot bins, cold feeds, or extracted HMA samples.
- 5.3 Field design verification testing shall not be conducted if less than 200 tons of material is to be produced in a single day. In such cases daily quality control testing shall be conducted in accordance with Section 6.0 and the sample shall meet the gradation requirements set forth in Table 401.02.29B. The sample shall also meet the design asphalt content within $\pm 0.4\%$, and a minimum VMA of 0.5% below the design criteria, ~~and the VFA design criteria specified in MP 401.02.28.~~
- 5.4 The percent air voids shall be within the range of 2.8 – 5.2 percent.
- 5.5 The field design verification mix property requirements are listed in Table 401.02.29A. Field design verification test results shall be documented on Form T 419.

TABLE 401.02.29A: Mix Property Field Design Verification Requirements

Property	Field Verification Tolerances
Asphalt Content (%)	JMF $\pm 0.4\%$
Air Voids (%)	3.0 – 5.0 %
Voids in Mineral Aggregate (VMA) %	Min. of 0.5% Below Design Criteria

- 5.6 Gradation requirements for the field design verification samples shall be as indicated in Table 401.02.29B. The gradation results shall fall within the limits of each listed control point with the exceptions as noted on the 2.36 mm (No. 8) sieve. The gradation must also pass beneath the restricted zone as described in Table 401.02.29B. Gradation results for all sieves listed in this table for each mix type shall be documented on Form T 421.
- 5.7 After each of the field design verification samples are tested, the results shall be evaluated to determine conformance to the requirements of Tables 401.02.29A and 401.02.29B. If any test results fall outside the allowable tolerance limits, then steps must be taken to make any necessary production adjustments to bring the mix back to within specification limits. If, after three samples the design criteria and gradation requirements of at least one of the samples is within all of the allowable tolerance limits then verification of the design is complete. If the criteria are not met, then three additional samples shall be tested. If, after six samples, the Division determines that

the mix cannot be produced within specification limits, the mix design shall be rejected, and a new mix design will be required. If the mix design is rejected the average percent asphalt and the average percent air voids of the six verification samples shall be determined. If either or both average values are

outside the allowable tolerance limits of Table 401.02.29C then the material represented by these samples shall have its price reduced in accordance with the schedule set forth in Section 7.0. District Materials shall notify MCS&T immediately upon the rejection of any mix design.

TABLE 401.02.29B: Design Aggregate Gradation Requirements (Note 1)

Nominal Max. Size	37.5 mm (1 ½ inch)	25 mm (1 inch)	19 mm (¾ inch)	12.5 mm (½ inch)	9.5 mm (⅜ inch)	Gradation Tolerances Shall Be The Design
Standard Sieve Size	Base-I		Base-II (P&L) Wearing-IV		Wearing-I (Scratch)	Control Points With Exception As Noted Below
50 mm (2")	100.0					-
37.5 mm (1½")	90.0 – 100.0	100				-
25 mm (1")	90.0 max	90.0 – 100.0	100.0			-
19 mm (¾")		90.0 max	90.0 – 100.0	100.0		-
12.5 mm (½")			90.0 max	90.0 – 100.0	100.0	-
9.5 mm (⅜")				90.0 max	90.0 – 100.0	-
4.75 mm (No.4)					90.0 max	-
2.36 mm (No.8)	15.0 – 41.0	19.0 - 45.0	23.0 - 49.0	28.0 - 58.0	32.0 - 67.0	JMF ± 6
1.18 mm (No.16)						-
600 µm (No.30)						-
300 µm (No. 50)						-
75 µm (No.200)	0.0 - 6.0	1.0 - 7.0	2.0 - 8.0	2.0 - 10.0	2.0 - 10.0	-

Sieve Size	Restricted Zon :					
	37.5 mm (1 ½ inch)	25 mm (1 inch)	19 mm (¾ inch)	12.5 mm (½ inch)	9.5 mm (⅜ inch)	
4.75 mm (No.4)	34.7	39.5				Mix gradation 45 power plot must fall below the restricted zone
2.36 mm (No.8)	23.3 - 27.3	26.8 – 30.8	34.6	39.1	47.2	
1.18 mm (No.16)	15.5 - 21.5	18.1 – 24.1	22.3 - 28.3	25.6 – 31.6	31.6 - 37.6	
600 µm (No.30)	11.7 - 15.7	13.6 - 17.6	16.7 - 20.7	19.1 – 23.1	23.5 - 27.5	
300 µm (No. 50)	10.0	11.4	13.7	15.5	18.7	

Note 1: Allowable tolerances for each JMF shall be the specified design control points shown in Table 401.02.29A with the exception as indicated on the 2.36 mm (No.8) sieve. These tolerances shall be applied to both the field verification testing of the JMF and the daily contractor quality control testing. The gradation of the mix shall also continue to pass beneath the restricted zone.

- 5.8 Volumetric production targets shall be established at the end of the field design verification process. The production target asphalt content shall be selected at a value within ± 0.2 % of the approved design asphalt content using the results of the field verification testing to determine the appropriate value. The VMA production target shall be determined from the field verification test data at a value which also provided an air void content that was at or near the JMF target air void content. This VMA value may be adjusted to optimize the ± 1.0 % tolerance of Table 401.02.29C if the result is near the minimum allowable requirement. ~~The production target for VFA shall be~~ reported for informational purposes only ~~the limits of the design criteria~~. The production target for air voids shall remain at 4.0 %.
- 5.9 When new plant production targets are established from the field verification process, a new target maximum density shall also be determined for compaction control by averaging the maximum density results of all of the samples used for verification of the mix. The District shall forward the verification test data to MCS&T Division.
- 5.10 An approved mix design (JMF) may be used on other projects during the year without reverification if all of the mix design criteria are the same.
- 5.11 The maximum allowable blend change for a mix design shall be ten percent on any single aggregate component. If an aggregate blend change of more than five percent on any single aggregate component is required, the Contractor shall evaluate the mix to determine whether the volumetric properties, FA ratio, and aggregate properties (coarse and fine aggregate angularity, clay content, and flat and elongated particles) are adversely affected by the change in blended aggregates. The Contractor shall also determine whether the aggregate gradation still passes between the control points and beneath the restricted zone. The calculations used in this evaluation shall be provided to the District. The District shall review and verify the results of this evaluation. If

the District determines any of the abovementioned properties are adversely affected by the blend adjustment, they may revoke the change in the JMF. If the JMF volumetric properties cannot be

maintained without these changes, then the contractor will be required to provide a new mix design.

- 5.12 After the field design verification has been successfully completed and quality control testing (as described in Section 6.0) has begun, the Contractor shall monitor the maximum specific gravity of the mix for any consistent change. If, over a five-sample period, there is an average change in the maximum specific gravity of ± 0.02 or greater from the verified value of the mix then a field design reverification may be required. A reverification shall not be conducted if the averages of the percent% asphalt, percent% air voids, and percent% VMA, ~~and % VFA~~ of the five quality control samples do not meet the requirements of Table 401.02.27C. The District will review the Contractor's test data, compare it to their verification sample test data, and determine if a reverification is necessary. If the District determines that a reverification of the mix is needed, a new blended aggregate bulk specific gravity shall also be determined for the mix before the field reverification begins. The District will forward the reverification and bulk aggregate specific gravity test results to MCS&T Division.
- 5.13 All approved mix designs shall be reverified on the first project on which they are used in any subsequent years as long as there are no changes to the design specifications that would require a new mix design. In addition, the blended aggregate bulk specific gravity shall be determined before reverification begins.

6. QUALITY CONTROL REQUIREMENTS

- 6.1 After the field design verification has been successfully completed, quality control sampling and testing shall begin. If production is to continue for four hours or more after the last field design verification sample was taken, then the first randomly selected quality control sample shall be taken within that remaining time period. If production continues for less than four hours after the last field design verification sample was taken, then the first randomly selected quality control sample will not be required until the next production day.
- 6.2 The material produced shall conform to the verified plant production target values established and controlled within the tolerances of Table 401.02.29C. The aggregate gradation shall conform to the requirements of Table 401.02.29B.
- 6.3 Adjustments to the accepted JMF aggregate proportions shall be made only for the purpose of maintaining the gradation requirements of Table 401.02.29B and/or the design properties of Table 401.02.29C. The maximum allowable adjustment shall be as indicated in Section 5.10. The minimum sample requirements of the approved quality control plan will be sufficient when the allowable adjustments are made as a result of deficient or borderline test properties of the previous test sample.

TABLE 401.02.29C: Quality Control Mix Property Tolerances

Property	Production Tolerances
Asphalt Content (%)	Verified JMF $\pm$ 0.4 %
Air Voids (%)	4.0 $\pm$ 1.2 %
Voids in Mineral Aggregate (VMA) %	Verified JMF $\pm$ 1.0 % with a minimum of 0.5% below the minimum design criteria

- 6.4 If the previous test sample meets all specification requirements, but the Contractor later determines that the gradation of the material entering the plant has changed, then an aggregate proportion adjustment up to two percent will be allowed without requiring an additional test sample. However, if more than one such change is made during the production day, then an additional test sample beyond that specified in the approved quality control plan will be required for each adjustment.
- 6.5 Minimum Sampling and Testing Frequency: During each day of plant production a minimum of one sample shall be taken for production periods of six hours or less. When the production period exceeds six hours, a minimum of one sample for each half of the production period shall be taken. If the production period exceeds twelve hours, a third sample shall be taken. The Contractor's sampling frequency shall be in accordance with their approved Quality Control Plan.
- 6.6 For the purpose of administration, the quantity of material represented by an individual test shall be determined as follows: the first sample taken after the field design verification has been approved shall represent the quantity produced from the beginning of production after field design verification until the time the sample was taken. The second sample shall represent the material produced between the time that the first and second samples were taken and so on. The last sample taken prior to a halt in production under a given JMF shall represent that quantity of material produced from the time that the next to last sample was taken until production was stopped. Sampling and testing for evaluation of compliance with the verified JMF shall be as follows: Obtain a sample large enough for determining the percent asphalt, percent air voids, percent VMA, and gradation of the mix in accordance with the specified test methods listed in Section 401.5.1 of the Specifications. If excessive aggregate breakdown in the ignition oven prevents proper gradation analysis, aggregate samples may be obtained from hot bins, cold feeds, or extracted HMA samples. The VFA calculation shall be conducted for informational purposes only.
- 6.7 A four-sample average shall be used for the purpose of determining whether or not the material meets specification requirements. The test results of the first four samples shall be averaged. After the fifth sample is taken a four-sample moving average shall begin. This first moving average shall consist of the average of the second through fifth test samples. Each time a new sample is taken a new moving average shall be

calculated by averaging the new sample with the previous three samples. The moving average shall continue through a single paving season (one calendar year).

- 6.8 In cases where production is limited and less than four samples of the specified mix design are taken, then the average shall consist of the total number of samples taken during the paving season in accordance with the Quality Control Plan. A new four sample average shall be established at the first startup of a new paving season after the field design verification has been completed.
- 6.9 The Contractor shall maintain control charts for percent asphalt, percent air voids, and percent VMA, ~~and percent VFA~~. These control charts shall be prepared in accordance with the guidelines of MP 300.00.51. As an alternative method, the control charts may be prepared with a personal computer using software that can generate such charts and provide a distinct graphic representation of all data points. Data points required on the control charts are the daily individual Contractor quality control tests, district verification sample tests, and the moving average of every four Contractor quality control tests. ~~A VFA data points shall be calculated to the nearest one percent and all other~~ data points shall be calculated to the nearest 0.1 percent.
- 6.10 For hand drawn charts, the quality control test data points shall be represented by a small blue circle symbol "O" and connected by a dashed line. The four-sample moving average data points shall be represented by a small red square symbol "■" and connected by a solid line. District verification sample test data points shall be represented by a small red circle symbol "O" but shall not be connected. The upper and lower tolerance limits of the test properties which were established through the field design verification described in Section 6.0 shall be represented by solid horizontal lines.
-
- 6.11 If the computer-generated control chart cannot be produced using the symbols and lines described above, then a graph legend shall be included which shall indicate the graphic symbols used to represent the required data points and lines.
- 6.12 The quality control charts shall be updated daily and placed in a location that is easily accessible to the Division for review at any time.

7. DEGREE OF NONCONFORMANCE

- 7.1 Should the four-sample average of test values for percent asphalt, percent air voids, or percent VMA, ~~or percent VFA~~ fall outside the verified JMF tolerances by more than the allowable deviation of Table 401.02.29C then production shall be halted until the Contractor takes necessary steps to bring production under control. Production shall also be halted if three consecutive aggregate gradation tests fall outside the tolerance limits of Table 401.02.29B. Actions taken by the Contractor to bring production back in control shall be documented in the plant diary.

- 7.2 When the four-sample average of the Contractor's quality control tests for percent asphalt and/or percent air voids falls outside the JMF tolerances of Table 401.02.29C, the Sublot of material represented by the last individual test value in the moving average shall have its price reduced in accordance with the schedule set forth in Section 7.3. In the case where the average is nonconforming and the last tested Sublot is conforming, then there would be no price adjustment.
- 7.3 The degree of nonconformance shall be determined using the following relationship:

When the moving average is greater than the upper control limit

$$Q_U = X_n - UL$$

When the moving average is less than the lower control limit

$$Q_L = LL - X_n$$

Where Q_U = Percent of non-conformance at Upper Limit

Q_L = Percent of non-conformance at Lower Limit

UL = Upper Limit LL

LL = Lower Limit

X_n = Average of four consecutive test values (less than four when production is limited)

If it is decided by the Division that the material is allowed to remain in place, then the Sublot shall have its price reduced in accordance with Tables 401.02.29D and/or 401.02.29E, as applicable.

TABLE 401.02.29D: ADJUSTMENT OF CONTRACT PRICE FOR MIX NOT WITHIN TOLERANCE LIMITS OF PERCENT ASPHALT

QU or QL	Percent of Contract Price to be Paid
0.0	100
0.1	98
0.2	96
0.3	92
Greater Than 0.3	*

* The Division will make a special evaluation of the material and determine the appropriate action.

TABLE 401.02.29E: ADJUSTMENT OF CONTRACT PRICE FOR MIX NOT WITHIN TOLERANCE LIMITS OF PERCENT AIR VOIDS

QU or QL	Percent of Contract Price to be Paid
0.0	100
0.1	98
0.2	96
0.3	92
Greater Than 0.3	*

* The Division will make a special evaluation of the material and determine appropriate action.

- 7.4 Should the moving average of both the test properties for the same Sublot fall outside of the JMF tolerance, thus resulting in a reduced price for each, then the following procedure shall be used. The quantity of material represented by the last Sublot in the moving average will have an adjusted unit price which is the product of the original price times the percent as a result of non-conformance of the first test property times the percentage unit price as a result of non-conformance of the second test expressed in the following formula.

$$AUP = OUP \times PUPAC \times PUPAV *$$

Where:

AUP = Adjusted Unit Price

OUP = Original Unit Price

PUPAC = Percent Unit Price as a result of Asphalt Content Analysis expressed as a decimal

PUPAV = Percent Unit Price as a result of Air Void Analysis expressed as a decimal

* PUPAC and PUPAV are used in the formula as needed as a single non-conforming item or together for both non-conforming items as shown.

- 7.5 A new moving average shall start with the fourth sample that is taken after production is resumed (less than four when production is limited). If, at any time, the Division determines that a mix cannot be consistently produced within the tolerance limits of the verified design properties, approval of the mix may be revoked, and the contractor will be required to provide a new mix design.

8. SMALL QUANTITY TESTING

- 8.1 If project activities are such that not more than 75 tons of a specific mix design are being produced per day during the period of an entire calendar week, then the following small quantity testing requirements shall apply.

- 8.2 If the plant has a current inspection and approval by District Materials and has successfully verified the mix design being produced, then the minimum quality-control sample requirements shall be one sample per week. The sample shall be taken on the first day of use during the week. If the plant has not verified the mix design being produced and quantities do not meet the minimum threshold for verification sampling, then the normal testing requirements of this MP shall apply.

9. DIVISION VERIFICATION SAMPLING AND TESTING

- 9.1 Verification testing of asphalt mixtures is the responsibility of the Division. Quality control tests conducted by the Contractor may be used as a part of the verification process. The Division shall sample and test for applicable items completely independent of the contractor at a frequency equal to approximately ten (10) percent of the frequency for testing given in the approved QC Plan. Witnessing the contractor's sampling and testing activities may also be a part of the acceptance procedure, but only to the extent that such tests are considered "in addition to" the ten (10) percent independent tests.
- 9.2 The verification samples taken by the Division will be statistically evaluated for similarity to the Contractors' quality control tests in accordance with the guidelines of MP 700.00.54. If the evaluation indicates that the Division's test results are similar to the Contractor's test results, then the material represented by this evaluation will be considered acceptable. Those properties to be evaluated, as referenced in MP 700.00.54, will consist of percent asphalt, percent air voids, and gradation. In addition, the VMA ~~and VFA~~ test results will be evaluated using the guidelines of MP 700.00.54.
- 9.3 If a dissimilarity is detected, an immediate investigation will be conducted to determine the cause. The intent of the investigation is to define and correct any testing deficiencies that may cause a misrepresentation of the tested material.

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

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 set up 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 [AASHTO Publications Style Manual and Process Guide](#)¹, current edition.
 - 2.2 [Using SI Units in ASTM Standards: A Guide to Form and Style for ASTM Standards, Part H](#)²
 - 2.3 [WVDOH Design Directives DD-105](#)³
 - 2.4 ASTM E29 - Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications.
-

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.
 - 3.1.3 The third set (two digits) is defined by this Division thus:
 - 1. .00 - .09 Field Sampling
 - 2. .10 - .19 Pre-sampling (Source or Intermediate Points)
 - 3. .20 - .29 Testing
 - 4. .30 - .39 (For future designation)
 - 5. .40 - .49 Inspection
 - 6. .50 - .59 Quality Assurance System

¹ <https://materials.transportation.org/>

² <https://sn.astm.org/rules-and-regs/using-si-units-astm-standards-nd12.html>

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

- 7. .60 - .69 Reporting (laboratory)
 - 8. .70 - .79 Reporting (issuance under master control)
 - 9. .80 - .89 (For future designation)
 - 10. .90 - .99 Miscellaneous
-

4. COMMON DEFINITIONS

- 4.1 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 WVDOH 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 and Special Provisions, 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 Should: When referring to a rule or provision, indicates that said rule or provision is not mandatory, but is recommended as part of good practice.
 - 4.3.5 Shall: When referring to a rule or provision, indicates that said rule or provision is mandatory.
 - 4.3.6 WVDOH project: When referring to any construction project in the state that is governed by the Specifications, the term to be used is “WVDOH project(s).”
 - 4.3.7 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.
 - 4.3.8 Chief Engineer: When referring to the final approving entity, the term “Chief Engineer” shall be used based on the WVDOH org chart.
 - 4.3.9 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.
 - 4.3.10 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 choose to do so.
 - 4.3.11 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.
 - 4.3.12 All other Divisions shall be spelled out once and then given an appropriate abbreviation. For example, Engineering Division “Engr Division”

- 4.3.13 APL: When referring to MCS&T Approved Product List, the term to be used is “APL”, with all letters capitalized.
- 4.3.13.1 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”.

5. UNITS

- 5.1 For units each champion has the option of using solely SI, or both SI and Imperial (combined units) as the standard.
- 5.2 When writing a procedure, the following two statements govern:
- 5.2.1 For solely SI, the values stated in SI are to be regarded as standard. No other units of measurement are included.
- 5.2.2 For combined units, the values stated in either SI or Imperial are to be regarded separately. The value stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance.
- 5.2.3 When providing a sample calculation or an example of a filled form, the champion may choose to use any single unit system.
- 5.2.4 When converting units, rounding shall be performed as specified in ASTM E29-Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications.
- 5.2.4.1 In the instance of length measurement, inches and feet shall be rounded to the nearest 5 mm. For example, 1 foot or 12 inches is 305 mm.
- 5.3 An example of the unit syntax is as follows:
- 5.3.1 The distance between the earth and moon is 238,900 mi (384,400 km).
- 5.3.2 The cylinder shall be 6 in (150 mm) x 12 in (305 mm).

6. FORMAT GUIDELINES

- 6.1 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](https://downloads.transportation.org/Publications/aashto_style_manual.pdf)⁴. These guidelines are further refined in this document.
- 6.1.1 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.
- 6.1.2 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 https://downloads.transportation.org/Publications/aashto_style_manual.pdf

- 6.1.3 Links shall be [blue and clickable](#)⁵. 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.
- 6.1.3.1 Any instances of an email address shall also be clickable and adhere the guidelines for a link.
- 6.1.4 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.”
- 6.1.4.1 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.

7. HEADER GUIDELINES

- 7.1 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.
- 7.1.1 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.
- 7.1.2 All MPs shall contain headers in the 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

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

- 7.1.4 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

- 7.1.4.1 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.

8. MP APPROVAL PROCESS

- 8.1 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.
- 8.2 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 committee may vote to recommend or reject the proposed document. 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 Administration (FHWA). Once the document is affirmed by FHWA, the document is posted and distributed. If any comment is received during the approval process, the document is cycled back to the MP Committee meeting for review and another approval vote.
- 8.2.1 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.
- 8.2.2 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 Technical Support Webpage](https://transportation.wv.gov/highways/TechnicalSupport/Pages/Design-Directives.aspx)⁶

9. RECONFIRMATION PROCESS

- 9.1 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

⁶ <https://transportation.wv.gov/highways/TechnicalSupport/Pages/Design-Directives.aspx>

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.

- 9.2 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.
- 9.3 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.

10. POSTING AND DISTRIBUTION OF MPS

- 10.1 Active MPs are available on the [WVDOH MCST MP Webpage](#)⁷. The webpage shows the MP number, the title of the MP and the latest approval or reconfirmation date.
- 10.1.1 For each document (if applicable), an archived link is available to provide a documented history of updates. Figure 4 provides an example.

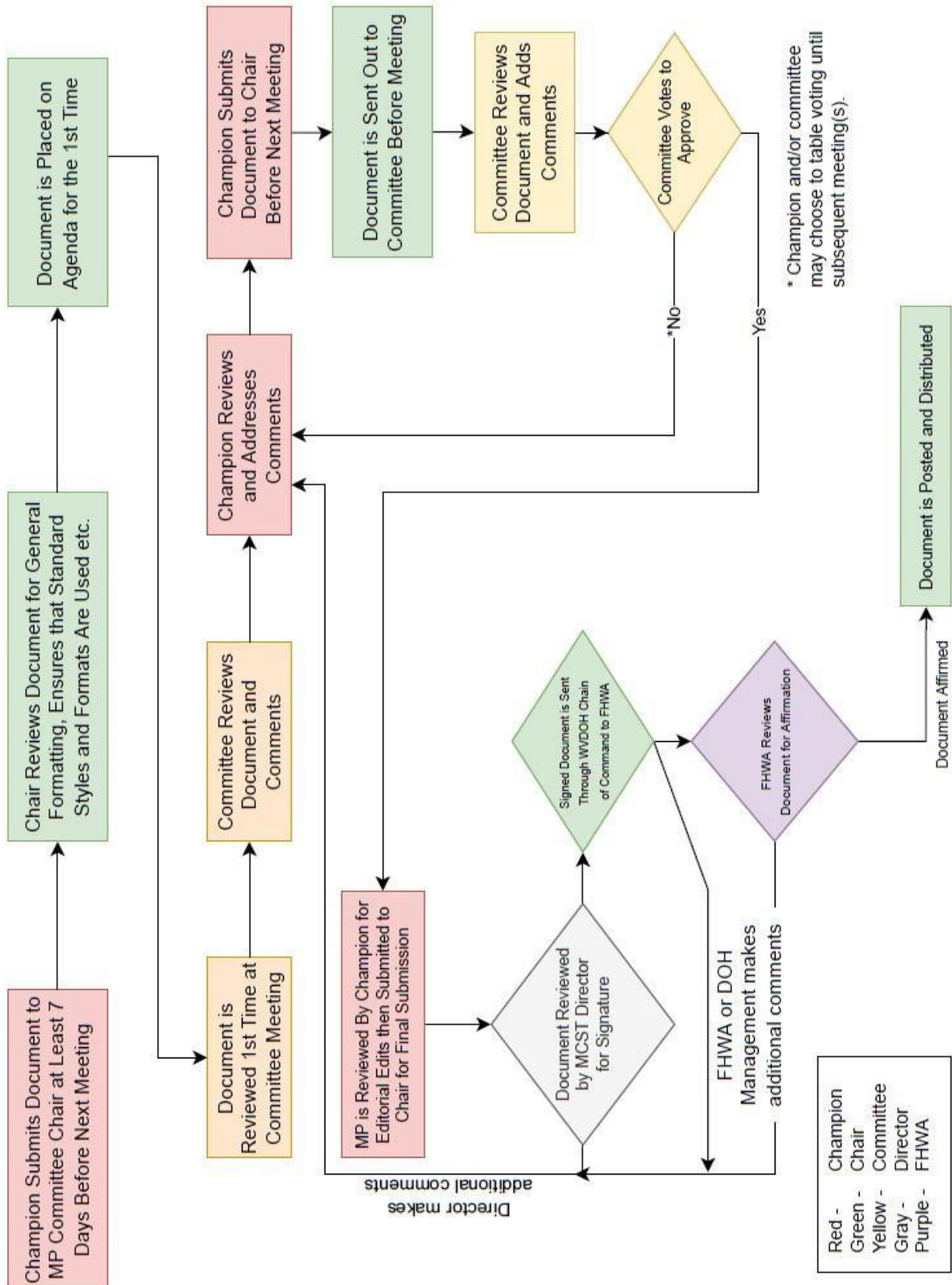
106.00.02	Procedure for Evaluation of New Products for Use In Highway Construction	November 2016
Archive		

Figure 4 – MP Committee Webpage Example

- 10.2 When a document is affirmed by FHWA, the documents will be distributed to applicable Division Directors, District Engineer/Managers and District Material Supervisors.

MP 100.00.00 Steward – Materials Control Section
MM:Bb
ATTACHMENT

⁷ <https://transportation.wv.gov/highways/mcst/Pages/WVDOH-Materials-Procedures.aspx>



ATTACHMENT 1 – MP Committee Meeting Flowchart