20240807 – August Specifications Committee Meeting

August Specifications Committee Meeting Agenda

Meeting Date
Wednesday, August 7, 2024 @ 9:00am
Meeting Location: Building 5, Conference Room 820, Technical Support Division Charleston, WV
Also meeting virtually via Google Meet video conference. E-mail distribution message includes instruction.

Approved Permanent Specification changes from last Committee meeting (04/03/24)

- **715.42.10.5-PVC-Coated, Galvanized Rigid Conduit:** Revision adds subsection to aid in the creation of APL and the materials finalization process.

Approved Project Specific Special Provisions (SP) from last Committee meeting (04/03/24)

- **SP636-Digital Speed Limit Trailer**

Items removed from Committee Agenda

- **None**

Old Business Items

SECTION	TITLE	DESCRIPTION
720	**720.3.2-Quality Assurance (QA) Testing** V. Allison	**5th time to Committee; discussed in December, February, April, and June.** Specification change to Section 720-Smoothness Testing. The revision updates the turnaround time for testing and the removal of Schedule 3 paving. Updates per comments at the last meeting; it is redline copy showing the revisions. Approval is expected in August.
	SP-Civil Rights and Labor (CRL) D. Ballard	**3rd time to Committee; discussed in April, and June.** The purpose of this SP is to notify contractors and subcontractors that they will be required to electronically submit certified payrolls and subcontractor payments utilizing the Civil Rights & Labor (CRL) module within the AWP system. The SP addresses CRL system requirements and access procedures, payroll submission/import methods, and subcontractor payment submission requirements. No update to the Special Provision. Approval is expected in August.

20240807 – August Specifications Committee Meeting

406	**SP406-High Friction Surface Treatment** K. Baranowski	**3rd time to Committee; discussed in April, and June.** The purpose of this SP is to include language as it should pertain to a bridge deck, specifically, and in-service bridge deck that has cracking. The SP addresses the widespread bridge deck cracking and then applies the High Friction Surface Treatment. Overall, this provides an overlay that includes high friction for safety purposes and takes care of the cracks. No update to Special Provision. Approval is expected in August.
106	**106.1-Source of Supply and Quality Requirements** J. Adkins	**2nd time to Committee, discussed in June.** Specification change to Section 106-Measurement and Payment. Updating Buy America requirements to correlate with new guidance from FHWA. The revision adds reference to the MPs and federal guidelines. Updates per comments at the last meeting; it is redline copy showing the revisions. Approval is expected in August.
109	**109.20.1-Electronic Ticket Delivery** G. Hanna	**2nd time to Committee, discussed in June.** Specification change to Section 109-Measurement and Payment. Revisions adds precast concrete products, pipe, and reinforcing steel to subsection. Updates per comments at the last meeting; it is redline copy showing the revisions. Approval is expected in August.
601	**SP601-Structural Concrete** A. Gillispie	**2nd time to Committee, discussed in June.** Project Specific Special Provision (SP) for Structural Concrete. The revision adds Class S concrete. No updates to Special Provision. Approval is expected in August.
701	**SP701-Expansive Hydraulic Cement** A. Gillispie	**2nd time to Committee, discussed in June.** Project Specific Special Provision (SP) for Hydraulic Cement. Revision adds Expansive Hydraulic Cement as a subsection. No updates to Special Provision. Approval is expected in August.

20240807 – August Specifications Committee Meeting

701	**701.5-Rapid Hardening Hydraulic Cements** A. Gillispie	**2nd time to Committee, discussed in June.** Specification Change to 701-Hydraulic Cement. The revision adds new subsection 701.5-Rapid Hardening Hydraulic Cement to the subsection. No updates to specification. Approval is expected in August.

New Business

SECTION	TITLE	DESCRIPTION
506	**506.3-Proportioning** A. Gillispie	**1st time to Committee.** Specification Change to 506-Concrete Pavement Repair. The revision adds a continuous mobile volumetric mixer as an option in lieu of a batch plant. The specification is redline copy showing the revision.
514	**514.4-Testing** A. Thaxton	**1st time to Committee.** Specification Change to 514-Roller Compacted Concrete. The revision updates AASHTO T23 to AASHTO R100. The specification is redline copy showing the revision.
603	**603.6.2.1-Class S-P Concrete Mix Design Testing.** A. Thaxton	**1st time to Committee.** Specification Changes to 603-Prestressed Concrete Members. The revision replaces the Rapid Chloride Test with the Surface Resistivity Test. The specification is redline copy showing the revision.
623	**623.2-Materials** K. Kukaua	**1st time to Committee.** Specification Change to 623-Pneumatically Applied Mortar or Concrete (Shotcrete). Revision updates the Materials Table in 623.2 to reflect the fibers being used for shotcrete being added in section 715 Fibers for Portland Cement Concrete. The dosage at which they pass these requirements will be the dosage required for application in the field. Additionally revised in the table is the subsection for Curing Materials. The specification is redline copy showing the revision.

20240807 – August Specifications Committee Meeting

655	**SP655-Matting for Erosion Control** J. Bailey	**1st time to Committee.** Project Specific Special Provision (SP) Matting for Erosion Control. This is an update to a previously approved special provision. The revision removes physical requirements such as consistency, Percentage Open Area (POA), and Unit Weight and Yield. The revision also adds acceptance from a manufacturer based on the test data of the product. The Special Provision is redline copy showing the revision.
708	**708.3-Joint and Crack Sealant, Hot-Poured for Concrete and Asphalt Pavements** S. Jack	**1st time to Committee.** Specification Change to 708-Joint Materials. The revision adds that hot-applied asphalt aggregate-filled materials shall be evaluated by AASHTO Product Evaluation and Audit Solutions and shall meet the requirements of ASTM D8260. The specification is redline copy showing the revision.
712	**712.4-Galvanized Steel Deep Beam Guardrail, Fasteners and Anchor Bolts** G. Hanna	**1st time to Committee.** Specification Change to 712-Guardrail and Fence. This is an update to a previously approved specification. The revision adds the MP reference. The specification is redline copy showing the revision.
715	**715.3-Fibers for Portland Cement Concrete** K. Kukaua	**1st time to Committee.** Specification Change to 715-Miscellaneous Materials. The specification change included the removal of requiring hybrid fibers, the alteration of the minimum required fiber reinforced cement properties was changed. All the values listed under the minimum required fiber reinforced concrete properties are connected, the minimum 25% residual strength ratio is a function of the flexural strength and the EFS value. In order to obtain the specified ultimate flexural strength at peak stress, the equivalent flexural strength number needed to be increased. The specification is redline copy showing the revision.

20240807 – August Specifications Committee Meeting

2024 Specifications Committee

The Specification Committee typically meet every other month; on the first Wednesday at 9:00am. 2024 meetings will be held in **February (2/7), April (4/3), June (6/12), August (8/7), October (10/2), and December (12/4).**

Calendar subject to change, updates will be given, as needed.

Deadline for new items & updates to these provisions is July 7, 2024.

If you are the 'champion' of any specification changes and/or project specific special provisions currently in the Specification Committee, it is your responsibility to edit/update/modify them in a timely manner per comments and discussion in Spec Committee. *Failure to submit updates may result in removal of item and/or delays.*

Comments

Comments are requested for Specifications Changes and Project Specific Special Provisions as they help in the decision-making process. Please send comments by Friday prior to the meeting!

Please Send Comments to either: **Dee.L.Begley@wv.gov** or **Janie.M.Adkins@wv.gov**

File Format Structure and Progression of items thru Specifications Committee

The purpose of the below protocol is to provide guidance on the file structure of Proposed Specifications & Project Specific Provisions as they progress through Specifications Committee. This procedure would facilitate a means of tracking changes from meeting to meeting as the agenda & provisions are posted publicly online on the Spec Committee website.

TYPES OF PROVISIONS:

There are three standard types of provisions typically discussed in committee:

1. **Specification Changes** – These are permanent changes to the WVDOH Standard Specifications.
    - Unless inserted into a project proposal, these changes typically go into effect in January (of subsequent year) with the Supplemental Specifications
2. **Project Specific Special Provisions (SP)** – Are applied to specifically designated projects.
3. **Updates to previously approved SP** – Changes/edits/updated to SP that have been approved by spec committee.

NEW BUSINESS ITEMS:

New items should be setup & submitted in the following format along with a brief overview of the item or reason for the change:

1. **Specification Changes** – Show as red-line copy (see note)
2. **Project Specific Special Provisions (SP)** – Will be shown in all black.
3. **Updates to approved SP** – Shown as red-line copy.

20240807 – August Specifications Committee Meeting

NOTE: Red-line copy is a form of editing which indicates removal or addition of text. You can redline a Microsoft Word document by using the built-in "Track Changes" feature or you can manually redline document with font color changes & strike-through.

OLD BUSINESS ITEMS:

Updated provisions that were discussed at the last committee meeting should be setup in the following format:

- Redline copy from prior meeting would not be shown.
- Redline copy of new changes/updates (from previous meeting)

PROGRESSION OF ITEMS THRU COMMITTEE AND APPROVAL:

Depending on how important the project and/or comments/discussion of item at previous meeting, then several things can happen in no particular order.

- Few comments/discussion/minor changes…will recommend approval of item at next meeting.
- A lot of comments/discussion…will not recommend approval at next meeting; item will be updated and reviewed again at the next meeting.
- SPs in committee may be used in advertised project. Hope to work to address comments & finish approving at subsequent meeting.

2023 Standard Specification Roads and Bridges

Print Version:

WVDOH Employees-contact us or stop by Technical Support

Industry-We have an order form on our webpage here:

- https://transportation.wv.gov/highways/TechnicalSupport/specifications/Documents/SpecBookOrderForm_20230925.pdf

2024 Supplemental Specifications

The 2024 Supplemental is posted on our webpage.

- https://transportation.wv.gov/highways/TechnicalSupport/specifications/Pages/default.aspx

DRAFT

~~May 2, 2024~~ July 2, 2024

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 720
SMOOTHNESS TESTING

REMOVE AND REPLACE THE CONTENTS OF THE ENTIRE SUBSECTION WITH THE FOLLOWING:

720.1-DESCRIPTION:

To measure and evaluate the ride quality of pavement surfaces in accordance with the International Roughness Index (IRI), as well as the most recent forms of AASHTO R-56, AASHTO M328, and AASHTO R-57.

720.2-EQUIPMENT:

720.2.1-High-Speed or Low Speed Inertial Profiler: Provide a high-speed or low speed inertial profiler for measuring and evaluating the ride quality of pavement surfaces. The inertial profiler shall be certified at a facility approved by the Materials Control, Soils and Testing Division (MCS&T). Certification facilities should conduct the evaluation in accordance with the most recent edition of AASHTO R-56 "Standard Practice for Certification of Inertial Profiling Systems". All inertial profilers shall be maintained in accordance with the most recent edition of AASHTO M 328 "Standard Specifications for Inertial Profiler" Calibration and verification shall be done in accordance with MP 720.10.0. The Contractor shall submit equipment certification documentation after becoming certified or after recertification. Proof of equipment certification shall be available upon request.

720.2.2-Inertial Profiler Operator Certification: Certification through the Material Control, Soils and Testing Division shall be required to operate an inertial profiler in the State of West Virginia. The operator shall pass a written exam administered by MCS&T. All operators receiving a passing score on the written exam will be placed on the WVDOH Materials Certification Directory that is found on the MCS&T webpage. Certification shall be for a period of three years. Certified operators shall contact MCS&T for certification renewal.

720.3-RIDE QUALITY TESTING:

720.3.1-Quality Control (QC) Testing: QC testing on ~~NHS routes~~ all eligible projects is the responsibility of the Contractor. QC testing is optional, but when performed shall be completed in accordance with MP 720.10.01 Section 8 and shall be completed no later than ~~fourteen (14)~~ thirty (30) calendar days after all lanes are continuously open to traffic. Data collection shall be done by a certified inertial profiler and certified inertial profiler operator (See 720.2.1 and 720.2.2~~,~~). Collected profile data shall be submitted to ~~the project engineer~~ the DOH MCS&T roadway inbox DOHMCSnTRoadway@wv.gov in accordance with MP 720.10.01 Section 10

within ~~five (5)~~ seven (7) calendar days of testing. Price adjustments will be calculated according to Contractor's QC data unless QA testing determines otherwise.

~~**720.3.2 Quality Assurance (QA) Testing:** QA testing is the responsibility of the Division. The Engineer shall submit a "Bridge and Pavement Testing Request Form" form to MCS&T via email, within five (5) calendar days after all lanes are continuously open to traffic. Within fourteen (14) calendar days from receiving the request, the Division will conduct QA testing. The Division will use a certified inertial profiler and certified operator for QA testing.~~

720.3.~~3~~2 Quality Assurance ~~Verification~~ (QA~~V~~) Testing: QA~~V~~ testing is the responsibility of the Division. ~~The Division's profile data and the Contractor's profile data will be compared to determine the IRI differences. Final project price adjustments will be made using the Contractor's profile data if the IRI differences are within the allowable limits outlined in Table 720.3.3.~~ The Engineer shall submit a pavement testing request form to MCS&T to the DOH MCS&T roadway inbox DOHMCSnTRoadway@wv.gov within five (5) calendar days after all lanes are continuously open to traffic. QA testing will be completed in accordance with MP 720.10.01 Section 8 and should be completed no later than thirty (30) calendar days after receiving the pavement testing request from the Contractor, or within 30 calendar days of the Contractor's QC test. In the event QA testing cannot be completed within thirty (30) calendar days of QC testing, price adjustments will be calculated solely based on QC data. If QC testing was not performed, then price adjustments will be calculated solely based on QA data regardless of time frame. The Division will perform testing using a certified inertial profiler and a certified inertial profiler operator in accordance with the most recent edition of AASHTO R 56 "Standard Practice for Certification of Inertial Profiling Systems".

720.3.3 QA Testing Comparison: The Division's profile data and the Contractor's profile data will be compared to determine the IRI differences. Final project price adjustments will be made using the Contractor's profile data if the IRI differences are within the allowable limits outlined in Table 720.3.3. If the QA testing IRI differences do not meet the maximum allowable difference from Table 720.3.3, QA testing data will be used for final price adjustments. This Comparison is only applicable if both profiles are completed within thirty (30) calendar days of each other.

TABLE 720.3.3
QA~~V~~ Testing Allowable IRI Differences

Contractor's IRI Mean (in/mi)	Maximum Allowable Differences
50.0 or Less	8.5% of Contractor's IRI Mean
50.1 to 150.0	6.0% of Contractor's IRI Mean
150.1 or Greater	7.0% of Contractor's IRI Mean

~~**720.3.4 Referee Testing:** Referee testing is the responsibility of the Division. If the QAV testing IRI differences does not meet the maximum allowable difference from Table 720.4.3, the Division will perform referee testing using a certified inertial profiler and a certified inertial profiler operator in accordance with the most recent edition of AASHTO R 56 "Standard Practice for Certification of Inertial Profiling Systems". The profile data from the referee test shall be used in determining the final project price adjustments.~~

~~**720.3.4.1 Referee Data:** If the referee test data still does not meet the allowable IRI differences MCS&T can recommend the Contractor recertify their inertial profiler and inertial profiler operator that was used on the project.~~

720.3.~~5~~4-Testing After Repairs: Should repairs be needed to the surface from the defects in the pavement prior to project closeout, QA ~~and QAV~~ testing shall be conducted after all repairs are made. This will be the final tested value for the lot.

720.4-RIDE QUALITY ANALYSIS:

720.4.1-Data Location: The average IRI number used in ride quality analysis shall be the mean roughness index (MRI) which is the average IRI of both the left and right wheel path. Analysis shall be done in accordance with MP 720.10.01 Section 9.

720.4.2-Omitted Sections: Bridge Structures and any sections tested which are not included in the pavement project shall be removed from the Smoothness Analysis. These removed bridges and sections shall also include a Lead-In and Lead-Out distance to be removed from the Ride Quality Analysis. The Lead-In distance shall be two hundred (200) feet and the Lead-Out distance shall be two hundred (200) feet.

720.4.3-Sampling Lots: The pavement shall be divided into sampling lots of one-tenth (0.1) lane mile each. Each Lot shall have a smoothness measurement, expressed in inches per mile (in./mi.).

720.4.3.1-Special Cases for Sampling Lots Less Than One-Tenth (0.1) Lane Mile: In some cases, sampling, lots of one tenth (0.1) lane mile will not be attainable. These cases include areas at the end of the project as well as areas that are before the 'lead in" length of bridges. If these areas are less than five-hundredths (0.05) of a lane mile that will be eliminated from Smoothness analysis. If these areas are more than five-hundredths (0.05 mile) lane mile these areas will be included in analysis and pay adjustments will be prorated to the nearest one hundredth (0.01) mile. ~~This shall apply to all projects governed by Section 720.~~

720.5-NATIONAL HIGHWAY SYSTEM (NHS) PAVEMENT PROJECT:

Pavement projects located on any NHS route and greater than 0.2 miles of continuous new pavement shall be tested with a high-speed or low speed inertial profiler certified in accordance with Section 720.2.

720.5.1-Determining National Highway System Routes: The NHS map should be used when determining if a route is on the National Highways System. This tool can be found online at the following link:
https://wvdot.maps.arcgis.com/apps/dashboards/88e87932344946408b7c17f1bd454752

720.5.2-Schedule 1 NHS Pavement Projects: NHS pavement projects with a total new pavement thickness of four (4) inches or greater shall be classified as Schedule 1 NHS Pavement Projects. The final price adjustments for Schedule 1 NHS Pavement Projects shall be determined using the calculations shown in Table 720.5.2.

TABLE 720.5.2
Schedule 1 NHS Pavement Projects

IRI for each 0.1-mile section (in/mi)	Price Adjustment ($)
65.0 or Less	0
65.1 to 95.0	1,300 - 20(IRI) ~~+ 1,300~~
95.1 or Greater	Corrective Action Required

720.5.2.1-Corrective Action for Schedule 1 NHS Pavement Projects: Corrective action shall be required for Schedule 1 NHS Pavement Projects having an IRI greater than 95.1 in/mi. Corrective action shall be performed using diamond grinding, micro milling, or other work methods approved by the Engineer.

720.5.3-Schedule 2 NHS Pavement Projects: NHS pavement projects with a total new pavement thickness ~~three (3) inches or greater and~~ less than four (4) and greater than one (1) inch inches shall be classified as Schedule 2 NHS Pavement Projects. The final price adjustments for Schedule 2 NHS Pavement Projects shall be determined using the calculations shown in Table 720.5.3.

TABLE 720.5.3
Schedule 2 NHS Pavement Projects

IRI for each 0.1-mile section (in/mi)	Price Adjustment ($)
80.0 or Less	0
80.1 to 120.0	1,200 - 15(IRI)
120.1 or Greater	-600

~~**720.5.4-Schedule 3 NHS Pavement Projects:** NHS pavement projects with a pavement thickness less than three (3) inches and more than one (1) inch shall be classified as Schedule 3 NHS Pavement Projects. The final price adjustments for Schedule 3 NHS Pavement Projects shall be determined using the calculations shown in Table 720.5.4.~~

~~**TABLE 720.5.4**~~
~~**Schedule 3 NHS Pavement Projects**~~

~~IRI for each 0.1-mile section (in/mi)~~	~~Price Adjustment ($)~~
~~80.0 or Less~~	~~0~~
~~80.1 to 120.0~~	~~1,200 – 15 (IRI)~~
~~120.1 or Greater~~	~~-600~~

720.6-NON-NATIONAL HIGHWAY SYSTEM PAVEMENT PROJECTS:

Pavement projects located on any Non-NHS routes shall be tested with equipment outlined in 720.2.1, 720.2.2 and 720.3 if the project meets all four of the following requirements:

1. Resurfacing is the primary project type
2. Greater than 1 mile of continuous pavement~~,~~
3. Edge lines and center line on the new pavement in accordance with Section 663.
4. Thickness of one inch (1) or more of new pavement (including scratch if used)

720.6.1-Ride Quality Analysis Before Project: Non-NHS pavement projects shall be tested before the pavement project begins. Any new construction of a Non-NHS route will be evaluated as an NHS route according to 720.5.

720.6.2-Data Source Collection After Project Completion: The data ~~source~~ collection after project completion shall be collected by the Division's high-speed or low speed inertial profiler as referenced in 720.3.2. On non-NHS routes Quality Control Testing is optional for the contractor. If QC testing is performed, it shall follow the process outlined in section 720.3.

720.6.3-Final Price Adjustments for Non-NHS: If the average ~~precent~~ percent improvement for the entire project is 30.1% or more, no price adjustment will be assessed for the project. If the average percent improvement for the entire project is 30.0% or less, then each 0.1 mile lot that has an IRI of 80.1 or greater, will be penalized based on the following table. Table 720.6.3.

TABLE 720.6.3
Non-NHS Pavement Projects

IRI for each 0.1-mile section (in/mi)	Price Adjustment ($ per 0.1-mile Section)
80.1 – 170.0	320 - 4(IRI)
170.1 or Greater	-360

Where:

$$\text{Percent Improvment (\%)} = \frac{\text{Before IRI of Lot} - \text{After IRI of same Lot}}{\text{Before IRI of Lot}} \text{ X } 100$$

720.7- PROJECTS THAT DO NOT FALL UNDER PREVIOUS CHARACTERIZATIONS:

At the discretion of the Engineer pavement projects not falling into any of the other classifications shall be measured and evaluated for ride quality analysis under the direction of the Engineer. If recommended by the Engineer this shall be done by the Contractor with a ten (10) foot straightedge. There will not be any pay adjustments based on Smoothness for these projects.

DRAFT

March 5, 2024

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

ELECTRONIC SUBMISSION OF PAYROLLS AND SUBCONTRACTOR PAYMENT

1.0-GENERAL REQUIREMENTS:

The Contractor and all subcontractors shall submit all certified payrolls and subcontractor payments, including those made to Disadvantaged Business Enterprises (DBEs), using the AASHTOWare™ Project Civil Rights and Labor (CRL) system in accordance with this provision. For subcontractor payments, the term "subcontractor" shall include all vendors subject to the Required Contract Provisions Federal-Aid Construction Contracts (FHWA-1273). All subcontracting agreements made by the Contractor shall include this Special Provision.

There will be no direct payment for recording and reporting of this information. All costs associated with this provision shall be considered incidental. More information about the CRL system can be located at: https://www.aashtowareproject.org/index.php.

2.0-SYSTEM REQUIREMENTS:

The CRL system is web-based. The Contractor shall ensure compatibility with the CRL system as necessary to successfully execute the work. The CRL system requires the ability to read, create, and edit spreadsheets in the .xlsx file format.

Contractors will be contacted by the Department after the project is awarded to begin the process for accessing the CRL system for them and their subcontractors. Contractors must register for payroll access and develop a method of import prior to the Pre-Construction Conference. The Department's Civil Rights Compliance Division will provide training for entry of certified payrolls and subcontractor payments in CRL. Detailed information can be found on the Department's Civil Rights Compliance Division webpage at: https://transportation.wv.gov/crc/Pages/default.aspx

Contractors shall ensure each subcontractor, including DBEs, has registered for payroll access and developed their method of import prior to commencing work. The Contractor and subcontractors will be granted access after submitting Request Access forms for each individual user who requires an account. Only those firms with a contract in the system should submit the Request Access form. The software is configured so that each firm can only see their specific

contract information. There will only be one single sign-on process for multiple application access within the Department.

The Department will provide access and a log-in identification (ID) for the CRL system to designated employees of the Contractor and approved subcontractors entered into the system for the contract. The login ID and password are unique to the designated employee and must not be shared with other employees. There are no fees associated with accessing the system or receiving a login ID.

3.0-PROCEDURES:

3.1-Certified Payroll and Subcontractor Data Submission: The Contractor and all subcontractors shall use the CRL system to provide the Department with electronic certified payrolls. The Contractor shall assume all responsibility for ensuring all payrolls and all subcontractor payrolls are submitted and certified electronically in CRL for each week in which any contract work is performed. If all payrolls are not received in this timeframe, the progress payment shall be withheld until all necessary payrolls have been received. Electronic submittal of certified payrolls can be submitted using the following methods:

- Manually add, copy, or modify data directly into CRL;
- Import payroll data with the CRL payroll spreadsheet XML converter tool available at https://xml.cloverleaf.net/spreadsheet/;
- Convert payroll system program data to Payroll XML and import it into the CRL system. Information on how to convert to payroll program data to an XML file can be located at https://xml.cloverleaf.net/resourcekit/;
- The Contractor may send, on behalf of a subcontractor, payroll payment information based on a signed, certified paper payroll through the Electronic Proxy Payroll Process. Import payroll data with the CRL payroll spreadsheet XML converter tool available at https://xml.cloverleaf.net/spreadsheet/.

The Department's Civil Rights Compliance Division may require at any time certified paper copies of payrolls conforming to FHWA-1273 from any or all Contractors working on the project.

3.2-Subcontractor Payment Submission Requirements: The Contractor shall post payment to subcontractors in CRL, including DBE firms listed on their DBE plan towards meeting their contract DBE goal, within fourteen (14) days after receipt of payment from the Department. The Contractor shall submit, and shall require each subcontractor to provide, payment amounts relative to all involvement on the project during the life of the contract in which participation occurs and verification is available. The Contractor shall enter all payments made to all subcontractors into the Payment area of CRL for each estimate.

Refer to the Special Provision for Subcontractor Prompt Payment for further information regarding subcontractor payments.

The Department's Civil Rights Compliance Division may require at any time proof of payments from any or all subcontractors working on the project, including any information related to Contractor DBE payments.

DRAFT

March 18, 2024

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 406
HIGH FRICTION SURFACE TREATMENT

406.1-DESCRIPTION:

ADD THE FOLLOWING TO THE END OF THE SUBSECTION:

Bridges to receive an High Friction Surface Treatment (HFST) overlay shall be pretreated/primed for the purpose of crack sealing and complete waterproofing.

406.2-MATERIALS:

ADD THE FOLLOWING AFTER THE FIRST SENTENCE:

Materials for the pretreatment/ priming of bridge decks must be from the same manufacturer and proven by the manufacturer of the binder to be compatible.

406.3-ACCEPTANCE TESTING:

REMOVE AND REPLACE THE FIRST SENTENCE WITH THE FOLLOWING:

The binder and aggregate shall be evaluated by AASHTO Product Evaluation and Audit Solutions. Bridge deck pretreatment/primer must have certification from the binder manufacturer that the materials are compatible. This certification shall be submitted to the Engineer a minimum of two weeks prior to starting work.

DRAFT

406.5-PLACING:

ADD THE FOLLOWING AFTER THE FIRST PARAGRAPH:

The manufacturer's representative must be on site for the pretreatment/primer on bridge decks. Plans will indicate locations and whether the pretreatment/primer is to be a flood coat or crack chasing method. The Contractor is responsible for the proper construction sequence and methods of applying the binder and aggregate after the application of the pretreatment/primer on bridge decks.

406.11-BASIS OF PAYMENT:

ADD THE FOLLOWING TO THE END OF THE SECOND PARAGRAPH:

Pretreatment/primer of bridge decks will be incidental to Quantity of "High Friction Surface Treatment".

DRAFT

~~September 28, 2023~~ April 24, 2024

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 106
CONTROL OF MATERIALS

106.1-SOURCE OF SUPPLY AND QUALITY REQUIREMENTS:

DELETE THE CONTENTS OF THE SUBSECTION AND REPLACE WITH THE FOLLOWING:

106.1.1-Definitions: Unless the context in which used clearly requires a different meaning, as used in this section:

"Aluminum and glass products" means products rolled, formed, shaped, drawn, extruded, forged, cast, fabricated, or otherwise similarly processed from aluminum and glass.

"Coating" means all processes that protect or enhance the value of a material or product to which it is applied, such as, but not limited to, epoxy coatings, galvanizing, and painting.

"Construction material" means an article, material, or supply that is or consists primarily of non-ferrous metals, plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables), glass (including optic glass), fiber optic cable (including drop cable), optic fiber, engineered wood, lumber, or drywall. A "construction material" does not include an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives. Items that consist of two or more of the listed materials that have been combined together through a manufacturing process, and items that include at least one of the listed materials combined with a material that is not listed through a manufacturing process, are treated as manufactured products and not as construction materials.

"Domestic aluminum and glass products" means aluminum and glass products for which all manufacturing processes, including application of a coating, have occurred in the United States.

"Domestic steel products" means steel products for which ~~all manufacturing processes, including application of a coating, have occurred in the United States.~~ all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.

"Federal-aid highway project" means highway construction, maintenance, and utility projects funded in whole or in part with Federal-aid funds.

"Manufacturing process" means any process which modifies the chemical content, the physical size or shape, or the final finish of a material, including melting and mixing, rolling, extruding, machining, bending, grinding, drilling, and coating.

"Manufacturing process" for construction materials means the final manufacturing process and the immediately preceding manufacturing stage for the construction material.

"Manufacturing process" for steel and iron means any process which modifies the chemical content, the physical size or shape, or the final finish of a material, including melting and mixing, rolling, extruding, machining, bending, grinding, drilling, and coating.

"Material" means any tangible substance incorporated into a highway project.

"Public Works" includes roads, highways, streets, bridges, sidewalks, sewage systems, buildings, engineering and architectural works, and any other structure, facility or improvement constructed or undertaken by the Division.

"State contract project" means any erection or construction of, or any addition to, alteration of or other improvement to any building or structure, including, but not limited to, roads or highways, or the installation of any heating or cooling or ventilating plants or other equipment, or the supply of any materials for such projects, pursuant to a contract with the State of West Virginia for which bids were solicited.

"Steel products" means products rolled, formed, shaped, drawn, extruded, forged, cast, fabricated or otherwise similarly processed, or processed by a combination of two or more of such operations, from steel made by the open hearth, basic oxygen, electric furnace, Bessemer or other steel making process.

"United States" means the United States of America and includes all territory, continental or insular, subject to the jurisdiction of the United States.

106.1.2-State and/or Federal Use of Domestic Steel and Iron: Any steel or iron materials used for either Federal-aid highway and state contract projects shall be manufactured, including the applications of any coatings, in the United States and compliant with 23 U.S.C. 313 and 23 CFR 635.410, entitled "Buy America Requirements." and compliant with Chapter 5, Article 19 and Chapter 5A, Article 3, Section 56 of the West Virginia Code, entitled the "West Virginia American Steel Act of 2001.

Buy America requirements do not apply to non-ferrous alloy materials used to make steel or any raw materials (iron ore and alloys), scrap, pig iron, or processed, pelletized, and reduced iron ore. Buy America requirements do not apply to temporary elements not permanently incorporated into a project, such as falsework, temporary sheet piling, detour bridges and the like; temporary elements left in place at the Contractor's convenience, unless the contract plans and specifications require steel or iron components (i.e. stay-in-place forms, ties for steel, sheet piling, etc.) or imply that the item be left in place; or items that are simply moved from one place to another within the same project.

When steel or iron materials are used, the Contractor shall furnish a certificate of compliance which covers all materials and products involved, including those of any subcontractors and suppliers certifying compliance with Buy America requirements prior to the permanent incorporation of the materials into the project in accordance with MP 106.10.50.~~. The Division shall not authorize or make any payments to a Contractor not fully compliant with this requirement. Any payment made to any Contractor who did not fully comply with this requirement may be recovered by the Division.~~

Any exception to Federal Buy America requirements for domestic steel and iron will be in accordance with ~~MP 106.10.50~~ MP 106.10.51 and shall be compliant with 23 U.S.C. 313~~, and~~ 23 CFR 635.410, and 2 CFR 184.

106.1.3-Preference for Domestic Aluminum and Glass Products: Any aluminum or glass products to be supplied in the performance of any contract or subcontract for the construction, reconstruction, alteration, repair, improvement, or maintenance of public works or for the purchase of any item of machinery or equipment to be used at the sites of public works shall be manufactured in the United States and compliant with Chapter 5, Article 19 of the West Virginia Code**.** This requirement applies to all federal and state public works contracts, including state purchase order contracts; however does not apply to any State funded projects with a contract award amount of $50,000, or less.

The Division shall not authorize or make any payments to a Contractor not fully compliant with this requirement. Prior to any payment, the Division shall require the Contractor to furnish a certificate of compliance which covers all materials and products involved, including those of any subcontractors and suppliers, in accordance with MP 106.10.50. ~~Any payments made by the Division to any Contractor who did not fully comply with this requirement may be recovered by the Division.~~

106.1.4-Use of Domestic Construction Materials: Any construction materials, as defined in Section 106.1.1, shall be manufactured in the United States and compliant with the "Infrastructure Investment and Jobs Act," Section 70901-52, entitled the "Build America, Buy America Act." Section 70901-52, entitled the "Build America, Buy America Act" as implemented by the Office of Management and Budget (OMB) in the ~~"Preliminary Guidance for Construction Materials" in~~ OMB Memorandum ~~M-22-11~~ M-24-02.~~.~~ No construction material may be used unless the manufacturing process for the manufacture of the construction material occurs in the United States. The Buy America standards that apply to the manufacturing process for construction materials are listed in MP 106.10.50.

Buy America also applies to all projects within the scope of a finding, determination, or decision under the National Environmental Policy Act (NEPA), regardless of the funding source, if at least one contract within the scope of the NEPA decision is funded with Federal funding provided under Title 23.

Buy America only applies to construction materials that are consumed in, incorporated into, or affixed to a~~n infrastructure~~ project. As such, it does not apply to tools, equipment, and supplies, such as temporary scaffolding, removed at or before completion of the project. Nor does Buy America 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 or permanently affixed to the structure.

When construction materials are permanently installed into the project, the Contractor shall supply adequate documentation certifying compliance with Buy America requirements prior to the permanent incorporation of the materials into the project in accordance with MP 106.10.50.

Any exceptions to Buy America requirements for domestic construction materials will be in accordance with ~~MP 106.10.50~~ MP 106.10.51 and shall be compliant with the Build America, Buy America Act.

106.1.5-Exceptions: Any exceptions to state preference requirements for domestic aluminum, glass, and steel products will be in accordance with ~~MP 106.10.50~~ MP 106.10.51 and shall be compliant with Chapter 5, Article 19 and Chapter 5A, Article 3, Section 56 of the West Virginia Code.

When foreign-made aluminum, glass, and steel products are used or supplied in compliance with an approved exception, the Contractor shall be responsible for providing procedures acceptable to the Division for determining that specification requirements are met, including all inspections at no additional cost to the Division. The use of foreign-made products will not be reason for grant an extension of contract time.

DRAFT

~~April 11, 2024~~ June 13, 2024

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 109
MEASUREMENT AND PAYMENT

109.20-WEIGH TICKETS:

109.20.1-Electronic Ticket Delivery:

DELETE THE CONTENTS OF THE SUBSECTION AND REPLACE WITH THE FOLLOWING:

In addition, for aggregate, asphalt, ~~aggregate~~, ~~and~~ concrete, pipe, precast concrete products, and reinforcing steel, electronic ticket delivery (e-tickets) shall be required with the standard information provided as on the paper ticket. The e-ticketing system must interface with the WVDOH e-ticketing portal and provide WVDOH field personnel the ability to access tickets from a smartphone, tablet, or laptop and to make notes associated with each ticket if needed. The service must also provide a daily summary report. A digital signature of the weigh person on an e-ticket or daily summary report shall be considered the equivalent as a hand-signed/initialed, printed ticket.

DRAFT

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 601
STRUCTURAL CONCRETE

601.1-DESCRIPTION:

ADD THE FOLLOWING AFTER THE TENTH PARAGRAPH IN THE SUBSECTION:

Class S concrete shall be used for bridge decks and other bridge elements when designated in the plans. This mix shall be used to produce a concrete of high durability with low shrinkage potential.

601.2-MATERIALS:

ADD THE FOLLOWING TO THE TABLE:

MATERIAL	SECTION OR SUBSECTION
Expansive Hydraulic Cement	701.5

601.3-PROPORTIONING:

ADD THE FOLLOWING AFTER THE FIFTH PARAGRAPH:

Design mixture testing for Class S concrete shall be in accordance with MP 711.03.23 and shall include air content, slump, compressive strength, surface resistivity, sequential air method (SAM) number, and shrinkage tests. The Contractor shall complete the following tests for mix design acceptance of Class S concrete before mix design submittal and approval:

- **Surface Resistivity-** For establishment of the mixture proportions, specimens for surface resistivity tests shall be made on representative samples prepared and tested in accordance

with AASHTO T 358. A set of three 4-inch x 8-inch cylinders shall be fabricated and moist cured from both of the batches at the minimum cement factor as outlined in Section 3.3 of MP 711.03.23, as specified in AASHTO R 39, for 28 days prior to testing, and the results of this test shall not be less than 40 kΩ-cm.

- **SAM number-** For establishment of the mixture proportions, SAM number tests shall be performed on a representative sample from both of the batches at the minimum cement factor as outlined in Section 3.3 of MP 711.03.23. These samples shall be prepared and tested in accordance with AASHTO T 395. The SAM number for both of these samples shall be less than or equal to 0.20.
- **Shrinkage-** For establishment of the mixture proportions with Portland cement, the 28-day drying shrinkage shall not exceed 0.035% based on average of three specimens from a representative sample from one of the batches at the minimum cement factor as outlined in Section 3.3 of MP 711.03.23. This sample shall be tested in accordance with ASTM C157. Specimens shall be moist cured for 7 days before beginning the 28-drying shrinkage testing.

For establishment of the mixture proportions with Expansive hydraulic cement, the 28-day drying shrinkage shall not exceed 0.035% based on average of three specimens from a representative sample one of the batches at the minimum cement factor as outlined in Section 3.3 of MP 711.03.23. This sample shall be tested in accordance with ASTM C878. The initial 7-day expansion shall range from 0.03% to 0.06%. Specimens shall be moist cured for 7 days before beginning the 28-drying shrinkage testing.

The cost of all test mix requirements shall be considered incidental to the cost of Class S concrete.

601.3.1-Mix Design Requirements:

DELETE THE CONTENTS OF THE SUBSECTION AND REPLACE WITH THE FOLLOWING:

Prior to the start of construction, the Contractor shall design and submit to the Engineer for approval the proportion of materials, including admixtures, to be used which will result in a workable concrete having the applicable properties enumerated below, including those of Table 601.3.1A. A mix design prepared in accordance with MP 711.03.23, shall be required for each class of concrete to be used in the work. The mix design shall be accompanied by a statement giving the source of materials and certified test data from a Division approved laboratory demonstrating the adequacy of the mix design. The Contractor shall notify the Engineer of any change in the source of materials or the addition of admixtures during the progress of the work, since such change may necessitate a new mix design. The Contractor shall also state the Ā value of the fine aggregate and the Ā value of the combined grading of the coarse aggregate, fine aggregate, and cement used in the mix design. Each mix design shall remain approved for a period of three years from the date of approval, after which the mix design may be re-approved for an additional time period. The guidelines for this re-approval process are set forth in MP 711.03.23.

Approved Hydration Control Stabilizing Admixtures, as defined in Section 707.15, which are designed to stop the hydration of cement in a concrete mix, enabling an extension to the allowable discharge time from a truck mixer as outlined in Section 601.7, may be added to an

existing approved concrete mix design in accordance with the procedures outlined in MP 711.03.23.

TABLE 601.3.1A

Class of Concrete	Design 28 Day Compressive Strength	Target Cement Factor	Maximum Water Content	Standard Size of Coarse Aggregate***	Entrained Air
	Pounds per Square inch	lbs./c.y.*	lb. of water / lb. of cement **	Number	Percent
A	3500	682	0.51	7, 78, or 8	7.5
K	4000	658	0.44	57, 67	7.0
B	3000	564	0.49	57, 67	7.0
C	2500	494	0.58	57, 67	6.0
D	2000	400	0.62	57, 67	5.5
H	4000	See Table 601.3.1C	0.40	57,67	6.5
DC	4500	705	0.44	7, 78, 8	6.0

* An equal mass of a SCM may be substituted for Portland cement up to the maximum amount in Table 601.3.1B. Only one SCM is permitted in a mix design, except for Class H concrete. The target cement factor of Class H concrete shall consist of Option 1 or Option 2 from Table 601.3.1C. The Contractor may choose either option.

** When using a SCM, masses of these materials shall be considered as cement for purposes of establishing maximum water content.

*** A number 67 coarse aggregate may be used in Class DC concrete, provided the Engineer approves the use of that size aggregate for the specific project on which it is to be used. That approval will depend on the minimum spacing of the reinforcing steel in the drilled shaft foundation.

TABLE 601.3.1B

Material	Class of Concrete	Quantity
Fly Ash	All Classes Except H	20%
Slag Cement	All Classes Except H	50%
Silica Fume	All Classes Except H	8%

TABLE 601.3.1C

Option	Cement	Fly Ash	Slag Cement	Silica Fume
1	470 lbs.	132 lbs.		30 lbs.
2	423 lbs.		195 lbs.	30 lbs.

MP 711.03.26 shall be used to control the cement factor in all classes of concrete except Class H and Class S.

The Contractor may develop mix designs with a reduced target cement factor as indicated in Table 601.3.1D in lieu of Table 601.3.1A, provided the aggregates used in those mix designs meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1. The Ā requirements will not apply for mix designs that use optimized aggregate gradation.

The Contractor shall develop Class S mix designs according to the requirements of Table 601.3.1D. The aggregates used in Class S mix designs shall meet the requirements for

optimized aggregate gradation in Section 601.3.2.4.1. The Ā requirements will not apply to Class S concrete.

TABLE 601.3.1D

Class of concrete	Design 28 Day Compressive Strength	Target Cement Factor	Maximum Water Content	Nominal Maximum Aggregate Size	Entrained Air
	Pounds per Square inch	lbs./c.y. Note 1	lb. of water/lb. of cement Note 2	Inches	Percent
A	3,500	642	0.51	½ or ⅜	7.5
K	4,000	618	0.44	1 or ¾	7.0
B	3,000	524	0.49	1 or ¾	7.0
C	2,500	454	0.58	1 or ¾	6.0
D	2,000	360	0.62	1 or ¾	5.5
H	4,000	See Table 601.3.1E	0.40	1 or ¾	6.5
S	4,000	600	0.42 Note 4	1 or ¾	6.5
DC Note 3	4,500	665	0.44	½ or ⅜	6.0

Note 1 An equal mass of a SCM may be substituted for Portland cement up to the maximum amount in Table 601.3.1B. Only one SCM is permitted in a mix design, except for Class H concrete. The target cement factor of Class H concrete shall consist of Option 1 or Option 2 from Table 601.3.1E. The Contractor may choose either option. This footnote does not apply to Class S concrete for the substitution of a SCM for cement. The substitution of a SCM for cement is specified in the last paragraph of this subsection.

Note 2 When using a SCM, masses of these materials shall be considered as cement for purposes of establishing maximum water content.

Note 3 Nominal maximum aggregate size of $^{3}/_{4}$ inches may be used in Class DC concrete, provided the Engineer approves the use of that size aggregate for the specific project on which it is to be used. That approval will depend on the minimum spacing of the reinforcing steel in the drilled shaft foundation.

Note 4 The maximum water content for a mix design with Expansive hydraulic cement may be increased to 0.45.

TABLE 601.3.1E

Option	Cement	Fly Ash	Slag Cement	Silica Fume
1	440 lbs.	127 lbs.		25 lbs.
2	397 lbs.		186 lbs.	25 lbs.

The target cement factor for Class S concrete shall include at least one of the SCMs from Table 601.3.1F as a replacement portion by equal mass. The SCM(s) shall be limited to not more than two of the SCMs listed in Table in 601.3.1F. However, the maximum replacement percentage for any individual SCM shall not be exceeded, and the total replacement percentage of any combination of SCMs shall not exceed 50%.

TABLE 601.3.1F

Material	Quantity	
	Minimum %	Maximum %
Fly Ash	15	25
Slag Cement	25	50
Silica Fume	6	10

601.3.1.1-Mix Design Using Potentially Reactive Aggregate:
601.3.1.1.1-Selecting Preventive Measures For ASR:
601.3.1.1.1.3-Level of Prevention:

DELETE THE TABLE AND REPLACE WITH FOLLOWING:

TABLE 601.3.1.1.1.3
Determining the Level of Prevention

Level of ASR Risk	Classes of Concrete		Precast Concrete Member	Prestressed Concrete Member
	D	A, B, C, K, H, S, DC		
Risk Level 0	V	V		V
Risk Level 1	W	X		Y
Risk Level 2	X	Y		Z
Risk Level 3	Y	Z		See footnote**

** It is not permitted to construct prestressed concrete members (Section 603) with Aggregate Reactivity Class of R3. Measures must be taken to reduce the level of risk in these circumstances by selecting the aggregates only from the Reactivity Classes of R0, R1, or R2.

601.3.1.1-Mix Design Using Potentially Reactive Aggregate:
601.3.1.1.1-Selecting Preventive Measures For ASR:
601.3.1.1.1.4-Requirements for Various Prevention Levels:

DELETE THE CONTENTS OF THE SUBSECTION AND REPLACE WITH THE FOLLOWING:

These requirements shall apply to all classes of concrete except Class H and Class S. The prevention levels for Class H and Class S concrete is specified in section 601.3.1.1.1.5.

601.3.1.1-Mix Design Using Potentially Reactive Aggregate:
601.3.1.1.1-Selecting Preventive Measures For ASR:
601.3.1.1.1.4-Requirements for Various Prevention Levels:
601.3.1.1.1.4.2-Preventions Level W, X and Y:

DELETE AND REPLACE THE CONTENTS OF TABLE 601.3.1.1.1.4.2b WITH THE FOLLOWING:

TABLE 601.3.1.1.1.4.2b
Minimum Replacement Level of SCM (percentage by mass of cementitious material)

Type of SCM*****	Alkali Content of SCM* (Na_2Oe)	Level W	Level X	Level Y
Fly ash** (Cao ≤18%)	≤3.0	15	20	25****
	>3.0, ≤4.5	20	25****	Not Allowed
Slag Cement	≤1.0	25	35	50

TABLE 601.3.1.1.1.4.2b

Minimum Replacement Level of SCM (percentage by mass of cementitious material)

Silica Fume***	≤1.0	1.2 x LBA or 2.0 x KGA	1.5 x LBA or 2.5 x KGA	1.8 x LBA or 3.0 x KGA

* The alkali content of all approved SCM sources is listed on the WVDOH approved list of SCMs (APL). If the alkali content of an SCM source is not listed on the APL, the Division will test the SCM from the source to determine the alkali content prior to its use on any WVDOH project.

** The CaO content of approved fly ash sources is listed on the WVDOH approved list of fly ash (APL). If the CaO content of a fly ash source is not listed on the APL, the Division will test the fly ash from the source to determine the CaO content prior to its use on any WVDOH project.

*** The minimum level of silica fume (as a percentage by mass of cementitious material) is calculated on the basis of the alkali (Na_2Oe) content of the concrete contributed by the Portland cement and expressed in lb/yd³ (LBA in Table 601.3.1.1.1.4.2b). LBA is calculated by multiplying the cement content of the concrete in lb/yd³ by the alkali content of cement divided by 100. For example, for a concrete containing 500 lb/yd³ of cement with an equivalent alkali content of 0.81 percent of Na_2Oe, the value of LBA = 500 x 0.81/100 = 4.05 lb/yd³. For this concrete, the minimum replacement level of silica fume for Level Y is 1.8 x 4.05 = 7.3 percent. Regardless of the calculated value, the minimum level of silica fume shall not be less than 7 percent when it is only method of prevention. Mix design with silica fume > 8% shall be reviewed and approved by the Engineer.

**** Mix designs with minimum 25% of fly ash shall be reviewed and approved by the Engineer.

***** If two SCMs are used in Class S concrete in combination, the minimum mass replacement levels given in Table 601.3.1.1.1.4.2b for the individual SCMs may be reduced, provided the sum of the parts of each SCM is greater than or equal to one. For example, if silica fume and slag cement are used together, the silica fume level may be reduced to one-third of the minimum silica fume level in the Table 601.3.1.1.1.4.2b provided the slag cement is at least two-thirds of the minimum slag level required.

Note: The minimum replacement levels in Table 601.3.1.1.1.4.2b are appropriate for use with Portland cements of moderate to high alkali contents (0.71 to 1.00 percent Na_2Oe). Table 601.3.1.1.1.4.2c provides recommendations for adjusting the level of SCM when the equivalent alkali content of the Portland cement is above or below this range. The replacement levels should not be below those given in Table 601.3.1.1.1.4.2b for prevention level W, regardless of the equivalent alkali content of the Portland cement.

DELETE AND REPLACE THE CONTENTS OF OPTION 3 WITH THE FOLLOWING:

Option 3: Using the Lithium Nitrate Admixture: The 30 percent (30%) aqueous solution of Lithium Nitrate Admixture meeting the requirements of Section 707.17 shall be used for all level of prevention including "Level Z" given in Table 601.3.1.1.1.3 except for Class H and Class S concrete. The dosage rate of Lithium Nitrate Admixture shall be based upon the alkali content of cement used in a concrete mix.

Calculation of lithium nitrate ($LiNO_3$) admixture dosage (100 percent) for mitigation without use of SCMs with a 30 percent (30%) aqueous solution of lithium nitrate.

$$\text{Gallons of } LiNO_3/yd^3 = (A \times B \times 0.55)/100$$

Where:

A = Pound of Portland cement per cubic yard in a concrete mix

B = Percentage of Alkali content of cement used in a concrete mix

Example: If the cement content of concrete is 550 lbs/yd^3 and the total alkali content of the cement is 0.82 percent (0.82%), the dosage of lithium nitrate admixture is: (550 x 0.82 x 0.55)/100 = 2.48 Gal/yd^3.

The water content of the mix shall be adjusted by removing 0.85 gallons of water per gallon of lithium nitrate solution.

Example: Amount of water to be reduced (using the value from above example) Gal/yd^3 = 0.85 x 2.48 = 2.11

Any concrete mix using a 100 percent (100%) lithium nitrate admixture dosage will be accepted without evaluation. The contractor shall evaluate the effectiveness of less than 100 percent (100%) lithium nitrate admixture in a concrete mix, alone or in combination with fly ash or slag cement or silica fume, in the reduction of expansion in accordance with ASTM C1567*, when a reactive aggregate(s) is (are) used in a concrete mix, at a Division approved lab (an AASHTO accredited Lab, accredited for ASTM C1567) at the contractor's expense. The dosage rate shall not be less than 50 percent (50 %) when only a lithium nitrate admixture is using for evaluation and no SCMs are included in the concrete mix. The sampling and shipping of all aggregate shall be witnessed by a representative of the Division. The ASTM C1567 test results will be considered valid for 5 years from the date of testing.

If both of the aggregates (coarse and fine) used in a concrete mix are reactive (R1, R2 or R3), the contractor shall evaluate the effectiveness of the lithium nitrate admixture, alone or in combination with fly ash or slag cement or silica fume for both of the aggregates separately. When the same source material** is proposed for the use both as coarse and as fine aggregate, test only a selection of the reactive fine aggregate or reactive coarse aggregate, unless there is reason to expect that the coarse aggregate has a different composition than the fine aggregate or vice-versa. The combination of cement, lithium nitrate admixture, alone or in combination with fly ash or slag cement or silica fume, and aggregate that expands less than 0.10% at 16 days after casting will be considered as meeting the "Requirements for Various Prevention Levels (Section 601.3.1.1.1.4)" except for Class H and Class S concrete.

The approved lithium nitrate admixture shall meet the requirements of Section 707.17 and will be listed as "Type S" admixture with footnote of approved admixture for ASR mitigation on the MCS&T web page under Division Approved Source/Product Listing (APL) for Type S: Special Performance. The alkali level of fly ash used in the subject mix shall not exceed 4.5%. The alkali level of slag cement used in the subject mix shall not exceed 1.00%. The alkali level of silica fume used in the subject mix shall not exceed 1.00%. Mix design shall be reviewed and approved by the Engineer.

* Modify the w/c ratio of the mortar used in the ASTM C1567 test to 0.50.

Replace Section 5.3 (Sodium Hydroxide Solution) of ASTM C1567 with the following:
Sodium Hydroxide Solution - Each liter of solution shall contain 40.0 g of NaOH dissolved in 800 ml of water. Add 71 ml of the lithium nitrate admixture multiplied by the decimal equivalent of the lithium nitrate admixture dosage. (For example,

to test a 75% lithium nitrate admixture dosage, each liter of solution will contain 0.75 times 71 ml of lithium nitrate admixture.) This mixture shall be diluted with additional distilled or deionized water to obtain 1.0 liter of solution. The volume proportion of soaking solution to mortar bars in a storage container shall be 4 ± 0.5 volumes of solution to 1 volume of mortar bars. The volume of a mortar bar may be taken as 184 ml. Include sufficient test solution to ensure complete immersion of the mortar bars.

** Same source material applies to same Limestone, Diabase, Quartzite and Basalt source.

601.3.1.1-Mix Design Using Potentially Reactive Aggregate:
601.3.1.1.1-Selecting Preventive Measures For ASR:
601.3.1.1.1.5-Requirements for Various Prevention Levels for Class H Concrete:

DELETE THE TITLE OF THE SUBSECTION AND REPLACE WITH THE FOLLOWING:

601.3.1.1.1.5-Requirements for Various Prevention Levels for Class H and Class S Concrete:

601.3.1.1-Mix Design Using Potentially Reactive Aggregate:
601.3.1.1.1-Selecting Preventive Measures For ASR:
601.3.1.1.1.6-Evaluation of the effectiveness of SCM to prevent deleterious expansion:

DELETE THE CONTENTS OF THE SECTION AND REPLACE WITH THE FOLLOWING:

The contractor may evaluate the effectiveness of an SCM in the reduction of expansion in accordance with ASTM C1567*, when a reactive aggregate(s) is (are) used in a concrete mix, at a Division approved lab (an AASHTO accredited Lab, accredited for ASTM C1567) at the contractor's expense. The sampling and shipping of all aggregate shall be witnessed by a representative of the Division. ASTM C1567 test will be considered valid for 5 years from the date of testing.

If both of the aggregates (coarse and fine) used in a concrete mix are reactive (R1, R2 or R3), the contractor shall evaluate the effectiveness of SCM for both of the aggregates separately. When the same source material** is proposed for the use both as coarse and as fine aggregate, test only a selection of the reactive fine aggregate or reactive coarse aggregate, unless there is reason to expect that the coarse aggregate has a different composition than the fine aggregate or vice-versa. The combination of cement, SCM and aggregate that expand less than 0.10% at 16 days after casting will be considered as meeting the "Requirements for Various Prevention Levels (Section 601.3.1.1.1.4)" except for Class H and Class S concrete. The evaluation with the higher percentage of SCM replacement shall be selected for the minimum replacement level of SCM for prevention level in a mix design using potentially reactive aggregate.

When more than one mix design, for the same Producer/Supplier, is submitted for evaluation, only one evaluation of the effectiveness of an SCM in the reduction of expansion in accordance with ASTM C1567 testing data, as outlined in paragraphs first through four of this sub-section, will be required for that entire group of mix designs (except Class H and Class S) if all of the mix design in that entire group of mix designs have the same combination of cement, SCM and aggregate sources.

The alkali level of fly ash shall not exceed 4.5%. The alkali level of slag cement shall not exceed 1.00%. The alkali level of silica fume shall not exceed 1.00%. Mix designs with minimum 25% of fly ash shall be reviewed and approved by the Engineer. Mix design with silica fume > 8% shall be reviewed and approved by the Engineer.

* Modify the w/c ratio of the mortar used in the ASTM C1567 test to 0.50.
** Same source material applies to same Limestone, Diabase, Quartzite and Basalt source.

601.3.2-Field Tolerances and Adjustments:

601.3.2.1-Consistency:

DELETE THE CONTENTS OF THE FOURTH PARAGRAPH AND REPLACE WITH THE FOLLOWING:

Upon addition of a superplasticizer at the job site, the mixing drum shall be turned for a minimum of 60 revolutions or 5 minutes at mixing speed to establish a workable mixture of uniform composition and consistency. If a second job site addition of superplasticizer is used; the mixing drum shall be turned a minimum of 30 additional revolutions at mixing speed. All additions and mixing of the superplasticizer shall be completed before placement of the concrete is started. The total number of revolutions shall not exceed 300, and the concrete shall be discharged within the time limits in section 601.7. The slump of Class H and Class S concrete shall not exceed seven (7) inches under any circumstances.

601.3.2.2-Air Content:

DELETE THE SECTION AND REPLACE WITH THE FOLLOWING:

The target value of the entrained air at the point of placement shall be as shown in Tables 601.3.1A and D. However, when pumping concrete, the air content shall be measured before the concrete pump, and the target value of the entrained air shall be as shown in Tables 601.3.1A and D at that point. If the entrained air does not conform with the target value within plus or minus 2.5 percentage points, the Contractor shall take immediate steps to adjust the air content of succeeding loads by making necessary adjustments in the mixture. The air content shall be measured on loads already batched and enroute, as well as the first load to which any adjustments were made in batching procedures. If the air content exceeds the target value plus 3.0 percentage points the concrete shall be rejected. When the concrete is delivered in a truck mixer and the air content is less than the target value minus 2.5 percentage points the concrete shall be rejected, or the Contractor may use additional air entraining agent in an amount that is intended to achieve the target value specified. The addition is permitted under the conditions listed below.

The target of the entrained air content of Class H and Class S concrete at the time of placement shall be as shown in Tables 601.3.1A and D. If the entrained air does not conform with the target value within plus or minus 1.5 percentage points, the Contractor shall take immediate steps to adjust the air content of succeeding loads by making necessary adjustments in the mixture. If the entrained air content of Class H and Class S concrete does not conform to the target value plus 2.0 percentage points, the concrete shall be rejected. When Class H or Class S concrete is delivered in a truck mixer and the air content is less than the target value minus 2.0 percentage points, the concrete shall be rejected, or the Contractor may use additional air-entraining agent in an amount that is intended to achieve the target value specified. The addition is permitted under the conditions listed below.

i. The air entraining agent is the same as used in the approved mix design and is thoroughly mixed with a minimum of 2 gallons of water. The solution will be directed to the front of the mixer.
ii. The mixer is turned a minimum of 30 revolutions, at mixing speed, or the number of revolutions established in tests to comply with uniformity requirements, whichever is more.

Immediately after mixing, the air content and slump shall be measured by a certified inspector.

An air adjustment may be attempted twice per truck. If after the second addition the specified air content is not achieved, the concrete shall be rejected. These procedures do not alter the limits placed on time to discharge, the total revolutions of the mixing drum, or the specified slump.

601.4-TESTING:

601.4.1-Sampling and Testing Methods:

ADD THE FOLLOWING TO THE TABLE:

Sequential Air Method (SAM) Test	AASHTO T 395
Surface Resistivity Test	AASHTO T 358

ADD THE FOLLOWING SUBSECTION:

601.4.6-Surface Resistivity Tests for Acceptance of Class S Concrete: The Contractor shall also be required to fabricate and test three (3) Surface Resistivity test specimens, in accordance with AASHTO R 100 and AASHTO T 358, every time that a set of compressive strength specimens for Class S concrete is fabricated. These test specimens shall be 4-inch x 8-inch, and they shall be tested at an age of 28-days. These test specimens shall be moist cured until as close to the time of testing as possible and the results of this test shall not be less than 30 kΩ-cm. If the testing result is less than 30 kΩ-cm, then the concrete represented by resistivity value may be removed and replaced by the Contractor. If the Contractor elects to leave the material in place, the Engineer shall evaluate it as to the adequacy for the use intended. All concrete evaluated as unsatisfactory for the use intended shall be removed and replaced by the Contractor. When the Engineer's evaluation indicates that the work may satisfactorily remain in place, the subject material shall be paid for at a reduced unit price based on Table 601.4.6.

Table 601.4.6

Resistivity result obtained (values expressed in kΩ-cm)	Percent of unit bid price paid for material in question
28-29	95%
26-27	90%
24-25	85%
22-23	80%
20-21	70%
<20	Remove and replace

601.6-HANDLING, MEASURING, AND BATCHING OF MATERIALS:

ADD THE FOLLOWING PARAGRAPH AFTER THE FOURTH PARAGRAPH

When Expansive hydraulic cement is used, to avoid potential localized volcanic expansions, it is recommended to use pre-blended Type K expansive cement. Alternatively, the Expansive component can be added by a pre-mixed slurry at the plant or by slurry pump at the jobsite, instead of pre-blended cement, to prevent potential localized volcanic expansions.

601.7-MIXING:

DELETE AND REPLACE THE CONTENTS OF THE SIXTH PARAGRAPH OF THE SUBSECTION WITH THE FOLLOWING:

For all classes of concrete except Class H, Class S, and concrete for specialized overlays, the total amount of water in a concrete mix, including any water added at the job site, shall not be more than the amount which would cause the water-cement ratio (w/c) of that concrete mix to exceed the w/c which corresponds to the Mix Design Approved Strength, as outlined in Section 5.4 of MP 711.03.23. The maximum water amount shall also be shown in Attachment 4 or 5 of MP 711.03.23 for all approved concrete mix designs. However, under no circumstances shall the w/c in Table 601.3.1A be exceeded.

601.9-ADVERSE WEATHER CONDITIONS:

601.9.1-Cold Weather Concreting:

DELETE AND REPLACE THE FOLLOWING CONTENTS IN THE LAST PARAGRAPH:

Class H, Class S, and Class K Concrete Cold Weather Provisions: Cold weather periods shall be defined as those periods when temperatures above 50° F do not occur for more than half of any 24-hour duration. The temperature of the surface on which the concrete is to be placed shall

not be less than 45° F immediately prior to placement of the concrete. During the cold weather periods, as defined above, the temperature of the concrete immediately after placement shall be between 55 and 75° F.

601.10-PLACING CONCRETE:

601.10.1-General:

601.10.1.2-Concrete Placement Limitations:

DELETE AND REPLACE THE CONTENTS OF THE FIRST PARAGRAPH IN THE SUBSECTION:

Immediately prior to, and during, placement of Class H and Class S concrete, if the evaporation rate exceeds 0.10 lb./sq. ft. per hour (see Figure 1), the Contractor shall make provisions (i.e. wind breaks, fogging, etc.) to reduce the rate prior to placing concrete. These provisions shall be maintained during the placement of the concrete. If the evaporation rate obtained from Figure 1 is close enough to the maximum allowable value of 0.10 lb./sq. ft. per hour that there may a discrepancy in the exact numerical value, the following equation shall be used to obtain a more accurate value.

601.10.4-Placing Concrete Bridge Decks:

601.10.4.1-Fogging Equipment:

REMOVE AND REPLACE THE CONTENTS OF THE SUBSECTION WITH THE FOLLOWING:

When Class H and Class S concrete is used, fogging equipment shall be available for use in accordance with these specifications. The fogging nozzles shall produce an atomized mist. Fogging nozzles shall incorporate compressed air to create the mist. Handheld or hand operated equipment shall be permitted when the Contractor has demonstrated that his operator has been trained in its use.

601.11-FINISHING CONCRETE SURFACES:

601.11.4-Finishing Concrete Bridge Decks:

601.11.4.2-Class H Bridge Decks:

DELETE THE TITLE AND CONTENT OF THE SUBSECTION AND REPLACE WITH THE FOLLOWING:

601.11.4.2-Class H and Class S Bridge Decks: The surface of the Class H and Class S concrete shall be uniformly smooth, dense and even. The surface shall then be given a suitable texture with an approved burlap drag.

The Contractor shall texture in a transverse or longitudinal direction. Once begun, the direction of texturing shall not change. All texturing shall be performed prior to the beginning of curing operations. Only one pass of the drag over the finished area will be

permitted. Texturing shall be in strict accordance with the time requirements of 601.12.4 for applying wet burlap.

If texturing is done in the transverse direction, the Contractor shall texture by hand methods as soon as practicable after finishing machine passage, without any additional finishing operations between the machine passage and texturing operations.

If texturing is done in the longitudinal direction, the burlap drag shall be a seamless strip and shall be attached to the work bridge such that the surface of the concrete is textured as soon as practicable after finishing machine passage, without any additional finishing operations between the machine passage and texturing operations. Small areas, inaccessible to the attached drag, may be textured by hand methods.

The finishing movement and resulting progress of the burlap drag shall be done in a manner so as to prevent ridges or gouges from forming in the concrete surface. The drag shall be weighted, and the contact area changed as required to produce a texture acceptable to the Engineer. The drag shall be cleaned as required; to remove all hardened concrete particles and shall be replaced after each day's operation.

Texture resulting from the drag shall stop within one foot of curbs or parapets.

Any hand finishing operations shall be kept to a minimum for Class H and Class S bridge decks.

601.11.4.4-Class H Concrete Finished Deck Grooving:

ADD THE FOLLOWING TO THE TITLE OF THE SUBSECTION:

601.11.4.4-Class H and Class S Concrete Finished Deck Grooving:

601.12-CURING AND PROTECTING CONCRETE:

601.12.1-Curing Under Normal Conditions:

DELETE AND REPLACE THE CONTENTS OF THE SECOND PARAGRPAH WITH THE FOLLOWING:

Concrete surfaces shall be kept completely and continuously moist. Curing shall be continued for a period of at least 7 days. This curing period may be reduced if the contractor presents evidence that the in-place concrete has attained 70% of the specified strength for the class of concrete under cure. Under no circumstances, shall the period of cure be less than 3 days. The reduced curing period option is not applicable to Class H, Class S, or Class K concrete. When placing concrete elements with a minimum dimension greater than two (2) feet, the contractor shall not be permitted to add additional cement to the target cement factor in the approved mix design in order to obtain high-early strength and/or reduce curing time. Surfaces may have coverings temporally removed for finishing, but the covering shall be restored as soon as possible.

601.12.2-Curing Under Cold Weather Conditions:

DELETE THE FOURTH PARAGRAPH AND REPLACE WITH THE FOLLOWING:

Class H, Class S, and Class K Concrete Provisions: The surface temperature of the concrete shall be maintained between 55 and 75°F for 72 continuous curing hours immediately after placement. After this 72 hour period, a minimum concrete surface temperature of at least 50°F shall be maintained for an additional 96 continuous curing hours.

601.12.4-Curing Class H Concrete:

REMOVE AND REPLACE THE CONTENTS OF THE TITLE AND SUBSECTION WITH THE FOLLOWING:

601.12.4-Curing Class H and Class S Concrete: It is the nature of Class H and Class S concrete material to quickly form a plastic film at the surface upon drying. This film is to be protected from drying and cracking by prompt covering with wet burlap. Regardless of the type of concrete placed, the use of membrane curing compounds will not be allowed. Floor drains shall be immediately unplugged to permit the deck to drain.

The concrete surface shall be completely covered with clean, wet burlap. The burlap shall be thoroughly saturated over its entire area, but shall be drained of excess water before application. Burlap shall be lapped a minimum of one foot and shall lay flat. Failure to apply wet burlap within 30 minutes after discharge of the concrete from the truck and within 10 minutes of the completion of finishing operations shall be cause for rejection of the work as determined by the Engineer. Care shall be exercised to ensure that the burlap is well drained. Burlap shall be continuously wet for a period of seven days by means of automatic intermittent sprinkling or a continuous wetting system.

601.13-PROTECTIVE SURFACE TREATMENT:

601.13.1-Silane Treatment for Bridge Superstructure:

REMOVE AND REPLACE THE SECOND PARAGRAPH OF THE SUBSECTION WITH THE FOLLOWING:

The application of this silane protective surface treatment is not required for elements constructed from Class H and Class S concrete.

601.14-METHOD OF MEASUREMENT:

REMOVE AND REPLACE THE FIRST AND SECOND PARAPGRAPH OF THE SUBSECTION WITH THE FOLLOWING:

The quantity of work done for Classes A, B, C, D, H, K, M, and S concrete will be measured in cubic yards, complete in place and accepted as determined by the dimensions on the Plans or Contract Documents, subject to adjustments provided for in Sections 104.2 and 109.2.

The quantity of work done for Class H, Class S, and Class K concrete will be measured in cubic yards, complete in place and accepted, as measured from one end of the bridge to the other, fascia to fascia, and from the top of the forms to the finished elevation of the proposed deck surface. The volume of concrete required to fill the flutes of stay-in-place forms shall be calculated by taking the Contractor's approved SIP_{adj} factor and multiplying by the square yardage of SIP area minus beam widths, expansion dam widths, etc. as applicable.

601.16-PAY ITEMS:

ADD THE FOLLOWING TO THE TABLE:

601010-*	Class S Concrete	Cubic Yard
601025-009	Modified Concrete, Class S	Cubic Yard
601026-005	Modified Architectural Concrete, Class S	Cubic Yard

DRAFT

April 29, 2024

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

FOR

SECTION 701
HYDRAULIC CEMENT

ADD THE FOLLOWING SUBSECTION:

701.5–EXPANSIVE HYDRAULIC CEMENT:

Expansive hydraulic cement shall conform to the requirements of ASTM C845, Type K.

701.5.1-Expansive Component: Expansive component (mineral additive) may be blended with an ASTM C150 Type I or ASTM C595 TYPE IL to produce an ASTM C845 Type K. The resulting blend shall meet the requirements of ASTM C845, Type K and identical proportions shall be used in the proposed mix design.

DRAFT

May 7, 2024

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 701
HYDRAULIC CEMENT

ADD THE FOLLOWING SUBSECTION

701.5-RAPID HARDENING HYDRAULIC CEMENTS:
Rapid Hardening Hydraulic Cements shall be calcium sulfoaluminate, CSA, and be in accordance with ASTM C1600.

SECTION BREAK

NEW BUSINESS ITEMS

DRAFT

July 10, 2024

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 506
CONCRETE PAVEMENT REPAIR

506.3-PROPORTIONING:

ADD THE FOLLOWING TO THE END OF THE SUBSECTION:

Portland cement concrete for patching concrete pavement shall meet the requirements of Section 501, or Class B or Modified Class B as specified in Section 601, except that it shall be shown by compressive strength tests, in the approved mix design, that the concrete mix shall attain 2,000 psi prior to the time at which the pavement will be opened to traffic. Also, the maximum water-cement ratio (w/c) shall be 0.44, and an AASHTO number 8 (No. 8) coarse aggregate shall be required in Type II repairs with a depth of three (3) inches or less.

Type III repairs may be placed simultaneously with Type II repairs. When constructed in this manner, the same concrete mix shall be used in both repair types.

Prior to the start of work, the Contractor shall submit the mix proportions and recent compressive strength test data for the specified age at which the concrete is to be opened to traffic.

The Contractor may elect to use a mobile, continuous volumetric mixer in compliance with ASTM C685 at the patching location in lieu of a batch plant. A mobile, continuous volumetric mixer is defined as a truck mounted system where each component is automatically proportioned out for a selected batch size from on-board storage bins and automatically fed into a mixing unit to produce a mix complying with the requirements of 506.2. The unit shall be calibrated according to the manufacturer's recommendations by the Contractor in the presence of the Engineer before any placements are made on the project. Copies of all calibration form/calculations shall be submitted to the Engineer. A trial batch of at least 2 cubic yards shall be produced from the mobile, continuous volumetric mixer prior to placement of any patches on the project. Equip each truck with a ¼ cubic yard box constructed of suitable rigid materials for calibration purposes. The trial batch shall be accomplished by the Contractor under the observation of the Engineer. Trial batches will be sampled and tested by the Engineer. Trial batches will be sampled and tested by the Engineer to determine compliance with the specifications on the mix produced from the mobile, continuous volumetric mixer for slump, air content, and compressive strength.

DRAFT

June 26, 2024

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 514
ROLLER COMPACTED CONCRETE

514.4-TESTING:

514.4.1-Test Methods:

ADD THE FOLLOWING TO THE TABLE:

Standard Practice for Molding Roller-Compacted Concrete in Cylinder Molds Using a Vibrating Hammer	ASTM C1435
Compressive Strength of Cylindrical Concrete Specimens	AASHTO T 22
Making and Curing of Concrete Specimens	~~AASHTO T 23~~ AASHTO R100
Obtaining and Testing Drilled Core Specimens	AASHTO T 24
Measuring Length of Drilled Concrete Cores	AASHTO T 148
Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying	ASTM C566
Moisture-Density Relations of Soils using a ~~4.54 kg (~~10 lb.~~)~~ Rammer and a ~~457 mm (~~18 inches~~)~~ Drop	AASHTO T 180

514.4.2-Contractor's Quality Control:

514.4.2.2-Testing for Opening Pavement to Traffic:

ADD THE FOLLOWING TO THE FIRST PARAGRAPH OF THE SUBSECTION:

A minimum of three sets of compressive strength specimens shall be made for each day's paving operation. These compressive strength specimens shall be fabricated in accordance with ASTM C1435, and under the direct observation of the Engineer. A set of specimens consists of three cylinders. Field cure the specimens in accordance with ~~AASHTO T 23~~ AASHTO R100. Test one cylinder from each set of these cylinders for compressive strength in accordance with AASHTO T 22 at each of the following ages under the direct observation of the Engineer: 3 days, 5 days, and 7 days. The compressive strength of each set of cylinders shall be the average of the three specimens except that if one specimen shows evidence of improper sampling, molding, or testing, it shall be

discarded and the remaining two strengths averaged. Should more than one specimen representing a given test show definite defects due to improper sampling, molding, or testing, the entire test shall be discarded.

DRAFT

June 25, 2024

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 603
PRESTRESSED CONCRETE MEMBERS

603.6-CONCRETE:

603.6.2-Mix Design:

603.6.2.1-Class S-P Concrete Mix Design Testing:

REMOVE AND REPLACE THE FOLLOWING IN TABLE 603.6.2.1C:

TABLE 603.6.2.1C

Hardened Property Test	Total # Specimens	Specimen Size	Age at Testing	Magnitude of Loading	Approval Condition
Compressive Strength (AASHTO T 22)	7	4”x8” or 6”x12” cylinders	1 @ 24 ± 2 hrs. 1 @ 3days ± 2 hrs. 1 @ 7days ± 2 hrs. 1 @ 14days ± 2 hrs. 3 @ 28days ± 4 hrs.	Load Until Failure	per Design
Modulus of Elasticity[b] (ASTM C469)	7	6”x12” cylinders	1 @ 3days ± 2 hrs. 1 @ 7days ± 2 hrs. 1 @ 14days ± 2 hrs. 3 @ 28days ± 4 hrs.	40% of compressive strength (obtained above)	$\geq 57{,}000\sqrt{f'_c}$ [a]
Creep[b] (ASTM C512)	8 total (3 loaded, 3 remain unloaded, 2 tested for compressive strength)	6”x12” cylinders	72 ± 2 hours at age of initial loading	40% of compressive strength at time of loading	Creep Coefficient [c] ≤ 1.19 at 90 days [a]
Length Change (ASTM C157)	3	3”x3”x11” prisms	56 days	28-day cure per ASTM C157 then Air Storage for 28-days	≤ 0.0002 at 28 days of Air Storage [a]

TABLE 603.6.2.1C

Hardened Property Test	Total # Specimens	Specimen Size	Age at Testing	Magnitude of Loading	Approval Condition
~~Rapid Chloride~~ Concrete Surface Resistivity [b] ~~Permeability~~ (AASHTO T358 ~~AASHTO T 277~~)	3	4"x8~~2~~" ~~disc specimen~~ cylinders	~~56 days or~~ 28 days	~~60.0 ± 0.1 V~~	~~≤ 1500 coulombs (56 days) or ≤ 2000 coulombs (28 days)~~ < 30 kΩ-cm
Freeze-Thaw Resistance (ASTM C666-Procedure A)[b]	3	3"x4"x16" prisms	28 day cure prior to testing	300 cycles (0°F to 40°F)	Durability Factor ≥ 80

a. If the values obtained from testing the Class S-P mix do not meet the specified values in Table 603.6.2.1C, then the Fabricator's Engineer may submit calculations for prestress losses, camber, and long term deflections to the Division for review in accordance with Section 105.2.1.1, the Division Approval Method for shop drawings. If the Fabricator's calculations show that the values exceeding the specified values in Table 603.6.2.1C will not adversely affect the prestress losses, camber, and long term deflections, and the Division approves these calculations, then the Class S-P mix in question may be used to fabricate prestressed bridge members.

b. After the discontinuation of steam curing, test specimens shall be removed from the molds within 23.5 ± 0.5 hours and moist cured in the laboratory at a temperature between 73.5 ± 3.5 °F until the time of test. Freeze-Thaw Resistance testing shall begin when the specimens are at an age of 28 days.

c. The Creep Coefficient shall be defined as the Creep Strain at 90 days divided by the Initial Elastic Strain at the Time of Initial Loading. The Initial Elastic Strain shall be determined within 2 minutes after the application of the initial load.

DRAFT

June 24, 2024

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATIONS

FOR

SECTION 623
PNEUMATICALLY APPLIED MORTAR OR CONCRETE (SHOTCRETE)

623.2-MATERIALS:

DELETE THE FOLLOWING TABLE AND FOOTNOTES AND REPLACE WITH THE FOLLOWING:

MATERIAL	SUBSECTION OR STANDARD
Accelerating Admixtures	707.13
Air-Entraining Admixtures	707.1
Coarse Aggregate	703.1, 703.2
Curing Materials	~~7076.~~707.6-707.10
Fibers~~*~~	~~ASTM C1116~~715.3
Fine Aggregate	702.1
Portland Cement	701.1, 701.3
Supplementary Cementitious Materials**	707.4
Reinforcing Steel	709.1, 709.3, 709.4
Water	715.7
Water Reducing Admixtures	707.3
Water Reducing, Accelerating Admixtures	707.14
Water Reducing, Retarding Admixtures	707.2

~~*~~ ~~ASTM C1116, Type II or III. Provide a minimum dosage of 1.5 pounds per cubic yard. Use fibers that are a minimum of 1/2 inch length, monofilament or collated fibrillated microfibers.~~ The fibers selected for shotcrete shall be of suitable dimensions to not cause the clotting or clogging of concrete in the shotcrete delivery equipment. The contractor shall verify with the fiber manufacturer that their fiber selection is suitable for their equipment then submit this verification in writing to the Engineer.

** The use of a supplementary cementitious materials will not be permitted when a blended hydraulic cement is used.

DRAFT

~~August 9, 2018~~ June 24, 2024

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 655
MATTING FOR EROSION CONTROL

655.1-DESCRIPTION:

ADD THE FOLLOWING SUBSECTION:

655.1.1-Tied Concrete Block Erosion Mat: This work shall consist of furnishing and placing the Tied Concrete Block Erosion Control Mat (TCBM) in accordance with this Special Provision and in reasonably close conformity with the lines, grades, design, and dimensions shown on the plans.

The TCBM shall be manufactured or field fabricated from integrally formed individual concrete blocks tied together with high strength geogrid or pre-approved cable system.

655.2-MATERIALS:

ADD THE FOLLOWING SUB-SECTIONS:

655.2.1-Panel: The concrete blocks, cables, geogrid, fittings and other applicable elements shall be manufactured or fabricated into mats.

655.2.2-Concrete Blocks: Concrete block shall be tapered, beveled, and interlocked. The blocks shall incorporate interlocking surfaces or connections that prevent lateral displacement of the blocks within the mats when they are lifted for placement. Blocks shall exhibit resistance to mild concentrations of acids, alkalis, and solvents.

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. Sampling and testing of component materials shall be done in accordance with MP 603.02.10.

Blocks shall be wet-cast and conform to the requirements of MP 604.02.40 and Table 655.2.2. Concrete cylinders shall be made for compressive strength testing with 6-inch by 12-inch ~~(150 mm by 300 mm)~~ or 4-inch by 8-inch ~~(100 mm by 200 mm)~~ molds. The cylinders are

to be cured in the same area as the products for which they represent (Field Cured as outlined in AASHTO T23) 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.

A minimum of one set of compressive strength cylinders shall be fabricated for every 50 yd^3 ~~(38 m3)~~ of concrete that is produced, or once per half-day of production, whichever is less, to verify that the requirements of Table 655.2.2 are met. 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. The Fabricator shall perform an absorption test on one random block per five days of production in accordance with ASTM C642-13. After fabrication is completed and prior to shipment each mat shall be inspected to insure it meets all specification requirements and does not contain any defects, the Inspector will stamp the precast product invoice as accepted by MCS&T Division and provide a 7-digit Laboratory Reference Number for shipment.

TABLE 655.2.2
Physical Requirements

Minimum 28-day Compressive Strength (AASHTO T22 and T23)	Maximum Water Absorption after immersion and boiling (ASTM C642)	Air Content AASHTO T 152	~~Consistency (Slump)~~ ~~AASHTO T 119~~	~~Percentage Open Area (POA) within an individual panel~~	~~Unit Weight and Yield~~
4,000 psi (28 Mpa)	9.0%	7 ± 2%	~~Target ± 1.5 in. (38 mm)~~	~~30%~~	~~±2% of Theoretical~~

*Acceptance may also be from a manufacturer based on the test data of the product.

655.2.3-Polypropylene Geogrid: The TCBM shall be constructed of a high strength, rough service, low elongating, and continuous filament polypropylene geogrid with an acrylic coating. Interlocking geogrid shall have the following physical properties:

Mass/Unit Area	ASTM D-5261 7.0 oz./yd2 (240 g/m2)
Aperture Size	ASTM D-5261 7.0 oz./yd2 (240 g/m2)
Wide Width Tensile Strength	Machine Direction (MD) ASTM D-6637 2,055 lb./ft. (30 kN/m)
	Cross Machine Direction (CMD) ASTM D-6637 2,055 lb./ft. (30 kN/m)
Elongation at Break	ASTM D-6637 6 % (6%)
Tensile Strength @ 2%	Machine Direction (MD) ASTM D-6637 822 lb./ft. (12 kN/m)
	Cross Machine Direction (CMD) ASTM D-6637 822 lb./ft. (12 kN/m)
Tensile Strength @ 5%	Machine Direction (MD) ASTM D-6637 1,640 lb./ft. (24 kN/m)
	Cross Machine Direction (CMD) ASTM D-6637 1,640 lb./ft. (24 kN/m)

Tensile Modulus @ 2%	Machine Direction (MD) ASTM D-6637 41,100 lb./ft. (600 kN/m)
	Cross Machine Direction (CMD) ASTM D-6637 41,100 lb./ft. (600 kN/m)
Tensile Modulus @ 5%	Machine Direction (MD) ASTM D-6637 32,900 lb./ft. (480 kN/m)
	Cross Machine Direction (CMD) ASTM D-6637 32,900 lb./ft. (480 kN/m)

655.2.4-Underlayment: The backing material shall be rolled up with the TCBM and shall include the minimum of a double-net excelsior (wood fiber) blanket so when the system is unrolled the backing becomes the underlayment to stabilize the soils and promote growth of vegetation, unless otherwise specified on the plans. Alternate underlayment options include permanent erosion control matting per 715.24.2 type A and engineering fabric for erosion control per 715.11.6.

655.2.5-Transportation, Handling, and Storage: Upon delivery to the project, the Contractor shall inspect the TCBM for type, size, quantity, quality, and condition, to ensure that the proper material has been delivered and no damage occurred during transportation. Defects or damage will be cause for rejection, and immediate steps shall be taken to replace, at no additional cost.

TCBM with excelsior fiber backing may be left exposed for up to 30 days. If exposure will exceed 30 days, the rolls must be tarped or otherwise covered to minimize UV exposure.

655.2.6-Visual Inspection: All units shall be free of defects that would interfere with the proper placing of the unit or impair the strength and permanence of the overall system.

Surface cracks incidental to the normal manufacture of concrete shall not be deemed grounds for rejection. Cracks exceeding 0.25 inches in width and/or 1.0 inch in depth shall be deemed grounds for rejection and unit replacement.

Surface chipping resulting from customary methods of manufacture, shipping, handling and installation shall not be grounds for rejection. Chipping resulting in a weight loss exceeding 15% of the average weight of a concrete unit shall be deemed grounds for rejection and unit replacement.

CONSTRUCTION METHODS

655.3-PLACING:

ADD THE FOLLOWING SUB-SECTIONS:

655.3.8-Tied Concrete Block Erosion Mat:

655.3.8.1-Subgrade Preparation: The prepared subgrade shall provide a firm, unyielding foundation for the mats. The subgrade shall be prepared as detailed on the plans. Subgrade surface shall be free of any debris, protrusions, rocks, sticks, roots or other hindrances which would result in an individual block being raised more than ¾" above the adjoining blocks. Undulations, rolls, knolls and rises in the subgrade to which the TCBM is able to contour over and maintain intimate contact with the subgrade will be allowed. Apply seed directly to the prepared soil prior to installation of mats. Use seed and/or topsoil per project specifications. Install mats to the line and grade shown on the plans and

according to the manufacturer's installation guidelines. The manufacturer or authorized representative will provide technical assistance during installation as needed.

655.3.8.2-Anchoring: The upstream end of the TCBM is to be embedded 18 inches to prevent undermining of the mat. This also provides anchorage when the mats are installed on steeper slopes. Edges exposed to concentrated flows, such as side channels, shall also be embedded 18 inches. Edges exposed to sheet flow shall have the row of blocks along that edge embedded into the soil.

In instances where the TCBM cannot be embedded into the soil, such as when it is placed on a rock foundation, mechanical anchorage may be required. The polypropylene grid cast into the concrete blocks shall be attached to the anchoring system as indicated on the Contract Drawings. An engineered anchoring system, such as a percussion anchor that loops around lengths of rebar placed over the grid and in between the blocks, may be used. The design and layout of the anchoring system shall be by the Engineer, or a party designated by the Engineer.

The site should allow for manipulation of the mat during installation to achieve proper positioning and placement through the use of standard construction equipment including, but not limited to; excavator, forklift, skid-steer, or other under supervision of approved manufacturer representative.

655.3.8.3-Panel Seaming: Panel seams (Channel and Slopes) perpendicular to the hydraulic flow must be overlapped. The downstream panel will be terminated and properly anchored according to Contract Drawings. The upstream panel will then overlap the downstream panel by 18 to 24 inches. If no hydraulic or overland flow is expected, butting the seams together is acceptable. A 4 foot section of erosion control matting is used with 2 foot being placed under the mats on each side of the seam.

655.7-PAY ITEMS:

ADD THE FOLLOWING ITEM TO THE TABLE:

ITEM	DESCRIPTION	UNIT
655002-002	Tied Concrete Block Mattress	Square Yard ~~(Meter)~~

DRAFT

June 18, 2024

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 708
JOINT MATERIALS

708.3-JOINT AND CRACK SEALANT, HOT-POURED FOR CONCRETE AND ASPHALT PAVEMENTS:

ADD THE FOLLOWING SENTENCE TO THE SUBSECTION:

This material shall meet the requirements of ASTM D6690 and shall be evaluated by AASHTO Product Evaluation and Audit Solutions. Unless otherwise specified, Type II sealant shall be used. Hot-applied asphalt aggregate-filled materials shall be evaluated by AASHTO Product Evaluation and Audit Solutions and shall meet the requirements of ASTM D8260.

DRAFT

~~April 5, 2023~~ July 2, 2024

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 712
GUARDRAIL AND FENCE

712.4-GALVANIZED STEEL DEEP BEAM GUARDRAIL, FASTENERS AND ANCHOR BOLTS:

ADD THE FOLLOWING SENTENCE TO THE END OF THE SUBSECTION:

Galvanized steel deep beam guardrail, fasteners and anchor bolts shall be evaluated by AASHTO Product Evaluation and Audit Solutions. The AASHTO Product Evaluation and Audit Solutions testing results shall meet the requirements of AASHTO M 180. The rail shall be Type II, Class A. Fabricators of guardrail who supply to WVDOH projects shall meet MP 712.04.50.

DRAFT

~~January 17, 2023~~ June 24, 2024

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 715
MISCELLANEOUS MATERIALS

DELETE SUBSECTION 715.3 AND REPLACE WITH THE FOLLOWING:

715.3-FIBERS FOR PORTLAND CEMENT CONCRETE:

Fibers for Portland cement concrete shall be pre-approved fibers from the WVDOH approved list of fibers for Portland cement concrete. ~~The requirements for shotcrete fibers are separate and are addressed in Section 623.2.~~ Product submittals shall include: a completed Form HL-468 (available on the WVDOH Materials Division Web Page), a copy of the technical data sheet, the current Material Safety Data Sheet (MSDS), and the independent ~~AAHSTO~~ AASHTO accredited laboratory testing data meeting the requirements of 715.3.3. Any incomplete submittals will not be evaluated for inclusion on the WVDOH approved list of fibers for Portland cement concrete.

715.3.1-Definitions:

Micro Fibers: Fibers with diameters less than 0.012 inch.

Macro Fibers: Fibers with diameters equal to or greater than 0.012 inch.

Equivalent Diameter: Diameter of a circle having an area equal to the average cross-sectional area of a fiber.

Balling: A 1-inch diameter or greater conglomerate of fibers at the point of placement.

Aspect Ratio: Length/Equivalent Diameter, Ratio.

Hybrid Fibers: The combination of macro and micro fibers in a mix design containing fibers for Portland cement concrete.

715.3.2-Materials: Fibers shall be synthetic Type III in accordance with ASTM C1116 and ASTM D7508. ~~Hybrid fibers shall be required for use in bridge decks.~~ Type II fibers may be used in shotcrete. The use of hybrid fibers shall be permitted.

715.3.3 Fibers for Post Crack Tensile and Flexural Capacity, and Plastic Shrinkage Cracking Control: Fibers shall meet the requirements of Table 715.3.3 unless solely intended for plastic shrinkage cracking control which shall only be required to meet the requirements of the crack reduction ratio of Table 715.3.3.

TABLE 715.3.3 Minimum Required Fiber-Reinforced Concrete Properties

Required Hardened Fiber-Reinforced Concrete Properties	**Specification**	**Requirement**
Equivalent Flexural Strength $f^{150}_{e\ 150}$, min. [a]	ASTM C1609 [b]	~~150~~ 160 psi.
~~Equivalent Flexural Strength Ratio $R^{150}_{T,150}$, min.~~ [a]	~~ASTM C1609~~ [b]	~~25%~~
Crack Reduction Ratio, (CRR), min. reduction	ASTM C1579	≥ 85%

[a] The specimens shall be tested when the concrete ultimate flexural strength at peak stress (f_p) is a minimum of 650 psi. For 6 inch by 6 inch by 20 inch beam containing fibers the maximum allowable net deflection value of L/150 of the 18 inch span length is 0.12 inches.

[b] ASTM C1609 will use roller supports that meet the requirements of ASTM C1812.