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Remarks and Instructions

The complete manual, revision packages, and individual chapters can be accessed at www.wsdot.wa.gov/publications/manuals/m41-01.htm.

For updating printed manuals, page numbers indicating portions of the manual that are to be removed and replaced are shown below.

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Please contact Dan Gasche at 360-705-6970 or gasched@wsdot.wa.gov with comments, questions, or suggestions for improvement to the manual.

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Approved By

Signature

Washington State
Department of Transportation

Construction Manual

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Engineering and Regional Operations
State Construction Office

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Chapter 9 Materials

9-1 General

The quality of materials used on the project will be evaluated and accepted in various ways, whether by testing of samples, visual inspection, or certification of compliance. This chapter details the manner in which these materials can be accepted. Requirements for materials are described in *Standard Specifications for Road, Bridge, and Municipal Construction* M 41-10 Section 1-06 and Division 9.

The State Materials Engineer is responsible for the state's materials approval and acceptance program, and the Quality Assurance Program. Any changes or deviations to the approval or acceptance of materials, or the Quality Assurance Program beyond what is allowed in this chapter will require approval from the State Materials Engineer or the Assistant State Materials Engineer.

It is the Project Engineer's responsibility to accept materials in accordance with this chapter. For materials that do not meet specification requirements, the Project Engineer shall contact the State Construction Office which will coordinate with the State Materials Laboratory to determine the appropriate action.

9-1.1 PE Authority for Materials Approval and Acceptance

This chapter covers the Project Engineer's authority to approve and modify the acceptance of certain materials while maintaining normal approval and acceptance by the State Materials Laboratory and Region. The use of these processes mentioned within this section are to be implemented prior to work being performed and not to retroactively justify deficiencies discovered after the completion of work, with the exception that Reducing Frequency of Testing is implemented during the work. It is recommended that the Project Engineer office review the original Record of Materials to determine if items can be modified within the guidelines of this section. The Record of Material should be actively maintained per Section 9-1.2C. Materials accepted in accordance with these options shall be identified in the Project Engineer's preparation of the Certification of Materials under Section 9-1.2F.

The options that are available to the Project Engineer for approving and modifying the acceptance of materials are the following sections:

- Section 9-1.1A Sampling and Testing for Small Quantities of Materials
- Section 9-1.1B Reducing Frequency of Testing
- Section 9-1.1C Project Engineer Discretionary Materials Acceptance
- Section 9-1.1D Optional Approval/Acceptance for Materials

The Reduced Acceptance Criteria Checklist DOT Form 350-120 shall be completed and retained in the materials file when Reducing Frequency of Testing, Sampling and Testing for Small Quantities of Materials and Project Engineer Discretionary Materials Acceptance are invoked. All information requested on the checklist shall be filled in completely. Any items that do not require approval from the State Materials Laboratory and the State Construction Office may be approved at the Project Engineer level.

For approval of changes beyond the Project Engineer's authority (items marked with a "yes" and an "x" on DOT Form 350-120), a request must be transmitted to the

State Materials Laboratory and may require approval from the State Construction Office as well. The completed checklist shall accompany the request and represents the minimum information required to process the modification. The State Materials Laboratory and the State Construction Office have final authority to approve or reject any request for modification. Written approval by the State Materials Laboratory and State Construction Office constitutes agreement with the proposal. The signed checklist and all supporting documentation are to be placed in the project Materials File.

For approval contact the following:

- **State Materials Laboratory** – Areas of responsibility: All changes to materials approval and acceptance, and to *Standard Specifications* Division 9.
  Initial contact: Materials Quality Assurance Engineer
- **State Construction, Bridge** – Areas of responsibility: *Standard Specifications* Division 6.
- **State Construction, Roadway** – Areas of responsibility: *Standard Specifications* Divisions 2, 3, 4, 5, 7, and 8.

9-1.1A Sampling and Testing for Small Quantities of Materials

The Project Engineer may elect to accept small quantities of materials without meeting minimum sampling and testing frequencies using the following criteria. The use of this process is to be implemented prior to work being performed and not to retroactively justify deficiencies discovered after the completion of work.

An item can be accepted as a small quantity if the proposed quantity for a specific material is less than the minimum required testing frequency

Materials that will not be considered under the small quantity definition are:

- Concrete with a 28-day compressive strength of 4000 psi or greater.

Some issues that the Project Engineer may consider prior to use of small quantity acceptance are:

- Has the material been previously approved?
- Is the material certified?
- Do we have a mix design or reference mix design?
- Has it been recently tested with satisfactory results?
- Is the material structurally significant?

Small quantity acceptance could be visual, by certification, or other methods and the basis of acceptance shall be documented on DOT Form 350-120. For visual documentation, an entry should be made in the project records as to the basis of acceptance of the material, and the approximate quantity involved.

The small quantity acceptance may be used for any quantity of the following:

- Curbs and sidewalks
- Driveways and road approaches
- Paved ditches and slopes

Where jobsite mixing of concrete occurs in accordance with *Standard Specifications* Section 6-02.3(4)B small quantity acceptance can be used for acceptance of packaged concrete meeting the requirements of ASTM C 387. The packaged concrete bag must state that the concrete meets the requirements of ASTM C 387.

Washington State Department of Transportation

Reduced Acceptance Criteria Checklist

This checklist is required to be filled out for individual materials and be put in the Materials File.

If the material is listed in the CM Section 9-1.3C - 'Low Risk Materials' or this material qualifies for Visual Acceptance per 9-1.4C, then **you do not need to proceed with this form.**

Contract Number	Contract Title	Date

Bid Item Number	Plan Quantity	Material Description

Description of Change to Materials Acceptance: Explain the work being performed and the proposed changes to the normal materials acceptance, and/or inspection criteria. Explain why this is being proposed, what is the justification for the change, is this a 'critical' item of work and has proper approval (RAM/QPL) been performed?

Acceptance Criteria per RAM/QPL	Proposed Acceptance Criteria

R = Region Materials Engineer M = State Materials Laboratory C = State Construction Office	Yes	No	Required Approvals
I. Sampling and Testing for Small Quantities of Material (CM 9-1.1A)			
Is the proposed quantity greater than the minimum required frequency?	☐	☐	STOP If 'Yes'
For concrete, is the concrete Cl 4000 psi or greater?	☐	☐	STOP If 'Yes'
Is the material structurally 'significant'?	☐	☐	M C
II. Reduce Frequency of Testing: (CM 9-1.1B)			
Is the material running well within specification limits?	☐	☐	STOP If 'No'
Have ten consecutive samples been taken at normal frequency that indicate complete conformance within specification requirements?	☐	☐	STOP If 'No'
Is the proposal for deviation greater than 10% and less than 20%?	☐	☐	R
Is the proposal for deviation greater than 20% or elimintion of test?	☐	☐	M
For Quarry Sites, is 'fracture' being eliminated?	☐	☐	R
III. Project Engineer Discretionary Materials Acceptance (CM 9-1.1C)			
Is the work 'within' the vertical limits of the roadway?	☐	☐	M C
Is the dollar amount over $20,000 for this Bid Item? $ _____	☐	☐	M C
Is the total dollar amount over $50,000 for the entire project? $ _____	☐	☐	M C

State Materials Laboratory and Headquarters Construction concurrence documentation must be attached.

Approvals

Project Engineer Approval By: _____ Date _____

Region Materials Laboratory: Date of Concurrence _____

State Materials Laboratory: Date of Concurrence _____

State Construction Office: Date of Concurrence _____

DOT Form 350-120 EF 10/09 Distribution: ☐ Region Materials Lab ☐ State Materials Lab ☐ State Construction Office

Figure A-1

9-1.1B Reducing Frequency of Testing

Reducing the frequency of testing of materials is intended for WSDOT projects with a high volume of materials. In instances of uniform material production where the statistical acceptance testing data shows the material is running well within specification limits deviations from the testing frequency schedule may be instituted. Sampling frequency reduction may be considered only after ten consecutive samples taken at the normal testing frequency indicate full conformance with the specifications. The sampling and testing frequency will revert back to the normal frequency if there are any failing tests. The use of this process is to be implemented prior to work being performed and not to retroactively justify deficiencies discovered after the completion of work.

The Statistical Analysis of Materials (SAM) program will be utilized to develop and support approvals to reduce testing frequency and/or to eliminate selected test properties. Testing on selective materials may be reduced or eliminated without statistical data on select material, for example selective relief would be reduction/ elimination of fracture determinations and sand equivalent testing for production from quarry sources.

All deviations from the testing frequency must be documented in the project records, and fully explained by the Project Engineer. Lack of personnel, equipment, and facilities will not be considered sufficient reasons for such deviation.

The authority given below to approve deviations to testing frequencies shall not be subdelegated within the regions.

- The Project Engineer, licensed as a Professional Engineer in the State of Washington, may initiate and approve up to 10 percent deviations from the testing frequency schedule. The Project Engineer does not have the authority to reduce sampling frequencies for the following materials: Hot Mix Asphalt, Warm Mix Asphalt, Structural Concrete and Cement Concrete Pavement.
- The Region Materials Engineer, licensed as a Professional Engineer in the State of Washington, may approve requests from project engineers for an additional 10 percent deviation from the testing frequency schedule. The Region Materials Engineer does not have the authority to reduce sampling frequencies for the following materials: Hot Mix Asphalt, Warm Mix Asphalt, Structural Concrete and Cement Concrete Pavement.
- Elimination of fracture and/or SE from a Quarry Site requires approval from the Region Materials Engineer. Elimination of any other testing will require approval of State Materials Engineer or the Assistant State Materials Engineer.
- Request for sampling frequency deviations exceeding the Project Engineer and Region Materials Engineer reduction authority requires approval from the State Materials Engineer or the Assistant State Materials Engineer.
- Request for sampling frequency deviations for Hot Mix Asphalt, Warm Mix Asphalt, Structural Concrete and Cement Concrete Pavement require approval from the State Materials Engineer or the Assistant State Materials Engineer.

A copy of all testing frequency deviations with substantiating data approved by the Project Engineer and/or the Region Materials Engineer will be sent to the State Materials Engineer.

9-1.1C Project Engineer Discretionary Materials Acceptance

In advance of or during the course of the project, in the interest of economy and efficiency, noncritical items of work may be identified for which the Project Engineer may choose to modify the normal inspection or testing procedures. In taking these actions, the Project Engineer is acting under the professional responsibility inherent in all actions as a representative of the department and as a Licensed Professional Engineer. Full accountability of such actions is expected. The scope of such actions should not exceed $20,000 for a single bid item, nor exceed $50,000 for an entire project. Approval above these dollar amounts requires approval from the State Materials Laboratory and the State Construction Office. The use of this process is to be implemented prior to work being performed and not to retroactively justify deficiencies discovered after the completion of work.

The nature of the work to be accepted in this manner will generally be limited to minor and isolated items. Acceptance would typically involve dimensional conformance to the plans and a visual determination that the materials are suitable; however, the Project Engineer may require some testing or other means to support a decision. In such an action, the Project Engineer should be guided by the principle of achieving the intent of the contract, attaining reasonable expectations of service life proportional to cost, and protection of public safety. The changes in acceptance procedures will only be made to work occurring outside of vertical lines through the horizontal limits of the traveled way. Consideration should be given to the consequences of subsequent failure, ease of replacement, whether or not there is a high variability in the quality of similar work, or any other pertinent facts. Actions taken in accepting such materials should be identified in the project records with acknowledgment by signature of the Project Engineer, licensed as a Professional Engineer in the State of Washington.

9-1.1D Optional Approval/Acceptance for Materials

The materials listed in Table 9-1 may be accepted by visual acceptance at the option of the Project Engineer. The Project Engineer's Office can test or require additional documentation for any of the materials in this section if quality appears to be in question per *Standard Specifications* Section 1-06.1. Visual Acceptance requires Field Verification per Section 9-1.5, unless additional documentation is stipulated in the Contract Documents. The use of this process is to be implemented prior to work being performed and not to retroactively justify deficiencies discovered after the completion of work.

The Project Engineer is allowed to approve the Request for Approval of Material (RAM). If there is a question on the quality or ability of the material to perform its intended use, it is the responsibility of the Project Engineer to determine if it is appropriate to accept the materials by visual acceptance or if additional acceptance testing or certification is required. This includes contacting the Headquarters or Region Subject Matter Expert for assistance in assessing whether additional acceptance testing or certification is required for a material. Other items can be considered for addition to this list. Suggestions are encouraged and may be made to the State Construction Office or the State Materials Laboratory.

The "Buy America" requirements apply to all federally funded projects.

9-1.2 Control of Materials

The succeeding parts of this chapter outline the detailed method to be used in the control of materials. The expenditure made for materials is a large portion of construction costs. If faulty materials are permitted to be incorporated into the project, the cost of replacement may exceed the original cost.

Section 9-2 Materials Fabrication Inspection Office – Inspected Items Acceptance explains the process for the acceptance of fabricated items, and the types of Fabrication acceptance markings used to identify approved fabrication items.

Section 9-3 Guidelines for Job Site Control of Materials provides the engineer with additional information to assist in determination of the point of acceptance for materials from WSDOT and Contractor sources, the basis of acceptance, verification sampling and testing, tolerance limits, and the sampling and testing frequency guide.

Section 9-4 Specific Requirements for each Material provides specific requirements about each material that includes the following information:

1. Approval of Material
2. Preliminary Samples
3. Acceptance or Acceptance/Verification
4. Field Inspection
5. Specification Requirements
6. Other Requirements

Section 9-5 Quality Assurance Program defines the requirements for the materials tester to become qualified. The requirements for the Independent Assurance Program are also included.

Section 9-6 Radioactive Testing Devices explains policy on the administration of radioactive testing devices.

Section 9-7 WSDOT Test Methods/Field Operating Procedures defines the testing procedures and lists the equipment that are used in the field.

Material	*Standard Specifications* Reference	*Construction Manual* Section 9-4
Access Control Gates	Std Plan L-70.10 and L70.20	
Air Relief Valve	9-15.16	9-4.49
Automatic Control Valves	9-15.7(2)	9-4.49
Automatic Control Valves With Pressure Regulator	9-15.7(3)	9-4.49
Automatic Controller	9-15.3	9-4.49
Bark or Wood Chips	9-14.4(3)	9-4.48
Biodegradable Erosion Control Blanket	9-14.5(2)	9-4.80
Bollard Type 1 and 2	See Std. Plans for Bollards	9-4.95
Chain Link Gates	9-16.1(1)E	9-4.50
Check Dams	9-14.5(4)	9-4.80
Check Valves	9-15.12	9-4.49
Chemical Pesticides	8-02.3(2)A	
Clear Plastic Covering	9-14.5(3)	9-4.80
Coir Log	9-14.5(7)	9-4.80
Compost	9-14.4(8)	9-4.48
Compost Sock	9-14.5(6)	9-4.80
Concrete	9-16.1(1)F & 9-16.2(1)J	9-4.76
Concrete Brick	9-12.2	9-4.98
Detectable Marking Tape	9-15.18	9-4.49
Detectable Underground Warning Tape	9-29.1(6)	
Drain Valves	9-15.9	9-4.49
Drip Tubing	9-15.2	9-4.49
Electrical Wire and Splices	9-15.17	9-4.49
Fertilizer	9-14.3	9-4.47
Fittings and Hardware	9-16.1(1)D	9-4.50
Flow Control Valves	9-15.15	9-4.49
Galvanized Pipe and Fittings (Irrigation System)	9-15.1(1)	9-4.49
Galvanizing Repair Paint (Fence)	9-08.2	9-4.35
Gate Valves	9-15.6	9-4.49
Gypsum	9-14.4(6)	
Hose Bibs	9-15.10	9-4.49

Material	*Standard Specifications* Reference	*Construction Manual* Section 9-4
Hydraulically Applied Erosion Control Products (HECPs)	9-14.4(2)	9-4.48
Inlet Protection	8-01.3(9)D	9-4.80
Irrigation Heads	9-15.4	9-4.49
Lime	9-14.4(5)	
Manual Control Valves	9-15.7(1)	9-4.49
Miscellaneous Fence Hardware	9-16.2(1)H	9-4.50
Pipe, Tubing, and Fittings (Irrigation System)	9-15.1	9-4.49
Media Filter Drain Mix	Special Provision	9-4.101
Polyacrylamide (PAM)	9-14.5(1)	9-4.80
Polyethylene Pipe (Irrigation System)	9-15.1(3)	9-4.49
Polyvinyl Chloride Pipe and Fittings (Irrigation System)	9-15.1(2)	9-4.49
Pressure Regulating Valves	9-15.13	9-4.49
Quick Coupling Equipment	9-15.8	9-4.49
Rebar Chairs, Mortar Blocks (Dobies), and Spacers	6-02.3(24)C	9-4.29
Semi-Open Concrete Masonry Units Slope Protection	9-13.5(1)	9-4.43
Silt Fence and All Components	8-01.3(9)A	9-4.80
Sod	9-14.6(8)	
Stakes, Guys, and Wrapping	9-14.7	9-4.49
Staples and Wire Clamps	9-16.2(1)D	9-4.50
Straw	9-14.4(1)	9-4.48
Tackifier	9-14.4(7)	9-4.48
Temporary Curb	8-01.3(13)	
Temporary Pipe Slope Drain	8-01.3(14)	
Three-Way Valves	9-15.14	9-4.49
Topsoil Type A	9-14.1(1)	9-4.45
Topsoil Type B	9-14.1(2)	9-4.45
Topsoil Type C	9-14.1(3)	9-4.45
Valve Boxes and Protective Sleeves	9-15.5	9-4.49
Vertical Cinch Stays	9-16.2(1)G	9-4.50
Wattles	9-14.5(5)	9-4.80
Weed Control (Herbicides)	8-02.3(2)B	
Wire Fence and Gates	9-16.2	9-4.50 & 9-4.36
Wye Strainers	9-15.19	9-4.49

Optional Approval/Acceptance for Materials

Table 9-1

9-1.2A Materials Management Computer Programs

There is a series of material management computer programs that have been developed to aid the Project Engineer office's in tracking, approving, accepting, and testing materials.

- **Record of Materials (ROM)** – A listing of the construction items generated by the State Materials Laboratory that has been identified from the plans and specifications for each project. The ROM identifies the kinds and quantities of materials, the standard Acceptance Methods and the number of acceptance and verification samples required for each material that will be used on the project. It also lists the acceptance requirements for materials requiring other actions, such as fabrication inspection, manufacturer's certificate of compliance, shop drawings or catalog cuts.
- **Materials Tracking Program (MTP)** – A program to provide a process for the Project Offices to maintain the ROM and the bid item list. It also provides for a standardized material document tracking process with an electronic centralized data management storage system, to manage the approvals, acceptance and other material documentation associated with WSDOT construction contracts.
- **Aggregate Source Approval (ASA)** – A program that tracks aggregate sources, approvals and expiration dates for the different aggregate material types that could be used on a construction project. This application is designed to allow the user to query the database for the intended source of aggregate to be used, determine if it is approved, and print the ASA report.
- **Qualified Product List (QPL)** – A program that lists products that have been found capable of meeting the requirements of the *Standard Specifications* or General Special Provisions under which they are listed and, therefore, have been "*Approved*." These may be "*Accepted*" in the field by fulfilling the requirements of the Acceptance Code and any notes that apply to the product.
- **Statistical Analysis of Materials (SAM)** – A program that is used for the statistical acceptance of materials according to *Standard Specifications* Section 1-06. The testing data will be kept electronically for quality and compliance audits and for historical references. The program will generate the reports showing the composite pay factors and project totals.
- **Materials Testing System (MATS)** – A testing program where all materials testing will be recorded. This includes the testing performed at the State Materials Laboratory, the Region Materials Laboratory, and the project office acceptance testing. The program will generate the transmittal, provide for tracking the samples throughout the testing process, and automatically bills for the testing performed. The program will also provide a report detailing the test results, and distribute the reports according to the established distribution list.

9-1.2B Materials Forms

A number of form letters have been prepared as an aid to the Project Engineer in transmitting information to the State Materials Laboratory. In order to minimize delays to completion of material testing, transmittal letters should include all the information that is pertinent to the sample in question. In order to assist the State Materials Laboratory, copies of the transmittal letters should be retained in the project engineers Office. The following is a list of the forms that may be used for transmittal of samples and/or information to the State Materials Laboratory:

350-016	Asphalt Emulsion Sample Label
350-023 EF	Pit Evaluation Report
350-040 EF	Concrete Mix Design
350-041 EF	Request for Reference HMA Mix Design
350-042 EF	HMA Mix Design Submittal
350-067 EF	Thickness Measurements Pavement and Treated Base Cores Transmittal/Report
350-071 EF	Request for Approval of Material
350-072 EF	Transmittal of Catalog Cuts
350-073 EF	Hot Mix Asphalt Test Point Evaluation Report
350-074 EF	Field Density Test
350-092 EF	Hot Mix Asphalt Compaction Report
350-114 EF	Summary Report of Acceptance Sampling and Testing
350-115 EF	Contract Materials Checklist
350-572 EF	Manufacturer Certification of Compliance Check List
351-015 EF	Daily Compaction Test Report
410-025 EF	Project Engineer Transmittal

9-1.2C Record of Materials (ROM)

A Record of Materials (ROM) listing of all major construction items is provided by the State Materials Laboratory for each project. For these major construction items, the ROM identifies the kinds and quantities for all materials deemed to require quality assurance testing. It further identifies the minimum number of acceptance and verification samples that would be required for acceptance of those materials. The minimum number of acceptance tests is based on the planned quantities for the project and should be adjusted on the project ROM for the actual quantities used. Also listed are those materials requiring other actions, such as Fabrication Inspection, Manufacturer's Certificate of Compliance, Miscellaneous Certificates of Compliance, Shop Drawings, Catalog Cuts and Field Acceptance.

The acceptance action and/or numbers of samples listed are the minimum requirements for the Project Engineer's acceptance of those materials and the minimum requirements necessary for the Region's certification for the materials used on that project. The State Materials Laboratory will forward the Record of Materials electronically to the Region Materials Engineer, and Project Engineer shortly after the contract is awarded. The copy submitted to the Project Engineer is intended as a tool to assist the project office in tracking the materials approved, samples tested, Manufacturer's Certificate of Compliance, Shop Drawings, Catalog Cuts received, Field Acceptance, Field Verification and other pertinent data necessary for the Project Engineer's and the Region's certification of materials.

The acceptance requirements shown on the Record of Material may be modified by the Contractor's specific Requests for Approval of Material or submitted *Qualified Products List* page. In addition the ROM is based on the State Material Laboratory's review of the major items of construction identified by the contract Summary of Quantities. Reviewing the contract plans and provisions may identify additional materials documentation requirements as well as major construction items that require additional materials not accounted for in the State Material Laboratory's initial review of the project. These additional materials documentation requirements should be added to the project ROM and tracked for completion throughout the course of the project work.

The accuracy of the ROM and Certification of Materials is largely the responsibility of the Project Engineer.

Where the ROM is not clear or there appear to be opportunities to adjust the acceptance requirements that have been identified, the Project Engineer is encouraged to contact the Region Materials Engineer or the State Materials Laboratory Documentation Section for assistance.

In order to ensure clarity upon completion of the work and to allow for easy certification of the project by both the Project Engineer and the Region, it is important that the project ROM (maintained in the Materials Tracking Program) be accurately and actively maintained throughout the course of the project. Any changes to the acceptance requirements, additional materials used other than stated on the original Summary of Quantities or any additional materials added to the project by Change Order should be accurately documented and tracked in the project Record of Materials.

9-1.2D Materials Tracking Program, MTP

The Project Engineer office shall use the Materials Tracking Program (MTP) to maintain the materials documentation information for each State Contract that is administered by that office.

The MTP is a program that is an electronic filing cabinet to assist the Project Engineer office in managing and tracking required documentation. This will allow for easy certification of the project by both the Project Engineer and the Region.

The MTP is organized by Bid Item – Sub item as generated by the original Record of Materials. Materials documentation such as approval, acceptance, field verification, CMO and other documentation for each item is required to be maintained for each permanently incorporated material. The Project Engineer office is expected to keep up to date entries for accurate tracking of materials placed on the jobsite and update the MTP to reflect the actual materials and quantities placed. The program also tracks deficiencies and has various reports available for tracking documentation.

The program is located at http://webprod2.wsdot.wa.gov/materials/tracking.

9-1.2E Certification of Materials Origin

Projects that include Federal funding, or any project defined in the Federal Record of Decision under the National Environmental Policy Act (NEPA), must meet the requirements of "Buy America" (23 CFR 635.410, 23 USC 313). This provision, incorporated into the contract by General Special Provision, applies to all products containing steel or iron permanently incorporated into the project. The Contractor may choose to utilize minor quantities of foreign steel or iron, as described in the General Special Provision. Minor amounts of foreign steel and iron may be used in the project provided the cost of the foreign material used does not exceed one-tenth of one percent of the total contract cost or $2,500.00, whichever is greater. Included in this amount is state supplied materials, Proprietary items and Contractor provided materials.

The "Buy America" provision applies to products that are manufactured predominately of steel and iron if the product consists of at least 90 percent steel or iron content when it is delivered to the jobsite for installation. The 90 percent is a percentage of the total monetary value of the manufactured product.

To determine the 90 percent value, divide the raw steel or iron costs by the total manufactured product costs (without taxes, shipping, handling, or other fees applied), and if the percentage is equal to or greater than 90 percent of the final manufactured product costs, then the "Buy America" provision applies.

Determining whether a product is a steel or iron manufactured product, the jobsite includes the locations where any precast concrete products are manufactured. For example, in the specific case of "precast concrete products," the casting yard/facility is considered part of the "jobsite." Therefore, the iron and steel materials delivered to the precast yard/facility are subject to the "Buy America" provision.

The Contractor shall provide the completed and signed Certification of Materials Origin (CMO) to the Project Engineer prior to such items being incorporated into the permanent work. This certification may be supplied using DOT Form 350-109 EF or another form containing all the same information as required by DOT Form 350-109 EF. It is the responsibility of the Project Engineer to ensure the CMO is on file prior to placing or paying for products that are made of steel or iron. CMOs for domestic steel or iron from fabricated inspected items will be retained by the fabrication inspection office. The exception is 30 inch diameter or less concrete pipe (see Sections 9-4.16 and 9-4.21). The Project Engineer is required to ensure these CMOs are on file prior to placement and payment.

In all cases, Certification of Materials Origin (CMO) must be completed and signed prior to incorporation of the steel or iron materials into the project. It is the responsibility of the Project Office to ensure that the CMO is on file prior to placing or paying for steel or iron materials, as defined below.

Fabricated Items

- WSDOT Fabrications Inspection Offices will review the supporting documentation, i.e., Mill Certificates and CMOs prior to inspecting and Stamping/Tagging the fabricated material. The Fabricator/plant is required to supply the Fabrications Inspector the DOT Form 350-109 EF completed and signed with each item prior to inspection.
- The project field inspector is required to document in the IDR, QPL Contractor Product Information Page, or Field Note Record (FNR) prior to placement that the fabricated material is identified with a "D" – Domestic or "F" – Foreign per Section 9-1.5. Fabricated items bearing an "F" or not bearing any Stamp when delivered to the job site requires that the Project Engineer office obtain the DOT Form 350-109 EF from the Contractor and retain this form in the project records.

Non-Fabricated Items

- The Project Office is required to obtain, and place in the materials file, a completed Certification of Materials Origin for any materials containing iron or steel. This certification may be supplied using DOT Form 350-109 EF or another form containing all the same information as required by DOT Form 350-109 EF.

In summary, if a CMO is required, the Project Office is responsible for obtaining and filing the CMO prior to placement of or payment for the material unless the material is a fabricated item with a "D" stamp documented in the file.

Examples of products that are subject to "Buy America" provision include, but are not limited to the following:

- Steel or iron products used in pavements, bridges, tunnels or other structures, which include, but are not limited to the following: fabricated structural steel, reinforcing steel, piling, high strength bolts, anchor bolts, dowel bars, permanently incorporated sheet piling, bridge bearing, cable wire/strand, pre-stressing/post-tensioning wire, motor/machinery brakes and other equipment for moveable structures.
- Guardrail, guardrail posts, end sections, terminals, cable guardrail.
- Steel fencing material (fabric), fence post.
- Steel or iron pipe, conduit, grates, manhole covers, risers.
- Mast arms, poles, standards, trusses, or supporting structural members for signs, luminaires, or traffic control systems.
- Steel or iron components of precast concrete products, such as reinforcing steel, wire mesh and pre-stressing or post-tensioning strands or cables.

The miscellaneous steel or iron components, subcomponents and hardware necessary to encase, assemble and construct the above products (or manufactured products that are not predominantly steel or iron) are not subject to the "Buy America" provision. Examples include, but are not limited to the following:

- Materials listed under Section 9-1.3C – Low Risk Materials
- Anchor Ferrules
- Architecture miscellaneous items – doors, hinges, fixtures, faucets, shelves, etc.
- Bollard and Components
- Non-High Strength Bolts, Washers, and Nuts

- Clamps
- Dobie/Mortar Blocks
- Construction Aides – lifting hooks and inserts
- Electrical Miscellaneous Fittings
- Erosion Control Miscellaneous Hardware
- Fence Miscellaneous Hardware
- Gate Hardware (except for fabric and poles)
- Gabion Miscellaneous Hardware (except for twisted and welded fabric)
- Irrigation System Components and Hardware (except for steel or iron pipes and conduit)
- Pipe Sleeves
- Precast Concrete Traffic Barrier Pins
- Rebar chair and Spacers
- Screws
- Shims
- Slope Protection Miscellaneous Hardware
- Utility Inserts
- Welding Rods and Welding Wire
- Weld Splices for Precast Concrete Girders

9-1.2F Project Material Certification

The Project Engineer is responsible for obtaining all required materials documentation or otherwise ensuring that all required materials testing is completed, all with satisfactory results, prior to the materials being incorporated into the project. The Project Engineer is also responsible for maintaining a comprehensive accounting for the materials incorporated into the project in order to support the Region's Certification of Materials. Managing and accounting for materials used in the construction of a project are to be administered in the same manner regardless of its funding source; Federal, State, or a combination of both.

The Region is responsible for periodic reviews of each project's materials documentation at the Project Engineer's Office. Upon completion of the project the Region will prepare a Region Materials Certification letter listing all variances that were identified and their resolution. On projects that involve Federal participation where material deficiencies are documented, these deficiencies must be resolved with the State Construction Office through the Region before the Region Certification of Materials can be completed. On projects that involve State Funds only, documented deficiencies must be resolved with the Region prior to the Region Certification of Materials. The Regional Administrator or their designee is responsible for signing and distributing the certification letter.

The State Materials Laboratory will also perform compliance reviews on a sampling of completed projects statewide where the materials have been certified.

9-1.2F(1) Definitions

(I) Certification

A Region Materials Certification based on a documented evaluation of the project's materials inspection, sampling, testing, and other materials acceptance activities for their conformance to the contract documents, *Standard Specifications*, and this manual. The certification reflects the project's conformance with the Record of Materials as adjusted by the Project Engineer for:

1. Actual project quantities utilized.
2. Acceptance practices as provided for in this chapter.
3. Adjusted sampling/testing frequencies as provided for in Section 9-3.
4. Work added by Change Order.

(II) Variance

An identified difference between the materials acceptance requirements noted in this manual, the contract documents, the *Standard Specifications*, and a review of the completed projects Record of Materials. All variances must be noted. Such notations must include the basis by which the material was accepted and how the requirements for that material were met. Any variance between the recognized acceptance requirements and the Project Engineer's use of the material must be resolved with the Region, State Construction Office, and/or State Materials Laboratory, as appropriate.

9-1.2F(2) Project Material Certification Process

(I) Environmental and Engineering Programs Division (EEPD)

1. State Materials Laboratory (Documentation Section)
   a. Prepare the initial Record of Material for all major items of materials listed in the contract.
   b. Provide technical support, certification guidelines, format, and suggested documents. See Figure 9-1 for Contract Materials Checklist DOT Form 350-115. See Figure 9-2 for examples of the Region Materials Certification letter and its distribution.
   c. Conduct Compliance Reviews on a sampling of completed projects statewide where the Region has certified the materials.
2. State Construction Office (Documentation Engineer)
   a. Receives variances for federal aid projects identified during the Region's materials certification review.
   b. Coordinates with FHWA and Region to determine funding eligibility for variances.
   c. Prepares response to Region identifying degree of participation (Letter of Resolution).

3. Accounting Office

   a. The federal aid section will make the appropriate transaction as necessary upon receipt of the Letter of Resolution.

   b. Voucher a federal project only after receiving a copy of the Project Materials Certification, the Letter of Resolution and assure that the appropriate credit has been made to FHWA.

   c. Attach a copy of the Letter of Resolution to the Journal Voucher sent to FHWA.

(III) Region

1. Project Engineer

   a. Sets up and maintains a materials documentation system.

   b. Maintains and monitors a working Record of Material (ROM) ensuring materials certification throughout the course of the project.

   c. Identify, document, and justify all materials variances including determination and acceptance of noncritical items in accordance with Section 1-2.8. Justification may be any of the following:

      - Follow requirements of Section 1-2.8C(3) if the deficiency is a lack of manufacturer's certification.
      - Satisfy the deficiency through additional testing or documentation.
      - Demonstration that the existing documentation is adequate (for example, 19 out of 20 test were taken).
      - Demonstration that the cost of obtaining the missing documentation will not be justified by the benefits received.

   d. Identify and document the determination and acceptance of all non-critical items in accordance with Section 9-1.1.

   e. Prepares the Region Materials Certification package, which includes the Region Materials Certification memorandum, identified variances, Letters of Resolution for all identified variances on federal aid projects and resolution actions taken. This package also includes a completed Contract Materials Checklist DOT Form 350-115. The certification package is submitted to the Region Construction Manager for review. The certification letter is to be addressed to the State Construction Engineer.

2. Region Operations/Construction Office

   a. The Region shall review projects according to Section 10-5 for documentation requirements including materials.

   b. Resolve materials variances identified by the Project Engineer and the Region's review of materials documentation at the Region level for State funds only projects. Resolve materials variances on Federal aid projects through contact with the State Construction Office.

   c. Review certification package for completeness.

Washington State Department of Transportation

Contract Materials Checklist

Contract Number	Sign Route	Federal Aid Number(s)

Project Title

	Yes	No*	N/A	Item No(s).
1. All materials/products used in the construction of this project, including items added by Change Order, have been approved & are listed on the Record of Materials.		**		
2. The actual materials/products used along with the actual basis for acceptance of those materials and products has been documented.		**		
3. All uses of proprietary items, including those listed in the Special Provisions and/or contractor provided QPL items, are documented.				
4. When required, change of material/product letters and a revised RAM were initiated by the contractor.				
5. A Change Order has been completed for all materials accepted and incorporated into the project, but which failed to meet the required specifications when tested.		**		
6. An appropriate credit has been received for all non-specification materials used.		**		
7. Modifications to testing/inspection procedures, including CM 9-1.1, have been explained and documented by the Project Engineer prior to construction of the item.				
8. Acceptance based on Sampling and Testing for Small Quantities has been documented. CM Chapter 9-1.1A.				
9. Where Manufacturers Certifications were not provided prior to material or product installation, the Project Engineer has provided specific prior approval for the work to continue in accordance with 1-06.3 of the Standard Specifications.				
10. All required acceptance actions and documentation were completed and satisfactory test results demonstrated before payment was made on each item.				
11. Acceptance sampling & testing frequencies for each item accepted is adequate for the total quantities of those items incorporated into the project.		**		
12. All Acceptance Sampling and Testing completed by the Project Engineer utilized Qualified Testers and Certified Testing Equipment in accordance with the Qualified Tester program.				
13. All fabrication inspected items have been accepted in accordance with CM 9-2.1A		**		
14. The contractor has submitted all required Manufacturer Certifications and Mill Certifications, the Certifications represent the specification requirements noted in the contract, and quantities represented by the certifications match or exceed the final quantities used.		**		
15. All required catalog cuts have been approved and are on file.		**		
16. All required Certificates of Materials Origin have been received and are on file. (Fed Aid projects only)		**		

* Checklist items marked "No" constitute a Materials Certification deficiency. Each "No" requires the contract item number for the affected item to be shown along with an attachment to the Materials Checklist detailing the circumstances of use, the method used for acceptance of the material, the Project Engineer's evaluation of the material, suitability for it's application, and determination as to whether or not it may have met the specification in spite of the materials documentation oversight. If the project is Federally funded, the Project Engineer should also include a recommendation for Federal participation in light of the use of undocumented materials.

** These specific materials deficiencies on Federal Aid projects must be resolved through State Construction Office and may result in the loss of Federal participation.

Project Engineer's Signature _____ Date _____

Region Construction Engineer/Operations Engineer/Area Engineering Manager Signature _____ Date _____

DOT Form 350-115 EF
Revised 02/2010

Figure 9-1

Washington State Department of Transportation

Memorandum

Date:

Jeff Carpenter, P.E.
State Construction Engineer
P.O. Box 47354
Olympia, WA 98504-7354
MS: 47354

Cont. No.: SR-
F.A. No:
Section:

Completion Date: (may be substantial, physical, or completion date)

Dear Jeff:

This is to certify that:

The results of acceptance sampling and testing completed for the project referenced above, confirm that the materials incorporated into the project were found to have met the requirements as outlined in the contract plans, provisions, and Standard Specifications.

There were no exceptions

OR:

This is to certify that:

The results of the tests on acceptance samples indicate that the material incorporated in the construction operations controlled by sampling and testing were in conformance with the approved plans and specifications.

Exceptions to the plan and specifications are explained on the attached sheet(s).

Very truly yours,

Regional Administrator or designee

XX:xx
Attachment

cc: FHWA, 40943 (F.A. Projects Only)
State Materials Engineer, 47365
Regional Oper./Const. Engineer
Project Engineer

DOT Form 700-008 EF

Figure 9-2

d. Submit certification memorandum and Contract Materials Checklist to Regional Administrator for signature.

e. Distribute signed Region Materials Certification memorandum. The original is submitted to the State Construction Engineer, with copies sent to FHWA (for F.A. Projects) and the State Materials Engineer. A copy of the Letter of Resolution shall be attached if there are any variances.

3. Regional Administrator, or designee

   a. Signs the certification letter memorandum and Contract Materials Checklist.

4. State Construction Administration and Support Accounting Office

   a. Completes the necessary paperwork.

(IV) State Materials Laboratory – Compliance Review for Materials Certification Process

Compliance reviews will be performed by the State Materials Laboratory to document conformance of project records to materials certification standards.

The compliance review will normally be conducted at the Project Engineer office unless arrangements are made for it to be conducted elsewhere.

The goal is to perform a compliance review on at least one project per Project Engineer office every two years. Compliance reviews may be conducted more frequently as appropriate. Projects will be selected with consideration given to project size and complexity.

Reviews may be performed either prior to or after receipt of the Region Certification of Materials letter. Compliance reviews are performed in order to assist the Project Engineer office in verifying that all required materials documentation and testing has been completed in accordance with established requirements and standards. If the review is to be performed at the receipt of the Region Materials Certification Letter, the State Materials Laboratory will notify the Region within 60 days of intent to perform a compliance review on that project. Compliance reviews performed prior to receipt of the Region Materials Certification Letter will occur at any time after Substantial Completion.

The records maintained and developed by the Project Engineer for approval, acceptance and field verification of materials placed and paid for on the contract and any variances will be reviewed.

Upon completion of the review, the findings will be discussed with the Project Engineer and/or their representative. Deficiencies not rectified or meeting the requirements of Section 9-1.2F shall be noted during the Materials Certification. A copy of the final report will be sent to the Region Documentation Engineer, Construction Manager, State Construction Office, and the FHWA Division Office.

In addition to addressing material documentation deficiencies, the Project Engineer/ Construction Manager will correct any such discrepancy in the Project Engineer office material documentation process noted during the Compliance review.

The following items of documentation must be made available for the review:

1. Record of Materials, as revised and amended by the Project Engineer office (see Section 9-1.2C)
2. Approval Documents
   a. Request for Approval of Material (see Section 9-1.3B)
   b. *Qualified Products List* pages (see Section 9-1.3A)
3. Acceptance Documents
   a. Test Results
      - Acceptance Test Reports
      - Assurance Test Reports (where applicable)
      - Independent Assurance Test Reports (where applicable)
      - Verification Test Reports (Cement and Liquid Asphalt)
   b. Manufacturer's Certificate of Compliance (see Section 9-1.4D)
   c. Miscellaneous Certificates of Compliance (see Section 9-1.4E)
      - Lumber Grading Certificate
      - Certification of Cement Shipment
      - Notice of Asphalt Shipment or Certified Bill of Lading
      - Any other certificates required by the contract documents
   d. WSDOT Fabrications Inspected Items (see Section 9-1.4B)
   e. Concrete Pipe Acceptance Report (see Section 9-1.4B(3))
   f. Catalog Cuts (see Section 9-1.4G)
   g. Proprietary or Agency Supplied Items (see Section 9-1.3B(1)(IV) and 9-1.3B(1)(V))
   h. Visual Acceptance Items (see Section 9-1.4C)
   i. Reduced Acceptance Criteria Checklist (see Section 9-1.1)
4. Field Verification Documentation (see Section 9-1.5)
   a. Inspectors Daily Reports
   b. Field Note Records
5. Inspectors Daily Reports
6. Field Note Records
7. Comparison/Summary of Quantities
8. List of Change Orders
9. Project Engineer office Signature/Initial List

9-1.3 Approval of Materials

Prior to use, the Contractor must notify the engineer of all proposed materials to be permanently incorporated into the project in accordance with *Standard Specifications* Section 1-06.1. Some temporary items may require approval if required by the Contract Documents. This may be accomplished by a Qualified Product List (QPL) submittal or by submitting a Request for Approval of Material (RAM) DOT Form 350-071.

When materials are approved, it does not necessarily constitute acceptance of the materials for incorporation into the work. All additional acceptance actions, as noted by the code on the RAM or QPL must be completed prior to the materials being used in the work.

9-1.3A Aggregate Source Approval and the Qualified Products List

9-1.3A(1) Aggregate Source Approval

The State Materials Engineer establishes requirements for aggregate source sampling, testing and approval of aggregate sources in the Aggregate Source Approval (ASA) database. The ASA engineer at the State Materials Laboratory maintains and updates the ASA computer database, records source approvals, and coordinates with source owners and the Region materials engineers on sampling and testing for source approvals.

The Region Materials Engineer, licensed as a Professional Engineer in the State of Washington, may initiate and approve up to a 3 month extension of an aggregate source on a project-by-project basis for a WSDOT construction project as long as the extension is approved prior to the aggregate source/material expiration date. The Region materials engineer may approve infrequently used state owned aggregate sources that have expired in the ASA database without additional testing. In all cases the Region materials engineers shall base their decisions on testing data, source history, proposed material use, and other engineering information that supports extending approval duration or approving a state owned source. The Region Materials Engineer's decision must be documented and submitted to the State ASA Engineer for inclusion in the ASA Database. Lack of personnel, equipment, facilities, cost of testing and construction project deadlines will not be considered sufficient reasons for extending aggregate source approval dates.

Once the approval duration for a privately owned or leased aggregate source expires a re-evaluation of the aggregate source is required prior to approval unless the State Materials Engineer approves an extension. The Region materials engineer may request an aggregate source approval extension for an expired aggregate source by submitting the documentation noted above along with their recommended time extension to the ASA engineer. The State Materials Engineer will review the Region Materials Engineer's recommendation and determine if an extension or re-evaluation of the aggregate source is warranted.

For aggregate sources having variable quality, the Region Materials Engineer may have remarks added to the ASA database indicating that the aggregate source approval is on a stockpile basis. The Region Materials Engineer may approve these aggregate sources by either a stockpile(s) or on a project-by-project basis provided the aggregate source approval duration has not expired.

9-1.3A(2) Qualified Products List (QPL)

Products listed in the QPL have been found capable of meeting the requirements of the *Standard Specifications*, General Special Provision, Bridge Special Provision. and *Standard Plans* under which they are listed and, therefore, have been "Approved." These products may be "Accepted" by fulfilling the requirements of the Acceptance Code and any notes that apply to the product. If the Contractor elects to use the QPL, the most current list available at the time the product is proposed for use, shall be used. During the life of the contract, acceptance methods for materials in the QPL may change, becoming more stringent or less stringent. The acceptance method detailed on the originally submitted QPL page will continue to be the acceptance method for the life of the contract, unless the Contractor submits a new QPL page for the material. This is the case regardless of whether the acceptance method becomes more stringent or less stringent. Instructions are given in the QPL for processing QPL submittals. Contractors and Project Engineer offices are encouraged to use the QPL database for submittals. The QPL database is constantly updated with additions and/or deletions and can be accessed at www.wsdot.wa.gov/biz/mats/qpl/qpl.cfm.

The Project Engineer office shall review the material submittal for consistency with the Bid Item and shall promptly notify the Contractor of any concerns, working with the Contractor toward resolving these issues. QPL submittals inconsistent with the intended use for the Bid Item should be marked "unacceptable for intended use" and returned to the Contractor. Copies of QPL pages for materials that are to carry a WSDOT Fabrication Inspection "Stamp/Tag" or Sign Inspection "Decal" shall be forwarded to the WSDOT Headquarters Fabrication Inspection Office.

9-1.3B Request for Approval of Material – Submittal

The Contractor shall submit all Request for Approval of Materials (RAM) to the Project Engineer office using the WSDOT RAM form DOT Form 350-071.

If a RAM is submitted with a material found on the QPL, the project engineers office may code the RAM as defined in Section 9-1.3B(1).

If a RAM is submitted with a material not identified under the "Project Engineer's Office Approval Coding" (Section 9-1.3B(1)), the Project Engineer's Office shall submit the RAM to the State Materials Laboratory Documentation Section for coding.

The coding of the RAM is to determine if the proposed material on the RAM is capable of meeting the established standards and defining the acceptance method. Acceptance determines if the material being placed on the contract does meet the established standards.

When unable to approve a RAM as outlined below, the Project Engineer or delegated representative will sign, date, and code the items with a "7" –"Approval Pending" and forward it to the State Materials Laboratory Documentation Section. If the RAM is not filled out correctly it will be returned to the Project Engineer's Office prior to any action being taken. It is recommended that the RAM be submitted in a timely manner. The RAM may be forwarded by mailing, electronically transferring or faxing. A copy should also be returned to the Contractor at this point to inform them that the RAM has been sent to the State Materials Laboratory for approval. Submit any additional documentation, including appropriate transmittals that may assist the RAM engineer

in approving the proposed material; such as Test Reports, Catalog Cuts, Manufacturer's Certificate of Compliance, etc. The page number of the Special Provision or Plan Sheet will also aid in expediting the approval process.

The State Materials Laboratory Documentation Section may elect to delegate approval of some specialty items.

All RAMs shall be signed and dated by the engineer. Copies of all RAM's processed through the Project Engineer's Office shall be sent to the State Materials Laboratory Documentation Section. Copies shall be distributed as indicated at the bottom of the RAM form. Acceptance requirements should be noted on the maintained ROM and/or Materials Tracking Program (MTP). This is especially important since the maintained ROM and/or MTP will be used for auditing purposes.

9-1.3B(1) Project Engineer's Office Approval Coding

(I) QPL Reference Materials

The engineer may code the RAM if the product listed on the RAM is identified in the QPL by make, model, batch, color, size, part no., etc. The product must also be listed in the QPL under the appropriate *Standard Specifications* for the intended use as indicated by the Bid Item and Specification Reference shown on the RAM. The RAM should be coded with the 4-digit QPL acceptance code and any notes and/or restrictions restated as "Remarks" on the RAM.

(II) Aggregates

Aggregate Sources will be approved by consulting the Aggregate Source Approval database for the use intended. The Project Engineer shall approve the RAM, coding when there is a sampling frequency in Section 9-3.7 with a "1" – "Conditionally Approved: Acceptance based upon Satisfactory Test Report." Aggregates that do not have a sampling frequency should be coded per requirements of the ASA database. Print the ASA Report and attach it to the approved RAM.

The Region Materials Engineer may have added remarks to the ASA database for aggregate sources having variable quality. Contact the Region Materials Engineer prior to use. It has been demonstrated that some of these sources can provide quality material through diligent production and stockpile management. The Region Materials Engineer may approve these aggregate sources by the stockpile(s) or on a project-by-project basis.

Review the approval date on the ASA Report to verify that the approval of the aggregate source has not expired or will not expire before the end of your contract. If the aggregate source is approved at the beginning of your project, it does not mean that it is approved for the duration of the project. If the aggregate source requires evaluation, contact the Region materials office for further direction. If samples are required, the Region materials office will coordinate with the ASA engineer to obtain the necessary samples in accordance with SOP 128.

The remarks in the ASA Report also need to be reviewed to make sure that there are no additional requirements or restrictions on the material that you intend to use. If you are using concrete aggregate, review the ASR values to see if ASR mitigation is required for the concrete mix design.

(III) Optional Approval/Acceptance

The Project Engineer may elect to approve some materials by invoking Section 9-1.1D. This process allows the Project Engineer to approve the RAM. The PE needs to verify the material being approved meets the requirements listed and is for the same specifications as the material listed in Section 9-1.1D. After verifying concurrence with Section 9-1.1D, the Project Engineer shall approve the RAM, coding with an "8 – Approved per CM Section 9-1.1D."

(IV) Proprietary Materials

Where the Contract Documents state "shall be…" and list products by specific name and model, the Contractor needs only to complete the RAM indicating to the engineer the intended choice. The engineer shall approve the RAM, coding with an "8" – "Source Approved" and note the page number where it is listed in the Contract Documents as a proprietary product. Occasionally proprietary materials will have additional acceptance criteria and these criteria need to be noted on the RAM. On occasion the Subject Matter Expert for the material being placed may ask for additional documentation.

The "Buy America" requirements apply to Proprietary materials used on all federally funded projects. The "Buy America" requirements should be addressed by the Designer prior to including the material into the Contract Special Provisions. Ultimately it is the responsibility of the Project Engineer to verify that the requirements are met.

(V) Agency Supplied Materials

An approved RAM is not required for Agency Supplied Materials. If a RAM is submitted to the PEO, the engineer shall approve the RAM, coding with an "8" – "Source Approved" and note the page number where it is listed in the Contract Documents as an Agency Supplied Material. Additional acceptance criteria may be required by the Contract Special Provisions or Plans.

The "Buy America" requirements apply to Agency Supplied materials used on all federally funded projects. The "Buy America" requirements should be addressed by the Designer prior to including the material into the Contract Special Provisions. Ultimately it is the responsibility of the Project Engineer to verify that the requirements are met.

(VI) Concrete and Asphalt Batch Plants

For Concrete Batch Plants, the Project Engineer office shall ensure requirements of *Standard Specifications* Section 6-02.3(4)A are met prior to approving the RAM.

For Asphalt Mixing Plants, the Project Engineer office shall ensure requirement of *Standard Specifications* Section 5-04.3(1) are met. There is no approval on the RAM required for Asphalt Mixing Plants, however coding the RAM with an "8" – "Source Approved" would be appropriate.

(VI) Recycle Materials for Aggregate

Requirements for recycled materials in aggregates are described in *Standard Specifications* Section 9-03.21 which applies to recycled hot mix asphalt, portland cement concrete rubble, glass aggregates and steel furnace slag. The Project Engineer is required to verify that recycled material imported to the job site is not classified as a Dangerous Waste per the Dangerous Waste Regulations WAC 173-303. Recycled materials obtained from the Contracting Agency's roadways will not require testing and certification for toxicity testing or certification for toxicity characteristics.

The Project Engineer needs to do the following in order to determine and document the recycled material is not classified as a Dangerous Waste and is acceptable for use on a WSDOT project:

- Have the Contractor provide documentation identifying what recycled materials the Contractor is proposing to use and sampling documentation.
- Have the Contractor provide testing information from representative samples of the recycled material and check to ensure the recycled material is below the Maximum Concentration of Contaminates for the Toxicity Characteristics in the Toxicity Characteristics List in WAC 173-303-090.
- Have the Contractor certify that the recycled material is not a Washington State Dangerous Waste per WAC 173-303.

The Project Engineer can contact the WSDOT Hazardous Materials Program to help evaluate sample approach, lab results, help in determining if changes in the recycled material warrant additional testing, or other assistance as needed. The Hazardous Material Program can be reached at 360-570-6656.

The Contractor is required to do sampling and testing for toxicity of the recycled material at the frequency specified in *Standard Specifications* Secction 9-03.21(1) prior to combining with other materials and not less than one sample and test from any single source. If the Project Engineer suspects the recycled material may be contaminated based on a change in odor, appearance, or knowledge of the source of material, the WSDOT Hazardous Materials Program should be contacted to determine if a verification sample should be tested for toxicity. Sample results are expected to exhibit the average properties of the stockpile of material being proposed for use. The final blended product shall meet the acceptance requirements for the specified type of aggregate.

The RAM should be coded an "8" and noted as "certification and approval testing per *Standard Specifications* Section 9-03.21" in the remarks field.

9-1.3C Low Risk Materials

There are low risk materials that may be used in the project without contractor identification per *Standard Specifications* Section 1-06 or any other documentation unless stipulated in the Contract Documents. The "Buy America" requirements apply to all federally funded projects. Table 9-2 is a listing of these materials. Other items can be considered for addition to this list. Suggestions are encouraged and may be made to the State Construction Office or the State Materials Laboratory.

- Adhesive for Butyl Rubber Sheeting
- Asphaltic felt for bridge approach slabs and pavement seats
- Backer Rod for Induction Loop Vehicle Detectors
- Butyl Rubber Sheeting
- Coloidal copper compound
- Concrete Drain Tile with Cover for Ground Rods
- CSL Access Tubes and Caps
- Duct tape for bridge approach slab anchors
- Electrical pull string
- Electrical tape
- Expanded polystyrene for bridge approach slab anchors
- Friction tape, and moisture proof varnish for friction tape
- Fasteners for Mailbox Supports (bolts, nuts, and washers)
- Galvanized wire mesh and hardware for screens on sign bridges and cantilever sign structure bases
- Grout for cosmetic purposes
- High Visibility Fence including hardware and stakes
- Locknuts for terminating conduit
- Log Weirs and Root Wads with associated hardware
- Loose Woody Debris with associated hardware
- Mailbox Support Type 1
- Metal Form For Light Standard Foundation
- Nails
- Oxide Inhibitors for Aluminum Conductors
- Parting Compound for Concrete Forms
- Pea gravel for decorative purposes
- Pipe wrap and spacers for electrical conduit
- Polypropylene rope for induction loop centralizers
- Premolded joint filler for expansion joints in sidewalks, curbs, and gutters
- PVC pipe for bridge approach slab anchors
- PVC Pipe for Weep Holes through Bridge Abutment Pier Walls, Reinforced Concrete Retaining Wall Stem Walls, and Concrete Fascia Panels
- PVC solvent cement
- Rebar tie wire (plain and epoxy-coated)
- Shims for Concrete Barrier
- Signal Foundation Identification Tag and Epoxy adhesive to attache them
- Silicone sealant for electrical service cabinets
- Spacers for electrical conduit duct bank
- Spacers for rebar columns
- Steel Reinforcing Bar Centralizers
- Weed-free straw bales not used as mulch or check dams

Low Risk Materials
Table 9-2

9-1.4 Acceptance Methods for Materials

Materials acceptance is accomplished by several different methods. Once a material is approved and has demonstrated the ability to meet the applicable specification, a proper method of acceptance is determined for that type of product. The approved Request for Approval of Material or submitted Qualified Product List page will state the acceptance method.

Types of Acceptance methods are Sampling and Testing, WSDOT Fabrications Inspection, Manufacturer's Certificate of Compliance, Miscellaneous Certificates of Compliance, Shop Drawings, Catalog Cuts, Optional Approval/Acceptance for Materials, Visual Acceptance or Reduced Acceptance Criteria. Sampling and testing is the highest level of acceptance method showing conformance to the requirements. All designated acceptance documentation is to be approved and retained prior to material being placed except for verification samples and Manufacturer's Certificate of Compliance within the restraints of *Standard Specifications* Section 1-06.3.

9-1.4A Testing

Project Engineer offices are responsible for tracking the acceptance/verification tests performed on their contracts. Refer to *Standard Specifications* Section 1-06.2(1) and this chapter for testing criteria and frequency information. This chapter also includes a large variety of test procedures that may be performed in the field office lab or at the jobsite by a qualified tester. All testers shall be qualified to perform sampling/testing for those acceptance tests found in the *Construction Manual* M 41-01.

9-1.4A(1) Reference Test Report

When a Satisfactory Test Report is required, a Reference Test Report may be used if allowed in Section 9-4 for that specific material. A Reference Test Report as listed below will not be allowed for HMA Mix Designs or other materials unless allowed per Section 9-4.

A Reference Test Report shall consist of a printed copy of the current electronic QPL database page showing "referenced" lots previously tested during the current calendar year. The lot number in the QPL must match the lot number of the material used. The information will be listed in the "description" field for specific materials in the QPL. The QPL page used as the "Reference Test Report" shall be within the same calendar year that the material is used on the project. The QPL page must reflect the same specification as the material to be used and be received prior to installation of the intended material.

The use of a test report from another contract is no longer acceptable as a Reference Test Report.

9-1.4A(2) Statistical Acceptance With SAM

The Statistical Analysis of Materials program (SAM) has been developed to calculate the percent within limits of materials being statistically accepted per *Standard Specifications* Section 1-06.2(2). When the test results for at least three samples has been entered, the program will calculate the percent within limits based on the upper and lower acceptance limits, calculate the pay factor for each, and calculate the composite pay factor (CPF) for the material being evaluated.

(I) Initial Material Set-up

When a contract requires statistical analysis to be used, the "lot" acceptance criteria for the material needs to be entered into SAM. A lot is defined as 15 sublots; the final lot may be increased to 25 sublots. All samples from a material type, i.e., gravel backfill for walls, mineral aggregate, concrete aggregate, or CSBC shall be evaluated collectively. For paving concrete, each class of mix shall be evaluated collectively. For hot mix asphalt, each job mix formula, and all changes to that job mix formula shall be evaluated collectively.

Make sure that this information is correct. Once test data has been entered, the lot acceptance criteria can not be altered. There are three ways to establish the lot acceptance criteria:

1. Select the material. The appropriate specifications will be automatically retrieved.
2. For HMA, you can enter the mix design number, and the JMF, the acceptance specifications, the tolerances, price adjustment factors, and the upper and lower acceptance limits will be automatically retrieved.
3. Pick User Define and you will be able to add new requirements, or edit existing requirements. For HMA, make sure that you calculate the upper and lower acceptance criteria based on the tolerance limits.

If there is a change to the HMA job mix formula, (JMF), the program allows you to copy existing lots. The original mix design and a "-1, -2, -3…" number is added, and you are allowed to edit the JMF. These JMF's will be evaluated collectively.

It is important to delete lots that are not used from the program. The statistical acceptance results are used by other programs to evaluate the material.

(II) Inputting Test Results

Once the testing has been completed, the test results need to be entered into the program for the material being tested as soon as possible. Once the office starts using the Materials Testing Program for the field testing, the test results will be retrieved into the statistical program.

(III) Review work

As with all materials documentation, this information entered into the statistical program needs to be reviewed regularly to make sure that there are no mistakes. If an error has been found in the test data, the original data can be revised. If an error has been found in the lot acceptance criteria, all of the test data will have to be deleted and re-entered under the new lot.

(IV) Contractor Access

The PEO documentation engineer will give the contractor access to the statistical program. This will allow the contractor access to the statistical program for the work order they are working on to view the acceptance results. They will not be able to change the lot acceptance criteria or any test results. They will be able to access the acceptance portion of the program, and view the gradation report, the compaction report, and the contract detail report.

9-1.4B Fabricated Items

9-1.4B(1) Stamp/Tag

Items that are inspected and found to meet contract document requirements by the WSDOT Materials Fabrication Inspection Office are identified by a Stamp or Tag. This type of inspection is generally performed at the manufacturing or fabrication plants. There are various types of Stamps or Tags used for acceptance of inspected items, which attest that the item was in full conformance with the specifications at the time of inspection. The inspected items, along with the type of Stamp or Tag designation, are covered under Section 9-2.

It is the responsibility of the Project Engineer office to notify the WSDOT Materials Fabrication Inspection Office when their inspection services are needed by sending a 'cc' of the approved RAM or submitted QPL page to WSDOT Fabrications at fabinspect@wsdot.wa.gov. The Contractor or the Fabricator may also contact the WSDOT Materials Fabrication Inspection Office for needed inspection.

To schedule a fabrication inspection contact:

Fabrication Inspection – 360-709-5407

Mail Stop to send hardcopy documents – MS 47365 Attn: Fabrication Inspection

E-mail Address: fabinspect@wsdot.wa.gov

Physical Address: 1655 S 2nd Ave. SW, Tumwater, WA 98504-7365

WSDOT Materials Fabrication Inspection Office can be contacted at:

- State Materials Laboratory (Tumwater) 360-709-5407
- Seattle Inspection 206-464-7770
- Vancouver Inspection 360-905-2230
- Online at wwwi.wsdot.wa.gov/maintops/mats/construction/fabrication.htm

If there are no Stamps or Tags present, inform the Contractor that the item is not acceptable and contact the Materials Fabrication Inspection Office to determine the status of the inspection. Items lacking Stamps or Tags and those items damaged during shipping should be rejected and the material tagged or marked appropriately.

9-1.4B(2) Signing Decal

Signing items that are inspected and found to meet contract document requirements by the WSDOT Materials Fabrication Inspection Office are identified by a Decal. This type of inspection is performed at the sign fabrications plant. The Decal present attests that the item was in full conformance with the specifications at the time of inspection. The Decal designation is covered under Section 9-2.

It is the responsibility of the Project Engineer office to notify the WSDOT Materials Fabrication Inspection Office when their inspection services are needed by sending a 'cc' of the approved RAM or submitted QPL page to WSDOT Fabrications at fabinspect@wsdot.wa.gov. The Contractor or the Fabricator may also contact WSDOT Materials Fabrication Inspection Office as listed in Section 9-1.4B(1) for needed inspection.

9-1.4B(3) Concrete Pipe Acceptance Report

Concrete Pipe less than 30 inches in diameter that are inspected and found to meet contract document requirements by the WSDOT Materials Fabrication Inspection Office are identified by a Concrete Pipe Acceptance Report.

The Concrete Pipe Acceptance Report will indicate the date and original test results as performed by the Fabrication Inspector and will bear the appropriate certification from the fabricator.

It is the responsibility of the Project Engineer office field inspector to verify material delivered to the jobsite is represented by the Concrete Pipe Acceptance Report delivered with the pipe. The Concrete Pipe Acceptance Report is only valid for a 90 day period starting from the manufacturing date of the tested pipe.

The field inspector is required to verify the following:

- Manufacturing date of the pipe is within the 90-day window on the report.
- Pipe is at the age of the specified days or older as stated on the concrete pipe acceptance report.

Note: Concrete Pipe greater than 30 in require different acceptance per Section 9-4.

The WSDOT Materials Fabrication Inspection Office can be contacted as listed in Section 9-1.4B(1).

9-1.4C Visual Acceptance

Visual Acceptance is appropriate for material that has the lowest risk and consequence of failure. The field inspector is required to verify that proper "Approval" has been performed per Section 9-1.3. No further documentation is required for acceptance unless the Contract Documents mandate additional information.

9-1.4D Manufacturer's Certificate of Compliance

As designated by the specifications and contract special provisions, certain materials may be accepted on the basis of a Manufacturer's Certificate of Compliance. This acceptance is an alternative to job site sampling and testing. The submitted *Qualified Products List* page or approved Request for Approval of Material shall stipulate the items for which a compliance certification is an acceptable basis of acceptance. The Manufacturer's Certificate of Compliance is required prior to permanent installation of the material. See Section 1-2.8C(3) for guidance on allowing material to be placed without certification.

The form of the Manufacturer's Certificate of Compliance will vary considerably based on both the material and the origin, and may take the form of standard certificate form, individual letter from manufacturers, or overstamp on bill of lading. Certain information is required and is designated by the specifications. This information includes the identity of the manufacturer, the type and quantity of material being certified, the applicable specifications being affirmed, and the signature of a responsible representative of the manufacturer. Supporting mill tests or documents may also be required. A Manufacturer's Certificate of Compliance is required for each delivery of material to the project and the lot number, where lot numbers apply, of material being certified shall be identified.

Upon receipt of the Manufacturer's Certificate of Compliance at the project office, it shall be reviewed for compliance with the specification requirements using the preceding guidelines and the checklist for Transmittal of Manufacturer's Certificate of Compliance Check List DOT Form 350-572. The manufacturer of the material must make the certification. A supplier certificate is not acceptable except as evidence for lot number and quantity shipped and can only be accepted when accompanied by a certificate from the manufacturer, which meets the requirements of *Standard Specifications* Section 1-06.3. The Project Engineer's Office is required to retain the signed and dated Manufacturer's Certificate of Compliance Check List for each submittal.

9-1.4E Miscellaneous Certificate of Compliances

As designated by the specifications and contract special provisions, certain materials may be accepted on the basis of a Certificate of Compliance. Various Certificates of Compliance, such as a Lumber Grading Certificate, Lumber Grading Stamp, Certificate of Treatment, Bag Label, Concrete Delivery Ticket, Asphalt Certification of Shipment (BOL), Supplier's Certificate and Contactor's Certificate, may be required for acceptance on different types of materials.

Standard Specifications, Contract Provisions, and Chapter 9 may require written verification or retention of the Certificate of Compliances by the Project Engineer office Field Inspector.

9-1.4F Shop Drawings

As designated by the specifications and contract special provisions, certain materials may be accepted on the basis of a Shop Drawing. Shop drawings are generally manufacturer's or fabricator's drawings that show details about an item being built for a specific job. Approval of Shop Plans and Working Drawings is per Section 1-2.4H and Figure 1-1.

The Shop Drawing shall be retained and placed in the Materials Files for acceptance.

9-1.4G Catalog Cuts

As designated by the contract documents, certain materials may require the acceptance method be based on a Catalog Cut. A Catalog Cut may also be required in support of approving a Request for Approval of Materials (RAM) per Section 9-1.3B. The approved Catalog Cut is required prior to installation of the material.

Upon receipt of the Catalog Cut information at the project office, an initial review for compliance with the established specifications and contract documents should be performed. All information shall be accompanied by the "Transmittal of Catalog Cuts" form generated with the Record of Materials. The project office shall follow the directions on the Transmittal of Catalog Cuts DOT Form 350-072 and submit the package to the State Materials Lab Documentation Section for approval, or as per the original Record of Material. The Transmittal of Catalog Cuts form and catalog cuts for those materials listed in *Standard Specifications* Section 9-14 and 9-15, and accepted based on approved catalog cuts, should be submitted to the Region or State Roadside and Site Development Office for approval.

The Catalog Cut may be forwarded by mailing, electronically transferring or faxing.

9-1.5 Field Verification of Materials

All material permanently incorporated into a contract shall be field verified by the inspector. Field Verification shall occur prior to or during placement of the material. When the field inspector signs/initials a Field Note Record (FNR) for payment, they are affirming that items requiring field verification have been checked and have been found to be acceptable.

The field inspector shall inspect the product, material and construction processes for conformity to the contract requirements. The field inspector shall also inspect the product or material for shipment and handling damage.

The field inspector is required to verify that the material being placed is the same material that was submitted on the *Qualified Products List* (QPL) page or as listed on the approved Request for Approval of Material (RAM). The field inspector is also required to verify that the material being installed is the same lot/heat number/roll of material that was tested or certified for acceptance.

For WSDOT Fabrications Inspected items, the field inspector shall document in either the Inspector's Daily Report (IDR), QPL Contractor Product Information Page, or FNR the quantity, WSDOT Tag/Stamp/Decal and Material Origin Foreign or Domestic (F or D) designation.

If the placement of the materials has occurred prior to approval or acceptance, the field inspector is required to document in either the FNR or IDR all information that can be gathered such as Quantity, Manufacturer, Lot, Heat Number, Model or Type. The note in the FNR or IDR will link what was placed once the Approval and Acceptance documents have been received. The field inspector should immediately notify the Project Engineer office documentation person of the deficiency to ensure missing documentation is obtained.

Photos with dates are good supporting documentation and are highly recommended for all permanently placed materials.

9-2 Materials Fabrication Inspection Office – Inspected Items Acceptance

9-2.1 General

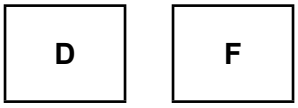
All fabrication inspection of construction materials is performed by the WSDOT Materials Fabrication Inspection Office, unless otherwise delegated by the State Materials Laboratory Construction Materials Engineer.

Items that are inspected and found to meet contract requirements by the WSDOT Materials Fabrication Inspection Office are identified by a tag or stamp. This type of inspection is generally performed at the manufacturing or fabrication plants; however there are items that are inspected at the job site as identified in Section 9-4. There are various types of Stamps or Tags used for acceptance of inspected items, which attest that the item was in full conformance with the specifications at the time of inspection. The inspected item along with the type of stamp designation is covered under Section 9-2.2.

9-2.1A Acceptance of Fabricated Items

The following is the process for the acceptance of inspected items.

1. The manufacturing or fabrication plant must be approved via the "Request for Approval of Material," (RAM) or the *Qualified Products List* (QPL)
2. The Materials Fabrication Inspection Office Inspector will obtain the necessary mill certifications, Certificate of Material Origin, or other documentation from the manufacturer. After assuring the inspected item and documentation meets contract provisions the inspector will identify approved material by applying a stamp or tag shown in Figure 9-3 through 9-7.



Domestic or Foreign Identifier Stamp
Figure 3A and 3B

Items containing Foreign steel and iron, and coating or or other processes performed outside the USA will be stamped with an "F" identifier, and items containing steel that has been determined to be of domestic origin will be stamped with a "D" identifier. See Figure 3A and 3B. This stamp is in addition to the appropriate acceptance tag or stamp in Figure 9-3, 9-4, 9-5, and 9-7. The "F" or "D" identifier will be stamped next to the acceptance stamp. For those items with an acceptance tag, the "F" or "D" stamp will be stamped on the back of the Tag.

For projects with the Buy America requirement, the Project Engineer office is required to obtain the Certificate of Materials Origin for foreign steel from the Contractor, track the quantity and retain these documents in the project records.

9-2.2 Inspected Items, Stamps, and Tagging Identification

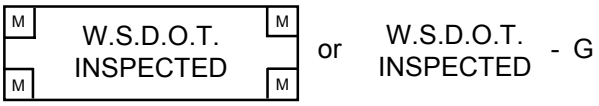
The following are examples of the types of Stamps and Tags used by the WSDOT Materials Fabrication Inspection Office. The letter or letter number combination on the Stamp or Tag represents the inspector who performed the inspection. In Figure 9-3, the inspector identification is denoted "M" and "G." In Figure 9-4, the inspector identification is denoted "N," and the "001234" is the inspection identification number.

9-2.2A Inspected Stamp Identification

The Stamp shown in Figure 9-3 identifies inspection and the inspector of the following items:

- Expansion Joints (Excluding Modular Expansion Joints)
- Precast Concrete Barrier
- Precast Concrete Catch Basins
- Precast Concrete Drywell
- Precast Concrete Inlets
- Precast Concrete Junction Boxes Type 1, 2, and 8
- Precast Concrete Manholes
- Precast Concrete risers and adjustment sections 4 in and above
- Signing Hardware
- Steel Culvert Pipe and Pipe Arch (Treated)
- Other items per the contact

All documentation associated with the Stamp in Figure 9-3 will be reviewed and approved by the WSDOT Materials Fabrication Inspection Office and kept at the point of Manufacture. Quantities of foreign steel used on the project will not be tracked by the WSDOT Materials Fabrication Inspection Office.



Stamps
Figure 9-3

9-2.2B Inspected Stamp and Tag Identification

The Stamp shown in Figure 9-4 or Tag shown in Figure 9-5 identifies inspection and the inspector of the following items:

- Anchor Bolts (ASTM A449 and ASTM F1554)
- Bridge Bearings (Disc, Spherical, Cylindrical, and Fabric Pad)
- Cattle guard
- Coated Steel Piling
- Concrete Drain, Perforated Underdrain, Culvert, and Storm Sewer Pipe (30″ and above in diameter)
- Concrete Sanitary Sewer Pipe (30″ and above in diameter)
- Epoxy Coated Steel Reinforcing Bars
- Grates (Grate Inlets and Drop Inlets)
- Handrail
- High Mast Light Poles (Contract Provisions)
- High Strength Bolts (shop provided)
- Light and Signal Standards
- Metal Bridge Railing (Steel and Aluminum)
- Miscellaneous Welded Shop Items
- Modular Expansion Joint
- Piles (Structural and Soldier)
- Precast Concrete Block Walls
- Precast Concrete Bridge Deck Panels
- Precast Concrete Box Culvert
- Precast Concrete Cable Vault's
- Precast Concrete Floor Panels
- Precast Concrete Junction Boxes Type 4, 5, and 6
- Precast Concrete Marine Pier Deck Panels
- Precast Concrete Noise Barrier Walls
- Precast Concrete Pier Caps
- Precast Concrete Pull Boxes
- Precast Concrete Retaining Walls
- Precast Concrete Roof Panels
- Precast Concrete Structural Earth Walls
- Precast Concrete Vaults (Utility, Drainage, etc.)
- Precast Concrete Wall Panels
- Precast Concrete Wall Stem Panels
- Precast Reinforced Concrete Three Sided Structures
- Prestressed Concrete Girders
- Prestressed Concrete Piles
- Seismic Retro Fit Guardrail Posts (Welded base plates)
- Seismic Retro Fit Earthquake Restrainers
- Sign Structures
- Steel for Bridges
- Steel Column Jackets
- Structural Steel for State Ferry System
- Wood Bridges
- Other items per the contact

All documentation associated with the Stamp in Figure 9-4 or the tag in Figure 9-5 will be reviewed and approved by the WSDOT Materials Fabrication Inspection Office and kept at the WSDOT Materials Fabrication Inspection Office. Quantities of foreign steel used on the project will not be tracked by the WSDOT Materials Fabrication Inspection Office.

Stamp
Figure 9-4

Tag
Figure 9-5

9-2.2C Inspected Tag Identification

The Tag in Figure 9-6 identifies inspection and the inspector of Treated Timber, Piling and Poles.

All documentation associated with the tag in Figure 9-6 will be reviewed and approved by the WSDOT Materials Fabrication Inspection Office and kept at the WSDOT Materials Fabrication Inspection Office.

Tag
Figure 9-6

9-2.2D Inspected Casting Stamp Identification

The Stamp shown in Figure 9-7 identifies inspection and the inspector of the following items:

- Gray-Iron Castings
- Steel Castings
- Ductile-Iron Castings (Catch Basin Frame and Grates, Manhole Ring and Covers, etc.)
- Other items per the contact

For Rectangular Frames and Grates, each set shall be stamped aligning the adjacent mating surfaces to each other. This alignment is critical as the leveling pads are ground to prevent rocking of the grates in the frames.

All documentation associated with the Stamp in Figure 9-7 will be reviewed and approved by the WSDOT Materials Fabrication Inspection Office and kept at the WSDOT Materials Fabrication Inspection Office. Quantities of foreign steel used on the project will not be tracked by the WSDOT Materials Fabrication Inspection Office.

WSDOT-A

Stamp
Figure 9-7

(This Stamp is impressed on the casting and will be circled with spray paint for ease of visibility of the Stamp.)

9-2.3 Sign Fabrication Inspection

The WSDOT Materials Fabrication Inspection Office is responsible for inspection of all permanent Signs detailed in the Contract Plans. Construction and temporary signs are not inspected by the WSDOT Materials Fabrication Inspection Office. The Materials Fabrication Inspector will verify that signs meet the requirements of the contract. The inspector will attach a "Fabrication Approved" decal (see Figure 9-8) to all approved signs prior to shipment of the sign to the job site (except double sided signs). Sign mounting hardware provided by the Sign Fabricator will be inspected and approved by the Materials Fabrication Inspector prior to shipment to the job site. The inspector will stamp each box of hardware "WSDOT INSPECTED" (see Figure 9-3).

Pre-approval of the Sign Fabricator by Traffic Operations and the WSDOT Materials Fabrication Inspection Office is required.

Figure 9-8

9-2.4 Concrete Pipe Acceptance Report

The WSDOT Materials Fabrication inspection Office periodically inspects and witnesses testing of concrete pipe less than 30 in in diameter at approved fabricators. During this inspection, samples of each type, size, and class of pipe are inspected and tested to verify compliance with the *Standard Specifications*.

For a 90-day period from the date of manufacture, concrete pipe less than 30 in in diameter may be shipped and accepted based on "Concrete Pipe Acceptance Reports." The concrete pipe that ships must be at the age or older than the concrete pipe tested and represented by the Concrete Pipe Acceptance Report. This report is prepared by the Materials Fabrication Inspector and copies are thereafter supplied by the fabricator to accompany each shipment of pipe.

9-3 Guidelines for Job Site Control of Materials

9-3.1 General

The intent of sampling and testing is to ensure that the material provided to the project conforms to the specifications. The frequency schedule in Section 9-3.7 covers the minimum requirements for sampling and testing at the project level. The Project Engineer is responsible for obtaining the number of samples necessary to ensure adequate control of the material being produced under the circumstances and conditions of the particular project. There may be cases where production is just getting under way, where source material is variable or marginal in quality. Also operations from commercial sources when small lots of material are being sampled (as for barge loads of aggregate) or when stockpiles are built and depleted may require more frequent sampling and testing. A minimum of one acceptance test is required unless the Project Engineer reduces materials acceptance per Section 9-1.1.

When in doubt as to sampling requirements, refer to Record of Materials (ROM), Request for Approval of Material (RAM), and Section 9-4.

In some instances, items usually sampled by project engineers representative may be sampled and tested by representatives of the State Materials Laboratory or other representatives. Such items as shown in this chapter, when properly identified with an "APPROVED FOR SHIPMENT" Tag, may be accepted for use by the Project Engineer without any further sampling or testing.

9-3.2 Sample Types

9-3.2A Preliminary Samples and Tests

Preliminary samples are intended to show the general character of the materials available or proposed for use. The sample may be taken from a natural deposit, the general stock of a dealer, or elsewhere. The material sampled may require further treatment before it will meet the specification requirements. Preliminary samples are a basis for approving which aggregate site or brand of material will be considered for use. Deliveries cannot be accepted on the basis of preliminary samples unless the samples represent an identified lot of materials.

Unless specified for a particular purpose, preliminary sampling and testing of materials from a potential source are not mandatory functions. It is to be performed when requested by the Project Engineer, Region Materials Engineer or the State Materials Laboratory on the Request for Approval of Material DOT Form 350-071.

9-3.2A(1) Sampling and Testing for Aggregate Source Approval

A pit or quarry source owner may contact the State ASA Engineer directly to request an ASA source approval and will pay all sampling and testing charges. If the Region or project offices elect to sample a pit or quarry for source approval for a project and this is paid by project funds, the samples will have to be obtained by the Region Materials Engineer's designated representative according to WSDOT SOP 128 and include all of the required documentation.

9-3.2A(2) Sampling and Testing for Preliminary Hot Mix Asphalt Mix Design

These samples are used to determine if the aggregate source is capable of meeting the mix design specification requirements. Preliminary samples shall be taken in accordance with WSDOT FOP for AASHTO T2 and consist of a minimum of 200 pounds of mineral material. Contact the Region materials office if preliminary samples are required. Give full details of type of construction proposed.

9-3.2B Acceptance Samples and Tests

Acceptance samples and tests are defined as those samples tested for determining the quality, acceptability, and workmanship of the materials prior to incorporating the materials into the project. The results of these tests are used to determine conformance to the contract requirements. The minimum frequency for sampling and testing of acceptance samples is detailed in Section 9-3.7.

The Code of Federal Regulations, 49 CFR, has listed certain materials to be hazardous. When shipping hazardous materials using a common carrier, i.e. UPS or Fed Ex, the USDOT and the carrier have special requirements that need to be followed. The following is a list of hazardous materials that we commonly sample and test on our projects; paint, epoxy part B, pigmented sealer, form release oil, and polyester resin. When these materials or other hazardous materials need to be sent for testing, contact the Region Materials Laboratory for shipping instructions. The Region Materials Laboratory needs to contact the shipper for proper shipping requirements.

9-3.2C Verification Samples and Tests

Verification samples and tests are used for verifying the reliability of a manufacturers test results when acceptance of the material is based upon a Manufacturer's Certificate of Compliance. In the event of a failing verification test, the Project Engineer office will be notified by the State Materials Laboratory or the State Construction Office. The Project Office needs to verify whether the material has been used. If the material was used, the Project Engineer office shall contact the State Construction Office which will coordinate with the State Materials Laboratory to determine the appropriate action.

9-3.3 Test Numbering

A separate series of numbers, starting with "No. 1" in each instance, shall be used for acceptance, independent assurance, and verification samples for each type of material for which there is a separate bid item. Verification samples shall be referenced to the corresponding Manufacturer's Certificate of Compliance.

9-3.4 Point of Acceptance

9-3.4A State Owned Source

Material produced from a State owned source may be accepted either as it is placed into stockpile or as it is placed in hauling vehicles for delivery to the roadway. The sampling and testing frequency during stockpiling shall be in conformance with Section 9-3.7.

In the event sample testing during stockpiling shows the material to be outside of specification limits, but within the tolerance limits, acceptance testing will be performed as the material is being used.

9-3.4B Contractor's Source

If stockpiled material is set aside exclusively for use on WSDOT projects it may be accepted the same as a state-owned source. If stockpiles are constructed for general use, materials for WSDOT projects shall be tested for acceptance from samples taken by the Project Engineer representative in accordance with WSDOT FOP for AASHTO T 2. The engineer will determine the exact point of acceptance. If an existing stockpile was built without acceptance testing during material production, and later set aside exclusively for use on state projects, the material may be accepted with satisfactory test results from samples taken by the Project Engineer representative in accordance with WSDOT FOP for AASHTO T 2. The sampling and testing frequency shall conform to Section 9-3.7.

9-3.5 Basis for Acceptance

The basis of acceptance of Hot Mix Asphalt and aggregates may be either by statistical evaluation or non-statistical evaluation methods. The method to be used is specified in *Standard Specifications* or Contract Documents.

The testing tolerances shown in Section 9-3.6 apply exclusively to the appropriate specifications as listed in the *Standard Specifications*.

9-3.5A Basis for Acceptance – Statistical Evaluation

For materials being accepted using statistical evaluation procedures, random samples will be evaluated to determine quality level within a defined tolerance band. Acceptance, bonus, and disincentive procedures are defined in the contract documents.

Test results with acknowledged errors or equipment deficiencies are to be immediately discarded without recourse and another sample run.

9-3.5A(1) Contractor HMA Retest

Test results for Hot Mix Asphalt may be retested at the request of the Contractor, as defined in the *Standard Specifications* Section 5-04.3(8)A. This specification allows the Contractor to request a retest of any sublot, provided the request is submitted in writing and within seven calendar days after the specified test results have been posted to a WSDOT website.

A split of the original acceptance sample must be tested utilizing different equipment and a different qualified tester. It is therefore necessary that a split of every field sample (i.e., opposite quarter from acceptance test) be saved in a secure area, accurately marked, and be available for retesting if necessary. The specification requires that the retesting be performed in the Region Materials Laboratory or the State Materials Laboratory. When the Contractor requests a retest, it is expected that the split sample be sent and tested as quickly as possible. This will require that testing of these samples be prioritized. By expediting the retest, problems that may exist in testing or with the material being produced can be identified and corrected, lessening the impact to both the Contractor and WSDOT.

9-3.5B Basis for Acceptance – Non-Statistical Evaluation

If statistical acceptance procedures are not specified non-statistical acceptance method will be used.

9-3.5B(1) Hot Mix Asphalt

When the test results for Hot Mix Asphalt fall outside the tolerance limits according to *Standard Specifications* Section 9-03.8(7), the material will be statistically evaluated according to the *Standard Specifications* Section 5-04.5(1)A.

9-3.5B(2) Aggregate

When the test results for aggregate fall outside the specification limits, the aggregate will be statistically evaluated according to the *Standard Specifications* Section 3-04.3(5).

The following sections (I) and (II) and Section 9-3.6 only apply to projects awarded prior to 2012, and that are not statistically accepted.

(I) Prior to Completion of Placement

During the production and placement of aggregate materials and when an acceptance test indicates the material is outside specification limits, the following actions shall occur:

1. Take the following actions any time a sample falls outside the specification limits, but within tolerance bands:
   a. Immediately take two separate additional samples representing current production in accordance with Section 9-4.
   b. Production will be accepted until the second sample is checked for properties that were out of specification in the first sample.
   c. Do not accept any additional material if the second sample is also out of specification.
   d. If the second sample is within specification, immediately check the third sample. Do not accept any additional material if the third sample is out of specification.
   e. No further material will be accepted after the time of rejection until corrections are made in the operations. This will be confirmed by new tests within specification limits.
   f. Basis for acceptance after this correction will be in conformity with the procedure outlined above. All tests of material outside the specification limits must be listed and justified on the materials certification as required by Section 9-1.2F(2).

2. The acceptance of material shall cease with any of the following conditions:
   a. When a sample falls outside of the applicable tolerance bands.
   b. When any two out of three consecutive samples are within tolerance bands, but outside specification limits.
   c. When any sample has a gradation that falls within both the high and low tolerance bands.
   d. When any sample of the material is outside the specification limits, but within the tolerance bands, in any two of the following properties:
      - Gradation
      - Fracture
      - Sand Equivalent
      - Flat and Elongated
      - Uncompacted Void Content of Fine Aggregate (Fine Aggregate Angularity)

(II) After Completion of Placement

Tolerance limits do not apply when all of the material has been placed on the project prior to completion of the testing. For materials that do not meet specifications, the Project Engineer office shall contact the State Construction Office which will coordinate with the State Materials Laboratory to determine the appropriate action.

9-3.5C Basis for Acceptance – Performance Graded Asphalt Binder and Emulsified Asphalt

The basis for acceptance of asphalt binder and emulsified asphalts is compliance with existing specifications as modified to include the tolerance as follows:

1. If a binder or emulsified asphalt sample fails to meet the required specifications, the binder or emulsified asphalt samples prior to and subsequent to the failed sample will be tested. Samples of asphalt binder or emulsified asphalt will continue to be tested until samples taken both prior to and subsequent to the failing samples meet the specifications.
2. If a binder or emulsified asphalt sample does not meet the specifications but is not more than 10 percent outside the specification limits and the binder or emulsified asphalt sample prior to and subsequent to the out of specification binder or emulsified asphalt both meet the specifications, there will be no price adjustment.
3. If the binder or emulsified asphalt sample is more than 10 percent out of specification or if the binder or emulsified asphalt sample is less than 10 percent out of specification and the binder or emulsified asphalt sample prior to or subsequent to the out of specification sample does not meet the specifications, the HMA or emulsified asphalt will be rejected.

9-3.6 Tolerance Limits

Crushed Screenings ¾" – ½" for New Construction B.S.T.	Specification Limits	Tolerance Limits
% Passing 1″	99-100	95-100
% Passing ¾″	95-100	90-100
% Passing ½″	0-20	0-25
% Passing ⅜″	0-5	0-10
% Passing No. 200	0-1.5	0-2.0
Fracture	90% Min.	85% Min.

Crushed Screenings ⅝" – No. 4 for Seal Coat B.S.T.	Specification Limits	Tolerance Limits
% Passing ¾″	99-100	95-100
% Passing ⅝″	95-100	90-100
% Passing No. 4	0-10	0-15
% Passing No. 10	0-3	0-7
% Passing No. 200	0-1.5	0-2.0
Fracture	90% Min.	85% min.

Crushed Screenings ½" – No. 4 for New Construction and Seal Coat B.S.T.	Specification Limits	Tolerance Limits
% Passing ⅝″	99-100	95-100
% Passing ½″	90-100	85-100
% Passing ⅜″	60-85	55-90
% Passing No. 4	0-3	0-8
% Passing No. 200	0-1.5	0-2.0
Fracture	90% Min.	85% Min

Crushed Screenings ⅜" – US No. 4 for Seal Coat	Specification Limits	Tolerance Limits
% Passing ½″	99-100	95-100
% Passing ⅜″	70-90	65-95
% Passing No. 4	0-5	0-10
% Passing No. 200	0-1.5	0-2.0
Fracture	90% Min.	85% Min

Crushed Screenings No. 4 – 0" Choke Stone for New Construction and Seal Coat B.S.T.	Specification Limits	Tolerance Limits
% Passing ⅜″	99-100	95-100
% Passing No. 4	76-100	71-100
% Passing No. 10	30-60	26-64
% Passing No. 200	0-10.0	0-11.0
Fracture	90% Min.	85% Min.

Permeable Ballast	Specification Limits	Tolerance Limits
% Passing 2½″	99-100	95-100
% Passing 2″	65-100	60-100
% Passing ¾″	40-80	35-85
% Passing No. 4	0-5 Max.	0-6 Max.
% Passing No. 100	0-2.0	0-2.9
Fracture	75% Min.	70% Min.

Crushed Surfacing Base Course	Specification Limits	Tolerance Limits
% Passing 1¼″	99-100	95-100
% Passing 1″	80-100	75-100
% Passing ⅝″	50-80	45-85
% Passing No. 4	25-45	20-50
% Passing No. 40	3-18	3-20
% Passing No. 200	7.5 Max.	9.0 Max.
Sand Equivalent	40 Min.	35 Min.
Fracture	75% Min.	70% Min.

Streambed Sediment	Specification Limits	Tolerance Limits
% Passing 2½″	99-100	95-100
% Passing 2″	65-95	60-100
% Passing 1″	50-85	45-85
% Passing No. 4	26-44	21-49
% Passing No. 40	16 max.	18 max.
% Passing No. 200	5.0-9.0	3.0-10.0.

Crushed Surfacing Top Course	Specification Limits	Tolerance Limits
% Passing ¾″	99-100	95-100
% Passing ½″	80-100	75-100
% Passing No. 4	46-66	41-71
% Passing No. 40	8-24	5-27
% Passing No. 200	10.0 Max.	11.0 Max.
Sand Equivalent	40 Min.	35 Min.
Fracture	75% Min.	70% Min.

Maintenance Rock	Specification Limits	Tolerance Limits
% Passing ⅝″	99-100	95-100
% Passing ½″	90-100	85-100
% Passing No. 4	45-66	40-71
% Passing No. 40	10-25	8-30
% Passing No. 200	7.0 Max.	8.0 Max.
Sand Equivalent	40 Min.	35 Min.
Fracture	75% Min.	70% Min.

Gravel Backfill for Walls	**Specification Limits**	**Tolerance Limits**
% Passing 4″	99-100	95-100
% Passing 2″	75-100	70-100
% Passing No. 4	22-66	17-71
% Passing No. 200	5.0 Max.	6.0 Max.
Sand Equivalent	60 Min.	55 Min.
Dust Ratio	⅔ Max.	

Gravel Backfill for Pipe Zone Bedding	**Specification Limits**	**Tolerance Limits**
% Passing 1½″	99-100	95-100
% Passing 1″	75-100	70-100
% Passing ⅝″	50-100	45-100
%Passing No. 4	20-80	15-85
% Passing No. 40	3-24	2-29
% Passing No. 200	10.0 Max.	11.0 Max.
Sand Equivalent	35 Min.	30 Min.

Gravel Backfill for Drains	**Specification Limits**	**Tolerance Limits**
% Passing 1″	99-100	95-100
% Passing ¾″	80-100	75-100
% Passing ⅜″	0-40	0-45
% Passing No. 4	0-4	0-5
% Passing No. 200	0-2	0-2.5

Gravel Backfill for Drywells	**Specification Limits**	**Tolerance Limits**
% Passing 1½″	99-100	95-100
% Passing 1″	50-100	45-100
% Passing ¾″	0-20	0-25
% Passing ⅜″	0-2	0-3
% Passing No. 200	0-1.5	0-2.0

Backfill for Sand Drains	**Specification Limits**	**Tolerance Limits**
% Passing ½″	90-100	85-100
% Passing No. 4	57-100	52-100
% Passing No. 10	40-100	35-100
% Passing No. 50	3-30	2-35
% Passing No. 100	0-4	0-5
% Passing No. 200	0-3.0	0-3.9

Sand Drainage Blanket	**Specification Limits**	**Tolerance Limits**
% Passing 2½″	90-100	85-100
% Passing No. 4	24-100	18-100
% Passing No. 10	14-100	9-100
% Passing No. 50	0-30	0-35
% Passing No. 100	0-7	0-8
% Passing No. 200	0-3.0	0-3.9

Gravel Borrow	Specification Limits	Tolerance Limits
% Passing 4″	99-100	95-100
% Passing 2″	75-100	70-100
% Passing No. 4	50-80	45-85
% Passing No. 40	30 Max.	33 Max.
% Passing No. 200	7.0 Max.	9.0 Max.
Sand Equivalent	50 Min.	45 Min.

Select Borrow	Specification Limits	Tolerance Limits
% Passing 6″	99-100	95-100
% Passing 3″	75-100	70-100
% Passing No. 40	50 Max.	55 Max.
% Passing No. 200	10.0 Max.	12.0 Max.
Sand Equivalent	30 Min.	25 Min.

Foundation Material Class A	Specification Limits	Tolerance Limits
% Passing 2½″	98-100	93-100
% Passing 2″	92-100	87-100
% Passing 1½″	72-87	67-92
% Passing 1¼″	58-75	53-80
% Passing ¾″	27-47	22-52
% Passing ⅜″	3-14	2-16
% Passing No. 4	0-1	0-2

Foundation Material Class B	Specification Limits	Tolerance Limits
% Passing 2½″	95-100	90-100
% Passing 2″	75-100	70-100
% Passing 1½″	30-60	25-65
% Passing 1¼″	0-15	0-17
% Passing ¾″	0-1	0-2

Hot Mix Asphalt	Specification Limits	Tolerance Limits
Asphalt Binder-Performance Grade (PG)	AASHTO M320	±10% of spec
Fracture	90% min.	85% min.
Uncompacted Void Content of Fine Aggregate < 3 million ESAL's ≥ 3 million ESAL's	 40% min 44% min	 35% min 39% min
Sand Equivalent	45 min.	40 min.

9-3.7 Acceptance Sampling and Testing Frequency Guide

Item	Test	Acceptance Sample
Gravel Borrow	Grading & SE	1 – 4000 Ton
Select Borrow	Grading & SE	1 – 4000 Ton
Gravel Borrow for Structural Earth Wall See Note 7	Grading & SE	1 – 4000 Ton
Sand Drainage Blanket	Grading	1 – 4000 Ton
Gravel Base	Grading, SE & Dust Ratio	1 – 4000 Ton
CSTC	Grading, SE & Fracture	1 – 2000 Ton
CSBC	Grading, SE & Fracture	1 – 2000 Ton
Streambed Sediment	Grading	1 – 500 tons
Maintenance Rock	Grading, SE & Fracture	1 – 2000 Ton
Ballast	Grading, SE & Dust Ratio	1 – 2000 Ton
Permeable Ballast	Grading & Fracture	1 – 2000 Ton
Backfill for Sand Drains	Grading	1 – 2000 Ton
Crushed Coverstone	Grading, SE & Fracture	1 – 1000 Ton
Crushed Screening		
⅝ – No. 4	Grading & Fracture	1 – 1000 Ton
½ – No. 4	Grading & Fracture	1 – 1000 Ton
No. 4 – 0	Grading & Fracture	1 – 1000 Ton
Gravel Backfill for		
Foundations	Grading & SE	1 – 1000 Ton
Walls	Grading, SE & Dust Ratio	1 – 1000 Ton
Pipe Zone Bedding	Grading & SE	1 – 1000 Ton
Drains	Grading	1 – 500 Ton
Dry Wells	Grading	1 – 500 Ton
PCC Paving		
Coarse Aggregate See Note 4	Grading	1 – 2000 CY
Fine Aggregate See Note 4	Grading	1 – 2000 CY
Combined Aggregate See Note 4	Grading	1 – 2000 CY
Air Content	Air	1 – 500 CY
Cylinders (28-day)	Compressive Strength	1 – 500 CY
Core	Density	1 – 500 CY
	Thickness	1 – 500 CY
Cement See Note 2	Chemical & Physical Certification	
PCC Structures		
Coarse Aggregate See Note 4	Grading	1 – 1000 CY
Fine Aggregate See Note 4	Grading	1 – 1000 CY
Combined Aggregate See Note 4	Grading	1 – 1000 CY
Consistency	Slump	1 for every 10 trucks, See Note 5
Air Content	Air	1 for every 10 trucks, See Note 5
Cylinders (28-day)	Compressive Strength	1 for every 10 trucks, See Note 5
Cement	Chemical & Physical Certification	
Grouts See Note 2	Compressive Strength	1 set per day
Hot Mix Asphalt		
Completed Mix, See Note 1		
	Grading & Asphalt Content	1 – 1,000 Ton
	Compaction	1 – 100 Ton

Item	Test	Acceptance Sample
Hot Mix Asphalt Aggregate		
Aggregate `	SE, Fracture, Uncompacted Void Content of Fine Aggregate	1 – 2,000 Ton
Mineral Filler	Sp. G & PI	Certificate

Asphalt Materials		**Certification**	
Asphalt Binder (PG, Etc.)	Verification:	2-1 quart	Every other mix acceptance sample, see Note 3
Emulsified Asphalt for Bituminous Surface Treatment (BST)	Verification:	2-1 quart	Every other shipment
Emulsified Asphalt for Fog Seal	Verification:	None Required	
Emulsified Asphalt for HMA Tack Coat	Verification:	2-1 quart	1 sample per project (Statistically Evaluated Projects Only

Compaction See Note 6	
Embankment	1 – 2500 CY
Cut Section	1 – 500 LF
Surfacing	1 – 1,000 LF (per layer)
Backfill	1 – 500 CY

Note 1 Mix design conformation samples shall be submitted to the State Materials Laboratory Bituminous Materials Section. For all projects, beginning with the first Acceptance sample, submit one sample (two representative quarters) every 10,000 mix tons (One conformation sample for every ten Acceptance samples). The conformation samples should be taken in conjunction with and be representative quarters of the acceptance samples taken for the project as described in WSDOT Test Method 712.

Note 2 Cement may be accepted by the engineer based on the Manufacturer's Mill Test Report number indicating full conformance to the Specifications. The engineer has the option of taking samples at the job site for submission to the State Materials Laboratory for testing.

Note 3 The first sample of asphalt binder will be taken with the second Hot Mix Asphalt (HMA) mix sample. For nonstatistical HMA, take one sample for every 2,000 tons of mixture.

Note 4 The frequency for fine, course, and combined concrete aggregate samples for PCC Paving and PCC Structures shall be based on the cubic yard (CY) of concrete.

Note 5 Sample the first truck, and each load until two successive loads meet specifications, and then randomly test one load for every ten loads. If at any time one load fails to meet specifications, continue testing every load until two successive loads meet specifications, and then randomly test one load for every ten loads.

Note 6 For materials placed in a non-structural application outside the roadway prism such as slope flattening or shoulder dressing, acceptance for compaction may be based on visual inspection to the satisfaction of the engineer.

Note 7 The gravel borrow for structural earth walls shall be tested for Los Angeles Wear and Degradation prior to placement and the test data may come from an approved source in the aggregate source approval database. For geosynthetic reinforcement, the gravel borrow shall be tested for pH prior to placement. For metallic reinforcement, the gravel borrow shall be tested for pH, resistivity, chlorides, and sulfates prior to placement. If the resistivity of the backfill material equals or exceeds 5,000 ohm-cm, the specified chloride and sulfate limits may be waived. If the aggregate source has variable quality, additional testing may be required. Contact the Regional Materials Engineer or the State Geotechnical Engineer for direction.

9-4 Specific Requirements for Each Material

9-4.1 Portland Cement, Blended Hydraulic Cement, Fly Ash, and Other Cementitious Materials

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – Preliminary samples will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance/Verification**
   a. **Acceptance**
      i. **Bulk Cement** – Acceptance shall be by receipt of a Manufacturer's Mill Test Report. The Mill Test Report Number shall be reported on each certified concrete delivery ticket.
      ii. **Bagged Cement**
         - **Less than 400 Bags** – Visual Acceptance per Section 9-1.4C. Verify each Bag is labeled meeting the requirements of AASHTO M 85 or ASTM C150.
         - **400 Bags and Greater** – Acceptance shall be by "Satisfactory" test reports from the State Materials Laboratory. Obtain a 10-pound sample from one of every 400 bags and ship to the State Materials Laboratory for testing.
      iii. **Fly Ash** – Acceptance shall be by receipt of a Manufacturer's Mill Test Report submitted with Mix Design.
      iv. **Ground Granulated Blast Furnace Slag** – Acceptance shall be by receipt of a Manufacturer's Mill Test Report submitted with Mix Design.
      v. **Microsilica Fume** – Acceptance shall be by receipt of a Manufacturer's Mill Test Report submitted with Mix Design.
   b. **Verification** – Cement producers, importers/distributors, and suppliers that certify Portland cement or blended cement will provide samples directly to the State Materials Laboratory on a quarterly basis for comparison with the manufacturer's mill test report per WSDOT Standard Practice QC-1. The Project Engineer office will be notified in the event of a failing test report. The PEO will be required to check Concrete Delivery Tickets for failing mill test numbers to ensure that the failing cement from that mill test was not placed.

4. **Field Inspection** – Field verify per Section 9-1.5. For Bagged cement, verify each Bag is labeled meeting the requirements of AASHTO M 85 or ASTM C 150.
5. **Specification Requirements** – See *Standard Specifications* Section 9-01, 9-23.9, 9-23.10, and 9-23.11. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – Allow a minimum of 14 days from receipt of the sample at the Laboratory for testing. DO NOT permit the use of bagged cement until a "Satisfactory" test report has been received from the State Materials Laboratory.

9-4.2 Bituminous Materials

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance/Verification**
   a. **Acceptance** – Acceptance shall be by the Asphalt Supplier's Certification of Compliance incorporated in their Bill of Lading with the information required by *Standard Specifications* Section 9-02.
   b. **Verification** – Samples for verification conformance will be taken based on the frequencies stated in Section 9-3.7. Because the entire sample may be used in testing, it is necessary to take a backup for each sample. The samples shall be taken and labeled in duplicate by the engineer with both samples forwarded promptly to the State Materials Laboratory. Consult the FOP for AASHTO T 40 for detailed sampling procedures.

      Enter complete data on gummed label DOT Form 350-016 and attach to each of the two cans. Complete a Sample Transmittal DOT Form 350-056 and attach it, in its envelope, to the container. If tape is used to attach envelope to container, or the containers together, be sure the tape is not contacting the label(s).

      The Project Engineer office will be notified in the event of a failing test report. The PEO shall refer to Section 9-3.5C and contact WSDOT Roadway Construction Office for possible price adjustment.
4. **Field Inspection** – Field verify per Section 9-1.5. Check the "Bill of Lading" to confirm that the liquid asphalt delivered complies with the requirements of the mix design verification report.
5. **Specification Requirements** – See *Standard Specifications* Section 9-02. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – None.

9-4.3 Pavement Marker Adhesive

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071. Submit Manufacturers Certificate of Compliance meeting the requirements of *Standard Specifications* Section 1-06.3, including supporting tests reports to State Materials Laboratory for evaluation.
3. **Acceptance**
   a. **Bituminous Adhesive** – If the lot is listed on the QPL, it may be used without testing on current projects per Section 9-1.4A(1). If the lot is not on the QPL, submit a sample taken by, or in the presence of, an agency representative for each lot. Samples must be submitted for testing 10 days prior to use of adhesive. Samples submitted shall be accepted on receipt of "Satisfactory" test reports from the State Materials Laboratory.
   b. **Epoxy Adhesive** – Acceptance shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D.
4. **Field Inspection** – Field Verify per Section 9-1.5.
   a. **Bituminous Adhesive** – Verify correct heating of product per manufacturer's recommendations.
   b. **Epoxy Adhesive** – Check for set and hardness prior to opening to traffic. Epoxies shall be mixed and applied in conformance to manufacturer's written instructions unless otherwise modified in writing by the manufacturer's agent.
5. **Specification Requirements** – See *Standard Specifications* Section 9-02.1(8) and 9-26.2. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – There may be special shipping requirements for adhesive. These samples shall be transported to the Region Materials Laboratory for proper shipping.

9-4.4 Concrete Aggregates

1. **Approval of Material** – In accordance with *Standard Specifications* Section 1-06, approval of materials is required prior to use. Consult the Aggregate Source Approval (ASA) database for approval status of the material for each source. If the ASA database indicates the aggregate source has expired or will expire before the end of the project, a source evaluation will be required. Contact the Region Materials Office for further direction. If samples are required, the Region Materials Office will coordinate with the ASA Engineer to obtain the necessary samples in accordance with SOP 128.

Source approval is not required for aggregates used for Commercial Concrete, as described in *Standard Specifications* Section 6-02.3(2)B.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Acceptance shall be administered in accordance with *Standard Specifications* Section 3-04. Acceptance samples shall be obtained, tested, and recorded in accordance with the contract documents, and Sections 9-3.7 and 9-7.
4. **Field Inspection** – Field verify per Section 9-1.5.
5. **Specification Requirements** – See *Standard Specifications* Section 3-02,3-04, 6-02.3(2)B, 9-03.1, and 9-03.2. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – Consult the ASA database to see if Alkali Silica Reactive (ASR) mitigation is required. ASR mitigation is not required for Commercial Concrete as identified in *Standard Specifications* Section 6-02.3(B).

9-4.5 Aggregates for Bituminous Surface Treatment, Ballast, Permeable Ballast, Crushed Surfacing Base and Top Course, Maintenance Rock, and Gravel Backfill for Foundations Class A

1. **Approval of Material** – In accordance with *Standard Specifications* Section 1-06, approval of materials is required prior to use. Consult the Aggregate Source Approval (ASA) database for approval status of the material for each source. If the ASA database indicates that the aggregate source has expired, or will expire before the end of the project, a source evaluation may be required. Contact the Region Materials Office for further direction. If samples are required, the Region Materials Office will coordinate with the ASA Engineer to obtain the necessary samples according to SOP 128.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Acceptance shall be administered in accordance with *Standard Specifications* Section 3-04. Acceptance samples shall be obtained, tested, and recorded in accordance with the contract documents, and Sections 9-3.7 and 9-7.
4. **Field Inspection** – Field verify per Section 9-1.5.
5. **Specification Requirements** – See *Standard Specifications* Section 3-02, 3-04, 9-03.4, 9-03.9, and 9-03.12(1)A. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – Refer to *Standard Specifications* Section 9-03.21 to see if recycled materials are permitted.

9-4.6 Aggregates for Hot Mix Asphalt (HMA)

1. **Approval of Material** – In accordance with *Standard Specifications* Section 1-06, approval of materials is required prior to use. Consult the Aggregate Source Approval (ASA) database for approval status of the material for each source. If the ASA database indicates that the aggregate source has expired, or will expire before the end of the project, a source evaluation may be required. Contact the Region Materials Office for further direction. If samples are required, the Region Materials Office will coordinate with the ASA Engineer to obtain the necessary samples according to SOP 128.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Acceptance shall be administered in accordance with contract documents and *Standard Specifications* Sections 3-04 and 5-04.3(8)2. Acceptance samples shall be obtained, tested, and recorded in accordance with the contract documents, and Sections 9-3.7 and 9-7.

   The requirements for fracture, sand equivalent and uncompacted void content of fine aggregate shall apply at the time of its introduction to the cold feed of the mixing plant. Acceptance of the aggregate for gradation shall be in accordance with Section 9-4.7.
4. **Field Inspection** – Field verify per Section 9-1.5.
5. **Specification Requirements** – See *Standard Specifications* Sections 3-02, 3-04, 5-04, and 9-03.8. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – Refer to *Standard Specifications* Section 9-03.21 and contract provisions to see if recycled materials are permitted.

9-4.7 Hot Mix Asphalt (HMA)

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the ASA Database and *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – Not required.
3. **Acceptance** – Acceptance samples shall be obtained, tested, and recorded in accordance with the *Standard Specifications*, the contract special provisions, and Section 9-3 and 9-7.
   a. **Statistical** – Acceptance shall be administered under *Standard Specifications* Section 5-04.
   b. **Non-statistical** – Acceptance shall be based on "Satisfactory" laboratory test report.
   c. **Commercial** – Acceptance shall be at the option of the Project Engineer.

4. **Field Inspection** – Field verify per Section 9-1.5.
5. **Specification Requirements** – See *Standard Specifications* Section 5-04 and 9-03.8. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – The Project Engineer should perform a plant inspection prior to production. Contact the Region materials office for assistance with this inspection.

9-4.8 Mineral Filler

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Sample** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071. If required, ship 3 pounds in a polyethylene bag.
3. **Acceptance** – Acceptance of mineral filler (commercial stone dust) shall be based on "Satisfactory" laboratory tests only for each lot of 50 tons or less. Portland cement may be accepted without test if it is furnished in original factory sacks and is not lumpy.
4. **Field Inspection** – Field verify per Section 9-1.5. Verify that the mineral filler does not contain foreign material or lumps.
5. **Specification Requirements** – See *Standard Specifications* Section 9-03.8(5). Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – None.

9-4.9 Aggregate Materials for Walls (Gravel Backfill for Wall and Gravel Borrow for Structural Earth Walls)

1. **Approval of Material** – In accordance with *Standard Specifications* 1-06 approval of materials is required prior to use. Consult the Aggregate Source Approval (ASA) database for approval status of the material for each source. If the ASA database indicates that the aggregate source has expired, or will expire before the end of the project, a source evaluation may be required. Contact the Region materials office for further direction. If samples are required, the Region materials office will coordinate with the ASA engineer to obtain the necessary samples according to SOP 128.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

    a. **Gravel Borrow for Structural Earth Walls** – Shall be tested for Los Angeles Wear and Degradation prior to placement. If the source has current testing and listed in the ASA database, then the Los Angeles Wear and Degradation value can be used for approval. If the material does not have a current listing in the ASA database, a sample will have to be tested for Los Angeles Wear and Degradation.

        i. **Geosynthetic Reinforcement** – Prior to delivery of the material to the project a preliminary sample of material will be required to be tested for pH to determine if the material in fact meets specification requirements for the intended use.

        ii. **Metallic Reinforcement** – Prior to delivery of the material to the project a preliminary sample of material will be required to be tested for pH, Resistivity, Chlorides, and Sulfates to determine if the material in fact meet specification requirements for the intended use. If the Resistivity equals or exceeds 5,000 ohm-cm, the specified Chlorides and Sulfates limits may be waived.

3. **Acceptance** – Acceptance shall be administered in accordance with *Standard Specifications* Section 3-04. Acceptance samples shall be obtained, tested, and recorded in accordance with contract documents and Section 9-3.7 and 9-7.

4. **Field Inspection** – Field verify per Section 9-1.5.

5. **Specification Requirements** – See *Standard Specifications* Sections 3-02, 3-04, 9-03.12(2), and 9-03.14(4). Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – Refer to *Standard Specifications* Section 9-03.21 to see if recycled materials are permitted. Gravel Borrow for Structural Earth Walls, refer to *Standard Specifications* Section 9-03.14(4) if recycled materials are permitted.

9-4.10 Miscellaneous Aggregates: Gravel Base, Gravel Backfill for Foundation Class B, Gravel Backfill for Pipe Zone Bedding, Gravel Backfill for Drains, Gravel Backfill for Drywells, Backfill for Sand Drains, Sand Drainage Blanket, Gravel Borrow, Select Borrow, Common Borrow, Native Materials for Trench Backfill, Foundation Material Class A, B, and C, and Bank Run Gravel for Trench Backfill

1. **Approval of Material** – Approval is not required.

2. **Preliminary Samples** – A preliminary sample of the materials will be required only if coded on the Request for Approval of Material DOT Form 350-071 EF.

    a. **Common Borrow** – Prior to delivery of the materials consult with the Region Materials Engineer to determine if a preliminary sample is required to determine if the material meets the requirements of *Standard Specifications* Section 9-03.14(3).

3. **Acceptance**

   a. **Aggregate for Gravel Base, Gravel Backfill for Foundations Class B, Gravel Backfill for Pipe Zone Bedding, Gravel Backfill for Drains, Gravel Backfill for Drywells, Backfill for Sand Drains, Gravel Borrow, Select Borrow, Foundation Material Class A, B, and C, and Bank Run Gravel for Trench Backfill** – Acceptance shall be administered in accordance with *Standard Specifications* Section 3-04. Acceptance samples shall be obtained, tested, and recorded in accordance with the contract documents, and Sections 9-3.7 and 9-7.

   b. **Native Material for Trench Backfill** – Visual Acceptance per Section 9-1.4C. Verify that trench backfill is free of wood waste, debris, clods or rock greater than 6 inches in any dimension.

   c. **Common Borrow** – Visual Acceptance per Section 9-1.4C. Verify that common borrow is free of deleterious materials such as wood, organic waste, coal, charcoal, or any other extraneous or objectionable material.

4. **Field Inspection** – Field verify per Section 9-1.5.

5. **Specification Requirements** – See *Standard Specifications* Section 3-02, 3-04 and 9-03. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – Refer to *Standard Specifications* Section 9-03.21 to see if recycled materials are permitted.

9-4.11 Vacant

9-4.12 Premolded Joint Filler for Expansion Joints

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071. When a preliminary sample is required, it shall consist of a 1 square foot section of the proposed material. Submit sample to the State Materials laboratory for testing.

3. **Acceptance** – Visual Acceptance per Section 9-1.4C.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for accuracy in cutting, stapling, and care in handling.

5. **Specification Requirements** – See *Standard Specifications* Section 9-04.1(2). Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – None.

9-4.13 Elastomeric Expansion Joint Seals

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071. When a preliminary sample is required, it shall consist of a 2 feet section from each lot of material used. Submit sample to the State Materials Laboratory for testing.
3. **Acceptance** – If the lot is listed on the QPL, it may be used without testing on current projects per Section 9-1.4A(1). If the lot is not on the QPL, submit a sample taken by, or in the presence of, an agency representative for each lot. Samples must be submitted for testing 10 days prior to use of joint seal. Samples submitted shall be accepted on receipt of "Satisfactory" test reports from the State Materials Laboratory.

   Sample – The sample shall consist of a 2 feet section from each lot of material used.
4. **Field Inspection** – Field verify per Section 9-1.5.
5. **Specification Requirements** – See *Standard Specifications* Section 9-04.1(4). Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – None.

9-4.14 Poured Rubber Joint Sealer – Two Component

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – If the lot is listed on the QPL, it may be used without testing on current projects per Section 9-1.4A(1). If the lot is not on the QPL, submit a sample taken by, or in the presence of, an agency representative for each lot. Samples must be submitted for testing 10 days prior to use of joint sealer. Samples submitted shall be accepted on receipt of "Satisfactory" test reports from the State Materials Laboratory.

   Sample: The sample shall consist of an unopened container of each component (kit) from each lot, mixing instructions, and MSDS sheets. Submit sample to the State Materials Laboratory for testing.
4. **Field Inspection** – Field verify per Section 9-1.5. Make certain that application is in accordance with requirements of *Standard Specifications* and manufacturer's written recommendations. In order to obtain satisfactory adhesion of the sealer, joints must be thoroughly cleaned before the sealer is applied.

5. **Specification Requirements** – See *Standard Specifications* Section 9-04.2(2). Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – None.

9-4.15 Hot Poured Joint Sealant and Crack Sealing – Rubberized Asphalt

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance** – If the lot is listed on the QPL, it may be used without testing on current projects per Section 9-1.4A(1). If the lot is not on the QPL, submit a sample taken by, or in the presence of, an agency representative for each lot. Samples must be submitted for testing 10 days prior to use of joint sealant. Samples submitted shall be accepted on receipt of "Satisfactory" test reports from the State Materials Laboratory.

   Sample – When a sample is required, submit a one box sample to the State Materials Laboratory for testing.

4. **Field Inspection** – Field verify per Section 9-1.5. Ensure that application is in accordance with requirements of *Standard Specifications* Section 5-04.3(5C), 5-05.3(8)B, and the manufacturer's recommendation.

5. **Specification Requirements** – See *Standard Specifications* Section 9-04.2(1) for joint sealant and 9-04.10 for crack sealing – rubberized asphalt. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – None.

9-4.16 Concrete Drain, Perforated Underdrain, Culvert, and Storm Sewer Pipe

1. **Approval of Material** – Approval of the Fabricator is required prior to fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use, and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the Fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance**

   a. Concrete pipe less than 30 inch in diameter is accepted based on "Concrete Pipe Acceptance Reports" which shall accompany the pipe to the job site.

   b. Concrete pipe 30 inch in diameter and larger are individually inspected and stamped for approval by the Materials Fabrication Inspector at the fabrication facility prior to shipment. Acceptance is based on "APPROVED FOR SHIPMENT" Stamp (Figure 9-4). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.

4. **Field Inspection**

   a. **Concrete pipe less than 30 inch in diameter:**

      i. Verify that the "Concrete Pipe Acceptance Report" is current and covers the diameter, quantity and class of pipe delivered.

      ii. Inspect the manufacture date marked on each pipe to verify that it was made within the period covered by the "Concrete Pipe Acceptance Report." Also verify the pipe is at the age or older than the test pipe represented on the "Concrete Pipe Acceptance Report."

      iii. Verify that the pipe is free from handling and shipping damage.

      iv. Concrete sewer pipe requires testing after installation in conformance with the *Standard Specifications* Section 7-04.3.

      v. Complete the upper portion of the "Concrete Pipe Acceptance Report" and forward to the contract files.

   b. **Concrete pipe 30 inch in diameter and larger:**

      i. Verify that each pipe in the shipment is stamped "APPROVED FOR SHIPMENT."

      ii. Check that "APPROVED FOR SHIPMENT" Stamp (Figure 9-4) exhibits the "F" or "D" Stamp for foreign or domestic steel and document it.

      iii. Verify that pipe is free from handling and shipping damage.

      iv. Concrete sewer pipe requires testing after installation in conformance with the *Standard Specifications* Section 7-04.

5. **Specification Requirements** – See *Standard Specifications* Section 9-05. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements:**

   a. **Materials Fabrication Inspected CMO (30 inch in Diameter and larger)** – Certification of Material Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

      For projects with the Buy America provision refer to Section 9-1.2E to determine if a Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

b. **Non-Fabrication Inspected CMO (less than 30 inch in Diameter)** – For projects with the Buy America provision refer to Section 9-1.2E to determine if a Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.17 Corrugated Galvanized Steel, Aluminized Steel, Aluminum: Drain, Perforated Underdrain, Culvert Pipe Arch, and Storm Sewer Pipe

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. An on-site inspection of the fabricating facilities prior to approval will be required only if a new manufacture is requested on the Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance**
   a. **Treated** – Acceptance shall be by the Manufacturer's Certificate of Compliance with supporting Mill Certification per Section 9-1.4D.

      The Project Office is required to inspect treated culvert pipe for uniformity of coating, no hanging treatment drips inside the pipe or other problems with the coating. Upon request the State Materials Laboratory Fabrication Inspection office can come inspect the treated metal culvert pipe at the jobsite if there are concerns about the thickness of the treatment, and uniformity of the coating. WSDOT Fabrication inspectors are able to measure the thickness using non-destructive testing.

   b. **Untreated** – Acceptance shall be by Visual Acceptance per Section 9-1.4C. Verify that the appropriate AASHTO specification for the steel sheet, gauge thickness, and heat number is stamped on the pipe. Pipe not bearing this stamp shall not be installed. Any pipe, which is damaged in any way from shipping or handling, should not be accepted. If the manufacturer of the pipe delivered to the job site can not be identified, a Bill of Lading showing the manufacturer should be requested prior to accepting or installing the pipe.
4. **Field Inspection** – Field verify per Section 9-1.5. Check each delivery for fabrication details and quality of workmanship. Check for shipping damage and ensure that the galvanized coating is intact. Obtain documentation for all pipes not accepted under provisions established in the QPL.
5. **Specification Requirements** – See *Standard Specifications* Section 9-05. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.18 Polyvinyl Chloride (PVC) and Corrugated Polyethylene (PE) Drain, Perforated Underdrain, Culvert, and Storm Sewer Pipe

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance**
   a. **Drain Pipe, Perforated Underdrain Pipe, Solid Wall PVC Culvert and Storm Sewer Pipe** – Visual Acceptance per Section 9-1.4C.
   b. **Profile Wall PVC Culvert and Storm Sewer Pipe, Corrugated PE Culvert and Storm Sewer Pipe** – Acceptance shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D, shall accompany materials delivered to the project and shall include production lots for all materials represented.
4. **Field Inspection** – Field verify per Section 9-1.5.
5. **Specification Requirements** – See *Standard Specifications* Section 9-05. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – None.

9-4.19 Structural Plate Pipe, Pipe Arch, Arch, and Underpass

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Approval of fabrication facility as well as the base metal must be obtained. An on-site inspection by the WSDOT Materials Fabrication Inspection Office of the fabricating facilities prior to approval will be required only if a new manufacture is requested on the Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance** – Acceptance shall be on the basis of Manufacturer's Certificate of Compliance, with accompanying mill test reports per Section 9-1.4D. The mass of zinc coating for each heat number in the shipment must be present on the "Manufacturer's Certificate of Compliance." The mill test report will contain both chemical and physical analysis of the base metal.

   All suppliers of structural plate pipe, arches and underpass are to transmit four copies of the certification to the Project Engineer. At least one copy must accompany the shipment; the others may be forwarded through the Contractor. Two copies of the certification are to be retained in the Project Engineer's files.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for breaks of the galvanized or asphalt coating and for damage from shipment. Material in the shipment must be properly identified as to heat number.

5. **Specification Requirements** – See *Standard Specifications* Section 9-05.6. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.20 Steel, Gray-Iron, and Ductile-Iron Castings: Manhole Rings and Covers; Metal Frame, Grate, and Solid Metal Cover for Catch Basins or Inlets; Cast Metal Inlets; Frame (Ring), Grate, and Cover for Drywells

1. **Approval of Material** – Approval of the Fabricator is required prior to fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use, and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the fabricator.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance** – Acceptance is based on "WSDOT-A" (Figure 9-7) Stamp impressed stamped into all castings. In Figure 9-7, the "A" is an inspector identifier, and will be different for each individual inspector. An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin. Only properly stamped castings may be accepted.

   a. For Rectangular Frames and Grates, the frame and grate will each be stamped in such a fashion as to align adjacent mating surfaces to each other. This alignment is critical as the leveling pads are ground to prevent rocking of the grates in the frames.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for "WSDOT-A" Stamp (Figure 9-7) and the "F" or "D" Stamp for foreign or domestic steel and document it. Check for damage caused by shipping and handling.
5. **Specification Requirements** – See *Standard Specifications* Section 9-05.15. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – Certification of Material Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

   For projects with the Buy America The Project Engineer will provision; refer to Section 9-1.2E to determine if a Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.21 Sanitary Sewers

1. **Approval of Material** – Approval of materials and or the Fabricator is required prior to use or fabrication depending on the method of acceptance detailed below. The materials or Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. If approval is by the QPL, be certain to verify that the product is in fact qualified for its intended use, and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the fabricator.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Material may be accepted upon receipt of an "Approved" document in lieu of sampling as shown below:
   a. **Concrete Pipe Less Than 30 inch in Diameter** – Acceptance shall be based on "Concrete Pipe Acceptance Reports" which shall accompany the pipe to the job site.
   b. **Concrete Pipe 30 inch in Diameter and Larger** – Acceptance is based on "APPROVED FOR SHIPMENT" Stamp (Figure 9-4). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin. Pipes are individually inspected and stamped for approval by the Materials Fabrication Inspector at the fabrication facility prior to shipment.
   c. **Vitrified Clay Sewer Pipe and Ductile Iron Sewer Pipe** – Acceptance shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D.
   d. **PVC Sewer Pipe and ABS Composite Sewer Pipe** – Visual Acceptance per Section 9-1.4C.

4. **Field Inspection:**

   a. **Non-Concrete Pipe**

      i. Field verify per Section 9-1.5. Check material delivered to the project for damage, and conformance to the contract documents.

   b. **Concrete Pipe Less Than 30 inch in Diameter**

      i. Verify that the "Concrete Pipe Acceptance Report" is current and covers the diameter, quantity and class of pipe delivered.

      ii. Inspect the manufacture date marked on each pipe to verify that it was made within the period covered by the "Concrete Pipe Acceptance Report." Also verify the pipe is at the age or older than the test pipe represented on the "Concrete Pipe Acceptance Report."

      iii. Verify that the pipe is free from handling and shipping damage.

      iv. Concrete sewer pipe requires testing after installation in conformance with the *Standard Specifications* Section 7-04.3.

      v. Complete the upper portion of the "Concrete Pipe Acceptance Report" and forward to the contract files.

   c. **Concrete Pipe 30 inch in Diameter and Larger**

      i. Verify that each pipe in the shipment is stamped "APPROVED FOR SHIPMENT."

      ii. Check for "APPROVED FOR SHIPMENT" Stamp (Figure 9-5) and the "F" or "D" Stamp for foreign or domestic steel and document it.

      iii. Verify that pipe is free from damage caused by shipping and handling.

      iv. Concrete sewer pipe requires testing after installation in conformance with the *Standard Specifications* Section 7-04.

5. **Specification Requirements** – See *Standard Specifications* Section 7-17. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements**

   a. **Materials Fabrication Inspected CMO** – Certification of Material Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

      For projects with the Buy America provision refer to Section 9-1.2E to determine if a Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

b. **Non-Fabrication Inspected CMO** – For projects with the Buy America provision refer to Section 9-1.2E to determine if a Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.22 Structural Steel for Bridges

1. **Approval of Material** – Approval of the Fabricator is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use, and the product is listed under the appropriate specification. Approval of material sources through the QPL or RAM process for materials used by the Fabricator is not required. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the fabricator.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Acceptance is based on "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.

   The Materials Fabrication Inspector will provide a weekly Fabrication Progress Report to the Project Engineer while the structural steel is being fabricated.
4. **Field Inspection** – Field verify per Section 9-1.5. Check for "APPROVED FOR SHIPMENT" Tag or Stamp (Figure 9-4 or 9-5) and the "F" or "D" Stamp for foreign or domestic steel and document it. Check for shipping and handling damage.
5. **Specification Requirements** – See *Standard Specifications* Section 6-03 and 9-06. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements**

   a. **Materials Fabrication Inspected CMO** – Certification of Materials Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

   For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials from the Contractor, track the quantity, and retain these documents in the project records.

   b. **Non-Fabrication Inspected CMO** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.23 Unfinished Bolts (Ordinary Machine Bolts), Nuts, and Washers

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Acceptance of unfinished bolts, nuts, and washers shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D.
4. **Field Inspection** – Field verify per Section 9-1.5.
5. **Specification Requirements** – See *Standard Specifications* Section 9-06.5(1). Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.24 High Strength Bolts, Nuts, and Washers

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. If approval is by QPL, be certain to verify that the product is in fact qualified for its intended use, and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance**
   a. **Materials Fabrication Inspected Item** – Acceptance for high strength bolts, nuts, and washers associated with items receiving Materials Fabrication Inspection shall be an "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5) stamped on the container of bolts, nuts and washers. The Materials Fabrication Inspector will inspect hardware if it is available at the time of inspection at the point of manufacture. High strength bolts, nuts and washers not present during Materials Fabrication Inspection and delivered to the job site without an approval stamp shall be accepted by "Non-Fabrication Inspected Items" (see below). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.

b. **Non-Fabrication Inspected Items:**

i. **Fabrication Inspection Sampled** – Acceptance shall be by the Manufacturer's Certificate of Compliance for each heat number or manufacturing lot per Section 9-1.4D. When the materials are received on the job site stamped "WSDOT Sampled," the material shall also be accepted by the PEO on receipt of "Satisfactory" test reports from the State Materials Laboratory.

ii. **PEO Sampled** – Acceptance shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D for each heat number or manufacturing lot. Acceptance shall also be by a "Satisfactory" test report from the State Materials Laboratory when samples are required for each consignment lot as defined by *Standard Specifications* Section 9-06.5(3). A separate transmittal and materials certification shall accompany each sample of bolts, nuts, and washers.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5) and the "F" or "D" Stamp for foreign or domestic steel and document it.

5. **Specification Requirements** – See *Standard Specifications* Section 9-06.5(3). Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements**

a. **Materials Fabrication Inspected CMO** – Certification of Materials Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project engineer will track the quantity of the materials and retain these documents in the project records.

b. **Non-Fabrication Inspected CMO** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.25 Anchor Bolts, Nuts, and Washers

1. **Approval of Material** – Approval of the Fabricator is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use, and the product is listed under the appropriate specification. Approval of material sources through the QPL or RAM process for materials used by the Fabricator is not required. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the fabricator.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance**

   a. **Materials Fabrication Inspected Item** – Acceptance for ASTM a 449 and ASTM F 1554 Grade 105 anchor bolts and associated nuts and washers receiving Materials Fabrication Inspection shall be an "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5) on each bundle and the Materials Fabrication Inspectors inspection ID number randomly stamped on a representative number of anchor bolts. An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.

   b. **Non-Fabrication Inspected Items** – Acceptance for ASTM a 307 and ASTM F 1554 Grade 36 and Grade 55 anchor bolts, nuts and washers shall be based on receipt of Manufacturer's Certificate of Compliance.

      Nuts and washers for ASTM a 449 and ASTM F 1554 Grade 105 anchor bolts not containing an "APPROVED FOR SHIPMENT" Tag and/or Stamp shall be accepted by a Manufacturer's Certificates of Compliance per Section 9-1.4D and it will be the responsibility of the Contractor to supply the certifications to the Project Engineer's Office prior to use.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for "APPROVED FOR SHIPMENT" Tag (Figure 9-4) on bundles, the anchor bolts will be randomly stamped with an inspection ID number, and the "F" or "D" Stamp for foreign or domestic steel and document it. Check for damage due to shipping and handling.

5. **Specification Requirements** – See *Standard Specifications* Section 9-06.5(4), 9-28.14(2), and 9-29.6(5). Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements**

   a. **Materials Fabrication Inspected CMO** – Certification of Materials Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

      For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project engineer will track the quantity of the materials and retain these documents in the project records.

   b. **Non-Fabrication Inspected CMO** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.26 Reinforcing Bars for Concrete (Uncoated and Epoxy Coated Rebar)

1. **Approval of Material** – In accordance with *Standard Specifications* Section 1-06, approval of materials, bender cutter, and the coating facility is required prior to use.

   Materials, bender cutter, and the coating facility will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071 EF. An on-site inspection by WSDOT State Materials Laboratory's Fabrication Office of the bender cutter and the coating facility prior to approval will be required only if a new bender cutter and coating facility is requested on the Request for Approval of Materials DOT Form 350-071 EF. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT State Materials Laboratory Fabrication Office with a copy of the Qualified Products Page or Request for Approval of Material list the bender cutter, and/or coating facility. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the bender cutter and the coating facility.

   RAM Submittal:

   a. **Reinforcing Steel Rebar (Deformed and Plain Steel Bar)** – Submit documentation or a web link that demonstrates the Steel Reinforcing Bar Manufacturer is listed and compliant with the NTPEP audit program for Reinforcing Steel (rebar) Manufacturer as required in *Standard Specifications* Section 9-07.1(1)A.

   b. **Bender cutter and Coating Facility** – Submit the following information; Name of Facility, Contact Person, phone number, email address, and facility address.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071EF.

3. **Acceptance**

   a. **Reinforcing Steel Rebar (Uncoated)**

      1. **Acceptance** – Shall be by the Manufacturer's Certification of Compliance and Certified Mill Test Reports that will accompany each shipment per Section 9-1.4D.

      2. **Verification** – A representative of the State Materials Laboratory Fabrication Office may take random samples at the point of manufacture or fabrication for testing. The Project Engineer office will be notified in the event of a failing test report. The PEO will be required to check reinforcing bars for failing heat numbers to ensure that the failing reinforcing bars from that heat number was not installed.

         Note: If Mill Test reports are not available, do not permanently incorporate steel into the project, i.e. reinforcing steel being cast in concrete.

b. **Epoxy-Coated Steel Reinforcing Bar** – Acceptance shall be by an "APPROVED FOR SHIPMENT" Tag (Figure 9-5) attached to a representative number of bundles of epoxy coated reinforcing steel bars. An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic steel.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for the removal of excess rust and mill scale before using. Check steel fabrication and bends for compliance with contract documents.

5. **Specification Requirements** – See *Standard Specifications* Section 9-07. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements**

   a. **Materials Fabrication Inspected CMO** – Certification of Materials Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

      For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project Engineer will track the quantity and retain these documents in the project records.

   b. For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.27 Vacant

9-4.28 Mechanical Splices

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

2. **Preliminary Sample** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071. Required preliminary samples shall include a made up splice for each size bar to be used and the manufacturer's product information. The overall length of the sample shall be 6 feet plus the length of the splice.

3. **Acceptance** – Materials shall be accepted on receipt of "Satisfactory" test reports from the State Materials Laboratory. The sample shall be from Contractor's assembled samples (see Note) taken from the project. A Manufacturer's Certificate of Compliance and other technical data MUST be submitted with the samples. The overall length of the sample shall be 6 feet plus the length of the splice, and shall consist of one made up splice for each size bar to be used.

Note: This is a test of the Contractor's ability to properly assemble the splice as much as it is a test of the quality of the materials. For this reason the spliced bars must be assembled by the contractor's personnel, witnessed by the inspector and transmitted intact to the State Material Lab for testing.

4. **Field Inspection** – Field verify per Section 9-1.5. The PEO inspector shall verify that the splice is assembled per the Manufacturer's Instructions.
5. **Specification Requirements** – See *Standard Specifications* Section 6-02.3(24)F and G. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.29 Rebar Chairs, Mortar Blocks (Dobies), and Spacers

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Submittal

   a. **Mortar Blocks (Dobies)** – If approval action is being requested via the RAM process, attach the Manufacturer's Certificate of Compliance per Section 9-1.4D to assist in the approval process.

   b. **Rebar Chairs and Spacers** – Submit sample of each size and type with the Request for Approval of Material.

2. **Preliminary Sample** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance**

   a. **Mortar Blocks (Dobies)** – Acceptance shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D.

   b. **Rebar Chairs and Spacers** – Visual Acceptance per Section 9-1.4C.

4. **Field Inspection** – Field verify per Section 9-1.5.
5. **Specification Requirements** – See *Standard Specifications* Section 6-02.3(24)C. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.30 Dowels and Tiebars for Concrete Pavement, Incl. Epoxy Coated

Approval of Material – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

Preliminary Sample – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

Acceptance – Acceptance shall be by the Manufacturer's Certificate of Compliance and Certified Mill Test Report for both steel and coating process that will accompany each shipment per Section 9-1.4D.

Field Inspection – Field verify per Section 9-1.5. Check for dimensional conformance and ensure that proper mill test certificates have been provided. Check epoxy coating for damage and uniformity.

Specification Requirements – See *Standard Specifications* Section 9-07.5 and 9-07.6. Review contract documents to determine if supplemental specifications apply.

Other Requirements – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.31 Wire Reinforcement for Concrete

Approval of Material – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

Preliminary Samples – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

Acceptance – Acceptance shall be by the Manufacturer's Certificate of Compliance and Certified Mill Test Reports that will accompany each shipment per Section 9-1.4D.

Field Inspection – Field verify per Section 9-1.5. Check for excessive rust on wire, and check the spacing of the wires and weight per square yard.

Specification Requirements – See *Standard Specifications* Section 9-07.7, 9-07.8, and 9-07.9. Review contract documents to determine if supplemental specifications apply.

Other Requirements – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.32 Bridge Approach Slab Anchors

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Sample** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance**
   a. **Anchors Type A** – Acceptance for the Steel Rod and Plate shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D.
   b. **Anchors Type B** – Acceptance for the Threaded Steel Rod and Steel Plate shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D.
   c. **Other Anchor Rod materials** – Plastic pipe, polystyrene, and duct tape are identified as Low Risk Materials per Section 9-1.3C.
4. **Field Inspection** – Field verify per Section 9-1.5.
5. **Specification Requirements** – See *Standard Plans* A-40.50.00 and *Standard Specifications* Section 6-02.3(10). Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.33 Prestressing/Post Tensioning Reinforcement – Strand

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance/Verification**
   a. **Acceptance** – Acceptance shall be by the Manufacturer's Certificate of Compliance, Certified Mill Test Reports and the stress/strain curve that will accompany each shipment.
   b. **Verification** – The strand shall be tested for verification prior to placement. Samples for verification of conformance will be taken randomly at a frequency of 1 sample for every 5 reels. Sample per AASHTO M203. The samples shall be 6 to 7 feet in length. All samples must include the Manufacturer's Certificate

of Compliance, a mill certificate with supporting test report, and the stress/strain curve.

Submit 1 sample for each 5 reels to the State Materials Laboratory for testing. A copy of the Manufacturer's Certificate of Compliance, a mill certificate with supporting test report, and the stress/strain curve MUST accompany each sample submitted for testing. If the submitted sample fails the testing, submit two additional samples from the same heat number for additional testing.

4. **Field Inspection** – Field verify per Section 9-1.5. Check the strand for dirt, grease or rust.
5. **Specification Requirements** – See *Standard Specifications* Section 9-07.10. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.34 Prestressing/Post Tensioning Reinforcement – Bar

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Materials shall be accepted on receipt of "Satisfactory" test reports from the State Materials Laboratory. Send two samples from each heat number. If supplemental requirements apply, send additional samples of two bars from each heat number. See contract documents. Sample per AASHTO T244. The samples must be a minimum of 6 feet in length. A copy of the Manufacturer's Certificate of Compliance and Certified Mill Test Reports shall accompany each heat number of reinforcing bar.
4. **Field Inspection** – Field verify per Section 9-1.5.
5. **Specification Requirements** – Review contract documents to determine specification requirements.
6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.35 Painting, Paints, Coating, and Related Materials

1. **Approval of Material** – Approval of the materials and painting/coating facility is required prior to the application of the paint/coating. The materials and painting/coating facility will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials/coating facility(s) used to produce the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Materials listing for the painting/coating facility.
   - Materials for Painting/Coating preparation (i.e., Abrasive blast media, bird guano treatment, fungicide treatment, filter fabric, foam backer rod) do not require approval documentation. It is within the inspector's authority to ask for additional documentation if the products are not performing satisfactorily.

   RAM Submittal – Vinyl Pretreatment, Inorganic Zinc-Rich Primer, Organic Zinc-Rich Primer, Epoxy Polyamide, Rust-Penetrating Sealer, Black Enamel, Orange Equipment Enamel, Exterior Acrylic Latex Paint-White, Single-Component Urethane Sealant, and Galvanizing Repair Paint (High Zinc Dust Content): Attach Catalog Cut showing conformance with the Contract Documents to assist in approving the RAM.
2. **Preliminary Samples** – Preliminary Samples will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance**
   a. **Shop/Fabrications Coated Materials for Items Delivered to the Jobsite** – Acceptance is based on "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5). See Section 9-4 for individual materials acceptance.
   b. **Jobsite Coated Materials**
      i. **Primer Zinc Filled Single Component Moisture** – Cured Polyurethane, Intermediate and Stripe Coat Single Component Moisture-Cured Polyurethane, Top Coat Single-Component Moisture-Cured Polyurethane:
         - **20 gallons or Less** – Acceptance shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D. The Manufacturer's Certificate of Compliance shall include a list of materials and quantities used.
         - **Greater than 20 Gallons** – If the lot is listed on the QPL, it may be used without testing on current projects per Section 9-1.4A(1). If the lot is not on the QPL, a one-quart sample for each lot is required. The WSDOT Fabrication Inspection Office will pick up the sample from the Manufacturer/Distributor. Samples must be submitted for testing 10 days prior to use. Materials shall be accepted on receipt of "Satisfactory" test reports from the State Materials Laboratory.

      ii. **Vinyl Pretreatment, Inorganic Zinc** – Rich Primer, Organic Zinc-Rich Primer, Epoxy Polyamide, Rust-Penetrating Sealer, Black Enamel, Orange Equipment Enamel, and Exterior Acrylic Latex Paint-White: Visual Acceptance per Section 9-1.4C.

iii. **Pigment ed Sealer Materials for Coating of Concrete Surfaces** – If the lot is listed on the QPL, it may be used without testing on current projects per Section 9-1.4A(1). If the lot is not on the QPL, submit a one-quart sample taken by, or in the presence of, an agency representative for each lot. Samples must be submitted for testing 10 days prior to use. Materials shall be accepted on receipt of "Satisfactory" test reports from the State Materials Laboratory.

iv. **Single-Component Urethane Sealant** – Visual Acceptance per Section 9-1.4C.

v. **Repair material for Powder Coated Items** – Visual Acceptance per Section 9-1.4C that the repair material is per Contract Documents and is as specified in the Contractor's powder coating plan as specified by the engineer.

vi. **Galvanizing Repair Paint (High Zinc Dust Content)** – Visual acceptance per Section 9-1.4C that the spray can label states that the material meets "Federal Specification MIL-P-21035."

4. **Field Inspection** – Field verify per Section 9-1.5.

   See that paint is not caked in the container; it is free from skins and is well stirred before withdrawing portions for use.

5. **Specification Requirements** – See *Standard Specifications* Section 9-08. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – There may be special shipping requirements for paints and coatings. These samples shall be transported to the Region Materials Laboratory for proper shipping.

9-4.36 Timber and Lumber

1. **Approval of Material** – Approval of the Treatment Facility for treated lumber 6 in by 6 in and larger is required prior to the start of treatment. The Treatment Facility will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the Treatment Facility do not require approval through the Project Engineer office. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the Treatment Facility.

   The Project Engineer is responsible for obtaining the approval for all untreated lumber and treated lumber less than 6 in by 6 in prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance**

   a. **Untreated** – Acceptance shall be by a Lumber Grading Stamp or Grading Certificate for Timber and Lumber. The Grading Certificate will be issued by the grading bureau whose authorized stamp is being used, or by the mill grading the timber or lumber under the supervision of one of the following lumber grading agencies: West Coast Lumber Inspection Bureau (WCLIB), Western Wood Products Association (WWPA), or the Pacific Lumber Inspection Bureau (PLIB). Check that all lumber and timber has the proper lumber grade stamps.

      Typically Lumber Grade Stamps, as used by the various inspection agencies are shown in the QPL, Appendix B:

   b. **Treated**

      i. Acceptance for Treated Timber and Lumber 6 in × 6 in and greater shall be an "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5).

      ii. Acceptance for Treated Timber and Lumber less than 6 in × 6 in shall be by a Lumber Grading Stamp or Grading Certificate and Certificate of Treatment.

4. **Field Inspection** – Field verify per Section 9-1.5.

5. **Specification Requirements** – See *Standard Specifications* Section 9-09, 9-16.2, 9-28.14, and 9-32.4. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – Aquatic use requires additional documentation per *Standard Specifications* Section 9-09.3.

9-4.37 Vacant

9-4.38 Piling – All Types

1. **Approval of Material** – Approval of the Fabricator, coating facility and treatment facility is required prior to the start of fabrication. The Fabricator or treatment facility will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the Fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.

   The Project Engineer is responsible for obtaining the approval of materials prior to use. Materials listed as "PEO accepted" will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance**
   a. **WSDOT Fabricated Inspected**
      i. **Treated Wood Piling** – Acceptance shall be by an "APPROVED FOR SHIPMENT" Tag (Figure 9-6). Aquatic use requires additional documentation per *Standard Specifications* Section 9-09.3.
      ii. **Coated Steel Piling** – Acceptance shall be by an "APPROVED FOR SHIPMENT" Stamp (Figure 9-4). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.
      iii. **Prestressed Concrete Piling** – Acceptance shall be by an "APPROVED FOR SHIPMENT" Stamp (Figure 9-4). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.
      iv. **Structural and Soldier Piling** – Acceptance shall be by an "APPROVED FOR SHIPMENT" Stamp (Figure 9-4). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.
   b. **PEO Accepted**
      i. **Untreated Wood Piling** – Visual Acceptance per Section 9-1.4C and by field inspection per *Standard Specifications* Section 9-10.1(1).
      ii. **Steel Piling** – Acceptance shall be by the Manufacturer's Certificate of Compliance and Certified Mill Test Reports that will accompany each shipment per Section 9-1.4D.
      iii. **Steel Pile Tips, Shoes, and Pile Strapping** – Acceptance shall be by the Manufacturer's Certificate of Compliance and Certified Mill Test Reports that will accompany each shipment per Section 9-1.4D.
4. **Field Inspection** – Field verify per Section 9-1.5.
5. **Specification Requirements** – See *Standard Specifications* Section 9-10.1(1) and 9-19.1. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements**
   a. **Materials Fabrication Inspected CMO** – Certification of Materials Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

      For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

b. **Non-Fabrication Inspected CMO** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project engineer will track the quantity of the materials and retain these documents in the project records.

9-4.39 Vacant

9-4.40 Vacant

9-4.41 Precast Concrete Manholes, Catch Basins, Inlets, Drywells, and Risers

1. **Approval of Material** – Approval of the Fabricator is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the Fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Acceptance shall be a "WSDOT INSPECTED" Stamp (Figure 9-3). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.
4. **Field Inspection** – Field verify per Section 9-1.5. Check for "WSDOT INSPECTED" Stamp (Figure 9-3) and the "F" or "D" Stamp for foreign or domestic steel and document it.
5. **Specification Requirements** – See *Standard Specifications* Section 7-05 and 9-05.50(2), 9-05.50(3), 9-05.50(4), and 9-05.50(5). Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – Certification of Material Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

   For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.42 Riprap, Rock for Erosion and Scour Protection, Quarry Spalls, Rock for Rock Wall and Chinking Material, Backfill for Rock Wall, and Stone for Gabions

1. **Approval of Material** – In accordance with *Standard Specifications* Section 1-06, approval of materials is required prior to use. Consult the Aggregate Source Approval (ASA) database for approval status of the material for each source. If the ASA database indicated that the aggregate source has expired, or will expire before the end of the project, a source evaluation may be required. Contact the Region Materials Office for further direction. If samples are required, the Region Materials Office will coordinate with the ASA engineer to obtain the necessary samples according to SOP 128.

   When the usage is for non-structural applications, the Region Materials Engineer may approve the source.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

   a. **Stone for Gabions** – Prior to incorporating the material into the project a preliminary sample of material will be required; Stone for filling gabions shall be dense enough to pass the unit weight test described in *Standard Specifications* Section 8-14.3(3)F.

3. **Acceptance**

   a. Acceptance for quantities less than or equal to 150 cubic yards shall be by a Visual Acceptance per Section 9-1.4C.

   b. Acceptance for quantities that exceed 150 cubic yards, the Project Engineer shall determine and document that the grading is in conformance with the *Standard Specifications* and contract special provisions.

   c. Acceptance for non-structural applications shall be by a Visual Acceptance per Section 9-1.4C.

4. **Field Inspection** – Field verify per Section 9-1.5.

5. **Specification Requirements** – See *Standard Specifications* Sections 9-13 or 9-27.3(6). Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – Refer to *Standard Specifications* Sections 9-13 and 9-13.4 to see if recycled materials are permitted.

9-4.43 Semi-Open Slope Protection

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Submittal – Attach Catalog Cuts using the Catalog Cut Transmittal DOT Form 350-072 to assist in the approval process.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Acceptance shall be by the Certificate of Compliance which will accompany each shipment per Section 9-1.4E.
4. **Field Inspection** – Field verify per Section 9-1.5.
5. **Specification Requirements** – See *Standard Specifications* Section 9-13.5(1). See *Standard Plans*. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – None.

9-4.44 Plant Material

1. **Approval of Material** – Approval of the Nursery is required prior to the start of planting. The Nursery will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary Site Inspection will be required only if coded on the Request for Approval of Material DOT Form 350-071. Contact the Regional Landscape Architect or HQ Design Landscape Architect.
3. **Acceptance** – Visual Acceptance per Section 9-1.4C.

   Check for uniformity of plants within each lot and for representative sample lot based on the following:

   (N = total number of plants in lot) (n = number of plants in sample lot)

Total Number of Plants (N)	Minimum No. of Plants Required to Make Sample Lot (n)
0 – 500	All plants
501 – 1,000	500
1,001 – 5,000	600
5,001 – 30,000	850
Over 30,000	1000

   Should 5 percent or less of the sample lot fail, the entire lot may be accepted. Should over 5 percent of the acceptance sample lot fail to meet nominal specification requirements, the entire lot shall be rejected and removed from the project. The engineer may accept the plants if there is a large percentage of plants that appears to be exceptionally hearty and vigorous after sorting by the Contractor. If done immediately, the contractor shall be allowed to sort and remove the substandard portion of the plants.

   After the contractor has completed sorting, a new sample lot based on the above schedule of the remaining stock will again be selected and inspected. Should 5 percent or less of this sample lot fail, the sorted lot may be accepted.
4. **Field Inspection** – Field verify per Section 9-1.5.

5. **Specification Requirements** – See *Standard Specifications* Section 9-14.6. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – If there is a question on the plant material, contact the Regional Landscape Architect or HQ Design Landscape Architect at 360-705-7245.

9-4.45 Topsoil

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance**
   - **Type A** – Acceptance shall be as stated in the Contract Documents.
   - **Type B & C** – Visual Acceptance per Section 9-1.4C.
4. **Field Inspection** – Field verify per Section 9-1.5. The material shall be inspected for roots, weeds, subsoil, rocks, and other debris. Topsoil should not contain any manmade physical contaminants, such as concrete, plastic, glass or metal.
5. **Specification Requirements** – See *Standard Specifications* Section 9-14.1. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – If there is a question on the top soil, contact the Regional Landscape Architect or HQ Design Landscape Architect at 360-705-7245.

9-4.46 Seed

1. **Approval of Material** – In accordance with *Standard Specifications* Section 1-06 approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071 EF. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Submittal – Attach business license issued by the supplier's state or provincial Department of Licensing with a "seed dealer" endorsement. The Project Engineer can approve the Request for Approval of Material (RAM). The Region Landscape Architect or the HQ Design Landscape Architect can assist the Project Engineer in evaluating these submittals.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071 EF.
3. **Acceptance**
   a. **Non-Native or Non-Source Identified Seed** – Acceptance shall be by Certificate of Compliance per Section 9-1.4E. Seed shall be accepted based upon the analysis shown on the label/tag meeting contract requirements and by certification demonstrating compliance with WAC 16-302 for prohibited weed, noxious weeds, other weeds, and other crops.

b. **Native Seed, Source Not Identified** – Acceptance shall be by Certificate of Compliance per Section 9-1.4E. Seed shall be accepted based upon the analysis shown on the label/tag meeting contract requirements and by certification that seed meets or exceeds Washington State Department of Agriculture Seed Standards and by certification (blue tag) demonstrating compliance with WAC 16-302 for prohibited weed, noxious weeds, other weeds, and other crops.

c. **Native Seed, Source Identified** – Acceptance shall be by Certificate of Compliance per Section 9-1.4E. Seed shall be accepted based upon the analysis shown on the label/tag meeting contract requirements and by certification that seed meets or exceeds Washington State Department of Agriculture Seed Standards and by certification (blue tag) demonstrating compliance with WAC 16-302 for prohibited weed, noxious weeds, other weeds, and other crops and certification by yellow seed label from the Association of Official Seed Certifying Agents (AOSCA) or by site identification log.

4. **Field Inspection** – Field verify per Section 9-1.5. Each individual sack of seed must include a label (tag) as to the contents, demonstrating conformance to all requirements specified in the special provisions for each component of the seed mix. All bags must be unopened prior to use on the project. Retain label and certifications during each placement pay period showing analysis for contract records.

5. **Specification Requirements** – See *Standard Specifications* Section 9-14.2. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – If there is a question on the correct seed for the intended use, or other questions, contact the Region Landscape Architect or HQ Design Landscape Architect at 360-705-7245.

9-4.47 Fertilizer

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance**

   a. **Fertilizer for General Use** – Visual Acceptance per Section 9-1.4C. Verify that the material and chemical content shown on container label meets contract requirements.

   b. **Fertilizer for Erosion Control**

      i. **Less than 5 Acres** – Visual Acceptance per Section 9-1.4C. Verify that the material and chemical content shown on container label meets contract requirements.

      ii. **5 Acres and Greater** – Acceptance of fertilizer shall be by receipt of a Manufacturer's Certificate of Compliance (*Standard Specifications* Section 1-06.3) per Section 9-1.4D.

4. **Field Inspection** – Field verify per Section 9-1.5. All bags must be unopened prior to use on the project. Retain label during each placement pay period showing analysis for contract records.
5. **Specification Requirements** – See *Standard Specifications* Section 9-14.3. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – If there is a question on the intended use of the fertilizer, contact the Region or State Roadside and Site Development Office at 360-705-7245.

9-4.48 Mulch

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Submittal

   a. **Straw** – A certificate of compliance from either North America Weed Management Association (NAWMA) or Washington Wilderness Hay and Mulch (WWHAM) program indicating the straw is weed free or provide certification that the straw is steam or heat treated and is weed free.

   b. **Hydraulically Applied Erosion Control Products (HECP), Long-Term Mulch, Moderate-Term Mulch, and Short-Term Mulch** – Submit the following:
      - Test results dated within three years prior to the date of application from independent laboratory demonstrating compliance with Table 1 of *Standard Specifications* Section 9-14.4(2).
      - If the HECP contains cotton or straw, provide documentation that the material has been steam or heat treated to kill seeds or provide a U.S., Washington, or other State's Department of Agriculture laboratory test reports, dated within 90 days prior to the date of application, showing there are no viable seeds in the mulch.
      - Material Safety Data Sheet (MSDS) that demonstrates that the product is not harmful to plants, animals, and aquatic life.
      - Independent test results from the National Transportation Product Evaluation Program (NTPEP) for ASTM D 6459.

   c. **Wood Strand Mulch** – Submit preliminary sample to the State Materials Laboratory for evaluation.

d. **Tackifier** – Submit the following:
   - Test results dated within three years prior to the date of application from independent laboratory demonstrating compliance with Table 1 of *Standard Specifications* Section 9-14.4(2).
   - A satisfactory report for viscosity performed in accordance with ASTM D 2364.
   - Material Safety Data Sheet (MSDS) that demonstrates that the product is not harmful to plants, animals, and aquatic life.

e. **Compost** – Submit the following:
   - A copy of the Solid Waste Handling Permit issued to the manufacturer by the Jurisdictional Health Department in accordance with WAC 173-350.
   - Provide laboratory analysis from independent Seal of Testing Assurance (STA) Program certified laboratory that the material complies with the processes, testing, and standards specified in WAC 173-350 and *Standard Specifications* 9-14.4(8).
   - A copy of the manufacturer's Seal of Testing Assurance (STA) certification as issued by the U.S. Composting Council.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance**

   a. **Straw** – Acceptance shall be by Visual Acceptance per Section 9-1.4C.

   b. **Hydraulically Applied Erosion Control Products (HECPs), Long-Term Mulch, Moderate-Term Mulch, and Short-Term Mulch** – Acceptance shall be by Visual Acceptance per Section 9-1.4C.

   c. **Bark or Wood Chips** – Acceptance shall be by the Certification of Compliance per Section 9-1.4E.

   d. **Tackifier** – Acceptance shall be by Visual Acceptance per Section 9-1.4C.

   e. **Compost** – Materials shall be accepted on receipt of "Satisfactory" test report from an independent STA program certified laboratory, documentation stating that the compost facility is STA certified, waste handling permit, etc., see contract provisions.

   f. **Wood Strand Mulch** – Acceptance shall be by "Satisfactory" test report from the Contractor, performed in accordance with WSDOT Test Method 125 and Material Safety Data Sheet (MSDS) that demonstrates the product is not harmful to plant life.

4. **Field Inspection** – Field verify per Section 9-1.5. A visual inspection shall be made to ensure uniformity of the mulch. Also check for detrimental contamination.

5. **Specification Requirements** – See *Standard Specifications* Section 9-14.4. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – If there is a question on the intended use of mulch, contact the Region Landscape Architect, or State Roadside and Site Development Office at 360-705-7245.

   For Compost Only – Samples may be tested using the Solvita Compost Maturity Test by the Contracting Agency at the Engineer's discretion. To purchase Solvita Compost Maturity Test Kits for field office use, contact Woods End Research Laboratory, Inc., Box 297, Mount Vernon, Maine 04352, 207-293-2457, email info@woodsend.org.

9-4.49 Irrigation System

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Submittal – If approval action is being requested via the RAM process, attach Catalog Cuts or other appropriate documents, using proper transmittal, to assist in the approval process. All Irrigation System materials being requested via RAM process will be sent to the Region or State Roadside and Site Development Office, except for Electrical Wire and Splices, which will be sent to the State Materials Laboratory. Atmospheric vacuum breaker assemblies (AVBA), pressure vacuum breaker assemblies (PVBA), double check valve assemblies (DCVA) and reduced pressure backflow devices (RBFD) shall be of a manufacturer and model approved for use by the Washington State Department of Health. When approved, be certain to verify that the product is in fact qualified for its intended use, and the product is listed under the appropriate specification.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance**

   a. **QPL Acceptance**

      i. **PVC Pipe and Fittings, Automatic Controllers, Spray Heads, Valve Boxes and Protective Sleeves, Automatic Control Valves with Pressure Regulator, Quick Coupling Equipment, Electrical Wire and Splices** – Visual Acceptance per Section 9-1.4C.

      ii. **Cross-Connection Control Devices** – Visual Acceptance per Section 9-1.4C. Document that the model number of the device is listed on the current Washington State Department of Health (WSDOH) listing.

   b. **Non-QPL Acceptance**

      i. **PVC Pipe, Polyethylene Pipe, and Detectable Marking Tape** – Visual Acceptance per Section 9-1.4C.

      ii. **Galvanized Iron Pipe** – Manufacturer's Certificate of Compliance per Section 9-1.4D.

iii. **PVC Pipe Fittings, Drip Tubing, Automatic Controllers, Spray Heads, Valve Boxes and Protective Sleeves, Gate Valves, Manual Control Valves, Automatic Control Valves, Automatic Control Valves with Pressure Regulator, Quick Coupling Equipment, Drain Valves, Hose Bibs, Check Valves, Pressure Regulating Valves, Three-Way Valves, Flow Control Valves, Air Relief Valves, Electrical Wire and Splices, Wye Strainers** – Catalog Cut per Section 9-1.4G.

iv. **Cross Connection Control Devices** – Manufacturer's Certificate of Compliance per Section 9-1.4D, indicating device is approved by Washington State Department of Health (WSDOH) listing, and Catalog Cut per Section 9-1.4G.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for damage to the galvanized coatings in shipping and handling. See that damaged areas and field cut threads are protected with an approved galvanized repair paint formula, standard formula A-9-73.

5. **Specification Requirements** – See *Standard Specifications* Section 9-15. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.50 Fencing and Gates

1. **Approval of Material** – In accordance with *Standard Specification* Section 1-06, approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071 EF. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Submittal

   a. **Chain Link Fabric** – One sample consisting or three wires across full width of fabric, from one roll.

   b. **Wire Mesh** – One 12-in sample across full width of roll.

   c. **Tension Wire and Barbed Wire** – One 3-foot sample from one roll.

   d. **Grade 1 Post Material**

      i. **Rails and Grade 1 Posts for Chain Link Fence** – Sample to consist of one post and 12-in sample from each end of the rail, where appropriate.

      ii. **Corner Posts or Brace Posts** – One complete post assembly.

iii. **Wire Fence Line Posts** – One complete post with plate. Above samples are to be taken from properly identified lots of material. Be sure samples are numbered and properly identified as to Lot, if applicable, when sent to the Laboratory. If first sample fails, two additional samples are to be submitted from the same lot. Re-samples are to be properly identified as to lot and referenced to the previous Lab No. for the failing sample.

e. **Colored Ultraviolet-Insensitive Coating Material** – The Project Engineer can approve the Request for Approval of Materials. The State Materials Laboratory can assist the Project Engineer in these evaluations.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071 EF.

3. **Acceptance**

   a. The following materials shall be accepted on receipt of an acceptable Manufacturer's Certificate of Compliance per Section 9-1.4D:

      i. Chain Link Fabric and Wire Mesh

      ii. Tension Wire and Barbed Wire

      ii. Grade 1 and Grade 2 Post Material

      iv. Rails, Corner Posts, and Brace Posts

      v. Wire Fence Line Posts

   b. **Gates, Miscellaneous Fence Hardware, and Colored Ultraviolet-Insensitive Coating Material** – Visual Acceptance per Section 9-1.4C.

      Miscellaneous fence hardware includes such items as tie wire, hog rings, galvanized bolts, nuts, washers, fence clips, stays, post caps, tension band and bars, rail end caps, etc.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for damage to zinc or other coating on posts, rails, hardware, etc.

5. **Specification Requirements** – See *Standard Specifications* Section 9-16. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.51 Beam Guardrail and Guardrail Anchors

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. An on-site inspection by the WSDOT Materials Fabrications Inspection Office of the fabricating facilities prior to approval will be required only if a new manufacture is requested on the Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance**
   a. W Beam and Thrie Beam Rail Elements, components and hardware shall be accepted by a Manufacturer's Certificate of Compliance per Section 9-1.4D of this manual.
   b. A307 bolts, nuts and washers shall be accepted by Visual Acceptance per Section 9-1.4C.
4. **Field Inspection** – Field verify per Section 9-1.5:
   a. W Beam and Thrie Beam Rail Elements are stamped with the same heat number displayed on the Manufacturer's Certificate of Compliance.
   b. Bolt heads are stamped 307A.
   c. Components and hardware are accepted by an approved Manufacturer's Certificate of Compliance and field verification is not required.

   Check material delivered to the project for damage to galvanizing.
5. **Specification Requirements** – See *Standard Specifications* M 41-10, Section 9-16.3 and *Standard Plans* M 21-01.
6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.52 Guardrail Posts and Blocks

1. **Approval of Material** – In accordance with *Standard Specifications* Section 1-06 approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071 EF. An on-site inspection by the WSDOT Materials Fabrications Inspection Office of the Fabrication and Treatment Facilities prior to approval will be required only if a new manufacture is requested on the Request for Approval of Material DOT Form 350-071 EF. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071 EF.
3. **Acceptance**
   a. **Treated Timber Posts and Blocks** – Shall be accepted by a Lumber Grading Stamp or Grading Certificate for Timber and Lumber and Certificate of Treatment.
   b. **Steel Post and Blocks** – Shall be accepted by a Manufacturer's Certificate of Compliance per Section 9-1.4D.
   c. **Alternate Block Material** – Shall be accepted by documentation demonstrating conformance to the requirements of NCHRP Report 350 or the AASHTO Manual for Assessing Safety Hardware (MASH).
4. **Field Inspection** – Field verify per Section 9-1.5.
   a. Treated Timber Posts and Blocks field verified.
   b. Steel Posts and Steel Blocks are accepted by receipt of an approved Manufacturer's Certification of Compliance and field verification is not required. Check Steel Post and Steel Blocks delivered to the project for damage to galvanizing.
   c. Alternate Block Materials must be field verified.
5. **Specification Requirements** – See *Standard Specifications* Section 9-16.3 and *Standard Plans*.
6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.53 Miscellaneous Precast Concrete Products (Block Traffic Curb, Precast Traffic Curb)

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. An on-site inspection by the WSDOT Materials Fabrication Office of the fabricating facilities prior to approval will be required only if a new manufacture is requested on the Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance**

   a. **Precast Traffic Curb** – Visual Acceptance per Section 9-1.4C. Unless the curb sections have been inspected prior to shipping they are to be carefully inspected upon arrival on the project site. Check for surface color and damage, such as cracks, broken corner or edges, contour and alignment. Surface color and texture should match advanced sample provide by the manufacturer. See *Standard Plans* for details.

   b. **Block Traffic Curb** – Visual Acceptance per Section 9-1.4C. Check exposed faces of curb sections for damage such as chips, cracks, and air holes. See *Standard Specifications* Section 9-18.3 for details. Compressive strength may be determined in accordance with the FOP for ASTM C 805.

4. **Field Inspection** – Field verify per Section 9-1.5.

5. **Specification Requirements** – See *Standard Specifications* Section 9-18. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.54 Prestressed Concrete Girders

1. **Approval of Material** – Approval of the Fabricator is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the Fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the Fabricator.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance** – Acceptance is based on "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.

   The Materials Fabrication Inspector will provide a weekly Fabrication Progress Report to the Project Engineer while the girders are being fabricated.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5) and the "F" or "D" Stamp for foreign or domestic steel and document it. Check for damage caused by shipping and handling.

5. **Specification Requirements** – See *Standard Specifications* Section 6-02.3(25), 6-05.3(3), 6-02.3(28), and Section 9-19. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – Certification of Material Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

   For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.55 Pavement Marking Materials

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Submittal – Pavement Marking Paint and Plastic that are not listed on the QPL shall provide test data from an independent laboratory and field test documentation from northern NTPEP (National Transportation Product Evaluation Program) or test deck information conducted by other public entities may be considered provided the data is similar to a northern NTPEP Test Deck.

   Raised Pavement Markers that are not listed on the QPL shall provide a sample and test data from an independent laboratory and field test documentation from northern NTPEP (National Transportation Product Evaluation Program) or test deck information conducted by other public entities may be considered provided the data is similar to a northern NTPEP Test Deck.

   Glass Beads that are not listed in the QPL shall provide test data from an independent laboratory demonstrating compliance with *Standard Specifications* Section 9-34.4.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance** – Visual Acceptance per Section 9-1.4C.

4. **Field Inspection** – Field verify per Section 9-1.5. A visual inspection shall be made to ensure that cracked or damaged lane markers are not incorporated in the work.

5. **Specification Requirements** – See *Standard Specifications* Section 9-21 and 9-34. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – There may be special shipping requirements for epoxy and adhesive. These samples shall be transported to the Region Materials Laboratory for proper shipping.

9-4.56 Signing Materials and Mounting Hardware

1. **Approval of Material** – Approval of the Sign Fabricator as well as the manufacturer of the sign blanks, panels and the reflective sheeting is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the Fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.

   A RAM will not be required for sign mounting hardware provided by the Sign Fabricator. Mounting hardware from a source other than the sign fabrication facility will require approval by Request for Approval of Material DOT Form 350-071. Provide the Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the fabricator.

2. **Preliminary Samples** – A preliminary sample of the material may be required only if coded on the Request for Approval of Material DOT Form 350-071, or as requested by the Sign Fabricator Inspector.

3. **Acceptance**

   a. **Sign** – Acceptance is based on a "FABRICATION APPROVED" Decal (Figure 9-8).

   b. **Sign Mounting Hardware** – Hardware supplied by the Sign Fabricator will have the mounting hardware certifications verified at the sign fabricator's facility by the Materials Fabrication Inspector to ensure the materials meet the contract requirements. These records will be kept at the sign fabrication facility. Fabrication inspectors will verify sign mounting hardware as it is packaged for shipment and stamp it "WSDOT INSPECTED" (Figure 9-3). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.

      Contractor's who purchase sign mounting hardware separately from a source other than a WSDOT approved sign fabrication facility will be required to supply a Manufacturer's Certificates of Compliance per Section 9-1.4D and it will be the responsibility of the Contractor to supply the certifications to the Project Engineer's Office prior to use.

   c. **Bolts for Roadside Wood Posts** – Acceptance for A307 bolts, nuts and washers shall be by Visual Acceptance per Section 9-1.4C.

4. **Field Inspection** – Field verify per Section 9-1.5 that bolt heads are stamped 307A. Check for a "WSDOT INSPECTED" Stamp to the sealed hardware package (Figure 9-3), Document the "F" or "D." Check for "FABRICATION APPROVED" Decal (Figure 9-8) on the back of the sign and document in Inspector's Daily Report. Double-faced signs, which do not receive decals, will be approved on visual inspection at the fabricator's facility and in the field. A list/invoice of all inspected and accepted signs will be kept in the WSDOT Materials Fabrication

Inspection Office files. Check that all overhead signs are mounted with stainless steel bolts, u-bolts, washers, nuts, locknuts, mounting brackets and straps. Mounting hardware shall include bolts, nuts, washers, locknuts, rivets, post clips, windbeams, angles, "Z" bar, straps and mounting brackets.

If there is not a Decal present, inform the Contractor that the item is not acceptable and contact the WSDOT Materials Fabrication Inspection Office to determine the status of the inspection. Items lacking Decals or Stamps, or which are damaged during shipping, should be rejected and that material tagged or marked appropriately.

5. **Specification Requirements** – See *Standard Specifications* Section 9-28 and Section 9-1.4B(2). Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements**

   a. **Materials Fabrication Inspected CMO** – Certification of Materials Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

      For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

   b. **Non-Fabrication Inspected CMO** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.57 Liquid Concrete Curing Compound

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance** – If the lot is listed on the QPL, it may be used without testing on current projects per Section 9-1.4A(1). If the lot is not on the QPL, submit a one-quart sample taken by, or in the presence of, an agency representative for each lot. Samples must be submitted for testing 10 days prior to use of curing compound. Samples submitted shall be accepted on receipt of "Satisfactory" test reports from the State Materials Laboratory.

4. **Field Inspection** – Field verify per Section 9-1.5.

5. **Specification Requirements** – See *Standard Specifications* Section 9-23. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – None.

9-4.58 Admixtures for Concrete

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Materials shall be accepted on the basis of a Certified Concrete Delivery Ticket indicating the product and dosage of the admixture conform to the concrete mix design.
4. **Field Inspection** – Field verify per Section 9-1.5.
5. **Specification Requirements** – See *Standard Specifications* Section 6-02.3(5)B and 9-23. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – Check Concrete Delivery Ticket for proper admixture dosage.

9-4.59 Plastic Waterstop

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Material shall be accepted by a Manufacturer's Certificate of Compliance per Section 9-1.4D.
4. **Field Inspection** – Field verify per Section 9-1.5.
5. **Specification Requirements** – See *Standard Specifications* Section 9-24. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – None.

9-4.60 Epoxy Systems

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance**

   a. **Epoxy Bonding Agents** – Materials shall be accepted on receipt of "Satisfactory" test reports from the State Materials Laboratory. For epoxy bonding agents, submit mix ratios, intended use and a representative sample of each component with MSDS sheet for each batch or lot number. Samples shall be submitted to the State Materials Laboratory. A period of 21 calendar days should be allowed for testing.

      Sample – A representative sample shall be a minimum of a 1 pint container of each component or a pre-packaged kit. The sample size shall represent the mixing ratio, (for example; 1 pint of a and 2 pints of B, or 1 pint a and 3 pints of B). Containers shall be identified as "Component A" (Epoxy Resin) and "Component B" (Curing Agent) and shall be marked with the name of the manufacturer, the date of manufacture and the lot number.

   b. **Epoxy Grout/Mortar/Concrete** – Materials shall be accepted on receipt of "Satisfactory" test reports from the State Materials Laboratory. For epoxy grout/mortar/concrete, submit mix ratios, intended use and a representative sample of each component for each batch or lot number. Samples shall be submitted to the State Materials Laboratory. A period of 15 working days should be allowed for testing.

      Sample – A representative sample shall be a minimum of a 1 pint container of each component or a pre-packaged kit. The sample size shall represent the mixing ratio, (for example; 1 pint of a and 2 pints of B, or 1 pint a and 3 pints of B). Containers shall be identified as "Component A" (Epoxy Resin), "Component B" (Curing Agent), and "Aggregate Component" and shall be marked with the name of the manufacturer, the date of manufacture and the lot number.

      Acceptance for aggregate for non-Prepackaged Epoxy Grout/Mortar/Concrete shall be by the Certificate of Compliance per Section 9-1.4E.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for uniformity of color and conformance to required mix proportions. Streaking is an indication of inadequate mixing. Check for set and hardness with your thumbnail. You should not be able to dent the properly mixed and cured material. Epoxies shall be mixed and applied in conformance to manufacturer's written instructions unless otherwise modified in writing by the manufacturer's agent.

5. **Specification Requirements** – See *Standard Specifications* Section 9-26. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements**
   - Type IV epoxy bonding agent may be substituted for and be tested to the same criteria as Type I when used in the application identified in *Standard Specifications* Section 5-01.3(6) and 5-05.3(10). Ensure that the transmittal states the *Standard Specifications* for which the material is being tested for.
   - Aggregate for non-Prepackaged Epoxy Grout/Mortar/Concrete shall meet the requirements of *Standard Specifications* Section 9-03.1(2).
   - There may be special shipping requirements for epoxy. These samples shall be transported to the Region Materials Laboratory for proper shipping.

9-4.61 Resin Bonded Anchors

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Submittal – If approval is being requested by the Request for Approval of Material process, submit independent laboratory test report indicating resin bonded anchor system, for the specified size rods, meets specification requirements when tested in accordance with ASTM E 488.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance**

   a. **Resin adhesive** – Acceptance shall be by Visual Acceptance per Section 9-1.4C.

   b. **Threaded Rod, Nut, and Washer or Other Inserts** – Acceptance shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for proper embedment depths. Check that holes are properly cleaned. Check that the installation is in accordance with the manufacturers written instructions.

5. **Specification Requirements** – Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements**
   - For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.
   - There may be special shipping requirements for resin adhesive. These samples shall be transported to the Region Materials Laboratory for proper shipping.

9-4.62 Gabion Cribbing, Hardware, and Stone

1. **Approval of Material**

   Gabion Cribbing and Hardware – In accordance with *Standard Specifications* Section 1-06, approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071 EF. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   Stone – See Section 9-4.42.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance**

   Gabion Cribbing and Hardware – Acceptance shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D.

   Stone – See Section 9-4.42

4. **Field Inspection** – Field verify per Section 9-1.5.

5. **Specification Requirements** – See *Standard Specifications* Section 9-27.3. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.63 Steel Sign Structures – Cantilever, Sign Bridge, Bridge Mounted, Roadside

1. **Approval of Material** – Approval of the fabricator is required prior to the start of fabrication. The fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance** – The fabricated sign structure and associated hardware will be accepted on the basis of an "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.

   a. **Sign Structure – Cantilever, Sign Bridge, Bridge Mounted, and Roadside Type PLT/PLU** – Acceptance is based on "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.

      Note: The Materials Fabrication Inspector will inspect hardware if it is available at the time of inspection at the point of manufacture. Acceptance for Roadside Sign Structure Hardware not present during Materials Fabrication inspection and delivered to the job site without an approval stamp shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D. High strength bolts, nuts and washers in quantities over 50 require sampling.

   b. **Roadside – Except Type PLT and PLU** – Acceptance for Roadside sign structures except for Types PLT and PLU shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5) on the sign structure and associated hardware. Check for and the "F" or "D" indicator Stamp for foreign or domestic steel and document it.

5. **Specification Requirements** – See *Standard Specifications* Section 9-06.16 and 9-28.14. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements**

   a. **Materials Fabrication Inspected CMO** – Certification of Materials Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

      For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

   b. **Non-Fabrication Inspected CMO** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.64 Conduit

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Submittal – Attach Catalog Cuts using the Catalog Cut Transmittal DOT Form 350-072 to assist in the approval process.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance** – Visual Acceptance per Section 9-1.4C is required for Rigid Galvanized Steel, Aluminum, PVC, PE, HDPE, Fiberglass, and Flexible Metal Conduit including hardware such as (fittings, couplings, spacers, adapters, split internal expansion plugs, duct plugs, connectors, clamps, conduit bodies, and conduit supports), Expansion Fittings, Deflection Fittings, Combination Deflection and Expansion Fittings.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for "Nationally Recognized Testing Laboratories" (NRTL) approval labels. Check for damage to coatings caused by shipping and handling, and see that damaged areas and field cut threads are protected with an approved coating.

5. **Specification Requirements** – See *Standard Specifications* Section 9-29.1. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.65 Fiber Optic Cable, Electrical Conductors, and Cable

1. **Approval of Material** – In accordance with *Standard Specifications* Section 1-06 approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071 EF. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Submittal – Attach Catalog Cut using DOT Form 350-072 EF to assist in the approval process. The Project Engineer can approve the Request for Approval of Material (RAM). The Region Traffic Engineer or the State Materials Laboratory can assist the Project Engineer in these evaluations.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance** – Visual Acceptance per Section 9-1.4C of this manual.

4. **Field Inspection** – Field verify per Section 9-1.5. A visual inspection shall be made to ensure that no conductors with damaged insulation are incorporated into the project.
5. **Specification Requirements** – See *Standard Specifications* Section 9-29.3. Review Contract Documents to determine if supplemental requirements apply.
6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel and iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.66 Steel Poles – ITS, Pedestrian, Light, Signal Standards, and High Mast Light Poles

1. **Approval of Material** – Approval of the fabricator is required prior to the start of fabrication. The fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance**
   a. **Steel Light and Signal Standards Type II – V, ITS, and High Mast Light Poles** – As determined by the Materials Fabrications Inspection Office, Steel Light, Signal Standards and High Mast Light Poles may be inspected at the point of manufacture prior to shipping or at the jobsite by the Materials Fabrication Inspector. Acceptance is based on "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.

      Steel Light, Signal Standards and High Mast Light Poles delivered to the job site without "APPROVED FOR SHIPMENT" stamps and/or tags require Materials Fabrication Inspection. Contact the WSDOT Materials Fabrication Inspection Office for inspection. Provide the Materials Fabrication Inspector the following documentation for their review prior to their physical inspection of the Steel Light, Signal Standards and High Mast Light Poles.
      - Approved shop drawings not listed in Contract General Special Provisions.
      - Manufacturer's Certificate of Compliance for all steel and associated hardware identified in the pre-approved plan or approved shop drawing.

- Nondestructive test reports generated by the fabricator for inspection of welds.
- Certificate of Material Origin.

Note: The Materials Fabrication Inspector will inspect hardware if it is available at the time of inspection at the point of manufacture or at the jobsite. Hardware not present during Materials Fabrication inspection and delivered to the job site without an approval stamp may be accepted by the project office based on Manufacturer's Certificate of Compliance with supporting material certifications and Certificate of Material Origin. When high strength bolting materials are received on the job site without Fabrications Inspection Stamp, acceptance shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D for each heat number or manufacturing lot. Acceptance shall also be by a "Satisfactory" test report from the State Materials Laboratory, when samples are required, for each consignment lot as defined by *Standard Specifications* Section 9-06.5(3). A separate transmittal and materials certification shall accompany each sample of bolts, nuts, and washers.

b. **Standards Type Pedestrian Push Button, Pedestrian Signal, Type I, Ramp Meter & Flashing Beacon** – Acceptance shall be by the Manufacturer's Certificate of Compliance with supporting Mill Certification per Section 9-1.4D and:

- Approved shop drawings not listed in Contract General Special Provisions.
- Manufacturer's Certificate of Compliance for all steel and associated hardware identified in the pre-approved plan or approved shop drawing.
- Nondestructive test reports generated by the Fabricator for inspection of welds.

High strength bolting materials acceptance shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D for each heat number or manufacturing lot. Acceptance shall also be by a "Satisfactory" test report from the State Materials Laboratory, when samples are required, for each consignment lot as defined by *Standard Specifications* Section 9-06.5(3). A separate transmittal and materials certification shall accompany each sample of bolts, nuts, and washers.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5) and the "F" or "D" Stamp for foreign or domestic steel and document it. Contact WSDOT Materials Fabrication Inspection Office for inspection of Light and Signal Poles delivered to the jobsite without "APPROVED FOR SHIPMENT" Tag and/or Stamp.

5. **Specification Requirements** – See *Standard Specifications* Section 9-06.5(3) and 9-29.6. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements**

   a. **Materials Fabrication Inspected CMO** – Certification of Materials Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

      For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

   b. **Non-Fabrication Inspected CMO** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.67 Vacant

9-4.68 Luminaires, Lamps, and Light Emitting Diodes (LED)

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Submittal – Luminaires and Lamps – Attach Catalog Cuts using the Catalog Cut Transmittal DOT Form 350-072 to assist in the approval process.

   LED – Submit Independent Test Report verifying compliance with the Contract Document requirements along with Catalog Cuts using the Catalog Cut Transmittal DOT Form 350-072 to assist in the approval process.

2. **Preliminary Samples** – Preliminary samples will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance** – Visual Acceptance per Section 9-1.4C.

4. **Field Inspection** – Field verify per Section 9-1.5.

   a. **Luminaires** – A visual inspection shall be made to ensure damaged equipment is not installed and that luminaires are mounted level. Confirm the socket position is the same as that noted on the catalog cut.

   b. **Lamps for Luminaires** – Check that all lamps are of the proper wattage, see contract documents.

   c. **LEDs for Signal Heads** – Check that LEDs are as specified, see contract documents.

5. **Specification Requirements** – See *Standard Specifications* Section 9-29.10. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.69 Water Distribution System

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Submittal – Attach Catalog Cuts using the Catalog Cut Transmittal DOT Form 350-072 to assist in the approval process.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance**
   a. **QPL Acceptance**
      i. **Ductile Iron Pipe and Fittings, PVC Pipe and Fittings, Restrained Joints, Restrained Flexible Couplings, Gate Valves (3-in to 16-in), Butterfly Valves, Saddles, Corporation Stops** – Visual Acceptance per Section 9-1.4C.
      ii. **Copper Tubing and Polyethylene Tubing** – Manufacturer's Certificate of Compliance per Section 9-1.4D.
   b. **Non-QPL Acceptance**
      i. **Ductile Iron Pipe, Steel Pipe, Polyvinyl Chloride (PVC) Pipe, Polyethylene (PE) Pressure Pipe, Polyethylene Encasement** – Manufacturer's Certificate of Compliance per Section 9-1.4D.
      ii. **Fittings for Ductile Iron, Steel, PVC, and PE Pipe. Restrained Joints, Bolted Sleeve-type Couplings for Plain End Pipe, Restrained Flexible Couplings, Grooved and Shoulder Joints, Fabricated Mechanical Slip-type Expansion Joints, Gate Valves (3-in to 16-in), Butterfly Valves, Valve Stem Extensions, Combination Air Release/Vacuum Valves, Tapping Sleeve and Valve Assemblies, Hydrants, End Connections, Hydrant Extensions, Hydrant Restraints, Traffic Flanges, Saddles, Corporation Stops, Copper Tubing, Polyethylene Tubing, Service Fittings, Meter Setters, Bronze Nipples and Fittings, and Meter Boxes** – Catalog Cut per Section 9-1.4G.
      iii. **Valve Boxes, Valve Marker Posts, and Guard Posts** – Visual Acceptance per Section 9-1.4C.

4. **Field Inspection** – Field verify per Section 9-1.5. Check material delivered to the project for damage to the galvanized coatings caused by shipping and handling and conformance to the contract documents. See that damaged areas and field cut threads are protected with an approved galvanized repair paint formula, standard formula A-9-73.
5. **Specification Requirements** – See *Standard Specifications* Section 9-30. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements**
   a. Water distribution pipe requires testing after installation in conformance with the *Standard Specifications* Section 7-09.
   b. For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.70 Elastomeric Pads

1. **Approval of Material** – In accordance with *Standard Specifications* Section 1-06 approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071 EF. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Submittal

   a. **Load Bearing** – Submit Manufacturer's Certificate of Compliance and supporting tests in accordance with *Standard Specifications* Section 1-06.3, demonstrating compliance with *Standard Specifications* Section 9-3.1.
   b. **Non-Load Bearing; Girder Stop Pads and Seismic Restrainer Pads** – Attach Catalog Cut using Transmittal of Catalog Cut (DOT Form 350-072 EF) to assist in the approval process. The Project Engineer can approve the Request for Approval of Material (RAM).
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071 EF.
3. **Acceptance**
   a. **Load Bearing** – Acceptance shall be by a Manufacturer's Certificate of Compliance per Section 9-1.4D accompanied by a certified test report identifying the specific batch of material and demonstrating conformance to *Standard Specifications* Section 9-31.
   b. **Non-Load Bearing; Girder Stop Pads and Seismic Restrainer Pads** – Visual acceptance per Section 9-1.4C.

4. **Field Inspection**

   a. **Load Bearing** – Field verify per Section 9-1.5. Make certain that material to be used is from the certified batch.

   b. **Non-Load Bearing; Girder Stop Pads and Seismic Restrainer Pads** – Field verify per Section 9-1.5.

5. **Specification Requirements** – See *Standard Specifications* Section 9-31. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.71 Bridge Bearings – Cylindrical, Disc, Fabric Pad, Pin, Spherical

1. **Approval of Material** – Approval of the Fabricator is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the Fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance** – As determined by the WSDOT Materials Fabrication Inspection Office, Bridge Bearings may be inspected at the point of manufacture prior to shipping or at the jobsite by the Materials Fabrication Inspector. Contract Provision may provide for job site inspection of the Bridge Bearings by the engineer. Acceptance is based on "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.

   Bridge Bearings delivered to the job site without "APPROVED FOR SHIPMENT" stamps and/or tags require Materials Fabrication Inspection. Contact the WSDOT Materials Fabrication Inspection Office for inspection and required documentation needed prior to their physical inspection of the Bridge Bearing.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5) and the "F" or "D" Stamp for foreign or domestic steel and document it. Contact WSDOT Materials Fabrication Inspection Office for inspection of Bridge Bearings delivered to the jobsite without "APPROVED FOR SHIPMENT" Tag and/or Stamp.

5. **Specification Requirements** – Bearings specifications are currently defined in General Special Provisions and Bridge Special Provisions. Review the contract documents to determine the specification requirements.
6. **Other Requirements** – Certification of Material Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

   For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.72 Precast Concrete Barrier

1. **Approval of Material** – In accordance with *Standard Specifications* Section 1-06 approval of the Fabricator and materials is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071 EF. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the Fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071 EF.
3. **Acceptance**

   a. **Concrete Barrier** – Acceptance is based on "WSDOT INSPECTED" Stamp (Figure 9-3). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.

   b. **Connecting, Drift, and Steel Pins, and Miscellaneous Hardware** – The acceptance of connection, drift, and steel pins, and miscellaneous hardware is based on Manufacturer's Certificate of Compliance per Section 9-1.4D for each heat number or manufacturing lot.

      Connecting, drift, and steel pins verify the Manufacturer's Certification of Compliance and supporting mill tests comply with *Standard Specification* 6-10.2.
4. **Field Inspection** – Field verify per Section 9-1.5. Check for "WSDOT INSPECTED" Stamp (Figure 9-3) and the "F" or "D" Stamp for foreign or domestic steel and document it.
5. **Specification Requirements** – See *Standard Specifications* Sections 1-06 and 6-10. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – Certification of Materials Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

   a. **Materials Fabrication Inspected CMO** – Certification of Materials Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

      For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

   b. **Non-Fabrication Inspected CMO (Miscellaneous Hardware)** – For projects with the Buy America provision, refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.73 Vacant

9-4.74 Metal Bridge Rail

1. **Approval of Material** – Approval of the Fabricator is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the Fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance** – Acceptance is based on "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for "APPROVED FOR SHIPMENT" Tag or Stamp and the "F" or "D" Stamp for foreign or domestic steel and document it.

5. **Specification Requirements** – See *Standard Specifications* Section 6-06.3(2) and 9-06.18. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – Certification of Material Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

   For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.75 Construction Geosynthetics (Geotextiles and Geogrids)

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Approval – Submittal requirements for geogrid and geotextile products proposed for use in permanent geosynthetic retaining walls or reinforced slopes, refer to *Standard Specifications* Section 9-33.4(1).

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance**

   a. **Underground Drainage**

      i. **Less than** 100 **SY** – Acceptance shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D.

      ii. 100 **SY and greater** – Materials shall be accepted on receipt of "Satisfactory" test reports from the State Materials Laboratory.

   b. **Temporary or Permanent Geosynthetic Retaining Walls and Reinforced Slopes and Embankments over Soft Ground** – Materials shall be accepted on receipt of "Satisfactory" test reports from the State Materials Laboratory.

   c. **Soil Stabilization and Separation, Permanent Erosion Control, and Prefabricated Drainage Mat** – Acceptance shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D.

   d. **Temporary Erosion Control Materials** – Visual Acceptance per Section 9-1.4C.

4. **Field Inspection** – Field verify per Section 9-1.5. Check each roll of geotextile fabric for proper identification as shown on either the Manufacturer's Certificate of Compliance or on the State Materials Laboratory test report.

5. **Specification Requirements** – See *Standard Specifications* Section 9-33. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – If seams are sewn in the field, refer to 9-33.4(5) for sampling and testing requirements.

9-4.76 Concrete

1. **Approval of Material** – Approval of all materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   Cement – See Section 9-4.1.

   Concrete Aggregate – See Section 9-4.4.

   Admixtures for Concrete – See Section 9-4.58.

   Water – See Section 9-4.77.

   Submittal and approval of the Concrete Mix Design shall be per *Standard Specifications* Section 6-02.3(2) and 9-03.1(1) and Section 6-2.1A. Contractor must submit a concrete mix design on DOT Form 350-040. All concrete except commercial and Lean Concrete must come from a pre-qualified Batch Plant.

   For mix designs proposed for cement concrete pavement the contractor is required to submit flexural and compressive strength test results in accordance with *Standard Specifications* Section 5-05 as part of the concrete mix design.

   Note: If the Aggregate Source Approval (ASA) database Tracking System requires Alkali Silica Reactivity (ASR) mitigation, the concrete mix design submittal may include the use of either a low alkali cement (per *Standard Specifications* Section 9-01.3(3)) or fly ash (*Standard Specifications* Section 9-23.9) as approved by the engineer. The contractor shall provide test results for ASTM C 1567 showing the mitigating measures are effective (see *Standard Specifications* Section 9-03). Contact the State Materials Engineer if the contractor is proposing to use other mitigating measures.

2. **Preliminary Samples** – Not required.

3. **Acceptance**

   a. **Prepackaged Concrete** – Visual Acceptance per Section 9-1.4C that all bags are labeled meeting the requirements of ASTM C387.

   b. **Controlled Density Fill (CDF)** – Check Concrete Delivery Ticket to verify the mix provide is in accordance with the approved Mix Design.

   c. **Commercial and Lean Concrete** – Is accepted based on a Certificate of Compliance to be provided by the supplier as described in *Standard Specifications* Section 6-02.3(5)B.

   d. **Cement Concrete Pavement** – Compressive Strength shall be accepted on receipt of "Satisfactory" test reports. Acceptance samples shall be obtained, tested, and recorded in accordance with the contract documents, and Section 9-3 and 9-7. Air Content will be tested at the time of placement and documented on the Concrete Delivery Ticket. Acceptance samples shall be obtained, tested, and recorded in accordance with the contract documents, and this chapter.

e. **Structural Concrete** – Compressive Strength shall be accepted on receipt of "Satisfactory" test reports. Acceptance samples shall be obtained, tested, and recorded in accordance with the contract documents, and Section 9-3 and 9-7. Slump, Air Content and Temperature will be tested at the time of placement and documented on the Concrete Delivery Ticket. Acceptance samples shall be obtained, tested, and recorded in accordance with the contract documents, and this chapter.

4. **Field Inspection** – Field verify per Section 9-1.5. Check Concrete Delivery Ticket to verify the concrete provide conforms to the approved concrete Mix Design.
5. **Specification Requirements** – See *Standard Specifications* Section 2-09.3(1)E, 9-03.1, 5-05, and 6-02.
6. **Other Requirements** – None.

9-4.77 Water for Concrete

1. **Approval of Material** – Not required.
2. **Preliminary Samples** – Not required.
3. **Acceptance** – Acceptance is based on test results provided by the contractor. If the Contractor is using potable water that is clear and apparently clean, then no testing is required.

   a. **Physical Requirements** – Testing will be conducted on a weekly interval for the first four weeks and thereafter on monthly interval.

   b. **Chemical Requirements** – Testing will be conducted on a monthly interval.

4. **Field Inspection** – Field verify per Section 9-1.5.
5. **Specification Requirements** – See *Standard Specifications* Section 9-25.1.
6. **Other Requirements** – None.

9-4.78 Expansion Joints

1. **Approval of Material** – Approval of the Fabricator is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the Fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.

   The Project Engineer is responsible for obtaining the approval of materials prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – The Project Engineer shall collect, review and approve all of the documentation from the Fabricator for the various material items used in Manufacturing the expansion joints as listed below.
   a. **Gland Strip** – Acceptance shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D.
   b. **Steel Plates and Shapes** – Acceptance shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D.
   c. **Coatings for Steel Parts** – Acceptance shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D.

   The Materials Fabrications Inspection Office will inspect the workmanship of the Expansion Joint at the jobsite. Acceptance for the expansion joints is based on a "WSDOT INSPECTED" (Figure 9-3) Stamp.
4. **Field Inspection** – Field verify per Section 9-1.5. Contact Materials Fabrication Inspection Office for jobsite inspection.
5. **Specification Requirements** – Review contract documents to determine specification requirements.
6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.79 Traffic Signal Controller Assembly

1. **Approval of Material**

   Signal Controller Assembly – Approval of the Signal Controller Assembly Fabricator is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.

   Signal Controller Assembly "Pluggable" Components – The Project Engineer is responsible for obtaining the approval of traffic signal control equipment prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Submittal – Attach Catalog Cuts for components using the Catalog Cut Transmittal DOT Form 350-072 and fully dimensioned Shop Drawings to assist in the approval process.

2. **Preliminary Samples** – A preliminary sample of the individual components will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance**
   a. **Traffic Signal Controllers** – Shall be accepted on receipt of "Satisfactory" test reports. A "Satisfactory" test report is defined as acceptable performance in the following tests:
      - WSDOT Test Method 421, Traffic Controller Inspection and Test Procedure
      - WSDOT Test Method 422, Transient Voltage Test (Spike Test) Procedure (Optional)
      - WSDOT Test Method 423, Conflict Monitor Testing
      - WSDOT Test Method 424, Power Interruption Test Procedure (Only for Type 170 and NEMA Controllers)
      - WSDOT Test Method 425, Environmental Chamber Test
      - WSDOT SOP 429, Method for Determining the Acceptability of Traffic Signal Controller Assembly
      - WSDOT Test Method T427, Loop Amplifier Test (Optional)
      - WSDOT Test Method T428, Compliance Inspection and Test Procedure

   b. **Signal Controller Assembly "Pluggable" Components** – Visual Acceptance per Section 9-1.4C. Document functionality of the "pluggable" component at the start up by the Region Traffic Signal Inspector.
4. **Field Inspection** – Field verify per Section 9-1.5. Verify the controller cabinet assembly received on the job site, has satisfactory test report.
5. **Specification Requirements** – See *Standard Specifications* Section 9-29.13. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.80 Erosion Control Devices

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the Qualified Products List or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Submittal

   a. **Polyacrylamide (Pam), Coir Log Including Wood Stakes and Rope Ties, Clear Plastic Covering, and High Visibility Fencing** – Attached Catalog Cuts using Catalog Cut Transmittal DOT Form 350-072 to assist the approval process.

b. **Erosion Control Blanket** – Submit the following:
   - Independent test results from the National Transportation Product Evaluation Program (NTPEP).
   - If netting is present, attach Catalog Cut using the Catalog Cut Transmittal DOT Form 350-072) to assist the approval process.

c. **Check Dams**
   - Biodegradable Check Dams – Submit the following:
     – Refer to the RAM submittal requirements for Wattles, Compost Socks, and Coir Logs
   - Non-biodegradable Check Dams – Submit the following:
     – Geosynthetic material, submit Manufacturer's Certificate of Compliance
     – Attach Catalog Cuts using Catalog Cut Transmittal DOT Form 350-072 to assist the approval process.

d. **Wattles and Compost Socks** – Submit the following:
   - Attach Catalog Cuts using Catalog Cut Transmittal DOT Form 350-072 to assist the approval process.
   - Compost Fill Material – See the RAM transmittal requirements for compost in Section 9-4.48.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Acceptance for all erosion control devices shall be by Visual Acceptance per Section 9-1.4C.
4. **Field Inspection** – Field verify per Section 9-1.5.
5. **Specification Requirements** – See *Standard Specifications* Section 8-01, 9-14, and 9-33.
6. **Other Requirements** – If there is a question on the intended use of erosion control devices, contact the Statewide Erosion Control Program Lead at 360-570-6654.

9-4.81 Concrete Patching Material, Grout and Mortar

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Submittal – If the product is not listed on the QPL, submit test data from an accredited independent laboratory confirming that the concrete patching material, grout or mortar meets *Standard Specifications* Section 9-20.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance**

   a. **Concrete Patching Materials** – Concrete Patching materials shall be accepted on receipt of "Satisfactory" tests report for air content and compressive strength performed once per shift. The Contractor must submit a mix design meeting the requirements of *Standard Specifications* Section 9-20 for the concrete patching material.

   b. **Grout**

      i. **Grout Type 1** – Materials shall be accepted by Visual Acceptance per Section 9-1.4C to verify that the grout has achieved initial set, is less than 6 months old from date of manufacturer and that the water cement ratio is 0.45 or less. Initial set shall be determined by making 3 grout cubes per WSDOT TM 813 and documenting that the grout has set in a reasonable amount of time. Afterwards, the cubes may be discarded.

      ii. **Grout Type 2** – Materials shall be accepted by receipt of "Satisfactory" test report for compressive strength, testing to be performed once per bridge pier or 1 per day. Acceptance samples shall be obtained, tested, and recorded in accordance with the contract documents and Section 9-3 and 9-7.

      iii. **Grout Type 3** – Materials shall be accepted by receipt of "Satisfactory" test report for compressive strength, testing to be performed once per bridge pier or 1 per day, and shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D to verify ASTM C 157 and ASTM C 882 requirements. Acceptance samples shall be obtained, tested, and recorded in accordance with the contract documents and Section 9-3 and 9-7.

      iv. **Grout Type 4**

         - **Structural Applications** – Materials shall be accepted by receipt of "Satisfactory" test report for compressive strength, testing to be performed once per day, and shall be by Visual Acceptance per Section 9-1.4C for conformance to the mix design. Acceptance samples shall be obtained, tested, and recorded in accordance with the contract documents and Section 9-3 and 9-7.
         - **Soils Nails and Ground Anchors** – Acceptance shall be by Visual Acceptance per Section 9-1.4C for conformance to the mix design. Samples of the grout shall be obtained by the Contractor once per day in accordance with the contract documents and Section 9-7. These samples shall be retained until all associated verification, performance, and proof testing of the soil nails or ground anchors has been successfully completed. It is the Contractor's option to test the grout cubes.
         - **Nonstructural Applications** – Acceptance for column jacket pour back or bridge or retaining wall shaft CSL access tube pour back will be by Visual Acceptance per Section 9-1.4C for conformance to the mix design.

c. **Mortar**

i. **Mortar Type 1 for Finishing Applications** – Visual Acceptance per Section 9-1.4C and will require confirmation of *Standard Specifications* blending ratio.

ii. **Mortar Type 2 for Masonry Applications** – Visual Acceptance per Section 9-1.4C and will require confirmation of *Standard Specifications* blending ratio.

iii. **Mortar Type 3** – Shall be accepted on receipt of "Satisfactory" test report for compressive strength, testing to be performed once per day, and shall be by Visual Acceptance per Section 9-1.4C for conformance to the mix design. Acceptance samples shall be obtained, tested, and recorded in accordance with the contract documents, and Section 9-3 and 9-7.

d. **Aggregate Extender** – Materials shall be accepted on receipt of "Satisfactory" test reports.

4. **Field Inspection** – Field verify per Section 9-1.5. Verify that the amount of added water and aggregate extender complies with the mix design or manufacturers recommendations.

5. **Specification Requirements** – See *Standard Specifications* Section 9-20. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – Grouts extended with coarse aggregate will require 4″ × 8″ test specimens per WSDOT FOP for AASHTO T 23. Grouts extended with fine aggregate will require test specimens per WSDOT TM 813.

9-4.82 Streambed Aggregates

1. **Approval of Material** – In accordance with *Standard Specifications* Section 1-06, approval of materials is required prior to use. Consult the Aggregate Source Approval (ASA) database for approval status of the material for each source. If the ASA database indicated that the aggregate source has expired, or will expire before the end of the project, a source evaluation may be required. Contact the Region materials office for further direction. If samples are required, the Region materials office will coordinate with the ASA engineer to obtain the necessary samples according to SOP 128.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance**

a. **Streambed Sediment** – Acceptance shall be administered in accordance with *Standard Specifications* Section 3-04. Acceptance samples shall be obtained, tested, and recorded in accordance with the contract documents, and Section 9-3 and 9-7.

b. **Streambed Cobbles, Streambed Boulders and Habitat Boulders** – Visual Acceptance per Section 9-1.4C. Approximate size can be determined per *Standard Specifications* Section 9-03.11.

4. **Field Inspection** – Field verify per Section 9-1.5. Ensure that the gradation for streambed sediment remains constant.
5. **Specification Requirements** – See *Standard Specifications* Sections 3-02, 3-04, and 9-03.11. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – Streambed aggregates shall be naturally occurring water rounded aggregates. Aggregates from quarries, ledge rock, and talus slopes are not permitted.

   Refer to *Standard Specifications* Section 9-03.11 to see if recycled materials are permitted.

9-4.83 Temporary Traffic Control Materials

1. **Approval of Materials and Systems** – In accordance with *Standard Specifications* Section 1-06 approval of materials prior to use is required for:

   a. **Truck and Trailer Mounted Attenuators** – Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071 EF. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Submittal – The contractor shall provide certification that the unit complies with NCHRP 350 Test Level 3 requirements or the comparable requirement from the AASHTO Manual for Assessing Safety Hardware.

   b. **Portable Temporary Traffic Control Signal** – Material will be approved per *Standard Specifications* Section 1-10.3(3)K.

   c. **Pavement Markings** – Refer to Section 9-4.55.

   Prior approval is not required for:

   - Barricades
   - Construction Signs
   - Portable Changeable Message Signs
   - Sequential Arrow Signs
   - Sign Covering
   - Stop/Slow Paddles
   - Tall Channelizing Devices
   - Traffic Cones
   - Traffic Safety Drums
   - Tubular Markers
   - Warning Lights and Flashers
   - Wood Sign Posts

2. **Preliminary Samples** – No preliminary sample required.

3. **Acceptance**

   a. **Stop/Slow Paddles, Wood Sign Supports, Sign Covering** – Visual Acceptance per Section 9-1.4C to ensure good condition and conformance to the appropriate *Standard Specifications*.

   b. **Construction Signs, Sequential Arrow Signs, Portable Changeable Message Signs, Barricades, Traffic Safety Drums, Traffic Cones, Tubular Markers, Warning Lights and Flashers, Tall Channelizing Devices** – Visual Acceptance per Section 9-1.4C to ensure the signs and traffic control devices are acceptable or marginal as defined in *Quality Guidelines for Temporary Traffic Control Device* and conform to the appropriate *Standard Specifications*.

   c. **Portable Temporary Traffic Control Signal** – Visual Acceptance per Section 9-1.4C. All Portable Temporary Traffic Control Signals must be accepted prior to use. Inspect all Portable Temporary Traffic Control Signals to ensure good condition, functionality and conformance to the appropriate *Standard Specifications*.

   d. **Truck and Trailer Mounted Attenuator (TMA)** – Visual Acceptance per Section 9-1.4C. All Truck and Trailer Mounted Attenuators shall be selected from the approved manufacturers and models listed in the QPL and inspected for condition, reflectivity and conformance to the appropriate *Standard Specifications*.

4. **Field Inspection** – Field verify per Section 9-1.5. Field verify all temporary traffic controls devices to ensure good working order, cleanliness, and appropriate reflectivity.

5. **Specification Requirements** – See *Standard Specifications* Sections 1-10, 8-21.3(3), and 9-35. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – None.

9-4.84 Modular Expansion Joint

1. **Approval of Material** – Approval of the Fabricator is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the Fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.

2. **Preliminary Samples** – Preliminary samples of the material will be required by the contract provisions or if coded on the Request for Approval of Material DOT Form 350-071).

3. **Acceptance** – As determined by the WSDOT Materials Fabrication Inspection Office, Modular Expansion Joints may be inspected at the point of manufacture prior to shipping or at the jobsite by the Materials Fabrication Inspector. Contract Provision may provide for job site inspection of the Modular Expansion Joints by the engineer. Acceptance is based on "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.

   Modular Expansion Joints delivered to the job site without "APPROVED FOR SHIPMENT" stamps and/or tags require Materials Fabrication Inspection. Contact the WSDOT Materials Fabrication Inspection Office for inspection and required documentation needed prior to their physical inspection of the Modular Expansion Joints.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5) and the "F" or "D" Stamp for foreign or domestic steel and document it.

5. **Specification Requirements** – Modular Expansion Joints specifications are currently specified in General Special Provisions. Review the contract documents to determine the specification requirements.

6. **Other Requirements** – Certification of Material Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

   For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.85 Junction Boxes, Cable Vaults, and Pull Boxes

1. **Approval of Material**

   Fabrication Inspection items – Approval of the Fabricator is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071 EF. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the Fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.

   Note: Approved design/shop drawings are available online at www.wsdot.wa.gov/design/traffic/shop_drawings.htm. Online drawings represent fabricators designs that have passed initial proof load testing for design approval. The Online drawings maintained by the WSDOT Traffic Design Office are used to inspect Concrete Junction Boxes, Cable Vaults and Pull Boxes.

Non-Fabrication Inspection Items – Approval of the Structure Mounted and Non-Concrete Junction Boxes are required prior to use. The Structure Mounted and Non-Concrete Junction Boxes will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071 EF. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

RAM Submittal

a. **Standard Duty Junction Boxes Types 1,2, and 8** – Submittal and approval of Standard Duty Junction Boxes Types 1, 2, and 8 shall be in accordance with *Standard Specifications* Sections 9-29.2(1), 9-29.2(1)A, and 9-29.2(1)C.

b. **Heavy Duty Junction Boxes Types 4, 5, and 6** – Submittal and approval of Heavy Duty Junction Boxes Types 4, 5, and 6 shall be in accordance with *Standard Specifications* Sections 9-29.2(1), 9-29.2(1)B and 9-29.2(1)C.

c. **Standard Duty and Heavy Duty Cable Vaults and Pull Boxes** – Submittal and approval of Standard Duty and Heavy Duty Cable Vaults and Pull Boxes shall be in accordance with *Standard Specifications* Sections 9-29.2(2), 9-29.2(2)A, and 9-29.2(2)B.

d. **Structure Mounted Junction Boxes** – Attach Catalog Cuts using the Catalog Cut Transmittal DOT Form 350-072 EF and/or Shop Drawing to the State Materials Laboratory to assist in the approval process.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071 EF.

3. **Acceptance**

a. **Type 1, 2, and 8 Junction Boxes**

- **Concrete** – Acceptance is based on "WSDOT INSPECTED" Stamp (Figure 9-3). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.
- **Non-Concrete** – Acceptance shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D including an Independent Test Report from a Nationally Recognized Testing Laboratory.

b. **Type 4, 5, and 6 Junction Boxes** – Acceptance is based on "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.

c. **Cable Vaults and Pull Boxes** – Acceptance is based on "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.

d. **Structure Mounted Junction Boxes** – Visual Acceptance per Section 9-1.4C.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for appropriate "WSDOT INSPECTED (Figure 9-3) or "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5) and the "F" or "D" Stamp for foreign or domestic steel and document it. Junction boxes, cable vaults, and pull boxes with metallic lids Field verify per Section 9-1.5 that lids are marked in accordance with *Standard Specifications* Section 9-29.2(4) and the contract provisions.

5. **Specification Requirements** – See *Standard Specifications* Section 9-29.2 and *Standard Plans* sheets J-40.10-02, J-40.20-00, J-40.30-02, and J-40.36-00. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements**

   a. **Materials Fabrication Inspected CMO** – Certification of Materials Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

   For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The project Engineer will track the quantity of the materials and retain these documents in the project records.

   b. **Non-Fabrication Inspected CMO** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.86 Precast Bridge Deck Panels, Floor Panels, Marine Pier Deck Panels, Noise Barrier Walls, Pier Caps, Retaining Walls, Roof Panels, Structural Earth Walls, Wall Panels, and Wall Stem Panels

1. **Approval of Material** – Approval of the Fabricator is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the Fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance** – Acceptance is based on "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.

4. **Field Inspection** – Field verify per Section 9-1.5. Check for "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5) and the "F" or "D" Stamp for foreign or domestic steel and document it. Check for damage caused by shipping and handling.

5. **Specification Requirements** – See *Standard Specifications* Section 6-02.3(25), 6-02.3(28), 6-11, 6-12, and 6-13. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – Certification of Material Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

   For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.87 Precast Reinforced Concrete Three Sided Structures

1. **Approval of Material** – Approval of the Fabricator is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the Fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Acceptance is based on "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.
4. **Field Inspection** – Field verify per Section 9-1.5. Check for "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5) and the "F" or "D" Stamp for foreign or domestic steel and document it. Check for damage caused by shipping and handling.
5. **Specification Requirements** – Review the contract documents to determine the specification requirements.
6. **Other Requirements** – Certification of Material Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

   For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.88 Precast Concrete Vaults (Utility, Drainage, etc.) and Box Culverts

1. **Approval of Material** – Approval of the Fabricator is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the Fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Acceptance is based on "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.
4. **Field Inspection** – Field verify per Section 9-1.5. Check for "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5) and the "F" or "D" stamp for foreign or domestic steel and document it. Check for damage caused by shipping and handling.
5. **Specification Requirements** – Review the contract documents to determine the specification requirements.
6. **Other Requirements** – Certification of Material Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

   For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.89 Fabricated/Welded Miscellaneous Metal Drainage Items: Grate Inlets and Drop Inlets

1. **Approval of Material** – Approval of the Fabricator is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the Fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Acceptance is based on "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.
4. **Field Inspection** – Field verify per Section 9-1.5. Check for "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5) and the "F" or "D" Stamp for foreign or domestic steel and document it. Check for damage caused by shipping and handling.
5. **Specification Requirements** – See *Standard Specifications* Section 9-05.16. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – Certification of Material Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

   For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.90 Miscellaneous Steel Structures (Cattle Guards, Handrail, Retrofit Guardrail Posts With Welded Base Plate, Seismic Retrofit Earthquake Restrainers, Column Jackets)

1. **Approval of Material** – Approval of the Fabricator is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the Fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Acceptance is based on "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.
4. **Field Inspection** – Field verify per Section 9-1.5. Check for "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5) and the "F" or "D" Stamp for foreign or domestic steel and document it. Check for damage caused by shipping and handling.

5. **Specification Requirements** – See *Standard Specifications* Section 6-03. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – Certification of Material Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

   For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.91 Miscellaneous Welded Structural Steel

1. **Approval of Material** – Approval of the Fabricator is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the Fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Acceptance is based on "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.
4. **Field Inspection** – Field verify per Section 9-1.5. Check for "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5) and the "F" or "D" Stamp for foreign or domestic steel and document it. Check for damage caused by shipping and handling.
5. **Specification Requirements** – See *Standard Specifications* Section 6-03. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – Certification of Material Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

   For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.92 Wood Bridges

1. **Approval of Material** – Approval of the Fabricator is required prior to the start of fabrication. The Fabricator will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. Materials used within the fabricated item do not require approval through the Project Engineer office. Provide the WSDOT Materials Fabrication Inspection Office with a copy of the Qualified Products Page or Request for Approval of Material listing the Fabricator. Review of the Contract Special Provisions is necessary to determine if special qualifications or testing is required for approval of the fabricator.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Acceptance is based on "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5). An "F" or "D" will be stamped to indicate the steel or iron is of foreign or domestic origin.
4. **Field Inspection** – Field verify per Section 9-1.5. Check for "APPROVED FOR SHIPMENT" Stamp and/or Tag (Figure 9-4 or 9-5) and the "F" or "D" Stamp for foreign or domestic steel and document it. Check for damage caused by shipping and handling.
5. **Specification Requirements** – Review contract documents to determine the specification requirements.
6. **Other Requirements** – Certification of Material Origin for steel components will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

   For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.93 Electrical Service Cabinets

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   RAM Submittal – Attach Catalog Cuts for components using the Catalog Cut Transmittal DOT Form 350-072) and fully dimensioned Shop Drawings to assist in the approval process.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance** – Acceptance shall be by a Manufacture's Quality Check List included with the cabinet and signed by the Region Electrical Inspector.
4. **Field Inspection** – Field verify per Section 9-1.5. Verify the Electrical Service Cabinet assembly received on the job site, has a Manufacture's Quality Check List.
5. **Specification Requirements** – See *Standard Specifications* Section 9-29.24. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.94 Monument Case, Cover, and Riser

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. An on-site inspection of the fabricating facilities prior to approval will be required only if a new manufacture is requested on the Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Acceptance shall be by the Manufacturer's Certificate of Compliance with supporting Mill Certification per Section 9-1.4D.
4. **Field Inspection** – Field verify per Section 9-1.5.
5. **Specification Requirements** – See *Standard Specifications* Section 9-22. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.95 Steel Bollards

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. An on-site inspection by the WSDOT Materials Fabrication Office of the fabricating facilities prior to approval will be required only if a new manufacture is requested on the Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Acceptance shall be by the Manufacturer's Certificate of Compliance with supporting Mill Certification per Section 9-1.4D.
4. **Field Inspection** – Field verify per Section 9-1.5.
5. **Specification Requirements** – Review contract documents to determine the specification requirements.
6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.96 Metal Trash Racks, Debris Cages, and Safety Bars for Culvert Pipe and Other Drainage Items

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. An on-site inspection by the WSDOT Materials Fabrication Office of the fabricating facilities prior to approval will be required only if a new manufacture is requested on the Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Acceptance shall be by the Certificate of Compliance per Section 9-1.4E.
4. **Field Inspection** – Field verify per Section 9-1.5. Field Verify that hardware included is per the Contract Specifications and Plan.
5. **Specification Requirements** – See *Standard Specifications* Section 9-05.18. Review contract documents to determine if supplemental specifications apply.
6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the material and retain these documents in the project records.

9-4.97 Flow Restrictors and Oil Separators

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. An on-site inspection by the WSDOT Materials Fabrication Office of the fabricating facilities prior to approval will be required only if a new manufacture is requested on the Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.
3. **Acceptance** – Acceptance shall be by the Certificate of Compliance per Section 9-1.4E.
4. **Field Inspection** – Field verify per Section 9-1.5. Field Verify that hardware included is per the Contract Specifications and Plan.
5. **Specification Requirements** – Review contract documents to determine the specification requirements.
6. **Other Requirements** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.98 Concrete Blocks

1. **Approval of Material**

   Ecology Blocks – Approval of materials is not required.

   Masonry Units – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.

   Precast Concrete Block – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071. An on-site inspection by the WSDOT Materials Fabrication Office of the fabricating facilities prior to approval will be required only if a new manufacture is requested on the Request for Approval of Material DOT Form 350-071. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification.
2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071.

3. **Acceptance**

   a. **Ecology Block** – Visual Acceptance per Section 9-1.4C.

   b. **Masonry Units** – Acceptance shall be by the Certificate of Compliance per Section 9-1.4E.

   c. **Precast Concrete Block** – Acceptance shall be by the Manufacturer's Certificate of Compliance per Section 9-1.4D. A cylinder test report is required for each lot of blocks delivered to the job site. The freeze/thaw report shall be acceptable for a period of two years from the date the block was manufactured.

4. **Field Inspection** – Field verify per Section 9-1.5. The field inspector is required to document in their IDR the "lot" number of the precast concrete block as it is delivered to the job site.

5. **Specification Requirements** – See *Standard Specifications* Sections 6-13.3(4), 8-24.2, 9-12, and 9-13.5(1). Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – Certification of Material Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

   For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all foreign steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.99 Vacant

9-4.100 Intelligent Transportation Systems (ITS)/System Operations Management (SOM) Materials

1. **Approval of Material** – Approval of materials is required prior to use. Materials will be approved by the *Qualified Products Lists* or Request of Approval of Material DOT Form 350-071 EF. An on-site inspection by the WSDOT Materials Fabrications Inspection Office of the fabricating facilities prior to approval will be required only if a new manufacturer is requested on the Request for Approval of Material DOT Form 350-071 EF. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. The Project Engineer is allowed to approve the Request of Approval of Materials (RAM) for ITS/SOM Non-Standard Materials. For ITS/SOM Standard Materials the Project Engineer is required to follow the approval requirements located in Table 9-4.100-1.

2. **RAM Submittal**

   a. **ITS/SOM Non-Standard Materials** – The Project Engineer can approve the Request for Approval of Materials (RAM) for ITS/SOM non-standard materials used in the following applications:

      - Cameras, Closed Circuit Television Systems, and other Surveillance Devices

- Highway Advisory Radios, Variable and Dynamic Message Signs, and Road/Weather Information Systems
- ITS Controller Cabinet, Data Station, and Fiber Backbone
- Electronic Tolling, License Plate Reader and Radar Detectors
- Weigh-in-Motion Systems and Commercial Vehicle Tag Readers
- Traffic Data Collectors and Ramp Meters

Material submittal requirements for these materials shall be determine by the requirements of the contract, and/or consultation with either Region Traffic Engineer or the State Materials Laboratory.

b. **ITS/SOM Standard Materials** – For ITS/SOM Standard Materials, the Project Engineer is required to follow the approval requirements per the referenced sections listed in Table 9-4.100-1:

2. **Preliminary Samples** – A preliminary sample of the material will be required only if coded on the Request for Approval of Material DOT Form 350-071 EF.

3. **Acceptance**

a. **ITS/SOM Non-Standard Materials** – Acceptance of ITS/SOM materials shall be determined by the requirements of the contract, and/or consultation with either Region Traffic Engineer or the State Materials Laboratory.

b. **ITS/SOM Standard Materials** – Acceptance requirements for the following standard materials are located in the referenced sections in Table 9-4.100-1.

Material	*Construction Manual* Section
Anchor Bolts, Nuts, and Washers	9-4.25
Concrete	9-4.76
Conduit	9-4.64
Electrical Conductors and Fiber Optic Cable	9-4.65
Electrical Service Cabinets	9-4.93
High Strength Bolts, Nuts, and Washers	9-4.24
Junction Boxes, Cable Vaults, and Pull Boxes	9-4.85
Luminaires, Lamps, and Light Emitting Diodes (LED)	9-4.68
Painting, Paints, Coating, and Related Materials	9-4.35
Precast Concrete Vaults (Utility, Drainage, etc.) and Box Culverts	9-4.88
Resin Bonded Anchors	9-4.61
Signing Materials and Mounting Hardware	9-4.56
Steel Poles – ITS, Pedestrian, Light, Signal Standards, and High Mast Light Poles	9-4.66
Steel Sign Structures – Cantilever, Sign Bridge, Bridge Mounted, Roadside	9-4.63
Timber and Lumber	9-4.36
Traffic Signal Controller Assembly	9-4.79

Table 9-4.100-1

4. **Field Inspection** – Field verify per Section 9-1.5.

5. **Specification Requirements** – See *Standard Specifications* Sections 8-20 and 9-29. Review contract documents to determine if supplemental specifications apply.

6. **Other Requirements** – If there is a question on the intended use of ITS/SOM materials contact the Region Traffic Engineer or the State Materials Laboratory.

   a. If the Contractor submits an ITS/SOM material that is not specifically identified in the contract provisions, and it has been determine by either the Region Traffic Engineer or the State Materials Laboratory as an approved equal, contact with the State Construction Office is required.

   b. **Materials Fabrication Inspected CMO** – Certification of Material Origin will be the responsibility of the Materials Fabrication Inspector as defined in Section 9-2.1A.

      For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

   c. **Non-Fabrication Inspected CMO** – For projects with the Buy America provision refer to Section 9-1.2E to determine if Certification of Materials Origin is required. If the Buy America requirement applies, the Contractor is required to submit to the Project Engineer a Certification of Materials Origin for all steel or iron materials. The Project Engineer will track the quantity of the materials and retain these documents in the project records.

9-4.101 Media Filter Drain Mix

1. **Approval of Material** – Approval of materials is required prior to use. Material will be approved by the *Qualified Products List* or Request for Approval of Material DOT Form 350-071 EF. Be certain to verify that the product is in fact qualified for its intended use and the product is listed under the appropriate specification. For the aggregate component, if the ASA database indicates the aggregate source has expired, or will expire before the end of the project, a source evaluation may be required, Contact Region Materials office for further direction. If samples are required, the Region Materials office will coordinate with the ASA engineer to obtain the necessary samples in accordance with SOP 128.

2. **RAM Submittal**

   a. **Horticultural Grade Perlite, Agricultural Grade Dolomite Lime, and Agricultural Grade Gypsum** – Attach Catalog Cut or supply a bag label showing conformance with the contract documents to assist in approving the RAM.

3. **Preliminary Sample** – A preliminary sample of material will be required only if coded on the Request for Approval of Material DOT Form 350-071 EF.

4. Acceptance
   a. **Aggregate for Media Filter Drain Mix** – Acceptance shall be administered under *Standard Specifications* Section 3-04 for "Other Materials" based on one sample every 1000 tons. Acceptance samples shall be tested for grading and fracture.
   b. **Horticultural Grade Perlite, Agricultural Grade Dolomite Lime, and Agricultural Grade Gypsum** – Miscellaneous Certificate of Compliance per Section 9-1.4E or Catalog cuts per Section 9-1.4G.
5. **Field Inspection** – Field verify per Section 9-1.5. Ensure that the aggregate gradation remains constant. Ensure that the finish product shall be clean, uniformly mixed, and free from wood, bark, roots, and other deleterious materials.
6. **Specification Requirements** – Review contract documents for specification requirements.
7. **Other Requirements** – If there is a question on the intended use of Media Filter Drain Mix, contact Headquarters Hydraulics Office at 360-705-7260.

9-5 Quality Assurance Program

9-5.1 General

The purpose of the WSDOT Quality Assurance Program (QAP) is to ensure that materials incorporated into any highway construction project are in conformity with the approved plans and specifications, including any approved changes. This program also conforms to the criteria in FHWA regulation for *Quality Assurance Procedures for Construction* (*23 CFR 637*).

The QAP includes the following:

- Qualified Tester Program
- Equipment Calibration/Standardization/Check and Maintenance Program
- Qualified Laboratory Program
- Independent Assurance (IA) Program

9-5.2 Quality Assurance Program Structure and Responsibilities

Table 9-3 outlines the structure of the quality program for WSDOT.

State Materials Laboratory (SML) Requirements	
State Materials Engineer	Oversees • WSDOT Quality System Program • Accreditation of State Materials Laboratory • Program compliance reports to FHWA
Quality Systems Manager	Management of WSDOT's Quality System Program which includes: • Qualified Testers • Independent Assurance • Qualified Laboratory • Maintaining up-to-date Test Procedures in the *Construction Manual* M 41-01 and the *Materials Manual* M 46-01 • Maintaining Calibration/Standardization/Check Equipment Procedures • Auditing SML and regions compliance to the requirements of the QAP • Supervising Laboratory Review Team • Compiling yearly report for FHWA
SML Laboratory Managers	Management of their laboratory's QAP which includes: • Maintaining qualified testers • Maintaining calibrated/standardized/checked equipment for their department • Maintaining AMRL/CCRL Accreditation
Region Materials Laboratory Requirements	
Region Materials Engineer	Oversees • Region Quality System Program • Qualification of Region Materials Laboratory
Region Laboratory Supervisor	Management of the Region Laboratory Quality System Program which includes: • Maintaining qualified testers • Maintaining calibrated/standardized/checked equipment for the Region Materials Laboratory and field laboratories • Participating in biannual laboratory review

Region Materials Laboratory Requirements (continued)	
Region Independent Assurance Inspector	Management of the Region's QAP which includes: • Qualified tester – Determining how the program will be implemented in the region within the guidelines of this section – Proctoring written and proficiency examinations – Maintaining documentation of tester qualification • Independent Assurance – Determining frequency of visits – Witnessing IA process in the field – Investigating excessive deviations on split samples and aiding in the review of reports of deviation from specified sampling and testing procedures – Providing yearly report of IA to Quality Systems Manager • Other functions (optional by Region) – Conducting initial training for qualification – Mentoring new or newly qualified testers to enhance efficiency and confidence – Assisting in or conducting testing and inspection training in concert with the Region Construction Trainer – Reviewing materials, test-related records, and forms – Radiation safety officer
Project Engineering Office Requirements	
Project Engineer	Management of the Project Office QAP which includes: • Training of qualifying testers – Providing training opportunities – Providing opportunity for experience in the field – Maintaining qualified testers on projects – Maintaining staff of qualified testers to perform the testing on all projects under the management of the Project Engineer
PE Office Contact (appointed by PE as the office contact to the IAI)	• Tracking qualification of testers • Contacting IAI to schedule tester qualification or requalification • Contacting IAI to schedule an IA visit
Individual Tester Requirements	
Qualified Tester	Management of personal qualification which includes: • Preparing for requalification • Notifying office contact of approaching expiration of qualification; notification should be one month in advance of the expiration of qualification • Notifying office contact to schedule an IA review
Unqualified Tester	Management of personal qualification which includes: • Reading test procedure • Hands-on practice of test procedure • Notifying office contact when ready for written and proficiency examinations

Table 9-3

9-5.3 Qualified Tester Program

This program provides uniform statewide procedures for sampling and testing personnel qualification to ensure that tests required by the specifications are performed according to the prescribed sampling and testing methods. This program is based on AASHTO R 25.

All personnel who perform acceptance testing on materials must be qualified in the test method they are performing or may work under the direct supervision of a tester qualified as a trainee. An individual may only work as a trainee for one year.

It is the responsibility of the Project Engineer to ensure that all personnel sampling or testing materials on a project or in a field laboratory are qualified.

9-5.3A Types of Qualifications

The Qualified Tester Program has two types of qualifications; module qualified testers and method qualified testers.

9-5.3A(1) Module Qualified Tester

A module qualified tester is an individual that has proficiency in one or more testing modules. There are five modules which represent the majority of the acceptance tests performed on highway projects. Each module contains a defined list of test procedures.

To qualify as a module qualified tester, an individual must pass a written and a proficiency examination for each method in the module. These modules are listed in Table 9-4.

9-5.3A(2) Method Qualified Tester

A method qualified tester is an individual that has proficiency in one or more test procedures which may partially encompass methods in the qualification modules.

9-5.3B Qualification Process

All persons responsible for sampling of materials and performing acceptance testing on a project are required to be qualified. To become qualified an individual must pass a proficiency examination or a combination of a proficiency and written examination.

9-5.3B(1) Frequency of Qualification

A State Materials Laboratory (SML) qualification is good for one calendar year from the date of qualification. (Example: Qualification on January 2, 2009 expires on January 2, 2010)

A Region laboratory/field testing qualification is good from the date of qualification to December 31 of the year following qualification. (Example: Qualification on January 2, 2009 expires on December 31, 2010)

Qualification may not be granted or maintained by Grandfathering, the acceptance of a Professional Engineer or Engineer-in-Training Certificate, or lifetime qualification.

Aggregate Module	
Procedure Number	**Test Method**
AASHTO T-2	**WSDOT FOP for AASHTO for** the Sampling of Aggregates
AASHTO T-27/T11	**FOP for WAQTC/AASHTO for the Sieve Analysis of Fine & Coarse Aggregates**
AASHTO T-176	**WSDOT FOP for AASHTO for** Determining the Plastic Fines in Graded Aggregate by Use of the Sand Equivalent Test
AASHTO T-248	**WSDOT FOP for AASHTO for** Reducing Field Samples of Aggregates to Testing Size
AASHTO T-255	**WSDOT FOP for AASHTO for** Determining the Total Moisture Content of Aggregate by Drying
AASHTO T-335	FOP for AASHTO for Determining the Percentage of Fracture in Coarse Aggregate
Hot Mix Asphalt Module	
AASHTO T-168	**FOP for WAQTC/AASHTO for** the Sampling Bituminous Paving Mixtures
AASHTO T-209	**WSDOT FOP for AASHTO for** Determining the Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
AASHTO T-27/T11	**FOP for WAQTC/AASHTO for** the Sieve Analysis of Fine & Coarse Aggregates
AASHTO T-40	**FOP for WAQTC/AASHTO for** Sampling Bituminous Materials
AASHTO T 166	WSDOT FOP for AASHTO Bulk Specific Gravity of Compacted Hot Mix Asphalt Using Saturated Surface Dry Specimens
AASHTO T-308	**WSDOT FOP for AASHTO for** Determining Asphalt Content of Hot Mix Asphalt (HMA) by the Ignition Method
AASHTO T-329	FOP for AASHTO Moisture Content of Hot Mix Asphalt (HMA) by Oven Method
WSDOT 712	Standard Method of Reducing Bituminous Paving Mixtures
WSDOT 716	Method of Random Sampling for Location of Testing and Sampling Sites
AASHTO T 312	FOP for AASHTO for Preparing and Determining the Density of Hot-Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor
AASHTO T-304	WSDOT FOP for AASHTO Uncompacted Void Content of Fine Aggregates
Concrete Module	
AASHTO T-23	**WSDOT FOP for AASHTO for** Making and Curing Concrete test Specimens in the Field
AASHTO T-119	**WSDOT FOP for AASHTO for** Determining the Slump of Hydraulic Cement Concrete
AASHTO T-152	**FOP for WAQTC/AASHTO for** Determining the Air Content of Freshly Mixed Concrete by the Pressure Method
WAQTC TM-2	Sampling Freshly Mixed Concrete
AASHTO T-309	**WSDOT FOP for AASHTO for** Determining the Temperature of Freshly Mixed Portland Cement Concrete
WSDOT 716	Method of Random Sampling for Location of Testing and Sampling Sites
Embankment and Base Density Module	
AASHTO T-310	**WSDOT FOP for AASHTO for** In-Place Density and Moisture Content of Soil and Soil Aggregate by Nuclear Method
WSDOT SOP 615	Determination of the % Compaction for Embankment & Untreated Surfacing Materials Using the Nuclear Moisture-Density Gauge
Hot Mix Asphalt Density Module	
WAQTC TM-8	FOP for WAQTC for In Place Density of Bituminous Mixtures Using the Nuclear Moisture Gauge
WSDOT 716	Method of Random Sampling for Location of Testing and Sampling Sites

Testing Modules
Table 9-4

9-5.3B(2) Preparation for Initial Qualification

Prior to an individual taking either the written exam or the proficiency exam, it is the responsibility of the Project Engineer to make sure the following requirements have been met by the individual:

- Studied and understands the test method(s) for the method or module.
- Has watched the test performed by a qualified tester, attended classroom training or on-line training relevant to the test procedure.
- Has practiced the test procedure under the supervision of a qualified tester.
- Has successfully completed a hands-on demonstration of the test procedure which conforms to test method checklist(s) without coaching.
- Has worked in the field or laboratory under the close supervision of a qualified tester experienced in the test method(s).

These requirements may be waived for individuals with previous testing certification such as WAQTC or ACI.

9-5.3C Initial Qualification Examination Requirements

Qualification examinations will be either a proficiency examination or a combination of proficiency and written examination. Written and proficiency examinations are given to determine if the tester possesses the knowledge and skills necessary to satisfy the established qualification requirements.

Written and proficiency examinations for qualification of testers will be administered by the one or more of the following WSDOT personnel:

- Region independent assurance inspector (IAI)
- Assistant Region IAI, Construction Trainer
- Qualified Region Materials Laboratory staff under the direction of the Region Materials Engineer
- Qualified SML laboratory staff under the direction of the State Materials Engineer

Written examinations and checklists for proficiency examinations will be reviewed and updated yearly, under the direction of the Quality Systems Manager. Updated examinations will be published to the Independent Assurance Inspectors share site each year no later than January 30.

The individual administering any proficiency examination shall document the examination using the appropriate test method checklist from the *Construction Manual* M 41-01, *Materials Manual* M 46-01, AMRL, or CCRL.

9-5.3C(1) Written Examinations

Written examinations are required for Module Qualification and are optional for Method Qualification. Written Module Qualification examinations will consist of a series of written examinations based on each test procedure within the modules listed in Table 9-4.

The written examinations will be closed book and will consist of five or more multiple choice questions.

To successfully pass a written examination the individual must have a score of 60 percent or more on any individual method examination and an overall module score of 70 percent or more.

9-5.3C(2) Proficiency Examinations

Using a test procedure checklist from the *Construction Manual* M 41-01, *Materials Manual* M 46-01, AMRL or CCRL the examiner will document the tester's conformance to the test procedure. The tester is required to have a current copy of the test procedure available during the proficiency examination. Scoring of the proficiency exam will be on a Satisfactory/Unsatisfactory basis.

A satisfactory performance rating will be given for a performance that consists of the following:

1. Performing the key elements of the procedure correctly and in sequential order as established by the Test Method Checklist.

   Note: Incidences of single to several errors as isolated, first-time occurrences, which are acknowledged and corrected on the spot and discussed with the proficiency examination administer may constitute satisfactory performance.

2. Completing the test within the time limit of the test procedure or a reasonable time as defined by the administrator of the test.
3. Performing the calculations correctly.

An unsatisfactory performance rating will be given for a performance that consists of repeated infractions or incorrect performance of individual critical items on the checklist and/or the inability to complete the test method within the designated time limit.

The following items will result in immediate termination of the proficiency examination:

- Observed falsification of test reports.
- Violations of safety, hazardous materials.
- Violations of nuclear materials security standards.
- Failure to provide proper care of equipment.

9-5.3D Documentation of Initial Qualification

The IAI will be responsible for maintenance of the Region's qualified tester information in the Tester Qualification Database and in hard copy files within the Region. Originals of each tester's qualification examination (written examination and checklist) will be kept in the Region files for a minimum of seven years.

The State Materials Laboratory will be responsible for maintaining the Tester Qualification computer program.

9-5.3E Failure of Examination

An individual failing either the written or proficiency examination may request a reexamination. The waiting period for reexamination is as follows:

1. **First Failure** – A minimum of three days waiting period, unless this time limit is waived by the IAI.
2. **Second Failure** – A minimum of a one week waiting period or a minimum of three days waiting period and a letter from the Project Engineer documenting the steps taken to prepare the individual for reexamination.
3. **Three or more consecutive failures** – A minimum of a one month waiting period and a letter from the Project Engineer documenting the steps taken to prepare the individual for reexamination. When an individual fails the proficiency examination more than three times, consecutively, the IAI with the approval of the Region Materials Engineer may determine that the individual is not eligible for qualification.

9-5.4 Requalification of Testing Personnel

Once a tester's qualification expires he/she may no longer perform acceptance testing until a requalification visit has been satisfactorily completed Therefore, to prevent a lapse in qualification the tester should notify the Project Office contact one month in advance of their qualification expiration. Upon notification of the pending qualification expiration the Office contact should get in touch with the IAI to schedule a requalification visit.

Requalification requires the tester to perform a proficiency examination in the presence of one or more of the following WSDOT personnel:

- Region independent assurance inspector (IAI)
- Assistant Region IAI, Construction Trainer
- Qualified Region Materials Laboratory staff under the direction of the Region Materials Engineer or a Qualified SML laboratory staff under the direction of the State Materials Engineer.

If a tester's qualification expires prior to their requalification, the Project Engineer may request a 30 day extension of qualification. The extension must be approved by the Region IAI and the tester must be requalified within the 30-day extension period.

9-5.4A Requalification Examination

The requalification examination will meet the requirement of Section 9-5.3C(2) Proficiency Examinations. Results of the requalification will be reported as either Satisfactory or Unsatisfactory as defined in Section 9-5.3C.

The proficiency examination may be performed on a project site or in a laboratory.

If the tester's performance is satisfactory, the administrator of the proficiency examination shall document the examination using the appropriate test method checklist from the *Construction Manual* M 41-01, *Materials Manual* M 46-01, AMRL, or CCRL. If the requalification is performed in the field, the administrator of the proficiency exam may choose to obtain an Independent Assurance sample in accordance with the section.

If the performance is unsatisfactory the administrator may recommend corrective action.

Unsatisfactory performance constitutes repeated occurrences of previous on-the-spot corrections, incorrect performance of critical steps of the testing procedure. Administrator may also assign unsatisfactory performance based on observed falsification of test reports, violations of safety, hazardous materials or nuclear materials security standards, or failure to provide proper care of equipment.

9-5.5 Lapse in Qualification

A tester missing two consecutive yearly annual evaluations shall be required to qualify in accordance with Section 9-5.3C.

9-5.6 Suspension of Qualification

An IAI may recommend to the Region Materials Engineer that a tester's qualification be suspended for the following items:

1. Repeated failure of proficiency examinations for requalification.
2. Observed falsification of test reports.
3. Violations of safety that may result in injury or death to the individual or coworkers.
4. Violation of hazardous materials or nuclear materials security standards.
5. Failure to provide proper care of equipment.

If an IAI recommends suspension of a tester's qualification, a letter documenting the reason(s) for suspension of qualification will be sent to the tester's Project Engineer. Upon receipt of the letter the Project Engineer will remove the tester from performing the tests related to the suspension of qualification until all issues have been resolved to the satisfaction of the IAI.

In the case of a serious safety issue or a violation of nuclear material security standard, the IAI will notify the Project Engineer of the violation and may request the removal of the tester from the performance of that test procedure(s). The IAI will document the violation. The Region Materials Engineer, with recommendations from the IAI and the Project Engineer, will determine the duration of the suspension of qualification.

9-5.7 Report of Deviation from Specified Sampling and Testing Procedures

A report of a deviation from specified sampling and testing procedures requires following the procedure outlined in *Standard Specifications* Section 1-06.2(1). The Project Engineer should work with the Region IAI to review the test procedure and determine what, if any, deviation occurred during the sampling and testing. After determining if a deviation took place the Project Engineer can respond in writing to the report.

9-5.8 Calibration/Standardization/Check of Equipment

All laboratory equipment will be calibrated/standardized/checked as required by the test procedures, AASHTO R 18 or WSDOT Verification Procedures.

The State Materials Laboratory will calibrate/standardize/check all required equipment every 12 months unless otherwise stated in the test procedure, AASHTO R 18 or the WSDOT Verification Procedures.

Region and field laboratories will calibrate/standardize/check all required equipment once a year unless otherwise specified by the WSDOT Verification Procedures. All calibration/standardization/checks will be completed by April 1st of each year. A tag bearing the year the calibrate/standardize/check expires will be affixed to all calibrated/standardized/checked equipment. The tags will be provided to the regions each year by the Quality Systems Manager.

9-5.9 Qualified Laboratories

All laboratories performing acceptance testing on state or Federal funded construction projects must be qualified.

Qualification of the State Materials Laboratory will be by accreditation through the AASHTO Accreditation Program (AAP).

9-5.9A Qualification of Region or Other Subordinate Laboratories

Qualification of Region or other subordinate laboratories requires the following:

1. Identification of all test methods performed on a regular basis. Methods must conform to those established by WSDOT for materials acceptance.
2. Annually, calibration/standardization/check equipment laboratory and field test equipment, using State Materials Laboratory equipment calibrated/standardized or checked equipment procedure. All calibrated/standardized or checked equipment must have a calibration tag stating the expiration date of the calibration/standardization/check.
3. Maintain staff qualification for all methods performed in the laboratory. Qualification shall be either by Module Qualified Tester or Individual Method Qualified tester.
4. Each Region laboratory will be reviewed biennially by a team from the State Materials Laboratory. The process of the review will be in accordance with QC3, which is modeled after the AASHTO Materials Reference Laboratory (AMRL) inspection program.

9-5.9B Qualification of Private Laboratories

Qualification of Private Laboratories requires the following:

1. Approval for use by the State Materials Engineer.
2. The private laboratory must have an up-to-date *Laboratory Quality Systems Manual* meeting the requirements of AASHTO R 18.
3. The private laboratory must have documentation of tester training and qualification meeting the requirements of AASHTO R 25.
4. The testing equipment must be labeled with a sticker showing the date of calibration/standardization/check and all equipment calibration/standardization/check documentation must meet the requirements of AASHTO R 18.
5. The State Materials Laboratory Review team may conduct a yearly on-site review of the laboratory facilities, tester performance and calibration/standardization/check of the testing equipment in accordance with QC 3.

9-5.10 Independent Assurance Program (IAP)

The IAP shall consist of a system based approach to Independent Assurance (IA). This approach bases the frequency of IA evaluations on time, regardless of the number of tests, quantities of materials, or numbers of projects tested by the active qualified tester. This program is based on AASHTO R 44.

The overall IAP for the Region will be managed by the Region's IAI. Each active qualified tester will have an IA evaluation for each module or method they are qualified in once a year. An active qualified tester is defined as, any qualified tester performing at least one acceptance test per year.The Project Office is responsible for contacting the IAI and scheduling an IA visit when the following testing is occurring on a project:

- Concrete
- Aggregate
- HMA
- Density (HMA or Embankment)

The on-site evaluation of module qualified testers shall include evaluation of all test methods in the applicable qualification module. Method qualified testers will be evaluated in the performance of the individual test method.

IAP evaluations will be performed as follows:

- Concrete and Density test method evaluations will be by observation.
- Hot Mix Asphalt and Aggregate test methods shown in Table 9-5 will be evaluated by observation and split sample. All other Hot Mix Asphalt and Aggregate test methods will be evaluated by observation only.
- The field split of HMA or Aggregate will be tested by the individual who sampled and reduced the material, under the observation of the IAI or a qualified Region laboratory staff member under the direction of the Region Materials Engineer.
- The laboratory split of the IA sample must remain in the custody of the IAI until the sample is logged into the Region Materials Laboratory.

- A qualified tester from the Region Materials Laboratory will perform the testing on the laboratory portion of the split sample. The same tester may not perform both the field and the laboratory testing on an IA sample.
- The same equipment may not be used to test the laboratory and the field portions of the IA split sample.
- All equipment used for testing the split samples will be evaluated for condition and current calibration/standardization/check tags.

A record of the evaluation will be kept by the IAI in the Region Office and provided to the PE upon request. The record should contain the following:

- Name of qualified tester.
- Observations concerning the condition of the testing equipment.
- Observations concerning the performance of the qualified tester including, suggestions or on the-spot corrections for improving the tester's performance.

9-5.10A Comparison Evaluation of the Independent Assurance Sample

The IA split sample will be tested by the Region laboratory except, when the Region laboratory performs the acceptance testing. If the Region Materials Laboratory performs the acceptance testing then, the IA split sample will be tested by the State Materials Laboratory or another Region Materials Laboratory. The tester performing the comparison evaluation of the Independent Assurance sample must be qualified in the procedures being evaluated.

The calibrated/standardized/checked testing equipment used for the comparison must be different equipment than that used by the field during the split sample evaluation.

9-5.10B Assurance and Acceptance Test Results

Independent Assurance split samples will be compared using Table 9-5. Reports of the degree of conformance will be sent to the Project Engineer and the Region IAI by the Region Materials Engineer (RME).

Test	Normal Range of Deviation	Maximum Range of Deviation
Sand Equivalent	± 8 points	± 15 points
Fracture	± 5 percent	± 10 percent
Asphalt Binder Content (HMA)	± 0.3 percent	± 0.6 percent
Sieve Analysis – All Items: No. 4 sieve and larger	± 5 percent	± 8 percent
No. 6 sieve to No. 80 sieve	± 3 percent	± 6 percent
No. 100 sieve to No. 200 sieve	± 2 percent	± 4 percent

Table 9-5

Comments reflecting the degree of conformance will be entered in the remarks section of the report by the Region Materials Engineer. The degree of conformance will be determined according to the deviation ranges noted below. Gradation test results will be compared only on specification screens.

In the table above, "Normal Range" indicates an acceptable range of variation between test results and no action is required. Test results that fall in this category will be so indicated by the wording "*normal deviation*" on the IA reports.

Test results falling outside of the "Normal Range" but within the "Maximum Range," will be indicated by the wording "*questionable deviation*" on the I a reports.

Deviations falling into the questionable category will be reviewed by the Region IAI. The review may include the following:

- Check for calculation errors.
- Review of sampling and splitting procedure.
- Review of test procedure.

Findings of the review will be documented and a copy of the report retained in the Region IAI's file.

Test results exceeding the maximum range will be indicated by the wording "*excessive deviation*." Deviations falling in the excessive category will require a review by the Region IAI. The review will include the items listed under questionable deviations and may require the field tester to pull another IA sample. The IAI will document the findings of the review. If further action is required the IAI will submit a report to the Region Materials Engineer and Project Engineer. If further action is not required a copy of the report will be retained in the IAI's files.

9-5.10C Independent Assurance Report

WSDOT is required by 23 CFR Part 637 to provide an annual report to the FHWA summarizing the results of the IA program. These reports provide a tool for the Region and WSDOT to analyze trends, identify training needs, and make improvements.

Each Region IAI will submit an annual IA report to the Quality Systems Manager. The report will be submitted in January and will summarize the IA results of the previous year. The annual report will include the following:

1. Number or percent of testers evaluated.
2. How often the qualified testers were evaluated.
3. If applicable, include a general statement as to why all qualified testers were not evaluated.
4. What, if any, problems occurred and why.
5. A general statement as to how any problems that were reported were resolved.

The focus of Independent Assurance sampling is based on individual tester's activity and is not intended to provide independent assurance sample reports on all projects or on all materials on any particular project.

9-6 Radioactive Testing Devices

9-6.1 Administration and Safety

This chapter provides guidance for personnel using, transporting, and administering the use of, nuclear density gauges. The instructions included in this chapter will be used throughout the Washington State Department of Transportation for the express purpose of regulating the use of nuclear density gauges containing radioactive materials.

Each Region shall have a Radiation Administration Officer (RAO) and a Radiation Safety Officer (RSO) whose duties are described in Section 9-6.2 and 9-6.3 respectively. All RegionaRAO and RSO personnel must have radiation safety training. Only personnel who have successfully completed the WSDOT "Nuclear Gauge Safety and Operations" course are authorized to use or transport the nuclear density gauge. Personnel transporting gauges are also required to have training that satisfies USDOT training requirements of 49 CFR 172, subpart H (HAZMAT). This training can be satisfied by successful completion of the (WSDOT) eLearning course "Hazmat Training for the Portable Nuclear Gauge." Recurrent training is required every three years. Personnel performing acceptance testing with the nuclear density gauge must become a qualified or interim tester in either TM-8, In-Place Density of Bituminous Mixtures Using the Nuclear Moisture Gauge, and or, T-310, In-Place Density and Moisture Content of Soils and Soil-Aggregate by Nuclear Method. The operator's responsibilities for safety and security of the gauges are described in Section 9-6.4.

All personnel using or responsible for the nuclear density gauge shall be:

1. Thoroughly familiar with the safe handling techniques for using radioactive materials.
2. Fully informed of the hazards to health that exists near radioactive materials.
3. Completely familiar and in compliance with the following rules and regulations:
    a. Rules and Regulations for Radiation Protection by the State Department of Health, Division of Radiation Protection, Title 246, WAC.
    b. *Radiation Emergency Handbook* by the State Department of Health.

Copies of the above publications will be kept by the Region Radiation Safety Offficer and at the storage location of the gauge. A copy of the *Radiation Emergency Handbook* will also be supplied with each nuclear density gauge. Authorized Operator(s) will read this handbook before using the radioactive testing device for testing.

If an emergency as outlined in the *Radiation Emergency Handbook* occurs, the following people or agencies should be notified by the individual in charge of the nuclear density gauge:

- Radiation safety officer
- Radiation administration officer

The RSO or the RAO will notify the following people or agencies:

- Radiation Control Program, Health Services Division, State Department of Health, Olympia, WA (Phone 206/NUCLEAR).
- Washington State Patrol, if a public hazard exists.
- Radiation Administration Officer or Radiation Safety Offfficer, at the State Materials Laboratory.

The telephone numbers of these agencies or individuals will be posted at all storage sites and a copy of these numbers shall be kept with each nuclear density gauge.

WSDOT employees that work around or with nuclear gauges need to know the potential health and safety hazards of working with nuclear gauges and their individual rights. Each office that uses or stores nuclear gauges shall have a copy of the latest "*Sealed Source Edition Rules and Regulations for Radiation Protection*" published by the Department of Health. Every employee that uses a nuclear gauge, or works near the storage location of the nuclear gauges, must review the applicable Chapters 246-220 Radiation – General Provisions; 246-221 Radiation Protection Standards; 246-222 Radiation Protection – Worker Rights and sign the "Acknowledgment of the Hazards of Working with Radiation Sources" form which is available through the Radiation Safety Officer.

Any individual using radioactive sources or receiving on the job training with radioactive sources must wear a radiation exposure badge which records exposure the body may receive. Radiation exposure badges are assigned to individuals they are not to be used by any other person. Any individual using radioactive sources or receiving on the job training with radioactive sources must be familiar with the conditions outlined in WAC 246-221-010 and WAC 246-221-055 regarding radiation exposure during pregnancy and dose limits to the embryo/fetus. Personnel with valid safety or health concerns may be released from the operation of nuclear gauges without prejudice to their career opportunities with WSDOT.

The acquisition of radiation exposure badges, as needed by each Region, shall be the responsibility of the Region Radiation Safety Offfficer or a designated individual with radiation safety training. Three-month TLD (Thermal Luminescent Dosimeter) badges indicating exposure to gamma, beta, x-ray, and neutron radiation will be used as a minimum.

Each nuclear density gauge will be supplied in the manufacture's shipping container with an adequate latch. While transporting and when storing the nuclear density gauge, it must be secured with a minimum of three levels of security using locks:

1. Security level one is considered to be a combination of a lock on the handle of the nuclear density gauge, and a lock on the manufacture's shipping container.
2. Security level two is considered to be the chain and lock combination, or other locking mechanism, used to secure the manufacturers shipping container to the vehicle if in transport or field use, or to a storage bench or locker in an approved storage facility.

   Note: Security level two must prevent the manufacturers shipping container from being opened if the lock is removed.

3. Security level three is considered to be:

   a. If a passenger vehicle is used for transporting, the manufacturers shipping container containing the nuclear density gauge, which is secured and locked in the trunk.

   b. If a station wagon, van, or panel truck is used, the manufacturers shipping container containing the nuclear density gauge, which is secured and locked in the back of the vehicle in such a manner as to prevent it from moving during transport.

      Note: If the manufacture's shipping container can be seen through a window or other opening it must be covered.

   c. If a truck with a utility box is used, the manufacturers shipping container containing the nuclear density gauge must be secured in the utility box with the storage lid locked. The nuclear density gauge shall not be transported in the cab of the truck.

   d. If a truck with a canopy is used, the manufacturer's shipping container containing the nuclear density gauge must be secured to the bed of the truck and the canopy lid locked. The nuclear density gauge shall not be transported in the cab of the truck.

   e. If a licensed storage location, or temporary storage facility approved by the Region RSO is used, the storage facility door must be locked.

   At all times, the key(s) for the security locks will be in the possession of the individual responsible for the nuclear density gauge.

   Every effort shall be made to store and transport nuclear density gauges in a manner that minimizes its view from the general public.

   When the nuclear density gauges are not in use or in transit, they must be stored with three levels of security in licensed storage locations, or temporary storage facilities approved by the Region RSO.

   Performance audits shall be conducted randomly by the Region Radiation Safety Offficer or designee to ensure that each gauge operator and transporter:

   1. Understands the security and transportation requirements described above.
   2. Has the necessary means available to use three levels of security in each of their transport vehicles.
   3. Is actively employing the three levels of security while gauges are out of a licensed storage area.

The Region Radiation Safety Offficer shall retain records of performance audits.

9-6.2 Radiation Administration Officer (Region Materials Engineer)

The Radiation Administration Officer (RAO) will be responsible for administering the use of radioactive material within the Region.

The RAO will obtain, revise, and renew the Region's Radioactive Material License issued by the Washington State Department of Health. A license indicates the strength and type of radioactive sources that a Region may possess.

Licenses are issued subject to all the requirements of the Washington Rules and Regulations for Radiation Protection and to the conditions specified in the license. Licenses are also subject to any additional requirements of the Department of Health as stated in letters issued by DOH. Where a letter containing a license condition requirement differs from the Regulations, the letter will supersede the regulations insofar as the license is concerned.

When a change occurs in the radiation program, which would require a change to the current Radioactive Material License, the Licensee (RSO) will notify the Department of Health and request an appropriate amendment.

The Radiation Safety Officer (RSO) must be listed on the license. Individual operators are not required to be listed on the license, but the RAO or RSO must maintain a list of Authorized Operators. This list of Authorized Operators should include the operator's name, type of training, final test score, and a copy of the training certificate. The RAO or RSO will be responsible for the storage of the nuclear density gauge when not in field use and the assignment of nuclear density gauges to the individual project offices. The RAO or RSO will be responsible for maintaining the following records:

1. List of qualified operators within the Region.
2. List of qualified gauge transporters within the Region.
3. Radioactive testing device location records.
4. Radioactive testing device shipping records.

Prior to shipping or transferring a nuclear density gauge from one licensed organization to another, the shipper shall check, and be assured that, the receiver has a valid radioactive material license; and that the shipped or transferred sources do not exceed the limitations of the receiver's license. Shipment to authorized personnel within the Region is covered by the Region's license. The State Materials Laboratory shall be notified when repairs or calibration are needed for any of WSDOT's nuclear density gauges. When the nuclear density gauges are not in field use, the normal storage will be at the Region office. The Region office shall have an area designated for this purpose. The following information shall be posted on the walls of the storage facility to notify personnel of the existence of radiation:

1. "Caution – Radioactive Materials" sign.
2. DOH Form RHF-3 "Notice to Employees."
3. WAC Chapters 246-220, 246-221, and 246-222 of the Rules and Regulations for Radiation Protection.
4. DOH Form "Notification of a Radiation Emergency."

9-6.3 Radiation Safety Officer

The Radiation Safety Offficer (RSO) will be responsible for maintaining the radioactive material license. The RSO will be responsible for maintaining the following records:

1. Leak test records.
2. Medical records.
3. Radiation Exposure Report.
4. Minor testing device maintenance as outlined in the Radioactive Materials License.
5. The Acknowledgment of the Hazards of Working with Radiation Sources form.

Leak testing is required by law and is simply a swabbing of the sealed source to ascertain that no radioactive contamination has occurred from the nuclear source. The Region RSO shall be responsible for having each source leak tested every twelve months. The analysis of leak tests shall be done by a commercial firm licensed to do this work.

The service contract will be obtained by individual regions. Records of leak test results shall be kept in units of micro-curies and maintained for inspection. Any leak test revealing the presence of 1850 Bq or more of removable radioactive material shall be reported to the Department of Health, Division of Radiation Protection, P.O. Box 47827, Olympia, WA 98504-7827, within five days of the test. This report should include a description of the defective source or device, the results of the test, and the corrective action taken.

The RSO will be responsible for radiation exposure reports for personnel in that Region. Exposure records shall be kept on Department of Health Form RFH-5, or in a manner which includes all information required on said form. Each entry shall be for a period of time not exceeding one calendar quarter.

9-6.4 Authorized Operators

The Authorized Operators will be directly responsible to the RAO for the use and storage of the nuclear density gauge in the field and to the RSO for all safety in regard to the nuclear density gauge.

The Authorized Operators shall be responsible for posting the following information at all field storage areas:

1. “Caution – Radioactive Materials” Sign.
2. DOH Form RHF-3 “Notice to Employees.”
3. WAC Chapters 246-220, 246-221, and 246-222 of the Rules and Regulations for Radiation Protection.
4. DOH Form Notification of a Radiation Emergency

The Authorized Operator must keep the RAO or RSO informed of the location of the nuclear density gauge at all times. (The State Radiation Control Unit inspectors will want the sources produced or the exact locations given during their periodic inspections.) If the exact location where the nuclear density gauge will be used is known in advance, it should be noted before leaving the Region office, and if unknown, shall be forwarded to the RAO or RSO as soon as it is known.

The operation of the shutter-operating device should be frequently checked, and any malfunction reported to the RAO or RSO immediately. When not in use, the source index handle will be locked and the nuclear density gauge locked in an adequate storage facility. When operating the nuclear gauge (i.e., when the handle is in the "USE" position), unauthorized persons are not to be within 15 feet (5 meters) of the gauge.

9-6.5 Authorized Transporters

It is permissible for employees to be an authorized transporter of nuclear density gauges providing they have the training described in Section 9-6.1. It is not necessary for authorized transporters who are not also authorized operators to be assigned a radiation exposure badge. Authorized transporters will be issued a card stating the employee has "satisfactorily completed Hazmat training for transportation of the portable Nuclear Gauge as described in 49 CFR 172.700." Authorized transporters are subject to performance audits as described in Section 9-6.1.

9-7 WSDOT Testing Methods and Field Operating Procedures Included in This Manual

Procedure Number	Owner	Test Method
T 2	WSDOT	FOP for AASHTO for Sampling of Aggregate
TM 2	WAQTC	FOP for WAQTC for Sampling Freshly Mixed Concrete
TM 8	WAQTC	FOP for WAQTC for In-Place Density of Bituminous Mixes Using the nuclear Moisture-Density Gauge
T 23	WSDOT	FOP for AASHTO for Making and Curing Concrete test Specimens in the Field
T 27/11	WAQTC	FOP for WAQTC/AASHTO for Sieve Analysis of Fine and Coarse Aggregates
T 40	WAQTC	FOP for WAQTC/AASHTO for Sampling Bituminous Materials
T 99	WSDOT	FOP for AASHTO for Moisture-Density Relations of Soils Using a 5.5-lb Rammer and a 12-in Drop
T 119	WSDOT	FOP for AASHTO for Standard Test Method for Slump of Hydraulic-Cement Concrete
T 123	WSDOT	Method of Test for Bark Mulch
T 152	WAQTC	FOP for WAQTC/AASHTO for Air Content of Freshly Mixed Concrete by the Pressure Method
T 166	WSDOT	FOP for AASHTO for Bulk Specific Gravities of Compacted Asphalt Mixtures Using Saturated Surface Dry Specimens
T 168	WAQTC	FOP for WAQTC/AASHTO for Sampling Bituminous Paving Mixtures
T 176	WSDOT	FOP for AASHTO for Plastic Fines in Grade Aggregate by Use of the Sand Equivalent Test
T 209	WSDOT	FOP for AASHTO for Method of Test for Maximum Specific Gravity of Bituminous Paving Mixtures – "Rice Density"
T 217	WSDOT	FOP for AASHTO for Determination of Moisture in Soils by means of a Calcium Carbide Gas Pressure Moisture Tester
T 248	WSDOT	FOP for AASHTO for Reducing Samples of Aggregate to Testing Size
T 255	WSDOT	FOP for AASHTO for Total Moisture Content of Aggregate by Drying
T 272	WSDOT	FOP for AASHTO for Family of Curves – One Point Method
T 304	WSDOT	FOP for AASHTO for Uncompacted Void Content of Fine Aggregate

Procedure Number	Owner	Test Method
T 308	WSDOT	FOP for AASHTO for Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method
T 309	WSDOT	FOP for AASHTO for Method for Determination of the Temperature of Freshly Mixed Concrete
T 310	WSDOT	FOP for AASHTO for In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
T 312	WSDOT	FOP for AASHTO for Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor
T 329	WSDOT	FOP for AASHTO Moisture Content of Hot Mix Asphalt (HMA) by Oven Method
T 335	WSDOT	FOP for AASHTO for Determining the Percentage of Fracture in Coarse Aggregate
T 420	WSDOT	FOP for AASHTO for Determining the Maturity of Compost (Solvita Test)
SOP 615	WSDOT	Determination of the % Compaction for Embankment & Untreated Surfacing Materials using the Nuclear Moisture-Density Gauge
T 712	WSDOT	Standard Method of Reducing Bituminous Paving Mixtures
T 716	WSDOT	Method of Random Sampling for Location of Testing and Sampling Sites
SOP 723	WSDOT	Standard Operating Procedure for Submitting Hot Mix Asphalt (HMA) Mix Design for Verification
T 724	WSDOT	Method for Preparation of Aggregate for ACP Job Mix Design
T 726	WSDOT	Method of Test for Mixing Procedure for Binder and Aggregate
SOP 728	WSDOT	Standard Operating Procedure for Determining the Ignition Furnace Calibration Factor (IFCF) for Hot Mix Asphalt (HMA)
SOP 729	WSDOT	Determination of the Moving Average of Theoretical Maximum Density (TMD) for HMA
SOP 730	WSDOT	Standard Operating Procedure for Correlation of Nuclear Gauge Determined Density with Hot Mix Asphalt Cores
SOP 731	WSDOT	Standard Operating Procedure for Method for Determining Volumetric Properties of Hot Mix Asphalt
SOP 733	WSDOT	Standard Operating Procedure for Determination of Pavement Density Differentials Using the Nuclear Density Gauge
SOP 734	WSDOT	Standard Operating Procedure for Sampling Hot Mix Asphalt (HMA) after Compaction (Obtaining Cores)
SOP 735	WSDOT	Standard Operating Procedure for Longitudinal Joint Density
SOP 736	WSDOT	In-Place Density of Bituminous Mixes Using Cores
SOP 737		Procedure for the Forensic Testing of HMA Field Cores
C 805	WSDOT	Rebound Hammer Determination of Compressive Strength of Hardened Concrete
T 813	WSDOT	Field Method of Fabrication of 2-in. Cube Specimens for Compressive Strength Testing of Grouts and Mortars
T 818	WSDOT	Air Content of Freshly Mixed Self-Compacting Concrete by the Pressure Method
T 819	WSDOT	Making and Curing Self-Compacting Concrete Test Specimens in the Field
T 914	WSDOT	Practice for Sampling of Geotextiles for Testing
C 939	WSDOT	FOP for ASTM for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method)
C 1611	WSDOT	FOP for ASTM for Slump Flow of Self-Consolidating Concrete
C 1621	WSDOT	FOP for ASTM for Passing Ability of Self-Consolidating Concrete by J-Ring
D 4791	WSDOT	FOP for ASTM for Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate

WSDOT FOP for WAQTC T 27/T 11

Sieve Analysis of Fine and Coarse Aggregates

Significance

Sieve analyses are performed on aggregates used in roadway bases and in portland cement and asphalt cement concretes. Sieve analyses reveal the size makeup of aggregate particles – from the largest to the smallest. A gradation curve or chart showing how evenly or unevenly the sizes are distributed between largest and smallest is created in this test. How an aggregate is graded has a major impact on the strength of the base or on the properties and performance of concrete. In portland cement concrete (PCC), for example, gradation influences shrinkage and shrinkage cracking, pumpability, finishability, permeability, and other characteristics.

Scope

This procedure covers sieve analysis in accordance with AASHTO T 27 and materials finer than No. 200 (75 µm) in accordance with AASHTO T 11. The procedure combines the two test methods.

Sieve analyses determines the gradation or distribution of aggregate particles within a given sample in order to determine compliance with design and production standards.

Accurate determination of material smaller than No. 200 (75 µm) cannot be made with AASHTO T 27 alone. If quantifying this material is required, it is recommended that AASHTO T 27 be used in conjunction with AASHTO T 11. Following AASHTO T 11, the sample is washed through a No. 200 (75 µm) sieve. The amount of material passing this sieve is determined by comparing dry sample masses before and after the washing process.

This procedure covers sieve analysis in accordance with AASHTO T 27 and materials finer than No. 200 (75 µm) in accordance with AASHTO T 11. The procedure includes two method choices, A and B.

Note: All Field Operating Procedures (FOPs) referred to in this procedure are WSDOT FOPs.

Apparatus

- Balance or Scale – Capacity sufficient for the masses shown in Table 2, accurate to 0.1 percent of the sample mass or better and conform to the requirements of AASHTO M 231.
- Sieves – Meeting the requirements of AASHTO M 92.
- Mechanical Sieve Shaker – Meeting the requirements of AASHTO T 27.
- Suitable Drying Equipment – See FOP for AASHTO T 255.
- Containers and Utensils – A pan or vessel of a size sufficient to contain the sample covered with water and to permit vigorous agitation without loss of any part of the sample or water.
- Optional mechanical washing device.

Sample Sieving

In all procedures, it is required to shake the sample over nested sieves. Sieves are selected to furnish information required by specification. The sieves are nested in order of decreasing size from the top to the bottom and the sample, or a portion of the sample, is placed on the top sieve. The sample may also be sieved in increments.

Sieves are shaken in a mechanical shaker for the minimum time determined to provide complete separation for the sieve shaker being used.

Time Evaluation

WSDOT has deleted this section.

Overload Determination

Additional sieves may be necessary to provide other information, such as fineness modulus, or to keep from overloading sieves. The sample may also be sieved in increments.

For sieves with openings smaller than No. 4 (4.75 mm), the mass retained on any sieve shall not exceed 4 g/in^2 (7 kg/m^2) of sieving surface. For sieves with openings No. 4 (4.75 mm) and larger, the mass, in grams shall not exceed the product of 2.5 × (sieve opening in mm) × (effective sieving area). See Table 1.

Sieve Size in (mm)		8 φ (203)	12 φ (305)	12 × 12 (305 × 305)	14 × 14 (350 × 350)	16 × 24 (372 × 580)
		Sieving Area m^2				
		0.0285	0.0670	0.0929	0.1225	0.2158
3½	(90)	*	15.1	20.9	27.6	48.5
3	(75)	*	12.6	17.4	23.0	40.5
2½	(63)	*	10.6	14.6	19.3	34.0
2	(50)	3.6	8.4	11.6	15.3	27.0
1½	(37.5)	2.7	6.3	8.7	11.5	20.2
1	(25.0)	1.8	4.2	5.8	7.7	13.5
¾	(19.0)	1.4	3.2	4.4	5.8	10.2
⅝	(16.0)	1.1	2.7	3.7	4.9	8.6
½	(12.5)	0.89	2.1	2.9	3.8	6.7
⅜	(9.5)	0.67	1.6	2.2	2.9	5.1
¼	(6.3)	0.44	1.1	1.5	1.9	3.4
No. 4	(4.75)	0.33	0.80	1.1	1.5	2.6
Less than	(No. 4)	0.20	0.47	0.65	0.86	1.5

Sample sizes above are in kilograms. To covert to grams, multiple by 1,000. To convert to pounds, multiple by 2.2.

Maximum Allowable Mass of Material Retained On a Sieve (kg)
Table 1

Sample Preparation

Obtain samples in accordance with FOP for AASHTO T 2 and reduce to the size shown in Table 2 in accordance with FOP for AASHTO T 248. If the gradation sample is obtained from FOP for AASHTO T 308, the Ignition Furnace, proceed to Procedure Method A, Step 2.

Nominal Maximum Size* in (mm)		Minimum Dry Mass lb (kg)	
US No. 4	(4.75)	1	(0.5)
¼	(6.3)	2	(1)
⅜	(9.5)	2	(1)
½	(12.5)	5	(2)
⅝	(16.0)	5	(2)
¾	(19.0)	7	(3)
1	(25.0)	13	(6)
1¼	(31.5)	17	(7.5)
1½	(37.5)	20	(9)
2	(50)	22	(10)
2½	(63)	27	(12)
3	(75)	33	(15)
3½	(90)	44	(20)

*For aggregate, the nominal maximum size sieve is the largest standard sieve opening listed in the applicable specification upon which more than 1 percent of the material is permitted to be retained. For concrete aggregate, the nominal maximum size sieve is the smallest standard sieve opening through which the entire amount of aggregate is permitted to pass.

Sample Sizes for Aggregate Gradation Test
Table 2

Note: For an aggregate specification having a generally unrestrictive gradation (i.e., wide range of permissible upper sizes), where the source consistently fully passes a screen substantially smaller than the maximum specified size, the nominal maximum size, for the purpose of defining sampling and test specimen size requirements may be adjusted to the screen, found by experience to retain no more than 5 percent of the materials.

WSDOT Note 1: These sample sizes are standard for aggregate testing but, due to equipment restraints, samples may need to be partitioned into several "subsamples" (see Method A).

Overview

Method A – This method is the preferred method of sieve analysis for HMA aggregate.

- Determine dry mass of original sample.
- Wash through a No. 200 (75 µm) sieve.
- Determine dry mass of washed sample.
- Sieve material.

Method B

- Determine dry mass of original sample.
- Wash through a No. 200 (75 µm) sieve.
- Determine dry mass of washed sample.
- Sieve coarse material.
- Determine mass of fine material.
- Reduce fine portion.
- Determine mass of reduced portion.
- Sieve fine portion.

Procedure Method A

1. Dry the sample in accordance with FOP for AASHTO T 255, and record to the nearest 0.1 percent of total mass or better.

2. When the specification requires that the amount of material finer than No. 200 (75 µm) be determined, do Step 3 through Step 9. Otherwise, skip to Step 10.

   WSDOT Note 2: If the applicable specification requires that the amount passing the No. 200 (75 µm) sieve be determined on a portion of the sample passing a sieve smaller than the nominal maximum size of the aggregate, separate the sample on the designated sieve and determine the mass of the material passing that sieve to 0.1 percent of the mass of this portion of the test sample. Use the mass as the original dry mass of the test sample.

3. Nest a sieve, any sieve ranging from a No. 8 (2.36 mm) to a No. 16 (1.18 mm) may be used, above the No. 200 (75 µm) sieve.

4. Place the test sample in a container and add sufficient water to cover it.

   WSDOT requires the use of a detergent, dispersing agent, or other wetting solution when washing a sample from FOP for AASHTO T 308, an ignition furnace sample.

   WSDOT Note 3: A detergent, dispensing agent, or other wetting solution may be added to the water to assure a thorough separation of the material finer than the No. 200 (75 µm) sieve from the coarser particles. There should be enough wetting agent to produce a small amount of suds when the sample is agitated. Excessive suds may overflow the sieves and carry material away with them.

5. Agitate vigorously to ensure complete separation of the material finer than No. 200 (75 µm) from coarser particles and bring the fine material into suspension above the coarser material. When using a mechanical washing device, exercise caution to not degrade the sample.

6. Immediately pour the wash water containing the suspended and dissolved solids over the nested sieves, being careful not to pour out the coarser particles.

7. Add a second change of water to the sample remaining in the container, agitate, and repeat Step 6. Repeat the operation until the wash water is reasonably clear.

8. Return all material retained on the nested sieves to the container by flushing into the washed sample.

   WSDOT Note 4: A suction device may be used to extract excess water from the washed sample container. Caution will be used to avoid removing any material greater than the No. 200.

9. Dry the washed aggregate in accordance with FOP for AASHTO T 255, and then cool prior to sieving. Record the cooled dry mass.

10. Select sieves to furnish information required by the specifications. Nest the sieves in order of decreasing size from top to bottom and place the sample, or a portion of the sample, on the top sieve.

11. Place sieves in mechanical shaker and shake for a minimum of 10 minutes, or the minimum time determined to provide complete separation if this time is greater than 10 minutes for the sieve shaker being used.

12. Determine the individual or cumulative mass retained on each sieve and the pan to the nearest 0.1 percent or 0.1 g.

    WSDOT Note 5: Use coarse wire brushes to clean the No. 40 (425 µm) and larger sieves and soft bristle brushes for smaller sieves.

Calculations

The total mass of material after sieving should be verified with the mass before sieving. If performing T 11 with T 27, this would be the dry mass after wash. If performing just T 27, this would be the original dry mass. When the masses before and after sieving differ by more than 0.3 percent, do not use the results for acceptance purposes. When performing the gradation from HMA using T 308, the masses before and after sieving shall not differ by more than 0.2 percent.

Calculate the total percentages passing, individual or cumulative percentages retained, or percentages in various size fractions to the nearest 0.1 percent by dividing the masses for Method A, or adjusted masses for Methods B and C, on the individual sieves by the total mass of the initial dry sample. If the same test sample was first tested by T 11, use the total dry sample mass prior to washing in T 11 as the basis for calculating all percentages. Report percent passing as indicated in the "Report" section at the end of this FOP.

Percent Retained:

$$\text{IPR} = \frac{\text{IMR}}{\text{M}} \times 100 \text{ or } \text{CPR} = \frac{\text{CMR}}{\text{M}} \times 100$$

Where:

IPR = Individual Percent Retained
CPR = Cumulative Percent Retained
M = Total Dry Sample mass before washing
IMR = Individual Mass Retained OR Adjusted Individual mass from Methods B or C
CMR = Cumulative Mass Retained OR Adjusted Individual mass from Methods B or C

OR

Percent Passing (Calculated):

$$PP = PPP - IPR \text{ or } PP = 100 - CPR$$

Where:

PP = Percent Passing
PPP = Previous Percent Passing

Calculate cumulative percent retained on and passing each sieve on the basis of the dry mass of total sample, before washing. This will include any material finer than No. 200 (75 µm) that was washed out.

Divide the cumulative masses, or the corrected masses, on the individual sieves by the total mass of the initial dry sample (prior to washing) to determine the percent retained on and passing each sieve. Calculate the percent retained on and passing each sieve. Report percent passing as indicated in the "Report" section at the end of this FOP.

Example:

Dry mass of total sample, before washing: 3214.0 g

Dry mass of sample, after washing out the No. 200 (75 µm) minus: 3085.1 g

For the ½″ sieve:

Cumulative Mass retained on ½″ sieve = 161.0 g

$$\text{Cumulative \% retained} = \frac{161.0}{3214.0} \times 100 = 5.0\% \text{ retained}$$

% passing = 100-5.0 = 95% passing ½″ sieve

Sieve Size in (mm)		Cumulative Mass Retained (g)	Cumulative Percent Retained	Reported Percent Passing*
¾	(19.0)	0	0	100
½	(12.5)	161.0	5.0	95
⅜	(9.5)	642.0	20.0	80
No. 4	(4.75)	1118.3	34.8	65
**No. 6	(3.35)	1515.2		
No. 10	(2.0)	1914.7	59.6	40
No. 40	(0.425)	2631.6	81.9	18
No. 80	(0.210)	2862.7	89.1	11
No. 200	(0.075)	3051.1	94.9	5.1
Pan		3086.4		

*Report No. 200 (75 µm) sieve to 0.1 percent. Report all others to 1 percent.

**Intermediate sieve used to prevent overloading the U.S. No. 10 sieve.

Gradation On All Screens

Test Validation: (3086.4 – 3085.1)/3085.1 x 100 = 0.04% which is within the 0.3 percent requirement and the results can be used for acceptance purposes.

Procedure Method B

1. Perform steps 1 through 9 from the Procedure Method A, then continue as follows:
2. Select sieves to furnish information required by the specifications. Nest the sieves in order of decreasing size from top to bottom through the No. 4 (4.75 mm) with a pan at the bottom to retain the minus No. 4 (4.75 mm). See Table 1.
3. Place sieves in mechanical shaker and shake for a minimum of 10 minutes, or the minimum time determined to provide complete separation if this time is greater than 10 minutes for the sieve shaker being used.
4. Determine the individual or cumulative mass retained on each sieve and the pan to the nearest 0.1 percent or 0.1 g. Ensure that all material trapped in the openings of the sieve are cleaned out and included in the mass retained (see Note 5).
5. Determine the mass retained on each sieve to the nearest 0.1 percent of the total mass or better.
6. Determine the mass of the material in the pan (minus No. 4 (4.75 mm)).
7. Reduce the minus No. 4 (4.75 mm) using a mechanical splitter in accordance with FOP for AASHTO T 248 to produce a sample with a mass of 500 g minimum. Determine and record the mass of the minus No. 4 (4.75 mm) split.
8. Select sieves to furnish information required by the specifications. Nest the sieves in order of decreasing size from top to bottom through the No. 200 (75 μm) with a pan at the bottom to retain the minus No. 200 (75 μm).
9. Place sieves in mechanical shaker and shake for a minimum of 10 minutes, or the minimum time determined to provide complete separation if this time is greater than 10 minutes for the sieve shaker being used.
10. Determine the individual or cumulative mass retained on each sieve and the pan to the nearest 0.1 percent or 0.1 g. Ensure that all material trapped in the openings of the sieve are cleaned out and included in the mass retained (see Note 5).

Calculations

Compute the “Adjusted Cumulative Mass Retained” of the size increment of the original sample as follows when determining “Cumulative Mass Retained”:

Divide the cumulative masses, or the corrected masses, on the individual sieves by the total mass of the initial dry sample (prior to washing) to determine the percent retained on and passing each sieve. Calculate the percent retained on and passing each sieve. Report percent passing as indicated in the “Report” section at the end of this FOP.

When material passing the No. 4 (4.75 mm) sieve is split and only a portion of that is tested, the proportionate share of the amount passing the No. 200 (75 μm) sieve must be added to the sample mass to obtain a corrected test mass. This corrected test mass is used to calculate the gradation of the material passing the No. 4 (4.75 mm) sieve.

$$C = \left(\frac{M_1}{M_2} \times B\right) + D$$

Where:

C = Total cumulative mass retained of the size increment based on a total sample
M_1 = Mass of fraction finer than No. 4 (4.75 mm) sieve in total sample
M_2 = Mass of reduced portion of material finer than No. 4 (4.75 mm) sieve actually sieved
B = Cumulative mass of the size increment in the reduced portion sieved
D = Cumulative mass of plus No. 4 (4.75 mm) portion of sample

Example:

Dry mass of total sample, before washing: 3214.0 g

Dry mass of sample, after washing out the No. 200 (75 µm) minus: 3085.1 g

Sieve Size in (mm)		Cumulative Mass Retained (g)	Cumulative Percent Retained	Reported Percent Passing
¾	(19.0)	0	0	100
½	(12.5)	161.0	5.0	95
⅜	(9.50)	642.0	20.0	80
No. 4	(4.75)	1118.3	34.8	65

Gradation On Coarse Screens

Pan = 1968.0

Test Validation: (1118.3 + 1968.0 – 3085.1)/3085.1 x 100 = 0.04% which is within the 0.3 percent requirement and the results can be used for acceptance purposes.

The actual mass of material passing the No. 4 (4.75 mm) sieve and retained in the pan is 1968.0 g. This is M_1.

The pan (1968.0 grams) was reduced in accordance with the FOP for AASHTO T 248, so that at least 500 g are available. In this case, the mass determined was 512.8 g. This is M_2.

Sieve Size in (mm)		Cumulative Mass Retained (g)
No. 4	(4.75)	0
No. 10	(2.00)	207.5
No. 40	(0.425)	394.3
No. 80	(0.210)	454.5
No. 200	(0.075)	503.6
Pan		512.8

Gradation On Fine Screens

Test Validation: (512.8 – 512.8)/512.8 = 0.0% which is within the 0.3 percent requirement and the results can be used for acceptance purposes.

For the No. 10 sieve:

M_1 = 1968.0g
M_2 = 512.8g
B = 207.5g
D = 1118.3g

$$C = \frac{M_1}{M_2} \times B + D = \frac{1968.0g}{512.8g} \times 207.5g + 1118.3g = 1914.7g$$

$$\%\ \text{retained}\ \frac{1914.7g}{3214.0g} = 59.6\%$$

$$\%\ \text{passing} = 100 - 59.6 = 40.4\%, \text{reported as } 40\%$$

Sieve Size in (mm)		Cumulative Mass Retained (g)	Adjusted Cumulative Mass Retained (g)	Cum. Percent Retained	Reported Percent Passing*
¾	(19.0)	0	0	0	100.0
½	(12.5)	161.1	161.1	5.0	95
⅜	(9.5)	642.5	642.5	20.0	80
No. 4	(4.75)	1118.3	1118.3	34.8	65
No. 10	(2.0)	207.5 × 3.838 + 1118.3	1914.7	59.6	40
No. 40	(0.425)	394.3 × 3.838 + 1118.3	2631.6	81.6	18
No. 80	(0.210)	454.5 × 3.838 + 1118.3	2862.7	89.1	11
No. 200	(0.075)	503.6 × 3.838 + 1118.3	3051.1	94.9	5.1
Pan		512.8 × 3.838 + 1118.3	3086.4		

*Report No. 200 (75 µm) sieve to 0.1 percent. Report all others to 1 percent.

Final Gradation On All Screens

Alternative Method B

As an alternate method to account for the fact that only a portion of the minus No. 4 (4.75 mm) material was sieved, multiply the fine screen "Percent Passing" values by the percent passing the No. 4 (4.75 mm) sieve obtained in the coarse screen procedure, 65 percent in this case.

The mass retained in the pan must be corrected to include the proper percent of No. 200 (.075 mm) minus material washed out.

Divide the cumulative masses, or the corrected masses, on the individual sieves by the corrected pan mass of the initial dry sample (prior to washing) to determine the percent retained on and passing each sieve. Calculate the percent retained on and passing each sieve. Report percent passing as indicated in the "Report" section at the end of this FOP.

Dry mass of total sample, before washing: 3214.0 g

Dry mass of sample, after washing out the No. 200 (75 µm) minus: 3085.1 g

Amount of No. 200 (75 µm) minus washed out: 3214.0 g – 3085.1 g = 128.9 g

Sieve Size in (mm)		Cumulative Mass Retained (g)	Cumulative Percent Retained	Reported Percent Passing
¾	(19.0)	0	0	100
½	(12.5)	161.0	5.0	95
⅜	(9.50)	642.0	20.0	80
No. 4	(4.75)	1118.3	34.8	65

Gradation On Coarse Screens

Pan = 1968.0

Test validation: $\frac{1118.3 + 1968.0 - 3085.1}{3085.1} \times 100 = 0.04\%$

which is within the 0.3 percent requirement and the results can be used for acceptance purposes.

The actual mass of material passing the No. 4 (4.75 mm) sieve and retained in the pan is 1968.0 g. This is M_3.

The pan (1968.0 grams) was reduced in accordance with FOP for AASHTO T 248, so that at least 500 g are available. In this case, the mass determined was 512.8 g. This is M_4.

$$\text{Corrected pan mass} = M_4 + \frac{(M_4)(C_1)}{M_3}$$

Where:

M_4 = Mass retained in the pan from the split of the No. 4 (4.75 mm) minus

M_3 = Mass of the No. 4 (4.75 mm) minus of entire sample, not including No. 200 (.075 mm) minus washed out

C_1 = Mass of No. 200 (.075 mm) minus washed out

Sieve Size in (mm)		Cumulative Mass Retained (g)	Cumulative Percent Retained	Percent Passing
No. 4	(4.75)	0	0	100.0
No. 10	(2.00)	207.5	38.0	62.0
No. 40	(0.425)	394.3	72.2	27.8
No. 80	(0.210)	454.5	83.2	16.8
No. 200	(0.075)	503.6	92.2	7.8
Pan		512.8		

The corrected pan mass is the mass used to calculate the percent retained for the fine grading.

Example:

M_4 = 512.8g

M_3 = 1968.0g

C_1 = 128.9g

Corrected pan mass $= 512.8\text{g} + \frac{(512.8\text{g})(128.9\text{g})}{1968.0\text{g}} = 546.4\text{g}$

For the No. 10 sieve:

Mass of No. 10 sieve = 207.5g

Corrected Pan Mass = 546.4g

Cumulative % retained $= \frac{207.5\text{g}}{546.4\text{g}} = 38\%$

% passing = 100-38.0 = 62.0%

Adjusted % passing No. 10 = % passing No. 10 × % No. 4 = 62.0 × 0.65 = 40%

Sieve Size in (mm)		Adjustment	Reported Percent Passing*
¾	(19.0)		100
½	(12.5)		95
⅜	(9.5)		80
No. 4	(4.75)	100 × .65 =	65
No. 10	(2.00)	62.0 × .65 =	40
No. 40	(0.425)	27.8 × .65 =	18
No. 80	(0.210)	16.8 × .65 =	11
No. 200	(0.075)	7.8 × .65 =	5.1

*Report No. 200 (75 µm) sieve to 0.1 percent. Report all others to 1 percent.

Final Gradation On All Screens

Sample Calculation for Fineness Modulus

Fineness Modulus (FM) is used in determining the degree of uniformity of aggregate gradation in PCC mix designs. It is an empirical number relating to the fineness of the aggregate. The higher the FM, the coarser the aggregate. Values of 2.40 to 3.00 are common for FA in PCC.

The FM is the sum of the percentages retained on specified sieves, for PCC fine aggregate they are: No. 4 (4.75 mm), No. 8 (2.36 mm), No. 16 (1.18 mm), No. 30 (0.60 mm), No. 50 (0.30 mm), and No. 100 0.15 mm) divided by 100 gives the FM.

The following example is for WSDOT Class 2 Sand:

Sieve Size in (mm)		Percent Passing	Percent Retained	Percent Retained on Specified Sieves
No. 4	4.75 mm	100	0	0
No. 8	2.36 mm	87	13	13
No. 16	1.18 mm	69	31	31
No. 30	0.60 mm	44	56	56
No. 50	0.30 mm	18	82	82
No. 100	0.15 mm	4	96	96
				= 278
				FM = 2.78

Report

Results shall be reported on standard forms approved for use by the agency. Depending on the agency, this may include:

- Cumulative mass retained on each sieve.
- Cumulative percent retained on each sieve.
- Percent passing and retained on each sieve shall be reported to the nearest 1 percent except for the percent passing the U.S. No. 200 (75 µm) sieve, which shall be reported to the nearest 0.1 percent.
- FM to the nearest 0.01 percent for WSDOT Class 2 Sand.

Report the results using one or more of the following:

- Materials Testing System (MATS)
- DOT Forms 422-020, 422-020A, or 422-020B
- Form approved in writing by the State Materials Engineer

Performance Exam Checklist

WAQTC FOP for AASHTO T 27/T 11
Sieve Analysis of Fine And Coarse Aggregates

Participant Name _____ Exam Date _____

	Procedure Element	Yes	No
1.	The tester has a copy of the current procedure on hand?	☐	☐
2.	All equipment is functioning according to the test procedure, and if required, has the current calibration/verification tags present?	☐	☐
3.	Minimum sample mass meets requirement of Table 1 or from FOP for AASHTO T 308?	☐	☐
4.	Test sample dried to a constant mass by FOP for AASHTO T 255?	☐	☐
5.	Test sample cooled and mass determined to nearest 0.1 percent of mass?	☐	☐
6.	Sample placed in container and covered with water? (If specification requires that the amount of material finer than the No. 200 sieve is to be determined.)	☐	☐
7.	Dispersing Agent used for HMA?	☐	☐
8.	Contents of the container vigorously agitated?	☐	☐
9.	Complete separation of coarse and fine particles achieved?	☐	☐
10.	Wash water poured through required nested sieves?	☐	☐
11.	Operation continued until wash water is reasonably clear?	☐	☐
12.	Material retained on sieves returned to washed sample?	☐	☐
13.	Washed aggregate dried to a constant mass by FOP for AASHTO T 255?	☐	☐
14.	Washed aggregate cooled and mass determined to nearest 0.1 percent of mass?	☐	☐
15.	Sample placed in nest of sieves specified? (Additional sieves may be used to prevent overloading as allowed in FOP.)	☐	☐
16.	Material sieved in verified mechanical shaker for minimum of 10 minutes or for the minimum verified time whichever is longer?	☐	☐
17.	Mass of residue on each sieve determined to 0.1 percent of mass?	☐	☐
18.	Total mass of material after sieving agrees with mass before sieving to within 0.3 percent, or 0.2 percent for HMA (per FOP for AASHTO T 308)?	☐	☐
19.	Percentages calculated to the nearest 0.1 percent and reported to the nearest whole number, except No. 200 - reported to the nearest 0.1 percent?	☐	☐
20.	Percentage calculations based on original dry sample mass?	☐	☐
21.	Calculations performed properly? If material passing No. 4 sieve is split and only a portion is tested, calculation as noted in FOP performed properly?	☐	☐

First Attempt: Pass ☐ Fail ☐ Second Attempt: Pass ☐ Fail ☐

Signature of Examiner _____

Comments:

WSDOT FOP for WAQTC T 168

Sampling of Hot Mix Asphalt Paving Mixtures
FOP for WAQTC T 168

Significance

Testing bituminous paving mixtures in the field begins with obtaining and preparing the sample to be tested. Standardized procedures for obtaining a representative sample have been established. Producing strong, durable, reliable pavement in roadways requires careful sampling and accurate testing.

Technicians must be patient and follow these procedures. If one considers that the specifications require quality tests to be made on only a small portion of the total material placed, the need for a truly representative sample is apparent. For this reason, every precaution must be taken to obtain a sample that is truly representative of the entire batch and then to protect that sample from contamination and physical damage.

Scope

This procedure covers the sampling of bituminous paving mixtures from HMA plants, truck transports, and roadways in accordance with AASHTO T 168. Sampling is as important as testing, and every precaution must be taken to obtain a truly representative sample.

Apparatus

- Shovel.
- Sample containers such as cardboard boxes, metal cans, stainless steel bowls, or other agency-approved containers.
- Mechanical sampling device.
- Thermometer- Metal probe or other suitable thermometric device, accurate to 1ºF (0.5º C)

Sample Size

Sample size depends on the test methods specified by the agency for acceptance.

For Acceptance sampling and testing only: WSDOT requires a minimum of two times the amount required for testing. This should be 60 lbs.

For Acceptance and Conformation sampling and testing: WSDOT requires a minimum of four times the amount required for testing. This should be approximately 120 lbs. (See WSDOT *Construction Manua*l Section 9-3.7 for Conformation sampling frequency)

Sampling

- **General**

1. The material shall be tested to determine variations. The supplier/contractor shall sample the HMA mixture in the presence of the Project Engineer. The supplier/contractor shall provide one of the following for safe and representative sampling:

   a. A mechanical sampling device installed between the discharge of the silo and the truck transport that is approved by the Regional Materials Engineer.

   b. Platforms or devices to enable sampling from the truck transport without entering the truck transport for sampling HMA.

2. The supplier/contractor shall place dense graded mixture samples in cardboard boxes or stainless steel bowls or other agency provided containers. The samples shall be delivered to a location designated by the Project Engineer. Place open graded mixture samples in stainless steel bowls. Do not put open graded mixture samples in boxes until they have cooled to the point that bituminous material will not migrate from the aggregate.

   Note: Care shall be taken to prevent contamination of bituminous mixes by dust or other foreign matter, and to avoid segregation of aggregate and bituminous materials.

   - **Attached Sampling Devices** – Some agencies require mechanical sampling devices for HMA and cold feed aggregate on some projects. These are normally permanently attached devices that allow a sample container to pass perpendicularly through the entire stream of material or divert the entire stream of material into the container. Operation may be hydraulic, pneumatic, or manual and allows the sample container to pass through the stream twice, once in each direction, without overfilling. Special caution is necessary with manually operated systems since a consistent speed is difficult to maintain and non-representative samples may result. Check agency requirements for the specifics of required sampling systems.

     WSDOT requires the mechanical sampling device be located between the silo and the truck transport unless otherwise approved by the Region Materials Engineer.

   - **Sampling from Truck Transports Haul Units**

     a. Obtain samples in four approximately equal increments from truck transports.

     b. Obtain each increment from approximately 12 in (300 mm) below the surface, in each of the four quadrants of the load.

     c. Combine the increments to form a sample of the required size.

   - **Sampling from Roadway Prior to Compaction (Plate Method)**

     WSDOT has deleted this section.

Temperature of Mix

Immediately upon obtaining a sample, using a verified thermometer, check and record temperature of the sample.

Identification and Shipping

1. Identify sample containers as required by the agency.
2. Ship samples in containers that will prevent loss, contamination, or damage.
3. Refer to the sample identification requirements in FOP for WSDOT Test Method 712.

Performance Exam Checklist

WSDOT FOP for WAQTC/AASHTO T 168
Sampling of Hot Mix Asphalt Paving Mixtures

Participant Name _____ Exam Date _____

Procedure Element	Yes	No
1. The tester has a copy of the current procedure on hand?	☐	☐
2. Containers of correct type and ample size available?	☐	☐
3. Sampling	☐	☐
a. Samples from truck transport taken from four quadrants at approximate depth of 12 inches?	☐	☐
b. Samples taken with approved mechanical sampling device?	☐	☐
4. Temperature of mix checked?	☐	☐
5. Sample size meets agency requirements?	☐	☐
6. Sample identified as required?	☐	☐

First Attempt: Pass ☐ Fail ☐ Second Attempt: Pass ☐ Fail ☐

Signature of Examiner _____

Comments:

WSDOT FOP for AASHTO T 312

Preparing Hot-Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor

1. Scope

   1.1 This standard covers the compaction of cylindrical specimens of hot-mix asphalt (HMA) using the Superpave gyratory compactor.

   1.2 This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

   2.1 AASHTO Standards

   M 231 – Weighing Devices Used in Testing of Materials

   T 344 – Evaluation of the Superpave Gyratory Compactor (SGC) Internal Angle of Gyration Using Simulated Loading

   R 30 – Mixture Conditioning of Hot-Mix Asphalt (HMA)

   R 35 – Superpave Volumetric Design for Hot-Mix Asphalt (HMA)

   T 166 – Bulk Specific Gravity of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface-Dry Specimens

   T 168 – Sampling Bituminous Paving Mixtures

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

   T 275 – Bulk Specific Gravity of Compacted Hot Mix Asphalt (HMA) Using Paraffin-Coated Specimens

   T 316 – Viscosity Determination of Asphalt Binder Using Rotational Viscometer

   2.2 Other Standards

   WSDOT SOP 731 – Method for Determining Volumetric Properties of Hot Mix Asphalt (HMA)

3. Significance and Use

   3.1. This standard is used to prepare specimens for determining the mechanical and volumetric properties of HMA. The specimens simulate the density, aggregate orientation, and structural characteristics obtained in the actual roadway when proper construction procedure is used in the placement of the paving mix.

   3.2. This test method may be used to monitor the density of test specimens during their preparation. It may also be used for field control of an HMA production process.

4. Apparatus

4.1. Superpave Gyratory Compactor – An electrohydraulic or electromechanical compactor with a ram and ram heads as described in Section 4.3. The axis of the ram shall be perpendicular to the platen of the compactor. The ram shall apply and maintain a pressure of 600 ± 18 kPa perpendicular to the cylindrical axis of the specimen during compaction (Note 1). The compactor shall tilt the specimen molds at an average internal angle of 1.16 ± 0.02° (20.2 ± 0.35 mrad), determined in accordance with AASHTO T 344. The compactor shall gyrate the specimen molds at a rate of 30.0 ± 0.5 gyrations per minute throughout compaction.

Note 1: This stress calculates to 10,600 ± 310 N total force for 6 inches (150 mm) specimens.

4.1.1 Specimen Height Measurement and Recording Device – When specimen density is to be monitored during compaction, a means shall be provided to continuously measure and record the height of the specimen to the nearest 0.1 mm during compaction once per gyration.

4.1.2 The system may include a connected printer capable of printing test information, such as specimen height per gyration. In addition to a printer, the system may include a computer and suitable software for data acquisition and reporting.

4.2 Specimen Molds – Specimen molds shall have steel walls that are at least 7.5 mm thick and are hardened to at least a Rockwell hardness of C48. The initial inside finish of the molds shall have a root mean square (rms) of 1.60 um or smoother (Note 2). New molds shall have an inside diameter of 149.90 to 150.00 mm and be at least 250 mm high at room temperature. The inside diameter of in-service molds shall not exceed 150.2 mm.

Note 2: Smoothness measurement is in accordance with ANSI B 46.1. One source of supply for a surface comparator, which is used to verify the rms value of 1.60 um, is GAR Electroforming, Danbury, Connecticut.

4.3 Ram Heads and Mold Bottoms – Ram heads and mold bottoms shall be fabricated from steel with a minimum Rockwell hardness of C48. The ram heads shall stay perpendicular to its axis. The platen side of each mold bottom shall be flat and parallel to its face. All ram and base plate faces (the sides presented to the specimen) shall be flat to meet the smoothness requirement in Section 4.2 and shall have a diameter of 149.50 to 149.75 mm.

4.4 Thermometric Device – Used for determining the temperature of aggregates, binder, and HMA between 18 to 418ºF (10 and 232ºC).

4.5 Balance – A balance meeting the requirements of M 231, Class G5, for determining the mass of aggregates, binder, and HMA.

4.6 Oven – An oven, thermostatically controlled to ± 5ºF (± 3ºC) for heating aggregates, binder, HMA, and equipment as required. The oven shall be capable of maintaining the temperature required for mixture conditioning in accordance with R 30.

4.7 Miscellaneous – Flat-bottom metal pans for heating aggregates, scoop for batching aggregates, containers (grill-type tins, beakers, containers for heating asphalt), large mixing spoon or small trowel, large spatula, gloves for handling hot equipment, paper disks, mechanical mixer (optional), lubricating materials recommended by the compactor manufacturer.

4.8 Maintenance – In addition to routine maintenance recommended by the manufacturer, check the Superpave gyratory compactor's mechanical components for wear, and perform repair, as recommended by the manufacturer.

5. Hazards

5.1 Use standard safety precautions and protective clothing when handling hot materials and preparing test specimens.

6. Standardization

6.1 Items requiring periodic verification of calibration include the ram pressure, angle of gyration, gyration frequency, LVDT (or other means used to continuously record the specimen height), and oven temperature. Verification of the mold and platen dimensions and the inside finish of the mold are also required. When the computer and software options are used, periodically verify the data processing system output using a procedure designed for such purposes. Verification of calibration, system standardization, and quality checks may be performed by the manufacturer, other agencies providing such services, or in-house personnel. Frequency of verification shall follow the manufacturer's recommendations.

6.2 The angle of gyration refers to the internal angle (tilt of mold with respect to end plate surface within the gyratory mold). The calibration of the internal angle of gyration should be verified in accordance with AASHTO T 344.

7. Preparation of Apparatus

7.1 Immediately prior to the time when the HMA is ready for placement in the mold, turn on the main power for the compactor for the manufacturer's required warm-up period.

7.2 Verify the machine settings are correct for angle, pressure, and number of gyrations.

7.3 Lubricate any bearing surfaces as needed per the manufacturer's instructions.

7.4 When specimen height is to be monitored, the following additional item of preparation is required. Immediately prior to the time when the HMA is ready for placement in the mold, turn on the device for measuring and recording the height of the specimen, and verify the readout is in the proper units, mm, and the recording device is ready. Prepare the computer, if used, to record the height data, and enter the header information for the specimen.

8. HMA Mixture Preparation

8.1 Weigh the appropriate aggregate fractions into a separate pan, and combine them to the desired batch weight. The batch weight will vary based on the ultimate disposition of the test specimens. If a target air void level is desired, as would be the case for Superpave mix analysis and performance specimens, batch weights will be adjusted to create a given density in a known volume. If the specimens are to be used for the determination of volumetric properties, the batch weights will be adjusted to result in a compacted specimen having dimensions of 150 mm in diameter and 115 ± 5 mm in height at the desired number of gyrations.

Note 3: It may be necessary to produce a trial specimen to achieve this height requirement. Generally, 4500 to 4700 g of aggregate are required to achieve this height for aggregates with combined bulk specific gravities of 2.55 to 2.70, respectively.

8.2 Place the aggregate and binder container in the oven, and heat them to the required mixing temperature.

8.2.1. The mixing temperature range is defined as the range of temperatures where the unaged binder has a kinematic viscosity of 170 ± 20 mm^2/s (approximately 0.17 ± 0.02 Pa·s for a binder density of 1.00 g/cm^3) measured in accordance with T 316.

Note 4: Modified asphalts may not adhere to the equi-viscosity requirements noted, and the manufacturer's recommendations should be used to determine mixing and compaction temperatures.

Note 5: The SI unit kinematic viscosity is m^2/s; for practical use, the submultiple mm^2/s is recommended. The more familiar centistokes is a cgs unit of kinematic viscosity; it is equal to 1 mm^2/s. The kinematic viscosity is the ratio of the viscosity of the binder to its density. For a binder with a density equal to 1.000 g/cm^3, a kinematic viscosity of 170 mm^2/s is equivalent to a viscosity of 0.17 Pa·s measured in accordance with T 316.

8.3 Charge the mixing bowl with the heated aggregate from one pan and dry-mix thoroughly. Form a crater in the dry blended aggregate and weigh the required amount of binder into the mix. Immediately initiate mixing.

8.4 Mix the aggregate and binder as quickly and thoroughly as possible to yield HMA having a uniform distribution of binder. As an option, mechanical mixing may be used.

8.5 After completing the mixture preparation, perform the required mixture conditioning in accordance with R 30.

8.6 Place a compaction mold and base plate in an oven not to exceed 350°F for a minimum of 60 minutes prior to the estimated beginning of compaction (during the time the mixture is being conditioned in accordance with R 30).

8.7 Following the mixture conditioning period specified in R 30, if the mixture is at the compaction temperature, proceed immediately with the compaction procedure as outlined in Section 9. If the compaction temperature is different from the mixture conditioning temperature used in accordance with R 30, place the mix in another oven at the compaction temperature for a brief time (maximum of 30 minutes) to achieve the required temperature.

8.7.1. The compaction temperature is the mid-point of the range of temperatures where the unaged binder has a kinematic viscosity of 280 ± 30 mm^2/s (approximately 0.28 ± 0.03 Pa·s) measured in accordance with T 316 (Note 4).

8.8 If loose HMA plant mix is used, the sample should be obtained in accordance with T 168. The mixture shall be brought to the compaction temperature range by careful, uniform heating in an oven immediately prior to molding.

9. Compaction Procedure

9.1 When the temperature of the HMA is five degrees above the compaction temperature as shown on the Mix Design Verification Report, remove the heated mold, base plate, and upper plate (if required) from the oven. Place the base plate and a paper disk in the bottom of the mold.

9.2 Remove the pan of HMA from the oven and in one motion invert the pan onto the construction paper, vinyl mat, etc. Quickly remove any material that remains in the pan and include it with the HMA sample to be compacted. Grasp opposing edges of the paper and roll them together to form the HMA into a cylindrical shape. Insert one end of the paper roll into the bottom of the compaction mold and remove the paper as the HMA slides into the mold. This process needs to be accomplished in approximately 60 seconds. Place the mixture into the mold in one lift. Care should be taken to avoid segregation in the mold. After all the mix is in the mold, level the mix, and place another paper disk and upper plate (if required) on top of the leveled materials.

9.3 Load the charged mold into the compactor and center the loading ram.

9.4 Apply a pressure of 600 ± 18 kPa on the specimen.

9.5 Apply a 1.16 ± 0.02° (20.2 ± 0.35 mrad) average internal angle, as appropriate, to the mold assembly, and begin.

9.6 Allow the compaction to proceed until the desired number of gyrations specified is reached and the gyratory mechanism shuts off.

9.7 Remove the angle from the mold assembly; retract the loading ram; remove the mold from the compactor (if required); and extrude the specimen from the mold.

Note 6: The specimens can be extruded from the mold immediately after compaction for most HMA. However, a cooling period of 5 to 10 minutes in front of a fan may be necessary before extruding some specimens to insure the specimens are not damaged.

9.8 Remove the paper disks from the top and bottom of the specimens.

Note 7: Before reusing the mold, place it in an oven for at least 5 minutes. The use of multiple molds will speed up the compaction process.

10. Density Procedure

10.3 When the specimen height is to be monitored, record the specimen height to the nearest 0.1 mm after each revolution.

11. Density Calculations

WSDOT has removed this section. Refer to WSDOT SOP 731.

12. Report

WSDOT has removed this section. Refer to WSDOT SOP 731.

13. Precision and Bias

See AASHTO T 312 for precision and bias.

Performance Exam Checklist

Determining Density of Hot Mix Asphalt (HMA) Specimens by Means of the SHRP Gyratory Compactor
FOP for AASHTO T 312

Participant Name _____ Exam Date _____

Procedure Element	Yes	No
1. The tester has a copy of the current procedure on hand?	☐	☐
2. All equipment is functioning according to the test procedure, and if required, has the current calibration/verification tags present?	☐	☐
3. Main power for compactor turned on for manufacturer's required warm-up period if applicable?	☐	☐
4. Angle, pressure, and number of gyrations set?	☐	☐
5. Bearing surfaces, rotating base surface, and rollers lubricated?	☐	☐
Preparation of Mixtures		
1. Is mixture 5°F above compaction temperature? If not, was mixture placed in an oven and brought up to 5°F above compaction temperature?	☐	☐
2. Mold and base plate heated for a minimum of 60 minutes in an oven at a temperature not to exceed 350°F?	☐	☐
Plant Mix – Loose mix brought to compaction temperature by uniform heating immediately prior to molding.		
1. Mold, base plate, and upper plate (if required) removed from oven and paper disk placed on bottom of mold?	☐	☐
2. Mixture placed into mold in one lift, mix leveled, and paper disk and upper plate (if required) placed on top of material?	☐	☐
3. Mold loaded into compactor and a pressure of 600 ± 18 kPa applied?	☐	☐
4. Angle of 1.16 ± 0.02° (20.2 ± 0.35 mrad) applied to the mold assembly and gyratory compaction started?	☐	☐
5. Compactor shuts off when appropriate gyration level is reached?	☐	☐
6. Mold removed and specimen extruded?	☐	☐
7. Paper disks removed?	☐	☐
8. If specimens are used for determination of volumetric properties, are the heights of the specimens 115 ± 5 mm?	☐	☐
9. All calculations performed correctly?	☐	☐

First Attempt: Pass ☐ Fail ☐ Second Attempt: Pass ☐ Fail ☐

Signature of Examiner _____

Comments:

Washington State Department of Transportation

WSDOT SOP 734

Sampling Hot Mix Asphalt After Compaction (Obtaining Cores)

1. Scope
   - This method describes the process for obtaining Hot Mix Asphalt test cores for Laboratory testing after compaction has been completed. Cores may range in size from 2 in to 12 in
2. Significance and Use
   - Samples obtained in accordance with the procedure given in this practice may be used for measuring pavement thickness, density, and acceptance testing.
   - When cores are used to determine nuclear gauge correlation, refer to WSDOT SOP 730.
   - When cores are used to determine pavement density, the Bulk Specific Gravity ($\mathbf{G_{mb}}$) is determined according to WSDOT FOP for AASHTO T 166.
   - When cores are used for forensic testing of HMA, refer to SOP 737 "Procedure for the Forensic Testing of HMA Field Cores" to determine the required number and size of cores.
3. Apparatus
   - Core Drill Machine –A Core Drill Machine of sufficient horsepower and depth to minimize distortion of the compacted cores of Hot Mix Asphalt.
   - Core Bit – The cutting edge of the core drill bit shall be of hardened steel or other suitable material with diamond chips embedded in the metal cutting edge or as recommended by the core drill bit manufacturer. Typically the core drill bit should have an inside diameter of 4" ± 0.25" (100 mm ± 6 mm) or 6" ± 0.25" (150 mm ± 6 mm), these core bit dimensions are agency preferred alternatives. Suitable larger and smaller diameter core bit alternatives shall be employed as required by the agency.
   - Tools – Core layers may be separated using a saw or other suitable device which provides a clean smooth surface and does not damage the core.
   - Retrieval Device (Optional) –The retrieval device used for removing core samples from holes must preserve the integrity of the core. The device may be a steel rod of suitable length and with a diameter that will fit into the space between the core and the pavement material. There may be a 90 degree bend at the top to form a handle and a 90 degree bend at the bottom, approximately 2 in (50 mm) long, forming a hook to assist in the retrieval of the core or other suitable device.
4. Safety

   This standard does not purport to address all of the safety concerns, associated with its use. It is the responsibility of the user of this standard operating procedure to establish a pre activity safety plan prior to use.

5. Test Site Location
   - The quantity of cores to be obtained shall be determined by the test procedure to be performed or agency requirements. Refer to WSDOT SOP 730 when taking correlation cores.
   - Determine the location of the core(s) as required by the agency.
6. Procedure
   - For freshly placed Hot Mix Asphalt materials, the core shall be taken when the material has had sufficient amount of time to cool to prevent damage to the core.
   - Pavement may be cooled to expedite the removal of the core by the following methods; water, ice water, ice, or dry ice or liquid nitrogen.
   - Place the coring machine and core bit over the selected location.
   - Keep the core bit perpendicular to the Hot Mix Asphalt surface during the coring process.

     Note 1: If any portion of the coring machine shifts during the operation, the core may break or distort.
   - Constant downward pressure should be applied on the core bit. Failure to apply constant pressure, or too much pressure, may cause the bit to bind or distort the core.
   - Continue the coring operation until the desired depth is achieved.
   - If necessary, use a retrieval device to remove the core.
   - Clearly identify the cores location and offset without causing damage (i.e., lumber crayon or grease pencil).

     Note 2: If the core is damaged to a point that it cannot be used for its intended purpose, a new core shall be obtained within 6 in of the original location.
7. Filling Core Holes
   - When necessary, the hole made from the coring operation shall be filled with a material that will not separate from the surrounding material. If a Hot Mix Asphalt is available and used, it shall be compacted into the hole. A fast set grout product may be used in lieu of a Hot Mix Asphalt. A black dye can be used to color the grout on wearing lifts.
8. Transporting Cores
   - Transport cores in a suitable container(s) that prevents damage from jarring, rolling, hitting together, and/or impact with any object.
   - Prevent cores from freezing or excessive heat above 130º F (54º C), during transport.

     Note 1: In extreme ambient temperature conditions, cores should be placed in water during transport.
   - If the core is damaged in transport to a point it can not be utilized for its intended purpose the core will not be used.
9. Separate The Layers
   - When necessary, separate the lifts or layers of pavement courses by using a water cooled saw to cut the core on the designated lift line or separate by other suitable methods that will not damage the lifts or layers to be tested.

     Note 4: Lift lines are often more visible by rolling the core on a flat surface and/or surface drying the core.

10. Length Determination

    Measure the thickness of the designated lift to the nearest 0.01' or ⅛" according to WSDOT Test Method 720.

11. Report

    Core information shall be reported on standard agency forms and should include the following information.

    - The date the cores were obtained
    - Paving date
    - Contract number
    - Project title
    - Location of test
    - The lift being evaluated
    - Type of material being evaluated
    - Mix Design Lab Number
    - Average thickness of each core (to the nearest 0.01' or ⅛ ")
    - Average Theoretical Maximum Density

Washington State Department of Transportation

WSDOT SOP 737

Procedure for the Forensic Testing of HMA Field Cores

1. Scope

   This method describes the process for testing Hot Mix Asphalt (HMA) field cores for asphalt content, gradation, volumetric analysis, Hamburg Wheel-Test, Indirect Tensile Strength and asphalt binder grade determination.

   1.1 This standard covers the procedural steps required for forensic testing of HMA field cores. Cores for forensic testing may range in size from 4-12 inches, although many specific test procedures require the core specimen to be six inches.

   1.2 The values stated in English units are to be regarded as the standard.

2. Significance And Use

   2.1 Approvals of the material for HMA are required prior to use per *Standard Specifications* Section 1-06.1.

   2.2 Samples obtained in accordance with this procedure, shall be obtained using WSDOT SOP 734, “Sampling Hot Mix Asphalt after Compaction (Obtaining Cores)”.

3. Reference Documents

   Refer to applicable test methods within this procedure.

4. Apparatus

   Refer to applicable test methods within this procedure.

5. Safety

   This standard does not purport to address all of the safety concerns, associated with its use.

   It is the responsibility of the user of this standard operating procedure to establish a pre activity safety plan prior to use.

6. Test Site Location

   The sample location and quantity of cores to be obtained shall be determined by the test procedure to be performed or agency requirements.

7. Procedures

Perform procedures as needed to obtain desired test results:

7.1 Obtain cores per WSDOT SOP 734, "Sampling Hot Mix Asphalt after Compaction". The required quantity and size of cores for each procedure shall be as shown in Table 1:

Procedure	Size	Number of Cores	Special Instructions
AASHTO T331, "Standard Method of Test for Bulk Specific Gravity (Gmb) Density of Compacted Hot Mix Asphalt (HMA) Using Automatic Vacuum Sealing Method"	4" or 6"	1	
WSDOT FOP for AASHTO T209, "Theoretical Maximum Specific Gravity Density of Hot Mix Asphalt Paving Mixtures"	4" or 6"	1	
WSDOT FOP for AASHTO T308, "Determining the Asphalt Binder Content of Hot Mix Asphalt by the Ignition Method"	6"	1	
WSDOT FOP for AASHTO T27/11, "MechanicalAnalysis of Extracted Aggregate"	6"	1	
WSDOT FOP for AASHTO T324, "Hamburg Wheel-Track Testing of Compacted Hot Mix Asphalt	6"	2	Obtain cores 6" apart for each determination
WSDOT FOP for ASTM D6931, "Standard Test Method for Indirect Tensile Strength of Bituminous Mixtures"	6"	3	Obtain cores 6" apart for each determination
AASHTO R29, "Standard Practice for Grading or Verifying the Performance Grade (PG) of an Asphalt Binder"	6"	2	Obtain cores 6" apart for each determination

Table 1

7.2 Remove moisture from cores per AASHTO PP 75, "Vacuum Drying Compacted Asphalt Specimens" or ASTM D7227, "Rapid Drying of Compacted Asphalt Specimens Using Vacuum Drying Apparatus".

7.3 Determine core density per AASHTO T331, "Standard Method of Test for Bulk Specific Gravity (Gmb) and Density of Compacted Hot Mix Asphalt (HMA) Using Automatic Vacuum Sealing Method", and WSDOT FOP for AASHTO T209, "Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt Paving Mixtures". Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt Paving Mixtures data from corresponding field testing may be substituted in lieu of testing core material.

Note 1: AASHTO T331 shall be performed prior to WSDOT FOP for AASHTO T209. Before performing T209 all shaved or bare aggregate surfaces either from coring, surface wear or handling of the specimen shall be removed and separated from the specimen by carefully picking them from the specimen using a sharp tipped tool. Care must be taken not to remove fully coated aggregate. Removed particles shall be discarded and not included with the WSDOT FOP for AASHTO T209 test specimen.

7.4 Determine asphalt content per WSDOT FOP for AASHTO T308, "Determining the Asphalt Binder Content of Hot Mix Asphalt by the Ignition Method", if an ignition furnace correction factor (IFCF) is available. Otherwise, perform AASHTO T164, "Standard Method of Test for Quantitative Extraction of Asphalt Binder from Hot Mix Asphalt".

7.5 Determine aggregate sieve analysis per WSDOT FOP for AASHTO T27/11, "Mechanical Analysis of Extracted Aggregate". WSDOT FOP for AASHTO T27/11 shall be performed following binder extraction per WSDOT FOP for AASHTO T308, "Determining the Asphalt Binder Content of Hot Mix Asphalt by the Ignition Method" or AASHTO T164, "Standard Method of Test for Quantitative Extraction of Asphalt Binder from Hot Mix Asphalt".

7.6 Determine rutting and moisture-susceptibility of HMA per WSDOT FOP for AASHTO T324, "Hamburg Wheel-Track Testing of Compacted Hot Mix Asphalt".

7.7 Determine Indirect Tensile Strength (IDT) per WSDOT FOP for ASTM D6931, "Standard Test Method for Indirect Tensile Strength of Bituminous Mixtures".

7.8 Determine grade of asphalt per AASHTO R29, "Standard Practice for Grading or Verifying the Performance Grade (PG) of an Asphalt Binder". Extract the binder in accordance with AASHTO R59, "Recovery of Asphalt Binder from Solution by Abson Method" or ASTM D1856, "Standard Test Method for Recovery of Asphalt from Solution by Abson Method", for each asphalt grade determination.

Note 2: Binder specimens for AASHTO R29, Standard Practice for Grading or Verifying the Performance Grade (PG) of an Asphalt Binder may be obtained in conjunction with AASHTO T164, Standard Method of Test for Quantitative Extraction of Asphalt Binder from Hot Mix Asphalt.

WSDOT FOP for ASTM C 1611

Standard Test Method for Slump Flow of Self-Consolidating Concrete

1. Scope

   1.1 This test method covers the determination of slump flow of self-consolidating concrete.

   1.2 The values stated in either inch-pound units or SI units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

   1.3 This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. (**Warning**: Fresh hydraulic cementitious mixtures are caustic and may cause chemical burns to skin and tissue upon prolonged exposure.)

   1.4 The text of this standard references notes and footnotes that provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

2. Referenced Documents

   2.1 ASTM Standards

   C 143/C 143M – Test Method for Slump of Hydraulic-Cement Concrete

   C 172 – Practice for Sampling Freshly Mixed Concrete

   C 173/C 173M – Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

   C 670 – Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials

   2.2 AASHTO Standards

   T 119M/T 119 – Standard Test Method for Slump of Hydraulic-Cement Concrete

   T 347 – Slump Flow of Self-Consolidating Concrete (SCC)

   2.3 WAQTC Standards

   TM 2 – Sampling Freshly Mixed Concrete

3. Terminology

3.1 Definitions of terms specific to this standard:

3.1.1 *halo, n* – An observed cement paste or mortar ring that has clearly separated from the coarse aggregate, around the outside circumference of concrete after flowing from the slump cone.

3.1.2 *spread, n* – The distance of lateral flow of concrete during the slump-flow test.

3.1.3 *stability, n* – The ability of a concrete mixture to resist segregation of the paste from the aggregates.

3.1.4 *viscosity, n* – Resistance of a material to flow under an applied shearing stress.

4. Summary of Test Method

4.1 A sample of freshly mixed concrete is placed in a mold shaped as the frustum of a cone. The concrete is placed in one lift without tamping or vibration. The mold is raised, and the concrete allowed to spread. After spreading ceases, two diameters of the concrete mass are measured in approximately orthogonal directions, and slump flow is the average of the two diameters.

5. Significance and Use

5.1 This test method provides a procedure to determine the slump flow of self-consolidating concrete in the laboratory or the field.

5.2 This test method is used to monitor the consistency of fresh, unhardened self-consolidating concrete and its unconfined flow potential.

5.3 It is difficult to produce self-consolidating concrete that is both flowable and nonsegregating using coarse aggregates larger than 1 in (25 mm). Therefore, this test method is considered applicable to self-consolidating concrete having coarse aggregate up to 1 in (25 mm) in size.

6. Apparatus

6.1 Mold – The mold used in this test method shall conform to that described in FOP for AASHTO T 119.

6.2 Base Plate – The base plate on which the mold rests shall be nonabsorbent, smooth, rigid, and have a minimum diameter of 36 in (915 mm).

Note 1: Field experience and results from the round robin test program have shown that base plates made from sealed/laminated plywood, acrylic plastic, or steel are suitable for performing this test.

6.3 Strike-off Bar – As described in FOP for WAQTC T 152.

7. Sample

7.1 The sample of concrete from which test specimens are made shall be representative of the entire batch. Sample in accordance with FOP for WAQTC TM 2.

8. Procedure

8.1 The slump-flow test shall be performed on a flat, level, nonabsorbent base plate. Position and shim the base plate so it is fully supported, flat, and level.

8.2 Filling the Mold – WSDOT requires the use of Procedure B.

8.2.1 Filling Procedure B (Inverted Mold) – Dampen and place the mold, with the smaller opening of the mold facing down, in the center of a flat, moistened base plate or concrete surface. Using a suitable container, fill the entire mold continuously (Note 2). The mold shall be held firmly in place during filling. Do not rod or tamp the SCC. Slightly overfill the mold.

Note 2: Filling the mold with concrete by using multiple scoops or by pouring from a bucket or similar container has been found to be acceptable.

8.3 Strike off the surface of the concrete level with the top of the mold by a sawing motion of the strike-off bar. Remove concrete from the area surrounding the base of the mold to preclude interference with the movement of the flowing concrete. Remove the mold from the concrete by raising it vertically. Raise the mold a distance of 9 ± 3 in (225 ± 75 mm) in 3 ± 1 seconds by a steady upward lift with no lateral or torsional motion. Complete the entire test from start of the filling through removal of the mold without interruption within an elapsed time of 2½ minutes.

8.4 Wait for the concrete to stop flowing and then measure the largest diameter of the resulting circular spread of concrete to the nearest ¼ in (5 mm). When a halo is observed in the resulting circular spread of concrete, it shall be included as part of the diameter of the concrete. Measure a second diameter of the circular spread at an angle approximately perpendicular to the original measured diameter.

8.5 If the measurement of the two diameters differs by more than 2 in (50 mm), the test is invalid and shall be repeated.

9. Calculation

9.1 Calculate the slump flow using Eq 1:

$$\text{Slump flow} = \frac{(d^1 + d^2)}{2}$$

where:

d^1 = the largest diameter of the circular spread of the concrete, and

d^2 = the circular spread of the concrete at an angle approximately perpendicular to d^1

9.2 Record the average of the two diameters to the nearest ¼ in (5 mm).

10. Report

    10.1 Report the slump flow to the nearest ¼ in (5 mm).

    10.2 Report results on concrete delivery ticket (i.e., Certificate of Compliance).

    10.3 The name of the tester who performed the field acceptance test is required on concrete delivery tickets containing test results.

11. Precision and Bias

    See ASTM C1611/C 1611M for precision and bias.

Performance Exam Checklist

WSDOT FOP for ASTM C 1611/C 1611M
Standard Test Method for Slump Flow of Self-Consolidating Concrete

Participant Name _____ Exam Date _____

Procedure Element	**Yes**	**No**
1. The tester has a copy of the current procedure on hand?	☐	☐
2. All equipment is functioning according to the test procedure, and if required, has the current calibration/verification tags present?	☐	☐
3. Sample was taken per WSDOT FOP for WAQTC TM 2?	☐	☐
4. Molds and base plate dampened and base plate is flat, level, and fully supported?	☐	☐
5. Mold filled completely (slightly overfilled)?	☐	☐
6. Mold struck off level with top opening?	☐	☐
7. Excess material removed from base plate and mold raised 9 ± 3 inches, in 3 ± 1 seconds?	☐	☐
8. After flow stabilized, measured largest diameter (including halo if necessary)?	☐	☐
9. Second measurement taken approximately perpendicular to first measurement?	☐	☐
10.. First and second measurements agree within 2″?	☐	☐
11. Slump flow was reported as an average of the two measurements?	☐	☐
12. Slump flow reported to the nearest ¼″?	☐	☐

First Attempt: Pass ☐ Fail ☐ Second Attempt: Pass ☐ Fail ☐

Signature of Examiner _____

Comments: