VERMONT AGENCY OF TRANSPORTATION

MATERIALS SAMPLING MANUAL

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INTRODUCTION

This manual has been prepared by the Agency's Materials Testing and Certification Section to familiarize the reader with the Agency's adopted practices for accepting materials. The Materials Sampling Manual (MSM) includes tiered testing requirements based on acceptable levels of risk and service identified for each level. The material and sampling requirements are different for each level. These requirements are outlined in level-specific materials sampling and testing frequency tables presented later in this document.

Projects are assigned to a particular level based on the factors outlined in Section 4 of the Agency's Quality Assurance Program (QAP). For the purposes of this manual, the terms Resident Engineer and District Transportation Administrator will be synonymous for projects under the respective authority of each**.** The Resident Engineer is responsible for ensuring that their project's material acceptance requirements are met based on the material sampling and testing frequency tables (Tables 1, 2, and 3) and the Pay Item and Certification Quick Reference (Appendix A).

The Resident Engineer's decision regarding the acceptability of a material for a project will require consideration of the following; material certifications, visual inspections, and material test results. In addition, the status of a given product, material, material source, material producer, or contractor on a pre-approval list (such as products listed on the Agency's Approved Products List, or contractors on the Umbrella Certification Program) will also require consideration in the Acceptance decision.

It is the responsibility of the Resident Engineer to inform the Materials Testing and Certifications Section of any change in design or authorization for material specification changes.

For the purposes of this document the definitions of the QAP apply, see Section 3.0 of the QAP. The QAP and other Agency documents referenced within this text are available on the Agency website; http://vtrans.vermont.gov/highway/construct-material.

CERTIFICATION TO FHWA

Upon final acceptance of any Federal-aid highway projects, the Materials and Certifications Manager is responsible for preparing, on behalf of the Vermont Secretary of Transportation, a report that states: "The results of the tests used in the acceptance program indicate that the materials incorporated in the construction work, and the construction operations controlled by sampling and testing, were in conformity with the approved plans and specifications." Any exceptions to the contract provisions must be noted and explained. Requirements and regulatory information are contained in Title 23 Code of Federal Regulations (23CFR), Part 637, Subpart B.

It is the responsibility of the Resident Engineer to provide an explanation for any materials permanently incorporated into the work that are not in conformance with the contract provisions. Explanations must include the material involved, quantity involved, reason for nonconformance with specifications, and state why the material was incorporated into the project.

APPROVED SOURCE LISTS

Some materials are required to be obtained from suppliers or producers that have previously demonstrated conformance with the Agency's Quality Assurance Program and specification requirements. These approved source lists are maintained by the Materials Testing and Certification section and are discussed below.

1. APPROVED AGGREGATE SOURCE LIST

The 'Approved Aggregate Source List' is a tool used to determine which aggregate production facilities have been deemed Acceptable for use on Agency projects. The list includes aggregates produced for unbound, Portland cement concrete, and bituminous concrete applications. The 'Approved Aggregate Source List', applicable forms, and detailed information regarding its use, can be found on the Geotechnical Engineering section website.

2. APPROVED CEMENTITIOUS SOURCE LIST

The 'Approved Cementitious Source List' is a tool used to determine which cementitious production facilities and cementitious materials have been Approved for use on Agency projects. The list is populated with cementitious materials that have successfully completed annual evaluation and demonstrated conformance with the applicable specifications. The 'Approved Cementitious Source List', applicable forms, and detailed information regarding its use, can be found on the Materials Testing and Certification website.

3. APPROVED CONCRETE PRODUCER LIST

The 'Approved Concrete Producer List' is a tool used to determine which ready-mix concrete and precast concrete production facilities have been approved for use on Agency projects. The list is populated with facilities that have undergone annual inspection and satisfied the requirements of the Qualified Laboratory Program and applicable specifications for the materials being produced. The 'Approved Concrete Producer List', applicable forms, and detailed information regarding its use, can be found on the Materials Testing and Certification website.

4. APPROVED BITUMINOUS CONCRETE PRODUCER LIST

The 'Approved Bituminous Concrete Producer List' is a tool used to determine which bituminous concrete production facilities have been approved for use on Agency projects. The list is populated with facilities that have undergone annual inspection and satisfied the requirements of the Qualified Laboratory Program and applicable specifications for the materials being produced. The 'Approved Bituminous Concrete Producer List', applicable forms, and detailed information regarding its use, can be found on the Materials Testing and Certification website.

5. APPROVED PERFORMANCE-GRADED BINDER PRODUCER LIST

The 'Approved Performance-Graded Binder Producer List' is a list of performance-graded binder production facilities that have been Approved for use on Agency projects. The list is populated with suppliers and grades that have successfully completed annual evaluation and demonstrated conformance with the applicable specifications. The 'Approved Performance-Graded Binder Producer List', applicable forms, and detailed information regarding its use, can be found on the Materials Testing and Certification website.

6. UMBRELLA CERTIFICATION PROGRAM (UCP)

The 'Umbrella Certification Program' is a list of companies that have become an approved supplier for specific materials as defined by the Agency. The UCP is not intended to replace, but rather work in conjunction with, other methods employed by VTrans to certify materials. The 'Umbrella Certification Program', applicable forms, and detailed information regarding its use, can be found on the Materials Testing and Certification website.

MATERIAL ACCEPTANCE

As discussed in the introduction, there are several methods of material acceptance employed by the Agency. Each of these material acceptance tools maintained by the Materials Testing and Certification section are discussed below, including how to determine for which pay items each are to be applied, and where to find the necessary information and forms.

1. MATERIAL SAMPLING AND TESTING

The minimum material sampling frequency for materials designated for testing is listed in the level-specific 'Material Sampling and Testing Frequency Tables' (Table 1, 2, and 3) below.

VTrans' Material specifications reference material standards and test methods published by the American Association of State Highway and Transportation Officials (AASHTO) and the American Society for Testing and Materials (ASTM). The proper sampling and testing of materials being incorporated into Agency projects is required to determine whether or not the materials' properties conform to the Agency's contract requirements.

Each sample must be representative of the material used. Random samples are required whenever feasible. The Resident Engineer is responsible for maintaining a summary of quantities so that the total amount of sampled material represents the final project quantity for any given item. Personnel from the Agency's Central Laboratory located in Berlin, VT, are available to assist other Agency personnel with any questions or concerns regarding procedures for sampling or processing of samples. Contact information for these staff is available on the Agency website.

The minimum sample size is determined by the tests to be performed. The sample size listed should be large enough to accommodate re-testing, if required. Not all samples are transported to the Agency's Central Laboratory; some materials are transported to the Agency's Regional Laboratories. Resident Engineers are responsible for the timely delivery of applicable samples to the Central Laboratory.

Sample identification tags and cards will be provided by the Materials Testing and Certifications section. Sample tags and cards should be completed **with all the indicated information** and attached to the sample container immediately after the sample is taken. Sample tags and cards should be attached in a manner which will prevent their loss or damage during handling and transport. Examples of properly filled out sample cards for commonly sampled materials are included later in this document. As an alternative, Sitemanager labels can be printed and affixed to the sample in lieu of the sample tag.

When samples consist of more than one container, each container will have an attached sample tag. With the advent of the Site Manager software program it is increasingly important for the Resident Engineer to include the Site Manager line item on the sample tag or card. If this information is not included

in the sample identification, it could lead to material testing and reporting delays. If there is not a designated location on the sample card or tag itself for this information, then the Resident Engineer shall make sure that it is documented in the upper right hand corner on the front face of the sample card or tag.

2. MINOR QUANTITIES

For pay items that are designated as requiring sampling and testing, every effort should be made to acquire at least one sample during the time of construction. Circumstances in the construction operation, the quantity of the item used, and the application in which a material is used are important considerations before any quantity should be considered as minor.

The minor quantity threshold is defined for each pay item in the sampling and testing frequency tables presented below (Table 1 and Table 2). These quantity thresholds are based on total project quantity for a given pay item, not the quantity being placed at one time. Materials which meet the criteria for minor quantities shall be from known, reliable sources, perform satisfactorily, and meet the requirements for the purpose intended.

Minor quantities of materials may be accepted without sampling and testing, except as noted below. The acceptance of a minor quantity is the sole responsibility of the Resident Engineer. The Resident Engineer must provide written documentation on the “Minor Quantity Declaration Form”. This form shall be submitted to the Materials Acceptance Unit as the basis for declaring a quantity a "minor quantity”, prior to incorporating the material into the project.

If plant inspection/testing personnel are not available for small project quantities the following condition applies:

1) The Resident Engineer may waive plant inspection/testing requirements for Hot Mix Asphalt (HMA) from approved HMA plants with the exception that box samples (as appropriate to the material) are obtained and transported to the Central Laboratory for further evaluation. In these instances, testing of P.G. Binder may also be waived.

3. APPROVED NON-DURABLE PAVEMENT MARKING BATCH LIST (ANDPMBL)

The ‘Approved Non-Durable Pavement Marking Batch List’ is a tool used to accept certain types of pavement marking by documenting the use of paint batches that have been previously tested and approved by the Agency. The materials for which this acceptance tool may be applied are listed in the Pay Item and Certification Quick Reference (Appendix A). The ‘ANDPMBL’ list, applicable forms, and detailed information regarding its use, can be found on the Materials Testing and Certification website.

4. APPROVED PRODUCTS LIST (APL)

The ‘Approved Products List’ is a tool used to determine which products have been Approved for use on Agency projects. The materials for which this acceptance tool may be applied are listed in the Pay Item and Certification Quick Reference (Appendix A). The ‘Approved Products List’, applicable forms, and detailed information regarding its use, can be found on the Materials Testing and Certification website.

5. MATERIAL CERTIFICATION

A list of materials requiring certification, and certification forms for a given project, will be produced and made available by the Materials Acceptance Unit for each new project.

It is the responsibility of the Resident Engineer to ensure that the appropriate certifications are obtained by the Contractor and submitted to the Materials Acceptance Unit for audit **prior** to incorporating the materials into the project. See the Pay Item and Certification Quick Reference (Appendix A) for the list of pay items and materials requiring certification. It shall be the responsibility of the Resident Engineer to verify that the material certification represents the materials incorporated into the project. No payment shall be made on materials requiring certification until such material certifications have been audited and approved.

At the Engineer's discretion, testing of any material for which a certification is required may be performed either at the point of manufacture or after delivery to the site of the work. In such cases, the results of the tests shall govern the acceptance or rejection of the material tested.

When Agency approval is given for Working Drawings under the requirements of Section 105 and the referenced drawings or project Special Provisions have identified a component of an item by a specific product name and/or number, the Engineer may waive all or part of any certification or testing requirements for that particular product.

For permanently incorporated steel and iron materials, the following requirements shall apply:

(1) To comply with Buy America provisions, a manufacturer must certify that all manufacturing processes, including any coating application, occurred in the United States. Coating includes all processes which protect or enhance the value of the material to which the coating is applied.

(2) To identify a chain-of-custody documentation trail that identifies the product as one that meets the Buy America provisions, each supplier or fabricator involved in the manufacturing processes of a product will be required to include in their certification a statement that each process performed by them which alters the physical form or shape or changes its chemical composition was entirely performed in the United States.

(3) Allowable exceptions to the Buy America provisions may include the following conditions:

a. The amount of steel or iron materials do not meet the minimum threshold of $2,500.00 (the total amount of iron or steel products as delivered to the project) or 0.1% of the total contract amount, whichever is greater.

b. Buy America waivers are granted by FHWA on a project-by-project basis if the application of Buy America provision would be inconsistent with the public interest, or steel and iron materials/products are not produced in the United States in sufficient and reasonably available quantities which are of a satisfactory quality. If requesting a Buy America waiver, account for a significant lead-time.

Types of Certifications. Unless otherwise specified, certifications shall be prepared by the manufacturer for products delivered to the project and shall be one of the following types:

(1) Type A. A Type A Certification shall certify that the component materials and finished products have been tested by means identified in the Manufacturer's Quality Controls and the results conform to all requirements of the Agency, the State, pertinent Plans, Special Provisions, and Specifications for the Contract Item.

(2) Type D. A Type D Certification shall consist of a Type A Certification accompanied by a Certificate of Analysis (C of A) showing actual chemical and physical analysis of material used in the manufacture of products and a Certificate of Compliance (C of C) demonstrating that the properties of the finished product meet applicable specifications.

Advance Certification List (ACL). Manufacturers of materials requiring a Type A Certification may submit their certifications annually at the beginning of each calendar year and, if approved, their products will be included on a list of materials with advance certification. Materials that are included on the Advance Certification List will not require separate certification for each project. The Agency reserves the right to remove any manufactured product from the Advance Certification List at any time.

All project related certification documents to be audited by the Materials Acceptance Unit shall be submitted through DocExpress.

Small Quantity Certification Waiver (SQCW). At the discretion of the Engineer, certification requirements may be waived for materials with small quantities, if the material is not directly associated with the safety of a structure or roadway. A small quantity is a quantity where the total quantity of a material installed on a project has a value of $5,000 or less. Materials where a SQCW has been submitted must still meet or exceed the specified material requirements.

SAMPLING METHODS

1. Random or stratified random sampling is defined as a sampling procedure whereby any sample in a sublot has an equal probability of being selected. The method of obtaining a random sample is specified in ASTM D 3665.
2. Selective sampling is a non-random procedure where a sample is obtained for informational purposes
3. A split sample is a single material sample that has been divided into two or more portions.
4. Replicate samples are two or more material samples taken at the same location and time.

TYPES OF SAMPLES

Sampling and testing is classified as one of five different types:

1. Acceptance (random or stratified random)

2. Quality Control, including process control (random or selective)
3. Independent assurance (split, replicate)
4. Investigative (selective)
5. Verification (split, replicate or selective)

1. ACCEPTANCE SAMPLING AND TESTING

Acceptance sampling and testing is defined as sampling, testing, and the assessment of test results to determine if the materials and workmanship represented by those test results are in conformity with the requirements of the approved plans and specifications. The Resident Engineer is responsible for making the acceptance decision by determining if the material and workmanship being incorporated into the project are in conformity with the approved plans and specifications.

It is the intent of 23 CFR 637.205 (e) that all acceptance sampling performed on Federal-Aid Highway projects shall be obtained randomly. The Agency recognizes that there may be practical limitations to achieving this goal. Therefore, the Agency will employ practical measures to assure adequate numbers of samples are taken.

Acceptance samples will be obtained and tested by qualified Agency personnel or representatives. Laboratories where acceptance testing is performed must be a qualified laboratory as outlined in the Agency's Qualified Laboratory Program. A list of Qualified Laboratories will be made available on the Agency website. The requirements for personnel and laboratory qualifications are defined in the Agency's Quality Assurance Program (QAP), Qualified Laboratory Program (QLP), and Qualified Technician Program (QTP) and are available on the Agency website.

Re-sampling is warranted only if it is determined by the Agency that the original sample was not representative of the material being incorporated into the work.

Re-testing is warranted only if it is determined by the Agency that the test results were not obtained in accordance with the requirements of the QAP.

Proper sampling and testing procedures are outlined in the material sampling frequency tables (Tables 1, 2, and 3).

2. QUALITY CONTROL SAMPLING AND TESTING

Quality control, including process control, sampling and testing is defined as sampling and testing performed by the *Contractor*, *Producer*, or *Manufacturer* in the manufacturing, production, transport and placement of materials to ensure the materials and workmanship incorporated into the project are in conformity with the requirements of the approved plans and specifications. Acceptance sampling and testing shall not be used for process or quality control purposes.

Quality control sample test results shall not be used as the sole basis for making the acceptance decision.

3. INDEPENDENT ASSURANCE SAMPLES

Independent Assurance (IA) sampling and testing is defined as system-based sampling and testing that is conducted by the Independent Assurance (IA) Unit to provide an unbiased and independent

evaluation of the qualified sampling and testing personnel and the testing equipment used in the Acceptance program.

IA comparison samples shall be split or replicate samples obtained by IA technicians who have no direct responsibility for the acceptance samples or test results being compared.

Independent Assurance sample test results shall not be evaluated as part of the acceptance decision.

4. INVESTIGATIVE SAMPLES

Investigative samples are selective samples obtained by qualified Agency personnel or representatives. These samples are typically obtained for research purposes, forensic purposes, or for other investigative or informational purposes.

Investigative sample test results shall not be evaluated as part of the acceptance decision.

5. VERIFICATION SAMPLES

Verification samples are non-random field samples which, in the opinion of the sampler, represent the quality of the material or an item of construction.

Verification sampling and testing is performed by the Agency to verify the quality of the material or veracity of the *material certification,* and may be evaluated as part of the acceptance decision.

MATERIAL SAMPLING FREQUENCY TABLES

As explained in the introduction, this manual has been prepared by the Agency's Materials Testing and Certifications section to familiarize the reader with the Agency's adopted practices for sampling, testing, and independently comparing materials that may be incorporated into Agency projects. The Materials Sampling Manual (MSM) includes tiered testing requirements that coincide with the Quality Assurance Program project inspection levels as detailed in Section 4.0 of the Quality Assurance Program document. Sampling requirements for a given material may be different for each Quality Assurance Program project inspection level, in order to reflect the potential risk associated with each of these project inspection levels.

The Resident Engineer is responsible for ensuring that their project's sampling and testing requirements are met based on the material sampling and testing frequency tables. Minimum sampling requirements for acceptance are given in the material sampling frequency tables presented below. The sampling frequency for a given material is intended to give general guidance but may be increased for specific project needs. **Sampling frequency should be increased whenever there is uncertainty regarding the quality of the material or workmanship.**

It is to be interpreted in the following tables (Table 1, 2, and 3) that all sampling frequencies indicated are applicable per project. For example, '1/400 CY' should be interpreted to mean '1/400 CY/project'.

Table 1: Material Sampling Manual Project Levels 1 & 2

Type of Construction	Pay Item Number	Pay Item Name	Materials Specification Number	Material Name	Test	Minor Quantity Threshold	Minimum Acceptance Sampling Frequency **(per project)**	Acceptance Sampling Location	Sample Size [2]	Procedures: Sampling	Procedures: Testing [1]
Embankments	203.30	Earth Borrow	703.02	Earth Borrow	Moisture-Density		1/Soil type	Stockpile	50	R 90	T 99
					Moisture	< 300 CY	1/2000 CY	In place	2		T 255 or T 310
					Density	< 300 CY	1/2000 CY	In place			T 191 or T 310
	203.31	Sand Borrow	703.03	Sand Borrow and Cushion	Gradation	< 300 CY	1/3000 CY	In place	22	R 90	T 27, T 11
					Moisture-Density		1/10,000 CY/Source	Stockpile	50	R 90	T 99
					Moisture	< 300 CY	1/2000 CY	In place	20		T 255 or T 310
					Density	< 300 CY	1/2000 CY	In place			T 191 or T 310
	203.32	Granular Borrow	703.04	Granular Borrow	Gradation	< 300 CY	1/3000 CY	In place	22	R 90	T 27, T 11
					Moisture-Density		1/10,000 CY/Source	Stockpile	50	R 90	T 99
					Moisture	< 300 CY	1/2000 CY	In place	2		T 255 or T 310
					Density	< 300 CY	1/2000 CY	In place			T 191 or T 310
	203.35	Gravel Backfill for Slope Stabilization	704.07	Gravel Backfill for Slope Stabilization	Gradation	< 300 CY	1/5000 CY	In place	See note 2	R 90	T 27, T 11
					Moisture-Density		1/10,000 CY/Source	Stockpile	50	R 90	T 99
					Moisture	< 300 CY	1/5000 CY	In place	20		T 255 or T 310
					Density	< 300 CY	1/5000 CY	In place			T 191 or T 310
Excavation for Structures	204.30	Granular Backfill for Structures	704.08	Granular Backfill for Structures	Gradation	< 300 CY	1/3000 CY	In place	See note 2	R 90	T 27, T 11
					Moisture-Density		1/10,000 CY/Source	Stockpile	250	R 90	T 99
					Moisture	< 300 CY	1/500 CY	In place	30		T 255 or T 310
					Density	< 300 CY	1/500 CY	In place			T 191 or T 310
			704.05B	Crushed Gravel for Subbase, Fine Graded	Gradation	< 300 CY	1/3000 CY	In place	See note 2	R 90	T 27, T 11
Subbase	301.15	Subbase of Gravel	704.04	Gravel for Subbase	Gradation	< 300 CY	1/3000 CY	Stockpile on project	See note 2	R 90	T 27, T 11
					Moisture-Density		1/10,000 CY/Source[12]	Stockpile	250	R 90	T 180
					Moisture	< 300 CY	1/2000 CY	In place			T 310
					Density	< 300 CY	1/2000 CY	In place			T 310
	301.25	Subbase of Crushed Gravel, Coarse Graded	704.05A	Crushed Gravel for Subbase, Coarse Graded	Gradation	< 300 CY/650 TONS	1/3000 CY/6500 TONS	Stockpile on project	See note 2	R 90	T 27, T 11
					Moisture-Density		1/10,000 CY/Source[12]	Stockpile	250	R 90	T 180
					Moisture	< 300 CY/650 TONS	1/1000 CY/2150 TONS	In place			T 310
					Density	< 300 CY/650 TONS	1/1000 CY/2150 TONS	In place			T 310
	301.26 301.28	Subbase of Crushed Gravel, Fine Graded	704.05B	Crushed Gravel for Subbase, Fine Graded	Gradation	< 300 CY/650 TONS	1/3000 CY/6500 TONS	Stockpile on project	See note 2	R 90	T 27, T 11
					Moisture-Density		1/10,000 CY/Source[12]	Stockpile	250	R 90	T 180
					Moisture	< 300 CY/650 TONS	1/1000 CY/2150 TONS	In place			T 310
					Density	< 300 CY/650 TONS	1/1000 CY/2150 TONS	In place			T 310
	301.35	Subbase of Dense Graded Crushed Stone	704.06	Dense Graded Crushed Stone for Subbase	Gradation	< 300 CY	1/3000 CY	Stockpile on project	See note 2	R 90	T 27, T 11
					Moisture-Density		1/10,000 CY/Source[12]	Stockpile	250	R 90	T 180
					Moisture	< 300 CY	1/1000 CY	In place			T 310
					Density	< 300 CY	1/1000 CY	In place			T 310
	301.40	Subbase, RAP	301.02	Subbase, RAP	Gradation	< 500 TONS	1/2000 TONS	In place	See note 2	R 90	T 27, T 11
RSB	310.20	Full Depth Reclamation (FDR)	310.02	Reclaimed Base (2011) Full Depth Reclamation (2018)	Gradation		1/2500 sy for first 10,000 sy 1/10,000 sy thereafter	In place	165	R 90	T 27
					Moisture-Density		1/10,000 CY/Source[12]	Stockpile	50	R 90	T 180
					Moisture		1/4000 sy for first 10,000 sy 1/10,000 sy thereafter	In place			T 310
					Density		1/4000 sy for first 10,000 sy 1/10,000 sy thereafter	In place			T 310
Aggregate Surface Course	401.10	Aggregate Surface Course	704.12 (2011) 704.12 (a) (2018)	Aggregate for Surface Course and Shoulders (2011) Aggregate Surface Course (2018)	Gradation	< 300 CY	1/5000 CY	In place	100	R 90	T 27, T 11
					Moisture-Density		1/10,000 CY/Source	Stockpile	50	R 90	T 180
					Moisture	< 300 CY	1/5000 CY	In place			T 255 or T 310
					Density	< 300 CY	1/5000 CY	In place			T 191 or T 310
Aggregate Shoulders	402.12	Aggregate Shoulders	704.12 (2011) 704.12 (b) (2018)	Aggregate for Surface Course and Shoulders (2011) Aggregate for Shoulders (2018)	Gradation	< 300 CY	1/5000 CY	In place	100	R 90	T 27, T 11
	402.13	Aggregate Shoulders, RAP	402.02 (2011) 704.12 (b) (2018)	Aggregate for Shoulders (2018)	Gradation	< 300 CY	1/5000 CY	In place	100	R 90	T 27, T 11
	403.12	Aggregate Shoulders, RAP with RAS (2018)	704.12 (b) (2018)	Aggregate for Shoulders (2018)	Gradation	< 300 CY	1/5000 CY	In place	100	R 90	T 27, T 11
In-Place Recycling	415.20	Cold Mixed Recycled Bituminous Pavement	415.02	Cold Mixed Recycled Bituminous Pavement	Density		1/2000ft/lane/lift	In place			T 310 or ASTM D7830
	415.25	Emulsified Asphalt, Cold Mixed	415.02	Emulsified Asphalt	Distillation, Penetration @ 25 °C	< 40 CWT	1/day/production lot	Distributor Truck on Project	1 Quart	R66	T 49, T 59

Table 1: Material Sampling Manual Project Levels 1 & 2

Type of Construction	Pay Item Number	Pay Item Name	Materials Specification Number	Material Name	Test	Minor Quantity Threshold	Minimum Acceptance Sampling Frequency **(per project)**	Acceptance Sampling Location	Sample Size [2]	Procedures: Sampling	Procedures: Testing [1]
Surface Treatment Materials	404.65	Emulsified Asphalt	702.04	Emulsified Asphalt	Distillation, Penetration @ 25 °C	< 40 CWT	1/ 200 CWT	Distibutor Truck on Project	1 Quart	R 66	T 49, T 59
Bituminous Concrete Pavement Mainline Paving and Shoulders (Method Spec Acceptance)	406.25 406.27	Marshall Bituminous Concrete Pavement (Method Spec) Medium Duty Marshall Bituminous Concrete Pavement (Method Spec)	406.03	Bituminous Concrete Pavement	Slip AC Content	< 100 TONS	1/500 TONS for first 1,000 TONS, 1/1,000 TONS thereafter	Truck Batch Slip	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 100 TONS	1/500 TONS for first 1,000 TONS, 1/1,000 TONS thereafter	Truck @ Plant or on Project[11]		R 97	T 308, T 30
					Air voids, VMA	< 100 TONS	1/500 TONS for first 1,000 TONS, 1/1,000 TONS	Truck @ Plant or on Project[11]		R 97	T 166, T 209, T 269, PP 19
					Mixing Temperature	< 100 TONS	1/500 TONS for first 1,000 TONS, 1/1,000 TONS thereafter	Truck @ Plant or on Project[11]			
					Density-mat		Project less than 0.5 miles take 4 cores per day production. Project greater than 0.5 miles, 1 core per .5 miles, minimum of 6 cores per day.	In place	6" ID Core	R 67	T 166
					Density-joint		See specifications	In place	6" ID core	R 67	T 166
					Surface Tolerance		Project less than .5 miles, use straightedge only Project greater than .5 miles, use Road Surface Profiler 1/project, Wearing Surface only	In place	N/A		328 or Straight Edge
			702.02	Performance-Graded Asphalt Binder	Unit weight, Flashpoint, Rotational Viscosity, DSR - Original, Effect of heating mass, DSR - RTFO, DSR - PAV, Creep stiffness, m Value	< 200 TONS of Mix	1/1,500 TONS of Mix[13]	In-line @ plant	2 Quarts	R 66	T 48, T 228, T 240, T 313, T 315, T 316
			702.04	Emulsified Asphalt	Distillation, Penetration @ 25 °C	< 40 CWT	1/ 200 CWT	Distibutor Truck on Project	1 Quart	R 66	T 49, T 59
	490.30 (2011) 406.35 406.36 (2018)	Superpave Bituminous Concrete Pavement (Method Spec) (2011) Superpave Bituminous Concrete Pavement (Method Spec) Superpave Bituminous Concrete Pavement, Type IVB (Method Spec) (2018)	490.03	Superpave Bituminous Concrete Pavement	Slip AC Content	< 100 TONS	1/500 TONS for first 1,000 TONS, 1/1,000 TONS thereafter	Truck Batch Slip	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 100 TONS	1/500 TONS for first 1,000 TONS, 1/1,000 TONS thereafter	Truck @ Plant or on Project[11]		R 97	T 308, T 30
					Air voids, VMA	< 100 TONS	1/500 TONS for first 1,000 TONS, 1/1,000 TONS thereafter	Truck @ Plant or on Project[11]		R 97	T 312,T 166,T 209,T 269, R 35
					Mixing Temperature	< 100 TONS	1/500 TONS for first 1,000 TONS, 1/1,000 TONS thereafter	Truck @ Plant or on Project[11]			
					Density-mat		Project less than 0.5 miles take 4 cores per day production. Project greater than 0.5 miles, 1 core per .5 miles, minimum of 6 cores per day.	In place	6" ID core	R 67	T 166
					Density-joint		See specifications	In-place	6" ID core	R 67	T 166
					Surface Tolerance		Project less than .5 miles, use straightedge only Project greater than .5 miles, use Road Surface Profiler 1/project, Wearing Surface only	In place	N/A		328 or Straight Edge
			702.02	Performance-Graded Asphalt Binder	Unit weight, Flashpoint, Rotational Viscosity, DSR - Original, Effect of heating mass, DSR - RTFO, DSR - PAV, Creep stiffness, m Value	< 200 TONS of Mix	1/1,500 TONS of Mix[13]	In-line @ plant	2 Quarts	R 66	T 48, T 228, T 240, T 313, T 315, T 316
			702.04	Emulsified Asphalt	Distillation, Penetration @ 25 °C	< 40 CWT	1/ 200 CWT	Distibutor Truck on Project	1 Quart	R 66	T 49, T 59
	407.15	Bonded Wearing Course	407.03	Bonded Wearing Course	Slip AC Content	< 100 TONS	1/500 TONS	Truck Batch Slip	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 100 TONS	1/500 TONS	Truck @ Plant or on Project[11]		R 97	T 308, T 30
					Mixing Temperature	< 100 TONS	1/500 TONS	Truck @ Plant or on Project[11]			
			702.02	Performance-Graded Asphalt Binder	Unit weight, Flashpoint, Rotational Viscosity, DSR - Original, Effect of heating mass, DSR - RTFO, DSR - PAV, Creep stiffness, m Value	< 200 TONS of Mix	1/1,500 TONS of Mix[13]	In-line @ plant	2 Quarts	R 66	T 48, T 228, T 240, T 313, T 315, T 316
	407.16	Polymer-modified Emulsified Asphalt	702.04 (c)	Polymer-modified Emulsified Asphalt	Distillation, Penetration @ 25 °C	< 40 CWT	1/day/production lot	Distibutor Truck on Project	1 Quart	R 66	T 49, T 59

Table 1: Material Sampling Manual Project Levels 1 & 2

Type of Construction	Pay Item Number	Pay Item Name	Materials Specification Number	Material Name	Test	Minor Quantity Threshold	Minimum Acceptance Sampling Frequency **(per project)**	Acceptance Sampling Location	Sample Size [2]	Procedures: Sampling	Procedures: Testing [1]
Bituminous Concrete Pavement Mainline Paving and Shoulders (QA Acceptance)	406.25 406.27	Marshall Bituminous Concrete Pavement (QA) Medium Duty Marshall Bituminous Concrete Pavement (QA)	406.03	Bituminous Concrete Pavement	Slip AC Content	< 100 TONS	Stratified Random Sampling, 1/500 TON sublot per mix design.	Truck Batch Slip	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 100 TONS	Stratified Random Sampling, 1/500 TON sublot per mix design.	Truck @ Plant or on Project[11]		R 97	T 308, T 30
					Air voids, VMA	< 100 TONS	Stratified Random Sampling, 1/500 TON sublot per mix design.	Truck @ Plant or on Project[11]		R 97	T 166, T 209, T 269, PP 19
					Mixing Temperature	< 100 TONS	Stratified Random Sampling, 1/500 TON sublot per mix design.	Truck @ Plant or on Project[11]			
					Density-mat		Project less than 0.5 miles take 4 cores per day production. Project greater than 0.5 miles, 1 core per .5 miles, minimum of 6 cores per day.	In place	6" ID Core	R 67	T 166
					Density-joint		See specifications	In place	6" ID core	R 67	T 166
					Surface Tolerance		Project less than .5 miles, use straightedge only Project greater than .5 miles, use Road Surface Profiler 1/project, Wearing Surface only	In place	N/A		M 328 or Straight Edge
			702.02	Performance-Graded Asphalt Binder	Unit weight, Flashpoint, Rotational Viscosity, DSR - Original, Effect of heating mass, DSR - RTFO, DSR - PAV, Creep stiffness, m Value	< 200 TONS of Mix	1/1,500 TONS of Mix[13]	In-line @ plant	2 Quarts	R 66	T 48, T 228, T 240, T 313, T 315, T 316
			702.04	Emulsified Asphalt	Distillation, Penetration @ 25 °C	< 40 CWT	1/ 200 CWT	Distibutor Truck on Project	1 Quart	R 66	T 49, T 59
	490.30 (2011) 406.35 406.36 (2018)	Superpave Bituminous Concrete Pavement (QA) (2011) Superpave Bituminous Concrete Pavement (QA) Superpave Bituminous Concrete Pavement, Type IVB (QA) (2018)	490.03	Superpave Bituminous Concrete Pavement	Slip AC Content	< 100 TONS	Stratified Random Sampling, 1/500 TON sublot per mix design.	Truck Batch Slip	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 100 TONS	Stratified Random Sampling, 1/500 TON sublot per mix design.	Truck @ Plant or on Project[11]		R 97	T 308, T 30
					Air voids, VMA	< 100 TONS	Stratified Random Sampling, 1/500 TON sublot per mix design.	Truck @ Plant or on Project[11]		R 97	T 312,T 166,T 209,T 269, R 35
					Mixing Temperature	< 100 TONS	Stratified Random Sampling, 1/500 TON sublot per mix design.	Truck @ Plant or on Project[11]			
					Density-mat	R	Project less than 0.5 miles take 4 cores per day production. Project greater than 0.5 miles, 1 core per .5 miles, minimum of 6 cores per day.	In place	6" ID core	R 67	T 166
					Density-joint		See specifications	In-place	6" ID core	R 67	T 166
					Surface Tolerance		Project less than .5 miles, use straightedge only Project greater than .5 miles, use Road Surface Profiler 1/project, Wearing Surface only	In place	N/A		M 328 or Straight Edge
			702.02	Performance-Graded Asphalt Binder	Unit weight, Flashpoint, Rotational Viscosity, DSR - Original, Effect of heating mass, DSR - RTFO, DSR - PAV, Creep stiffness, m Value	< 200 TONS of Mix	1/1,500 TONS of Mix[13]	In-line @ plant	2 Quarts	R 66	T 48, T 228, T 240, T 313, T 315, T 316
			702.04	Emulsified Asphalt	Distillation, Penetration @ 25 °C	< 40 CWT	1/ 200 CWT	Distibutor Truck on Project	1 Quart	R 66	T49, T59
Non Mainline Paving; Side Roads, Handwork, Drives	406.25 (2011) 406.38 (2018)	Marshall Bituminous Concrete Pavement (2011) Hand Placed Bituminous Concrete Drives (2018)	406.03	Bituminous Concrete Pavement	Slip AC Content	< 200 TONS of Mix	1 per project	Truck Batch Slip	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 200 TONS of Mix	1 per project	Truck at Plant or on Project[11]		R 97	T 308, T 30
	490.30 (2011) 406.35 406.36 406.38 (2018)	Superpave Bituminous Concrete Pavement (2011) Superpave Bituminous Concrete Pavement Superpave Bituminous Concrete Pavement, Type IVB Hand Placed Bituminous Concrete Drives (2018)	490.03	Superpave Bituminous Concrete Pavement	Slip AC Content	< 200 TONS of Mix	1 per project	Truck Batch Slip	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 200 TONS of Mix	1 per project	Truck at Plant or on Project[11]		R 97	T 164 or T 308, T 30

Table 1: Material Sampling Manual Project Levels 1 & 2

Type of Construction	Pay Item Number	Pay Item Name	Materials Specification Number	Material Name	Test	Minor Quantity Threshold	Minimum Acceptance Sampling Frequency **(per project)**	Acceptance Sampling Location	Sample Size [2]	Procedures: Sampling	Procedures: Testing [1]
HPC Structural Concrete	501.32 (2011) 501.33 (2011) 501.34 (2011) 544.10	Concrete, High Performance Class AA (2011) Concrete, High Performance Class A (2011) Concrete, High Performance Class B (2011) Prefabricated Bridge Unit Superstructure	501.03	HPC Structural Concrete	Air Temperature Compressive Strength	< 10 CY	1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	C 172 T 23	ASTM C231 ASTM C1064 T 22
	501.35	Concrete, High Performance Class SCC	501.03	HPC Structural Concrete	Air Temperature Compressive Strength Spread (SCC)	< 10 CY	1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed	ASTM C172 T 23 ASTM C172	ASTM C231 ASTM C1064 T 22 ASTM C1611
	501.36 (2011)	Concrete, High Performance Class LW (2011)	501.03	HPC Structural Concrete	Air Temperature Compressive Strength Unit weight (for lightweight aggregate only)	< 10 CY	1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23 ASTM C172	ASTM C231 ASTM C1064 T 22 ASTM C173
			704.14	Lightweight Coarse Aggregate for Structural Concrete	Density		1 per placement	Stockpile at plant	0.5 to 2 cu ft	R 90	T 19
Performance-Based Structural	501.37 501.38 501.39	High Performance Concrete, Class PCD High Performance Concrete, Class PCS High Performance Concrete, Class SCC	501.03	HPC Structural Concrete	Air Temperature Compressive Strength Spread (SSC)	< 10 CY	1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft[3] for Compressive Strength or wheelbarrow needed	ASTM C172 T 23 ASTM C172	ASTM C231 ASTM C1064 T 22 ASTM C1611
Structural Steel	506.50 506.55 506.56 506.57 506.60 506.75	Structural Steel, Rolled Beam Structural Steel, Plate Girder Structural Steel, Curved Plate Girder Structural Steel, Truss Structural Steel Structural Steel (LS)	714.04	Carbon Steel Bolts, Nuts and Washers	Ultimate Tensile Stress Ultimate Tensile Stress, Wedge Rockwell Hardness		4 - Each combination of bolt production lot, nut lot, washer lot, and DTI lot (4 - Each combination Tension Control Assembly Bolt production lot if used) to be incorporated into the project for main member connections as designated in the Contract or as defined in 714.01, or other connections as deemed necessary by the Resident Engineer.	Original Manufacturer Shipping Container at the project or at fabrication facility	N/A	N/A	ASTM F606
			714.05	High Strength Bolts, Nuts and Washers	Ultimate Tensile Stress Ultimate Tensile Stress, Wedge Rockwell Hardness						ASTM F606
			714.06	Heat Treated Structural Bolts	Ultimate Tensile Stress Ultimate Tensile Stress, Wedge Rockwell Hardness						ASTM F606
			714.13	Tension Control Assemblies	Rotational Capacity Test						ASTM F3125
Reinforcing Steel	507.11 507.12 507.13	Reinforcing Steel, Level I Reinforcing Steel, Level II Reinforcing Steel, Level III	713.01	Bar Reinforcement	Ultimate Tensile Stress Yield Tensile Stress Elongation		1/grade/source	Stockpile on Project	6 ft	N/A	T 244
	507.19	Mechanical Bar Connectors	713.02	Mechanical Splices for Bar Reinforcement	Ultimate Tensile Stress		3 per size	Stockpile at plant/Project (must be fully assembled before delivery to lab)	connector length plus 12 inches of bar on each end	N/A	T 244
Precast/Prestressed Concrete	510.21 510.22 510.23 510.25 510.26 540.10 543.10	Prestressed Concrete Box Beams Prestressed Concrete Voided Slabs Prestressed Concrete Girders Prestressed Concrete Solid Slabs Prestressed Concrete NEXT D Beams Precast Concrete Structure Contractor-Fabricated Precast Concrete Structure	501.03	HPC Structural Concrete	Air Temperature Compressive Strength Spread (SCC)	1 per project (See note 5) 1 per project (See note 6) 1 per project (See note 6) 1 per project (See note 6)		At plant, as close to point of deposit as possible	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23 ASTM C172	ASTM C231 ASTM C1064 T 22 ASTM C1611
			704.14	Lightweight Coarse Aggregate for Concrete	Density (lightweight only)	1 per project		Stockpile at plant	0.5 to 2 cu ft	R 90	T 19
			713.01	Bar Reinforcement	Ultimate Tensile Stress Yield Tensile Stress Elongation	1/grade/source		at plant	6 ft	N/A	T 244
			713.02	Mechanical Splices for Bar Reinforcement	Ultimate Tensile Stress	3 per size		Stockpile at plant/Project (must be fully assembled before delivery to lab)	connector length plus 12 inches of bar on each end	N/A	T 244
			713.06	Prestressing Strands	Tensile testing	1 per project		at plant	6 ft	N/A	T 244
			707.03	Mortar, Type IV	Compression Strength of cubes	1 per placement		Project	3 cubes cast on project	R 64	ASTM C109
	510.24	Grouting Shear Keys	707.03	Mortar, Type IV	Compression Strength of cubes	1 per placement		Project	3 cubes cast on project	R 64	ASTM C109

Table 1: Material Sampling Manual Project Levels 1 & 2

Type of Construction	Pay Item Number	Pay Item Name	Materials Specification Number	Material Name	Test	Minor Quantity Threshold	Minimum Acceptance Sampling Frequency **(per project)**	Acceptance Sampling Location	Sample Size [2]	Procedures: Sampling	Procedures: Testing [1]
Prefabricated Bridge Unit	544.10	Bridge Unit Superstructure	501.03	HPC Structural Concrete	Air		1 per project (See note 5)	At plant, as close to point of deposit as possible	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172	ASTM C231
					Temperature		1 per project (See note 6)				ASTM C1064
					Compressive Strength		1 per project (See note 6)			T 23	T 22
					Spread (SCC)		1 per project (See note 6)			ASTM C172	ASTM C1611
			704.14	Lightweight Coarse Aggregate for Concrete	Density (lightweight only)		1 per project	Stockpile at plant	0.5 to 2 cu ft	R 90	T 19
			707.03	Mortar, Type IV	Compression Strength of cubes		1 per placement	Project	3 cubes cast on project	R 64	ASTM C109
			713.01	Bar Reinforcement	Tensile Testing Elongation		1/grade/source	at plant	6 ft	N/A	T 244
			713.02	Mechanical Splices for Bar Reinforcement	Tensile testing		3 per size	Stockpile at plant/Project (must be fully assembled before delivery to lab)	connector length plus 12 inches of bar on each end	N/A	T 244
			714.04	Carbon Steel Bolts, Nuts and Washers	Ultimate Tensile Stress Ultimate Tensile Stress, Wedge Rockwell Hardness		4 - Each combination of bolt production lot, nut lot, washer lot, and DTI lot (4 - Each combination Tension Control Assembly Bolt production lot if used) to be incorporated into the project for main member connections as designated in the Contract or as defined in 714.01, or other connections as deemed necessary by the Resident Engineer.	Original Manufacturer Shipping Container at the project or at fabrication facility	N/A	N/A	ASTM F606
			714.05	High Strength Bolts, Nuts and Washers	Ultimate Tensile Stress Ultimate Tensile Stress, Wedge Rockwell Hardness						ASTM F606
			714.06	Heat Treated Structural Bolts	Ultimate Tensile Stress Ultimate Tensile Stress, Wedge Rockwell Hardness						ASTM F606
			714.13	Tension Control Assemblies	Rotational Capacity Test						ASTM F3125
Structural Lumber	522.20 522.25 522.40	Structural Lumber and Timber, Untreated Structural Lumber and Timber, Treated Structural Glued Laminated Timber	709.01	Structural Lumber and Timber	Moisture Testing		1 per project	Project	N/A	N/A	Moisture Meter calibrated to ASTM D4444
			709.03	Structural Glued Laminated Timber	Moisture Testing		1 per project	Project	N/A	N/A	
Bridge Railing	525.11 525.33 525.335 525.34 525.41 525.44	Reset Existing Bridge Railing Bridge Railing, Galvanized 2 Rail Box Beam Bridge Railing, Galvanized 3 Rail Box Beam Bridge Railing, Galvanized 4 Rail Box Beam Bridge Railing, Galvanized HD Steel Beam/Fascia Mounted Bridge Railing, Galvanized, HDSB/Fascia Mounted/Steel Tubing	714.07	Anchor Bolts, Bridge Railing	Ultimate Tensile Stress		2 - Each combination of anchor bolt production lot, nut lot, and washer lot to be incorporated into the project	Original Manufacturer Shipping Container at the project or at fabrication facility	N/A	N/A	ASTM F606
	525.45	Bridge Railing, Galvanized Steel Tubing/Concrete Combination	501.03	HPC Structural Concrete	Air Temperature Compressive Strength Spread (SCC) Unit weight (for lightweight aggregate only)	< 10 CY	1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23 ASTM C172 ASTM C172	ASTM C231 ASTM C1064 T 22 ASTM C1611 ASTM C173
			704.14	Lightweight Coarse Aggregate for Concrete	Density (for lightweight aggregate only)		1 per placement	Stockpile at plant	0.5 to 2 cu ft	R 90	T 19
			713.01	Bar Reinforcement	Ultimate Tensile Stress Yield Tensile Stress Elongation		1/grade/source	Stockpile on Project	6 ft	N/A	T 244
			713.02	Mechanical Splices for Bar Reinforcement	Ultimate Tensile Stress		3 per size	Stockpile on Project (must be fully assembled before delivery to lab)	connector length plus 12 inches of bar on each end	N/A	T 244
			714.07	Anchor Bolts, Bridge Railing	Ultimate Tensile Stress		2 - Each combination of anchor bolt production lot, nut lot, and washer lot to be incorporated into the project	Original Manufacturer Shipping Container at the project or at fabrication facility	N/A	N/A	ASTM F606
	525.50 525.55 525.60	Bridge Railing Repair, Type I Bridge Railing Repair, Type II Bridge Railing Repair, Type III	714.07	Anchor Bolts, Bridge Railing	Ultimate Tensile Stress		2 - Each combination of anchor bolt production lot, nut lot, and washer lot to be incorporated into the project	Original Manufacturer Shipping Container at the project or at fabrication facility	N/A	N/A	ASTM F606
	525.70	Bridge Railing, Concrete F-Shape	501.03	HPC Structural Concrete	Air Temperature Compressive Strength Spread (SCC) Unit weight (for lightweight aggregate only)		1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23 ASTM C172 ASTM C172	ASTM C231 ASTM C1064 T 22 ASTM 1611 ASTM C173
			704.14	Lightweight Coarse Aggregate for Concrete	Density (for lightweight aggregate only)		1 per placement	at plant	0.5 to 2 cu ft	R 90	T 19
			713.01	Bar Reinforcement	Ultimate Tensile Stress Yield Tensile Stress Elongation		1/grade/source	Stockpile on Project	6 ft	N/A	T 244
			713.02	Mechanical Splices for Bar Reinforcement	Ultimate Tensile Stress		3 per size	Stockpile on Project (must be fully assembled before delivery to lab)	connector length plus 12 inches of bar on each end	N/A	T 244

Table 1: Material Sampling Manual Project Levels 1 & 2

Type of Construction	Pay Item Number	Pay Item Name	Materials Specification Number	Material Name	Test	Minor Quantity Threshold	Minimum Acceptance Sampling Frequency **(per project)**	Acceptance Sampling Location	Sample Size [2]	Procedures: Sampling	Procedures: Testing [1]
Structural Concrete	541.21 541.22 541.25 541.30 541.31 541.40	Concrete, Class AA Concrete, Class A Concrete, Class B Concrete, Class C Concrete, Class D Concrete, Class LW	541.03	Structural Concrete	Air Temperature Compressive Strength Unit weight (for lightweight aggregate only)	< 10 CY	1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23	ASTM C231 ASTM C1064 T 22
			704.14	Lightweight Coarse Aggregate for Structural Concrete	Density (for lightweight aggregate only)		1 per placement	Stockpile at plant	0.5 to 2 cu ft	R 90	T 19
	541.45	Controlled Density (Flowable) Fill	541.03	Structural Concrete	Air Temperature Compressive Strength		1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 ASTM D5971 Molds to be cut and taped prior to filling in accordance with ACI 229, Section 8.4	ASTM C231 ASTM C1064 ASTM D4832
Structural Concrete Repair	580.10 580.11 580.12 580.13 580.14 580.15 580.19	Repair of Concrete Superstructure, Class I Repair of Concrete Superstructure, Class II Repair of Concrete Superstructure, Class III Repair of Concrete Substructure, Class I Repair of Concrete Substructure, Class II Repair of Concrete Substructure, Class III Concrete, Class AA Overlay	541.03 501.03 501.03	Structural Concrete High Performance Structural Concrete (2011) Performance Based Structural Concrete (2018)	Air Temperature Compressive Strength	< 10 CY	1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23	ASTM C231 ASTM C1064 T 22
			780.02 780.03 780.05 (2018)	Overhead and Vertical Concrete Repair Material Rapid Setting Concrete Repair Material Polymer Concrete Repair Material (2018)	Compressive Strength		1 per first 25 units, then 1 per 100 units (bags) after	on project, as close to point of deposit as practical	3 cubes cast on project	R 64	ASTM C109
			780.04	Rapid Setting Concrete Repair Material with Coarse Aggregate	Compressive Strength		1 per first 25 units, then 1 per 100 units (bags) after	on project, as close to point of deposit as practical	1 cu ft for Compressive Strength Cylinders	ASTM C172	ASTM C231
Concrete for Manhole/Catch Basins FOR CAST-IN-PLACE ONLY	604.10 604.11	Concrete Catch Basin with Cast Iron Grate Concrete Manhole with Cast Iron Grate	541.03	Structural Concrete	Air Temperature Compressive Strength	< 10 CY	1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23	ASTM C231 ASTM C1064 T 22
Underdrains	605.10 to 605.23	Underdrain pipe Underdrain Carrier pipe	704.16	Drainage Aggregate	Gradation	< 600 CY	1/3000 CY	Stockpile on Project	55	R 90	T 27

Table 1: Material Sampling Manual Project Levels 1 & 2

Type of Construction	Pay Item Number	Pay Item Name	Materials Specification Number	Material Name	Test	Minor Quantity Threshold	Minimum Acceptance Sampling Frequency **(per project)**	Acceptance Sampling Location	Sample Size [2]	Procedures: Sampling	Procedures: Testing [1]
Curbs, Gutters, Traffic Islands, and Sidewalks	616.27 616.28 616.45 (2011) 618.10 618.11 621.45 (2011)	Cast-in-place Concrete Curb, Type A Cast-in-place Concrete Curb, Type B Portland Cement Concrete Gutter (2011) Portland Cement Sidewalk, 5 inch Portland Cement Sidewalk, 8 inch Concrete Median Barrier (2011)	541.03	Structural Concrete	Air Temperature Compressive Strength	< 10 CY	1 per 75 CY (See note 4)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23	ASTM C231 ASTM C1064 T 22
	616.300 (2011) 616.305 616.31 (2011) 616.315	Bituminous Concrete Curb Type A (ton) (2011) Bituminous Concrete Curb Type A (lft) Bituminous Concrete Curb Type B (ton) (2011) Bituminous Concrete Curb Type B (lft)	406.03a	Bituminous Concrete Pavement	Slip AC Content	< 200 TONS of Mix	1 per project	Truck @ Plant or on Project[11]	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 200 TONS of Mix	1 per project	Truck @ Plant or on Project[11]		R 97	T 164 or T 308, T 30
	616.47 618.15	Bituminous Concrete Gutters and Traffic Islands Bituminous Concrete Sidewalk	616.13	Bituminous Concrete Gutters and Traffic Islands	Slip AC Content	< 200 TONS of Mix	1 per project	Truck @ Plant or on Project[11]	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 200 TONS of Mix	1 per project	Truck @ Plant or on Project[11]		R 97	T 164 or T 308, T 30
			406.03a	Bituminous Concrete Pavement	Slip AC Content	< 200 TONS of Mix	1 per project	Truck @ Plant or on Project[11]			Truck Slip Calculation
					Gradation	< 200 TONS of Mix	1 per project	Truck @ Plant or on Project[11]		R 97	T 164 or T 308, T 30
			490.03a (2011) 406.03B (a) (2018)	Superpave Bituminous Concrete Pavement (2011) Bituminous Concrete Pavement (2018)	Slip AC Content	< 200 TONS of Mix	1 per project	Truck @ Plant or on Project[11]	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 200 TONS of Mix	1 per project	Truck @ Plant or on Project[11]		R 97	T 164 or T 308, T 30
Pavement Markings	646.400 to 646.479	Durable Pavement Markings	754.01(a) 754.01(b) 754.01(c) 708.10(a)	Optics, Type I Optics, Type II Optics, Type III Thermoplastic Pavement Marking, Type A	Retroreflectivity	N/A[14]	For Verification Only[14]	on project	2 Miles	N/A	ASTM D7585
Sign Foundations, Over Head Traffic Sign Supports, Traffic Control Signals & Street Lighting	675.40 (2011) 675.41 675.42	Foundation for W-Shape Steel Post (18 (2011), 24, 30 inch diameter)	541.03	Structural Concrete	Air Temperature Compressive Strength	< 10 CY	1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23	ASTM C231 ASTM C1064 T 22
			713.01	Bar Reinforcement	Ultimate Tensile Stress Yield Tensile Stress Elongation		1/grade/source	at plant or on project	6 ft	N/A	T 244
	675.43	Foundation for Tubular Steel Post	541.03	Structural Concrete	Air Temperature Compressive Strength	< 10 CY	1 per 50 CY (See Note 3)	on project as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23	ASTM C231 ASTM C1064 T 22
	677.12 677.13 677.22 677.23 677.25 678.15 679.46	Overhead Traffic Sign Support, Cantilever Overhead Traffic Sign Support, Multi-Support Overhead Traffic Sign Support, Cantilever with Lighting Overhead Traffic Sign Support, Multi-support with Lighting Remove and Reset Overhead Traffic Sign Support Traffic Control Signal System, Intersection Street Light Assembly	541.03	Structural Concrete	Air Temperature Compressive Strength	< 10 CY	1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23	ASTM C231 ASTM C1064 T 22
			713.01	Bar Reinforcement	Ultimate Tensile Stress Yield Tensile Stress Elongation		1/grade/source	at plant or on project	6 ft	N/A	T 244
			714.05	High Strength Bolts, Nuts and Washers	Ultimate Tensile Stress Ultimate Tensile Stress, Wedge Rockwell Hardness	4 - Each combination of bolt production lot, nut lot, washer lot, and DTI lot (4 - Each combination Tension Control Assembly Bolt production lot if used) to be incorporated into the project for main member connections as designated in the Contract or as defined in 714.01, or other connections as deemed necessary by the Resident Engineer.		Original Manufacturer Shipping Container at the project or at fabrication facility	N/A	N/A	ASTM F606
					Rotational Capacity Test						ASTM F3125
			714.06	Heat Treated Structural Bolts	Ultimate Tensile Stress Ultimate Tensile Stress, Wedge Rockwell Hardness						ASTM F606
					Rotational Capacity Test						ASTM F3125
			714.09	Anchor Bolts, Traffic Signals, Lighting, and Overhead Sign Structures[10]	Ultimate Tensile Stress	1 - Each anchor bolt production lot to be incorporated into the project. Include washer and nut with sample.		Original Manufacturer Shipping Container at the project or at fabrication facility	1 bolt, including threads (at least 18" long)	N/A	ASTM F606

Table 1: Material Sampling Manual Project Levels 1 & 2

Type of Construction	Pay Item Number	Pay Item Name	Materials Specification Number	Material Name	Test	Minor Quantity Threshold	Minimum Acceptance Sampling Frequency **(per project)**	Acceptance Sampling Location	Sample Size [2]	Procedures	
										Sampling	Testing [1]

Notes:

(1) Testing procedures are AASHTO procedures unless otherwise noted.
(2) Sample size is in pounds unless otherwise noted. The sample size should be selected based on the maximum nominal aggregate size (See AASHTO T27, Section 7.1). For example, if the material visually passes a 2", 1.5", or 1" sieve then the sample size is 220 lbs, 165 lbs, and 110 lbs, respectively.

(3) Total placement for day split into equal sublots not to exceed 50 CY, test yardage chosen randomly. The test yardage is used to determine which load to test with proper sample collection techniques followed Check first load for temperature, and air content. This will not be counted as the acceptance test for the first sublot. If the first load is determined to be out-of-specification then the Contractor must test each consecutive load until 3 consecutive passing loads are tested. VTrans will check 4th consecutive load to verify. Deck pours shall have no less than 3 acceptance tests, regardless of total CY placed. Acceptance tests shall be a minimum of 2 standard cured cylinder specimens in accordance with applicable test method. Acceptance tests for 541.40 Concrete, Class LW shall be a minumum of 3 standard cured cyinder speciments in accordance with applicable test method.

(4) Temperature and air content will be checked at the begining of the first load. This will not be counted as the acceptance test.

(5) Acceptance tests are to be performed by Owner representative at the frequency indicated, per project. However, all QC tests are to be witnessed by Owner representative. Minimum of six Compressive Strength for determining detensioning, to be cured with the piece. Four specimens to determine 28 day and shipping strengths and are to be cured with the piece until it is stripped and then standard cured.

(6) Acceptance tests are to be performed by Owner representative at the frequency indicated, per project. However, all QC tests are to be witnessed by Owner representative. As a minimum, the first load as well as the load that the Compressive Strength are fabricated from should be tested by QC.
(7) If the sample cannot be safely obtained from the end of pump truck hose at the point of placement (i.e. without retracting the hose from within formwork), the sample should be obtained from the mixer truck.
(8) Depends upon the mix type. For mixes with 3/4", 1/2", and 3/8" stone the sample size is 165 lbs, 55 lbs, and 22 lbs respectively.

(9) The sample size for HMA depends upon the nominal maximum aggregate in the mix, see following table. Minimum sample sizes are in accordance with AASHTO T168 and are suitable for routine testing. However, actual sample size is dependent upon the type and number of tests to which the material is to be subjected. AC Content is determined from the mass (weight) or percentage printed on the weight slip or demand ticket.

(10) Acceptance testing is not required for anchor bolts for traffic signal controllers and cabinets or pedestal poles.
(11) Bituminous mixtures sampled on project shall be sampled from the paver hopper, material transfer vehicle hopper, or the paver auger in accordance with AASHTO R 97.
(12) For projects less than 1250 CY of subbase material, the Agency shall be responsible for the testing and projects over 1250 CY the Contractor is responsible for the determination of the target density. For each source, subbase materials shall be sampled and tested once for the first 1250 CY and then once every 3000 CY thereafter.
(13) Acceptance sampling will occur at the frequency prescribed with acceptance testing occuring at a minimum frequency of 1/3,000 Tons of mix. Acceptance testing may occur at the 1/1,500 Tons of mix sampling frequency at the discretion of the HMA Materials Manager.
(14) Durable Pavement Markings will be accepted via visual inspection. Verification testing will occur, as specified herein, upon request.

Mix Type:	MS	I / IS	II / IIS	III / IIIS	IV / IVS	VS	VI / VIS
Maximum Nominal Aggregate Size, in:	1 1/2"	1"	3/4"	1/2"	3/8"	1/4"	3/16"
Minimum Sample Size, lbs:	25	20	16	12	8	6	4

Table 2: Material Sampling Manual Project Level 3

Type of Construction	Pay Item Number	Pay Item Name	Materials Specification Number	Material Name	Test	Minor Quantity Threshold	Minimum Acceptance Sampling Frequency **(per project)**	Acceptance Sampling Location	Sample Size [2]	Procedures	
										Sampling	Testing [1]
Embankments	203.30	Earth Borrow	703.02	Earth Borrow	Moisture-Density		1/Soil type	Stockpile	50	R 90	T 99
					Moisture	< 300 CY	1/2000 CY	In place	2		T 255 or T 310
					Density	< 300 CY	1/2000 CY	In place			T 191 or T 310
	203.31	Sand Borrow	703.03	Sand Borrow and Cushion	Gradation	< 300 CY	1 per project	In place	22	R 90	T 27, T 11
					Moisture-Density		1/10,000 CY/Source	Stockpile	50	R 90	T 99
					Moisture	< 300 CY	1 per project	In place	20		T 255 or T 310
					Density	< 300 CY	1 per project	In place			T 191 or T 310
	203.32	Granular Borrow	703.04	Granular Borrow	Gradation	< 300 CY	1 per project	In place	22	R 90	T 27, T 11
					Moisture-Density		1/10,000 CY/Source	Stockpile	50	R 90	T 99
					Moisture	< 300 CY	1 per project	In place	2		T 255 or T 310
					Density	< 300 CY	1 per project	In place			T 191 or T 310
	203.35	Gravel Backfill for Slope Stabilization	704.07	Gravel Backfill for Slope Stabilization	Gradation	< 300 CY	1 per project	In place	See note 2	R 90	T 27, T 11
					Moisture-Density		1/10,000 CY/Source	Stockpile	50	R 90	T 99
					Moisture	< 300 CY	1 per project	In place	20		T 255 or T 310
					Density	< 300 CY	1 per project	In place			T 191 or T 310
Excavation for Structures	204.30	Granular Backfill for Structures	704.08	Granular Backfill for Structures	Gradation	< 300 CY	1 per project	In place	See note 2	R 90	T 27, T 11
					Moisture-Density		1/10,000 CY/Source	Stockpile	250	R 90	T 99
					Moisture	< 300 CY	1/500 CY	In place	30		T 255 or T 310
					Density	< 300 CY	1/500 CY	In place			T 191 or T 310
			704.05B	Crushed Gravel for Subbase, Fine Graded	Gradation	< 300 CY	1/3000 CY	In place	See note 2	R 90	T 27, T 11
Subbase	301.15	Subbase of Gravel	704.04	Gravel for Subbase	Gradation	< 300 CY	1 per project	Stockpile on project	See note 2	R 90	T 27, T 11
					Moisture-Density		1/10,000 CY/Source	Stockpile	250	R 90	T 180
					Moisture	< 300 CY	1 per project	In place			T 310
					Density	< 300 CY	1 per project	In place			T 310
	301.25	Subbase of Crushed Gravel, Coarse Graded	704.05A	Crushed Gravel for Subbase, Coarse Graded	Gradation	< 300 CY	1 per project	Stockpile on project	See note 2	R 90	T 27, T 11
					Moisture-Density		1/10,000 CY/Source[12]	Stockpile	250	R 90	T 180
					Moisture	< 300 CY	1 per project	In place			T 310
					Density	< 300 CY	1 per project	In place			T 310
	301.26 301.28	Subbase of Crushed Gravel, Fine Graded	704.05B	Crushed Gravel for Subbase, Fine Graded	Gradation	< 300 CY	1 per project	Stockpile on project	See note 2	R 90	T 27, T 11
					Moisture-Density		1/10,000 CY/Source[12]	Stockpile	250	R 90	T 180
					Moisture	< 300 CY	1 per project	In place			T 310
					Density	< 300 CY	1 per project	In place			T 310
	301.35	Subbase of Dense Graded Crushed Stone	704.06	Dense Graded Crushed Stone for Subbase	Gradation	< 300 CY	1 per project	Stockpile on project	See note 2	R 90	T 27, T 11
					Moisture-Density		1/10,000 CY/Source[12]	Stockpile	250	R 90	T 180
					Moisture	< 300 CY	1 per project	In place			T 310
					Density	< 300 CY	1 per project	In place			T 310
	301.40	Subbase, RAP	301.02	Subbase, RAP	Gradation	< 400 TONS	1 per project	In place	See note 2	R 90	T 27, T 11
RSB	310.20	Full Depth Reclamation (FDR)	310.02	Reclaimed Base (2011) Full Depth Reclamation (2018)	Gradation		1/2500 sy for first 10,000 sy 1/10,000 sy thereafter	In place	165	R 90	T 27
					Moisture-Density		1/10,000 CY/Source[12]	Stockpile	50	R 90	T 180
					Moisture		1/4000 sy for first 10,000 sy 1/10,000 sy thereafter	In place			T 310
					Density		1/4000 sy for first 10,000 sy 1/10,000 sy thereafter	In place			T 310
Aggregate Surface Course	401.10	Aggregate Surface Course	704.12 (2011) 704.12 (a) (2018)	Aggregate for Surface Course and Shoulders (2011) Aggregate Surface Course (2018)	Gradation	< 300 CY	1 per project	In place	100	R 90	T 27, T 11
					Moisture-Density		1/10,000 CY/Source	Stockpile	50	R 90	T 180
					Moisture	< 300 CY	1 per project	In place			T 255 or T 310
					Density	< 300 CY	1 per project	In place			T 191 or T 310
Aggregate Shoulders	402.12	Aggregate Shoulders	704.12 (2011) 704.12 (b) (2018)	Aggregate for Surface Course and Shoulders (2011) Aggregate for Shoulders (2018)	Gradation	< 300 CY	1 per project	In place	100	R 90	T 27, T 11
	402.13	Aggregate Shoulders, RAP	402.02 (2011) 704.12 (b) (2018)	Aggregate for Shoulders (2018)	Gradation	< 300 CY	1 per project	In place	100	R 90	T 27, T 11
	403.12	Aggregate Shoulders, RAP with RAS (2018)	704.12 (b) (2018)	Aggregate for Shoulders (2018)	Gradation	< 300 CY	1 per project	In place	100	R 90	T 27, T 11
Surface Treatment Materials	404.65	Emulsified Asphalt	702.04	Emulsified Asphalt	Distillation, Penetration @ 25 °C	< 40 CWT	1/project/production lot	Distributor Truck on Project	1 Quart	R 66	T 49, T 59
In-Place Recycling	415.20	Cold Mixed Recycled Bituminous Pavement	415.02	Cold Mixed Recycled Bituminous Pavement	Density		1/2000ft/lane/lift	In place			T 310 or ASTM D7830
	415.25	Emulsified Asphalt, Cold Mixed	415.02	Emulsified Asphalt	Distillation, Penetration @ 25 °C	< 40 CWT	1/day/production lot	Distributor Truck on Project	1 Quart	R66	T 49, T 59

Table 2: Material Sampling Manual Project Level 3

Type of Construction	Pay Item Number	Pay Item Name	Materials Specification Number	Material Name	Test	Minor Quantity Threshold	Minimum Acceptance Sampling Frequency **(per project)**	Acceptance Sampling Location	Sample Size [2]	Procedures: Sampling	Procedures: Testing [1]
Bituminous Concrete Pavement Mainline Paving and Shoulders (Method Spec Acceptance)	406.25 406.27	Marshall Bituminous Concrete Pavement (Method Spec) Medium Duty Marshall Bituminous Concrete Pavement	406.03	Bituminous Concrete Pavement	Slip AC Content	< 100 TONS	1/1000 TONS for first 1,000 TONS, 1/day thereafter	Truck Batch Slip	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 100 TONS	1/1000 TONS for first 1,000 TONS, 1/day thereafter	Truck @ Plant or on Project[11]		R 97	T 308, T 30
					Air voids, VMA	< 100 TONS	1/1000 TONS for first 1,000 TONS, 1/day thereafter	Truck @ Plant or on Project[11]		R 97	T 166, T 209, T 269, PP 19
					Mixing Temperature	< 100 TONS	1/1000 TONS for first 1,000 TONS, 1/day thereafter	Truck @ Plant or on Project[11]			
					Density-mat		Project less than 0.5 miles take 4 cores per day production. Project greater than 0.5 miles, 1 core per .5 miles, minimum of 6 cores per day.	In place	6" ID Core	R 97	T 166
					Density-joint		See specifications	In place	6" ID core	R 97	T 166
					Surface Tolerance		Project less than .5 miles, use straightedge only Project greater than .5 miles, use Road Surface Profiler 1/project, Wearing Surface only	In place	N/A		M 328 or Straight Edge
			702.02	Performance-Graded Asphalt Binder	Unit weight, Flashpoint, Rotational Viscosity, DSR - Original, Effect of heating mass, DSR - RTFO, DSR - PAV, Creep stiffness, m Value	< 200 TONS of Mix	1/1,500 TONS of Mix[13]	In-line @ plant	2 Quarts	R 66	T 48, T 228, T 240, T 313, T 315, T 316
			702.04	Emulsified Asphalt	Distillation, Penetration @ 25 °C	< 40 CWT	1/project/production lot	Distibutor Truck on Project	1 Quart	R 66	T 49, T 59
	490.30 (2011) 406.35 406.36 (2018)	Superpave Bituminous Concrete Pavement (Method Spec) Superpave Bituminous Concrete Pavement (Method Spec) Superpave Bituminous Concrete Pavement, Type IVB (2018)	490.03	Superpave Bituminous Concrete Pavement	Slip AC Content	< 100 TONS	1/1000 TONS for first 1,000 TONS, 1/day thereafter	Truck Batch Slip	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 100 TONS	1/1000 TONS for first 1,000 TONS, 1/day thereafter	Truck @ Plant or on Project[11]		R 97	T 308, T 30
					Air voids, VMA	< 100 TONS	1/1000 TONS for first 1,000 TONS, 1/day thereafter	Truck @ Plant or on Project[11]		R 97	T 312,T 166,T 209,T 269, R 35
					Mixing Temperature	< 100 TONS	1/1000 TONS for first 1,000 TONS, 1/day thereafter	Truck @ Plant or on Project[11]			
					Density-mat		Project less than 0.5 miles take 4 cores per day production. Project greater than 0.5 miles, 1 core per .5 miles, minimum of 6 cores per day.	In place	6" ID core	R 97	T 166
					Density-joint		See specifications	In-place	6" ID core	R 97	T 166
					Surface Tolerance		Project less than .5 miles, use straightedge only Project greater than .5 miles, use Road Surface Profiler 1/project, Wearing Surface only	In place	N/A		M 328 or Straight Edge
			702.02	Performance-Graded Asphalt Binder	Unit weight, Flashpoint, Rotational Viscosity, DSR - Original, Effect of heating mass, DSR - RTFO, DSR - PAV, Creep stiffness, m Value	< 200 TONS of Mix	1/1,500 TONS of Mix[13]	In-line @ plant	2 Quarts	R 66	T 48, T 228, T 240, T 313, T 315, T 316
			702.04	Emulsified Asphalt	Distillation, Penetration @ 25 °C	< 40 CWT	1/ project/production lot	Distibutor Truck on Project	1 Quart	R 66	T 49, T 59
	407.15	Bonded Wearing Course	407.03	Bonded Wearing Course	Slip AC Content	< 100 TONS	1/500 TONS	Truck Batch Slip	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 100 TONS	1/500 TONS	Truck @ Plant or on Project[11]		R 97	T 308, T 30
					Mixing Temperature	< 100 TONS	1/500 TONS	Truck @ Plant or on Project[11]			
	407.16	Polymer-modified Emulsified Asphalt	702.04 (c)	Polymer-modified Emulsified Asphalt	Distillation, Penetration @ 25 °C	< 40 CWT	1/day/production lot	Distibutor Truck on Project	1 Quart	R 66	T 49, T 59

Table 2: Material Sampling Manual Project Level 3

Type of Construction	Pay Item Number	Pay Item Name	Materials Specification Number	Material Name	Test	Minor Quantity Threshold	Minimum Acceptance Sampling Frequency **(per project)**	Acceptance Sampling Location	Sample Size [2]	Procedures: Sampling	Procedures: Testing [1]
Bituminous Concrete Pavement Mainline Paving and Shoulders (QA Acceptance)	406.25 406.27	Marshall Bituminous Concrete Pavement (QA) Medium Duty Marshall Bituminous Concrete Pavement (QA)	406.03	Bituminous Concrete Pavement	Slip AC Content	< 100 TONS	Stratified Random Sampling, 1/500 TON sublot per mix design.	Truck Batch Slip	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 100 TONS	Stratified Random Sampling, 1/500 TON sublot per mix design.	Truck @ Plant or on Project[11]		R 97	T 308, T 30
					Air voids, VMA	< 100 TONS	Stratified Random Sampling, 1/500 TON sublot per mix design.	Truck @ Plant or on Project[11]		R 97	T 166, T 209, T 269, PP 19
					Mixing Temperature	< 100 TONS	Stratified Random Sampling, 1/500 TON sublot per mix design.	Truck @ Plant or on Project[11]			
					Density-mat		Project less than 0.5 miles take 4 cores per day production. Project greater than 0.5 miles, 1 core per .5 miles, minimum of 6 cores per day.	In place	6" ID Core	R 97	T 166
					Density-joint		See specifications	In place	6" ID core	R 97	T 166
					Surface Tolerance		Project less than .5 miles, use straightedge only Project greater than .5 miles, use Road Surface Profiler 1/project, Wearing Surface only	In place	N/A		M 328 or Straight Edge
			702.02	Performance-Graded Asphalt Binder	Unit weight, Flashpoint, Rotational Viscosity, DSR - Original, Effect of heating mass, DSR - RTFO, DSR - PAV, Creep stiffness, m Value	< 200 TONS of Mix	1/1,500 TONS of Mix[13]	In-line @ plant	2 Quarts	R 66	T 48, T 228, T 240, T 313, T 315, T 316
			702.04	Emulsified Asphalt	Distillation, Penetration @ 25 °C	< 40 CWT	1/ project	Distibutor Truck on Project	1 Quart	R 66	T 49, T 59
	490.30 (2011) 406.35 406.36 406.38 (2018)	Superpave Bituminous Concrete Pavement (QA) (2011) Superpave Bituminous Concrete Pavement (QA) Superpave Bituminous Concrete Pavement, Type IVB (QA) (2018)	490.03	Superpave Bituminous Concrete Pavement	Slip AC Content	< 100 TONS	Stratified Random Sampling, 1/500 TON sublot per mix design.	Truck Batch Slip	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 100 TONS	Stratified Random Sampling, 1/500 TON sublot per mix design.	Truck @ Plant or on Project[11]		R 97	T 308, T 30
					Air voids, VMA	< 100 TONS	Stratified Random Sampling, 1/500 TON sublot per mix design.	Truck @ Plant or on Project[11]		R 97	T 312,T 166,T 209,T 269, R 35
					Mixing Temperature	< 100 TONS	Stratified Random Sampling, 1/500 TON sublot per mix design.	Truck @ Plant or on Project[11]			
					Density-mat		Project less than 0.5 miles take 4 cores per day production. Project greater than 0.5 miles, 1 core per .5 miles, minimum of 6 cores per day.	In place	6" ID core	R 97	T 166
					Density-joint		See specifications	In-place	6" ID core	R 97	T 166
					Surface Tolerance		Project less than .5 miles, use straightedge only Project greater than .5 miles, use Road Surface Profiler 1/project, Wearing Surface only	In place	N/A		M 328 or Straight Edge
			702.02	Performance-Graded Asphalt Binder	Unit weight, Flashpoint, Rotational Viscosity, DSR - Original, Effect of heating mass, DSR - RTFO, DSR - PAV, Creep stiffness, m Value	< 200 TONS of Mix	1/1,500 TONS of Mix[13]	In-line @ plant	2 Quarts	R 66	T 48, T 228, T 240, T 313, T 315, T 316
			702.04	Emulsified Asphalt	Distillation, Penetration @ 25 °C	< 40 CWT	1/ project	Distibutor Truck on Project	1 Quart	R 66	T 49, T 59
Non Mainline Paving: Side Roads,-Handwork, Drives	406.25 (2011) 406.38 (2018)	Marshall Bituminous Concrete Pavement (2011) Hand Placed Bituminous Concrete Drives (2018)	406.03	Bituminous Concrete Pavement	Slip AC Content	< 200 TONS of Mix	1 per project	Truck Batch Slip	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 200 TONS of Mix	1 per project	Truck @ Plant or on Project[11]		R 97	T 308, T 30
	490.30 (2011) 406.35 406.36 406.38 (2018)	Superpave Bituminous Concrete Pavement Hand Placed Bituminous Concrete Drives (2018)	490.03	Superpave Bituminous Concrete Pavement	Slip AC Content	< 200 TONS of Mix	1 per project	Truck Batch Slip	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 200 TONS of Mix	1 per project	Truck @ Plant or on Project[11]		R 97	T 308, T 30

Table 2: Material Sampling Manual Project Level 3

Type of Construction	Pay Item Number	Pay Item Name	Materials Specification Number	Material Name	Test	Minor Quantity Threshold	Minimum Acceptance Sampling Frequency **(per project)**	Acceptance Sampling Location	Sample Size [2]	Procedures: Sampling	Procedures: Testing [1]
HPC Structural Concrete	501.32 (2011) 501.33 (2011) 501.34 (2011) 544.10	Concrete, High Performance Class AA (2011) Concrete, High Performance Class A (2011) Concrete, High Performance Class B (2011) Prefabricated Bridge Unit Superstructure	501.03	HPC Structural Concrete	Air Temperature Compressive Strength	< 10 CY	1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23	ASTM C231 ASTM C1064 T 22
	501.35	Concrete, High Performance Class SCC	501.03	HPC Structural Concrete	Air Temperature Compressive Strength		1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23	ASTM C231 ASTM C1064 T 22
					Spread (SCC)					ASTM C172	ASTM C1611
	501.36	Concrete, High Performance Class LW	501.03	HPC Structural Concrete	Air Temperature Compressive Strength Unit weight (for lightweight aggregate only)		1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23 ASTM C172	ASTM C231 ASTM C1064 T 22 ASTM C173
			704.14	Lightweight Coarse Aggregate for Structural Concrete	Gradation Density	< 80 CY	1 per project 1 per placement	Stockpile at plant Stockpile at plant	See note 8 0.5 to 2 cu ft	R 90 R 90	T 27 T 19
Performance-Based Structural Concrete	501.37 501.38 501.39	High Performance Concrete, Class PCD High Performance Concrete, Class PCS High Performance Concrete, Class SCC	501.03	HPC Structural Concrete	Air Temperature Compressive Strength Spread (SCC)	< 10 CY	1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23 ASTM C172	ASTM C231 ASTM C1064 T 22 ASTM C173
Structural Steel	506.50 506.55 506.56 506.57 506.60 506.75	Structural Steel, Rolled Beam Structural Steel, Plate Girder Structural Steel, Curved Plate Girder Structural Steel, Truss Structural Steel Structural Steel (LS)	714.04	Carbon Steel Bolts, Nuts and Washers	Ultimate Tensile Stress Ultimate Tensile Stress, Wedge Rockwell Hardness	4 - Each combination of bolt production lot, nut lot, washer lot, and DTI lot (4 - Each combination Tension Control Assembly Bolt production lot if used) to be incorporated into the project for main member connections as designated in the Contract or as defined in 714.01, or other connections as deemed necessary by the Resident Engineer.		Original Manufacturer Shipping Container at the project or at fabrication facility	N/A	N/A	ASTM F606
			714.05	High Strength Bolts, Nuts and Washers	Ultimate Tensile Stress Ultimate Tensile Stress, Wedge Rockwell Hardness						ASTM F606
			714.06	Heat Treated Structural Bolts	Ultimate Tensile Stress Ultimate Tensile Stress, Wedge Rockwell Hardness						ASTM F606
Precast/Prestressed Concrete	510.21 510.22 510.23 510.25 510.26 540.10 543.10	Prestressed Concrete Box Beams Prestressed Concrete Voided Slabs Prestressed Concrete Girders Prestressed Concrete Solid Slabs Prestressed Concrete NEXT D Beams Precast Concrete Structure Contractor-Fabricated Precast Concrete Structure	501.03	HPC Structural Concrete	Air Temperature Compressive Strength	1 per project (See note 5) 1 per project (See note 6) 1 per project (See note 6)	At plant, as close to point of deposit as possible		1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23	ASTM C231 ASTM C1064 T 22
					Spread (SCC)	1 per project (See note 6)				ASTM C172	ASTM C1611
			704.14	Lightweight Coarse Aggregate for Concrete	Density (lightweight only)	1 per project		Stockpile at plant	0.5 to 2 cu ft	R 90	T 19
			713.02	Mechanical Splices for Bar Reinforcement	Ultimate Tensile Stress	3 per size		Stockpile at plant/Project (must be fully assembled before delivery to lab)	connector length plus 12 inches of bar on each end	N/A	T 244
			707.03	Mortar, Type IV	Compression Strength of cubes	1 per placement		Project	3 cubes cast on project	R 64	ASTM C109
	510.24	Grouting Shear Keys	707.03	Mortar, Type IV	Compression Strength of cubes	1 per placement		Project	3 cubes cast on project	R 64	ASTM C109

Table 2: Material Sampling Manual Project Level 3

Type of Construction	Pay Item Number	Pay Item Name	Materials Specification Number	Material Name	Test	Minor Quantity Threshold	Minimum Acceptance Sampling Frequency **(per project)**	Acceptance Sampling Location	Sample Size [2]	Procedures	
										Sampling	Testing [1]
Prefabricated Bridge Unit	544.10	Bridge Unit Superstructure	501.03	HPC Structural Concrete	Air Temperature Compressive Strength Spread (SCC)		1 per project (See note 5) 1 per project (See note 6) 1 per project (See note 6) 1 per project (See note 6)	At plant, as close to point of deposit as possible	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23 ASTM C172	ASTM C231 ASTM C1064 T 22 ASTM C1611
			704.14	Lightweight Coarse Aggregate for Concrete	Density (lightweight only)		1 per project	Stockpile at plant	0.5 to 2 cu ft	R 90	T 19
			707.03	Mortar, Type IV	Compression Strength of cubes		1 per placement	Project	3 cubes cast on project	R 64	ASTM C109
			713.01	Bar Reinforcement	Ultimate Tensile Stress Yield Tensile Stress Elongation		1/grade/source	at plant	6 ft	N/A	T 244
			713.02	Mechanical Splices for Bar Reinforcement	Ultimate Tensile Stress		3 per size	Stockpile at plant/Project (must be fully assembled before delivery to lab)	connector length plus 12 inches of bar on each end	N/A	T 244
			714.04	Carbon Steel Bolts, Nuts and Washers	Ultimate Tensile Stress Ultimate Tensile Stress, Wedge Rockwell Hardness		4 - Each combination of bolt production lot, nut lot, washer lot, and DTI lot (4 - Each combination Tension Control Assembly Bolt production lot if used) to be incorporated into the project for main member connections as designated in the Contract or as defined in 714.01, or other connections as deemed necessary by the Resident Engineer.	Original Manufacturer Shipping Container at the project or at fabrication facility	N/A	N/A	ASTM F606
			714.05	High Strength Bolts, Nuts and Washers	Ultimate Tensile Stress Ultimate Tensile Stress, Wedge Rockwell Hardness						ASTM F606
			714.06	Heat Treated Structural Bolts	Ultimate Tensile Stress Ultimate Tensile Stress, Wedge Rockwell Hardness						ASTM F606
			714.13	Tension Control Assemblies	Rotational Capacity Test						ASTM F3125
Bridge Railing	525.11 525.33 525.335 525.34 525.41 525.44	Reset Existing Bridge Railing Bridge Railing, Galvanized 2 Rail Box Beam Bridge Railing, Galvanized 3 Rail Box Beam Bridge Railing, Galvanized 4 Rail Box Beam Bridge Railing, Galvanized HD Steel Beam/Fascia Mounted Bridge Railing, Galvanized, HDSB/Fascia Mounted/Steel Tubing	714.07	Anchor Bolts, Bridge Railing	Ultimate Tensile Stress Ultimate Tensile Stress, Wedge		2 - Each combination of anchor bolt production lot, nut lot, and washer lot to be incorporated into the project	Original Manufacturer Shipping Container at the project or at fabrication facility	N/A	N/A	ASTM F606
	525.45	Bridge Railing, Galvanized Steel Tubing/Concrete Combination	501.03	HPC Structural Concrete	Air Temperature Compressive Strength Spread (SCC) Unit weight (for lightweight aggregate only)	< 10 CY	1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23 ASTM C172 ASTM C172	ASTM C231 ASTM C1064 T 22 ASTM C1611 ASTM C173
			704.14	Lightweight Coarse Aggregate for Concrete	Density (for lightweight aggregate only)		1 per placement	Stockpile at plant	0.5 to 2 cu ft	R 90	T 19
			713.02	Mechanical Splices for Bar Reinforcement	Ultimate Tensile Stress		3 per size	Stockpile on Project (must be fully assembled before delivery to lab)	connector length plus 12 inches of bar on each end	N/A	T 244
			714.07	Anchor Bolts, Bridge Railing	Ultimate Tensile Stress		2 - Each combination of anchor bolt production lot, nut lot, and washer lot to be incorporated into the project	Original Manufacturer Shipping Container at the project or at fabrication facility	N/A	N/A	ASTM F606
	525.70	Bridge Railing, Concrete F-Shape	501.03	HPC Structural Concrete	Air Temperature Compressive Strength Spread (SCC) Unit weight (for lightweight aggregate only)		1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23 ASTM C172 ASTM C172	ASTM C231 ASTM C1064 T 22 ASTM C1611 ASTM C173
			704.14	Lightweight Coarse Aggregate for Concrete	Density (for lightweight aggregate only)		1 per placement	at plant	0.5 to 2 cu ft	R 90	T 19
			713.02	Mechanical Splices for Bar Reinforcement	Ultimate Tensile Stress		3 per size	Stockpile on Project (must be fully assembled before delivery to lab)	connector length plus 12 inches of bar on each end	N/A	T 244

Table 2: Material Sampling Manual Project Level 3

Type of Construction	Pay Item Number	Pay Item Name	Materials Specification Number	Material Name	Test	Minor Quantity Threshold	Minimum Acceptance Sampling Frequency **(per project)**	Acceptance Sampling Location	Sample Size [2]	Procedures	
										Sampling	Testing [1]
Structural Concrete	541.21 541.22 541.25 541.30 541.31 541.40	Concrete, Class AA Concrete, Class A Concrete, Class B Concrete, Class C Concrete, Class D Concrete, Class LW	541.03	Structural Concrete	Air Temperature Compressive Strength	< 10 CY	1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23	ASTM C231 ASTM C1064 T 22
					Unit weight (for lightweight aggregate only)					ASTM C172	ASTM C173
			704.14	Lightweight Coarse Aggregate for Structural Concrete	Density (for lightweight aggregate only)		1 per placement	Stockpile at plant	0.5 to 2 cu ft	R 90	T 19
	541.45	Controlled Density (Flowable) Fill	541.03	Structural Concrete	Air Temperature Compressive Strength		1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 ASTM D5971 Molds to be cut and taped prior to filling in accordance with ACI 229, Section 8.4	ASTM C231 ASTM C1064 ASTM D4832
Concrete Repair	580.10 580.11 580.12 580.13 580.14 580.15 580.19	Repair of Concrete Superstructure, Class I Repair of Concrete Superstructure, Class II Repair of Concrete Superstructure, Class III Repair of Concrete Substructure, Class I Repair of Concrete Substructure, Class II Repair of Concrete Substructure, Class III Concrete, Class AA Overlay	541.03 501.03 501.03	Structural Concrete High Performance Structural Concrete (2011) Performance Based Structural Concrete (2018)	Air Temperature Compressive Strength	< 10 CY	1 per 50 CY (See Note 3)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23	ASTM C231 ASTM C1064 T 22
			780.02 780.03 780.05 (2018)	Overhead and Vertical Concrete Repair Material Rapid Setting Concrete Repair Material Polymer Concrete Repair Material (2018)	Compressive Strength		1 per first 25 units, then 1 per 100 units (bags) after	on project, as close to point of deposit as practical	3 cubes cast on project	R 64	ASTM C109
			780.04	Rapid Setting Concrete Repair Material with Coarse Aggregate	Compressive Strength		1 per first 25 units, then 1 per 100 units (bags) after	on project, as close to point of deposit as practical	1 cu ft for Compressive Strength Cylinders	ASTM C172	ASTM C231
Underdrains	605.10 to 605.23	Underdrain pipe Underdrain Carrier pipe	704.16	Drainage Aggregate	Gradation	< 600 CY	1 per project	Stockpile on Project	55	R 90	T 27
Curbs, Gutters, Traffic Islands, and Sidewalks	616.27 616.28 616.45 (2011) 618.10 618.11 621.45	Cast-in-place Concrete Curb, Type A Cast-in-place Concrete Curb, Type B Portland Cement Concrete Gutter (2011) Portland Cement Sidewalk, 5 inch Portland Cement Sidewalk, 8 inch Concrete Median Barrier (2011)	541.03	Structural Concrete	Air Temperature Compressive Strength	< 10 CY	1 per project	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23	ASTM C231 ASTM C1064 T 22
	616.300 (2011) 616.305	Bituminous Concrete Curb Type A (ton) (2011) Bituminous Concrete Curb Type A (lft)	406.03a	Bituminous Concrete Pavement	Slip AC Content	< 200 TONS of Mix	1 per project	Truck @ Plant or on Project[11]	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 200 TONS of Mix	1 per project	Truck @ Plant or on Project[11]		R 97	T 164 or T 308, T 30
	616.31 (2011) 616.315	Bituminous Concrete Curb Type B (ton) (2011) Bituminous Concrete Curb Type B (lft)	702.04	Emulsified Asphalt	Distillation, Penetration @ 25 °C		1 per project	Distibutor Truck on Project	1 Quart	R 66	T 49, T 59
	616.47 618.15	Bituminous Concrete Gutters and Traffic Islands Bituminous Concrete Sidewalk	616.13	Bituminous Concrete Gutters and Traffic Islands	Slip AC Content	< 200 TONS of Mix	1 per project	Truck @ Plant or on Project[11]	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 200 TONS of Mix	1 per project	Truck @ Plant or on Project[11]		R 97	T 164 or T 308, T 30
			406.03a	Bituminous Concrete Pavement	Slip AC Content	< 200 TONS of Mix	1 per project	Truck @ Plant or on Project[11]			Truck Slip Calculation
					Gradation	< 200 TONS of Mix	1 per project	Truck @ Plant or on Project[11]		R 97	T 164 or T 308, T 30
			490.03a (2011) 406.03B (a) (2018)	Superpave Bituminous Concrete Pavement (2011) Bituminous Concrete Pavement (2018)	Slip AC Content	< 200 TONS of Mix	1 per project	Truck @ Plant or on Project[11]	Dependent on mix type[9]		Truck Slip Calculation
					Gradation	< 200 TONS of Mix	1 per project	Truck @ Plant or on Project[11]		R 97	T 164 or T 308, T 30

Table 2: Material Sampling Manual Project Level 3

Type of Construction	Pay Item Number	Pay Item Name	Materials Specification Number	Material Name	Test	Minor Quantity Threshold	Minimum Acceptance Sampling Frequency **(per project)**	Acceptance Sampling Location	Sample Size [2]	Procedures: Sampling	Procedures: Testing [1]
Sign Foundations, Over Head Traffic Sign Supports, Traffic Control Signals & Street Lighting	675.40 (2011) 675.41 675.42 675.43	Foundation for W-Shape Steel Post (18 (2011), 24, 30 inch diameter) Foundation for Tubular Steel Post	541.03	Structural Concrete	Air Temperature Compressive Strength	< 10 CY	1 per project	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23	ASTM C231 ASTM C1064 T 22
	677.12 677.13 677.22 677.23 677.25 678.15 679.46	Overhead Traffic Sign Support, Cantilever Overhead Traffic Sign Support, Multi-Support Overhead Traffic Sign Support, Cantilever with Lighting Overhead Traffic Sign Support, Multi-support with Lighting Remove and Reset Overhead Traffic Sign Support Traffic Control Signal System, Intersection Street Light Assembly	541.03	Structural Concrete	Air Temperature Compressive Strength	< 10 CY	1 per 75 CY (See Note 4)	on project, as close to point of deposit as possible[7]	1 cu ft for Compressive Strength or wheelbarrow needed for all tests	ASTM C172 T 23	ASTM C231 ASTM C1064 T 22
			714.05	High Strength Bolts, Nuts and Washers	Ultimate Tensile Strength Ultimate Tensile Strength, Wedge Rockwell Hardness		4 - Each combination of bolt production lot, nut lot, washer lot, and DTI lot (4 - Each combination Tension Control Assembly Bolt production lot if used) to be incorporated into the project for main member connections as designated in the Contract or as defined in 714.01, or other connections as deemed necessary by	Original Manufacturer Shipping Container at the project or at fabrication facility	N/A	N/A	ASTM F606
			714.06	Heat Treated Structural Bolts	Ultimate Tensile Strength Ultimate Tensile Strength, Wedge Rockwell Hardness						ASTM F606
			714.09	Anchor Bolts, Traffic Signals, Lighting, and Overhead Sign Structures (see note 10)	Ultimate Tensile Strength		1 - Each anchor bolt production lot to be incorporated into the project. Include washer and nut with sample.	Original Manufacturer Shipping Container at the project or at fabrication facility	1 bolt, including threads (at least 18" long)	N/A	ASTM F606

Notes:

(1) Testing procedures are AASHTO procedures unless otherwise noted.

(2) Sample size is in pounds unless otherwise noted. The sample size should be selected based on the maximum nominal aggregate size (See AASHTO T27, Section 7.1). For example, if the material visually passes a 2", 1.5", or 1" sieve then the sample size is 220 lbs, 165 lbs, and 110 lbs, respectively.

(3) Total placement for day split into equal sublots not to exceed 50 CY, test yardage chosen randomly. The test yardage is used to determine which load to test with proper sample collection techniques followed Check first load for temperature, and air content. This will not be counted as the acceptance test for the first sublot. If the first load is determined to be out-of-specification then the Contractor must test each consecutive load until 3 consecutive passing loads are tested. VTrans will check 4th consecutive load to verify. Deck pours shall have no less than 3 acceptance tests, regardless of total CY placed. Acceptance tests shall be a minimum of 2 standard cured cylinder specimens in accordance with applicable test method. Acceptance tests for 541.40 Concrete, Class LW shall be a minumum of 3 standard cured cyinder speciments in accordance with applicable test method.

(4) Temperature and air content will be checked at the begining of the first load. This will not be counted as the acceptance test.

(5) Acceptance tests are to be performed by Owner representative at the frequency indicated, per project. However, all QC tests are to be witnessed by Owner representative. Minimum of six Compressive Strength for determining detensioning, to be cured with the piece. Four specimens to determine 28 day and shipping strengths and are to be cured with the piece until it is stripped and then standard cured.

(6) Acceptance tests are to be performed by Owner representative at the frequency indicated, per project. However, all QC tests are to be witnessed by Owner representative. As a minimum, the first load as well as the load that the Compressive Strength are fabricated from should be tested by QC.

(7) If the sample cannot be safely obtained from the end of pump truck hose at the point of placement (i.e. without retracting the hose from within formwork), the sample should be obtained from the mixer truck.

(8) Depends upon the mix type. For mixes with 3/4", 1/2", and 3/8" stone the sample size is 165 lbs, 55 lbs, and 22 lbs respectively.

(9) The sample size for HMA depends upon the nominal maximum aggregate in the mix, see following table. Minimum sample sizes are in accordance with AASHTO T168 and are suitable for routine testing. However, actual sample size is dependent upon the type and number of tests to which the material is to be subjected. AC Content is determined from the mass (weight) or percentage printed on the weight slip or demand ticket.

(10) Acceptance testing is not required for anchor bolts for traffic signal controllers and cabinets or pedestal poles.

(11) Bituminous mixtures sampled on project shall be sampled from the paver hopper, material transfer vehicle hopper, or the paver auger in accordance with AASHTO R 97.

(12) For projects less than 1250 CY of subbase material, the Agency shall be responsible for the testing and projects over 1250 CY the Contractor is responsible for the determination of the target density. For each source, subbase materials shall be sampled and tested once for the first 1250 CY and then once every 3000 CY thereafter.

(13) Acceptance sampling will occur at the frequency prescribed with acceptance testing occuring at a minimum frequency of 1/3,000 Tons of mix. Acceptance testing may occur at the 1/1,500 Tons of mix sampling frequency at the discretion of the HMA Materials Manager.

Mix Type:	MS	I / IS	II / IIS	III / IIIS	IV / IVS	VS	VI / VIS
Maximum Nominal Aggregate Size, in:	1 1/2"	1"	3/4"	1/2"	3/8"	3/16"	3/16"
Minimum Sample Size, lbs:	25	20	16	12	8	4	4

MATERIAL SAMPLING FREQUENCY TABLES – LEVEL 4

The acceptance of the materials and corresponding pay items identified in the table below can be based on an approved source, registration on the Agency's Approved Products List (APL), acceptable material test results, or compliant material certifications (submitted prior to their use). The Agency Representative should ensure that these material certifications and test results are filed appropriately.

Applicable sections of the VTrans Standard Specifications for Construction referenced below are included in the chart in bold type.

Table 3

Material Identification	VTrans Pay Item No.	Recommended Basis for Acceptance
Aggregates	**varies**	One sample per project is required for each material that possesses a quantity greater than 200 CY.
Bridge Membranes	----	Contract Special Provisions
Culverts (Steel and HDPE)	**601**	Purchasing Contract – must satisfy material specifications in accordance with **710** and **711.**
Cast-in-Place Culvert Liners	----	Contract Special Provisions or APL
Epoxies	----	APL
Hot Mix Asphalt	**400 series**	Purchasing Contract – Contractor's Test Results. (Reference Table 406.03I in 2018 Standard Specifications for Construction for Air Voids, Mix Temperature, and Extracted Gradations.) An Agency Approved Mix Design and batch slips are required.
Precast Concrete Items	**varies**	Purchasing Contract – Type A Certification with Contractor's Test Results. An Agency Approved Mix Design is required.
Reinforcing Steel	**----**	Type D Certification
Retroreflective Pavement Markings	**646**	Must satisfy material specification requirements in Section **708**
Structural Bolts	**506.19**	Type D Certification —- **714.05**
Structural Concrete	**501, 541**	Purchasing Contract – Contractor's Test Results. (28-day Compression strength and entrained air) An Agency Approved Mix Design and batch slips are required.
Traffic Barriers	**621**	Must satisfy material specification requirements in Section **728**
Traffic Signal Equipment	**678**	Must satisfy material specification requirements in Section **752**
Traffic Signs	**675**	Must satisfy material specification requirements in Section **750**

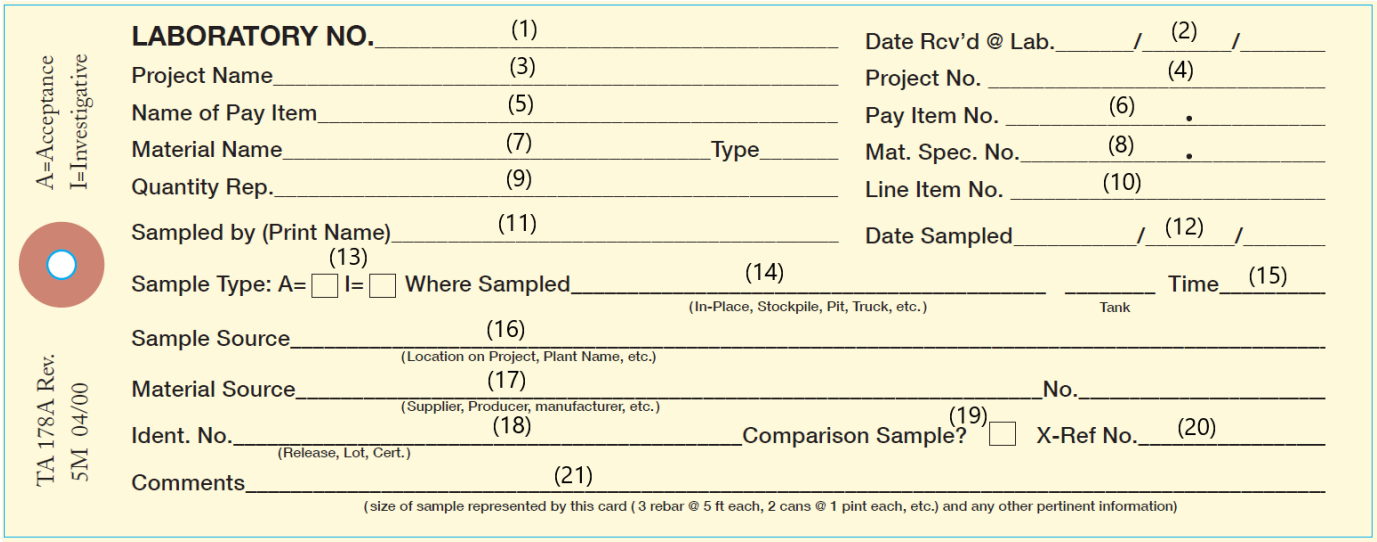
MARKING OF SAMPLES

All samples that are to be tested at the Agency's Central Laboratory or other Qualified Laboratories must be properly identified with a sample card, sample tag, or printed label. Sample identification should be completed **with all the indicated information** and attached to the sample container immediately after the sample is taken. Sample identification should be attached in a manner which will prevent their loss or damage during handling and transport. The individual receiving the sample at the laboratory shall date and initial the sample identification immediately upon receipt.

Sample tags should be made out as indicated below.

Please clearly indicate the Site Manager Project Line Item for the sampled material on the card. Examples of where this information can be documented are included below.

SAMPLE TAG EXAMPLE



INSTRUCTIONS FOR SAMPLE TAGS

(1) To be entered by Central Laboratory personnel.

(2) To be entered by Central Laboratory personnel.

(3) Enter the project name.

(4) Enter the project number.

(5) The pay item name, e.g., bituminous concrete pavement, subbase of gravel, structural steel.

(6) The number that coincides with the pay item name.

(7) The name of the material being submitted, e.g., asphalt cement, stone grits. "Type" is for hot-mix and reinforcing steel.

(8) The specification number assigned to the material submitted (normally a 700 series number.)

(9) The project quantity, including units, that the sample represents, e.g., gal., cwt, yd^3, tons.

(10) Enter the Site Manager Project Line Item number. Enter Work Package number for Design-Build projects.

(11) The first and last name of the person taking the sample should be printed followed by their signature. District personnel should include their district number. Personnel outside of the VTrans should identify their organization.

(12) The date the sample was taken.

(13) Check appropriate box for type of sample being submitted, e.g., Acceptance or Investigative.

(14) The construction location where the sample was obtained, e.g., stockpile, tank, transport, paver, roadway.

(15) Time and condition sample was taken.

(16) The supplier and location where the sample was obtained, e.g., station and offset on the project, Pike - Berlin, Barker Steel.

(17) The name of the manufacturer, producer, or owner of the pit / quarry where the material originated. For rebar samples both the supplier and manufacturer should be specified.

(18) Enter any available identifying number, e.g., release number, certification number, heat number.

(19) Check this box when an Independent Assurance sample is simultaneously taken with an Acceptance sample.

(20) Number used to cross-reference Independent Assurance samples with Acceptance samples. This number is assigned by VTrans' Independent Assurance personnel

(21) Enter special information or notes applicable to the sample, e.g., reinforcing steel grade and release number, hot mix AC content, temperature, etc.

VERMONT AGENCY OF TRANSPORTATION
MATERIALS AND RESEARCH SECTION
REPORT ON SAMPLE OF PORTLAND CEMENT / POZZOLAN

Proj. Name (1) Proj. No. (1) .
Lab. No (2) I.D. Marks (3) Quant. Represented (4) .
Name (5) Pay Item (6) Type (7) .
Sample/Submitted By (8) Title (8) Tested By (9) .
Sampled (10) Received (11) Tested (12) Reported (13) .
Date Ground (14) Resident (15) .
Sample From (16) Plant (17) .
Source (18) .
Location Used/To Be Used (19) Exam. For (20) .

SAMPLE CARD FOR PORTLAND CEMENT AND POZZOLAN, DESCRIPTION OF ENTRIES

(1) Project name(s) and number(s) represented by the cement or pozzolan sample.

(2) Entered by technician at the Central Laboratory.

(3) The kind of sample: Acceptance, Investigative, Verification or IA.

(4) Cubic yards of concrete represented by the cement, pozzolan, or mortar sample.

(5) Name of the cementitious product you are submitting; e.g., Portland cement, Fly Ash, Blended Cement, Tercem, Slag, Mortar Type IV

(6) Pay item number in which the cementitious material or grout is used.

(7) Type of cement, pozzolan, or mortar. Use Roman Numerals and pozzolan descriptor; e.g., I/II or II for Portland cement, II/SF for blended cement, II/SF/Slag for Tercem, FA for Fly Ash, and S for Slag, IV for Mortar Type IV.

(8) First and last name and employer of person submitting sample.

(9) Name of Central Laboratory technician testing the sample.

(10) Date sample was taken.

(11) Date sample was received at Central Laboratory.

(12) Date sample was tested. Entered by Technician at the Central Laboratory.

(13) Date sample test results were reported. Entered by Technician at the Central Laboratory.

(14) Use this space to enter the Sitemanager Line Item number, or Work Package number for Design-Build projects.

(15) Name of the Resident Engineer.

(16) Location where the sample was obtained; e.g., weigh hopper, silo, Bucket loader, Tanker. Or for mortars; mixer, wheelbarrow, etc.

(17) Ready mix producer's name and plant location. Applicable for plant-mixed mortars, not applicable for bagged products.

(18) Name of cement, pozzolan, or mortar manufacturer, i.e., plant source/location, or Brand and product name, i.e. Sika Grout 212.

(19) Location where concrete or mortar is to be used; e.g., bridge abutment, footing.

(20) Materials specification number for which the sample is to be tested; e.g., 701.02. 707.03

For cement/pozzolan samples, the reverse of the card is not filled out by sampler.

For mortar samples, the reverse side of the card is used to indicate the desired age of breaks for the cubes.

REPORT ON CONCRETE TEST BEAMS OR CYLINDERS

A. Front Side:

Laboratory No.....(filled by M&R Lab).....Line Item No……(0)…….
Pay Item Name.....(1)..... Pay Item No.....(2)..... ....
Material Name.....(3)..... Class.....(4)..... Material Spec. No..... (5)..... . ...
Quantity Rep.....(6)..... Date Sampled.....(7)..... Time Sampled.....(8)..... ....
Sample Type V☐ A☐ I☐ IA☐ (9) Sampled From..... …….(10)..... ....
Material Source.....(11).....__ __ __ __
Project Name.....(12)..... No.....(13).....__ __ __ __ __ __
Resident.....(14)..... Field Tested By.....(15)..... .....
Comparison Sample __ (16) X-Ref No.....(17)..... Lab Tested By.....(18).....
Location Used.....(19)..... Coarse Aggregate.....(20)..... ..... __ __ __ __
Fine Aggregate.....(20)..... __ __ __ __ Total Aggregate Dry Mass (Wgt.).....(21).....
Cement Brand.....(22)..... __ __ __ __ Type.....(23)..... Mass (Wgt.)/Vol. .....(24).....
Air Entraining Admixture.....(25)..... __ __ __ __ Dosage.....(26).....
Admixture.....(27)..... __ __ __ __ Dosage.....(28).....
Admixture.....(27)..... __ __ __ __ Dosage.....(28)..... .....

B. Back Side:

TEST RESULTS

Unit Mass (Weight) Fresh Concrete.....(29)..... Air.....(30)..... Slump.....(31).....

Total Water.....(32)..... w/c Ratio....(33).... Temperature, Concrete.....(34)..... Ambient.....(35).....

Specimen No.	Cyl	Date Received	Date Broken	Desired Age At Break	Age at Break	Hour of Break	Cure Type S/F *	Indiv. Break	Avg. Break
s				(37)			(38)		

* S = Standard Cure
F = Field Cure

Comments: (39)

Description of fields in the:

REPORT ON CONCRETE TEST BEAMS OR CYLINDERS

A. Front Side:

(0) Line Item number, or Work Package number for Design-Build projects.

(1) Pay item name, e.g., Concrete, Class B.

(2) Pay item number, e.g., 501.25, 616.27, etc.

(3) Material name, e.g., Portland cement concrete, silica fume concrete, etc.

(4) Class of concrete, e.g., AA, A, B, HPC-A etc..

(5) Specification reference for the specimen to be tested, e.g., 2011 VTrans Standard Specifications for Construction, Table 501.03A for cylinders

(6) Cubic yards of concrete represented by test specimens.

(7) The date the sample was taken.

(8) The time the sample was taken, using "military 24 hour time", e.g., 0845, 1420, etc.

(9) Check appropriate box for type of sample being submitted. See definitions, page 7.

(10) The location where the sample was obtained, e.g., truck, bucket, pump, etc. (Include truck number and/or load number.)

(11) Name and location of ready-mix plant.

(12) Project name that the sample applies to.

(13) Project number assigned to the project name.

(14) Print first initial and last name of the Resident Engineer assigned to the project.

(15) Print first initial and last name of person performing field tests and molding concrete test specimens.

(16) Check this box when an Independent Assurance sample is taken simultaneously with an Acceptance sample.

(17) Number used to cross-reference Independent Assurance samples with Acceptance samples. Assigned by Central Laboratory Personnel.

(18) Entered by Central Laboratory personnel.

(19) Specific part(s) of structure represented by test specimens, e.g., abutment, wingwall, drop inlet covers etc. Maximum of 40 characters.

(20) Name and location of coarse aggregate supplier and fine aggregate supplier.

(21) Total dry weight of coarse and fine aggregate per cubic yard in pounds.

(22) The name of the cement manufacturer.

(23) Type of cement.

(24) Pounds of cement per cubic yard.

(25) Enter brand name of air entraining admixture, e.g., Microair, Darex II, etc.

(26) Volume in fluid ounces per cubic yard of concrete or per cwt of cementitious material.

(27) Enter brand name of other admixture(s), e.g., WRDA Hycol, Pozzolith 322N, Daratard 17, fly ash, ground granulated blast furnace slag, etc.

(28) Volume in fluid ounces per cubic yard of concrete or per cwt of cementitious material for chemical admixtures. Weight per cubic yard of concrete for mineral admixtures.

B. Back Side:

(29) Unit weight of fresh concrete in pcf.

(30) Air content of fresh concrete in percent (to nearest 0.1%), e.g., 4.5, 5.7.

(31) Slump to the nearest nearest 0.25 inch, e.g., 2.25 in.

(32) Total gallons of water used per cubic yard including water batched, water added on project site and free aggregate moisture.

(33) Water / cementitious material ratio. Total amount of water in gallons per cubic yard multiplied by 8.345 lb. /gal., divided by the weight of cementitious material in lbs. per cubic yard.

(34) Concrete temperature in degrees Fahrenheit.

(35) Ambient temperature in the shade at the project site in degrees Fahrenheit.

(36) Specimen identification number (six characters maximum).

(37) Desired age at which specimens are to be tested.

(38) "S" for standard cured or "F" for field cured.

(39) Other information regarding test specimens. Thirty-five characters maximum, e.g., frozen specimens, etc

SAMPLE CARD EXAMPLES

LABORATORY NO. _____ Date Rcv'd @ Lab. ___/___/___

Project Name Guilford Project No. IM 091-1(33)

Name of Pay Item Subbase, of Crushed Gravel, Fine Graded Pay Item No. 301.26

Material Name Crushed Gravel for Subbase Type _____ Mat. Spec. No. 704.05

Quantity Rep. 1000 CY Line Item No. 0105

Sampled by (Print Name) John Doe Date Sampled 02/17/09

Sample Type: A=☒ I=☐ Where Sampled In Place (In-Place, Stockpile, Pit, Truck, etc.) _____ Tank Time _____

Sample Source Sta. 2+328, Q (Location on Project, Plant Name, etc.)

Material Source Cersosimo - Bemis Quarry, Vernon, VT (Supplier, Producer, manufacturer, etc.) No. _____

Ident. No. _____ (Release, Lot, Cert.) Comparison Sample? ☐ X-Ref No. _____

Comments 1 bag, approx. 100 lbs. (size of sample represented by this card (3 rebar @ 5 ft each, 2 cans @ 1 pint each, etc.) and any other pertinent information)

Aggregate Sample Card

LABORATORY NO. _____ Date Rcv'd @ Lab. ___/___/___

Project Name CHARLOTTE Project No. FEGC 019-4(20)

Name of Pay Item EMULSIFIED ASPHALT Pay Item No. 404.65

Material Name EMULSIFIED ASPHALT Type RS-1 Mat. Spec. No. 702.04

Quantity Rep. 200 CWT Line Item No. 0075

Sampled by (Print Name) JOHN DOE Date Sampled 10/19/17

Sample Type: A=☑ I=☐ Where Sampled TRUCK (In-Place, Stockpile, Pit, Truck, etc.) _____ Tank Time 14:02

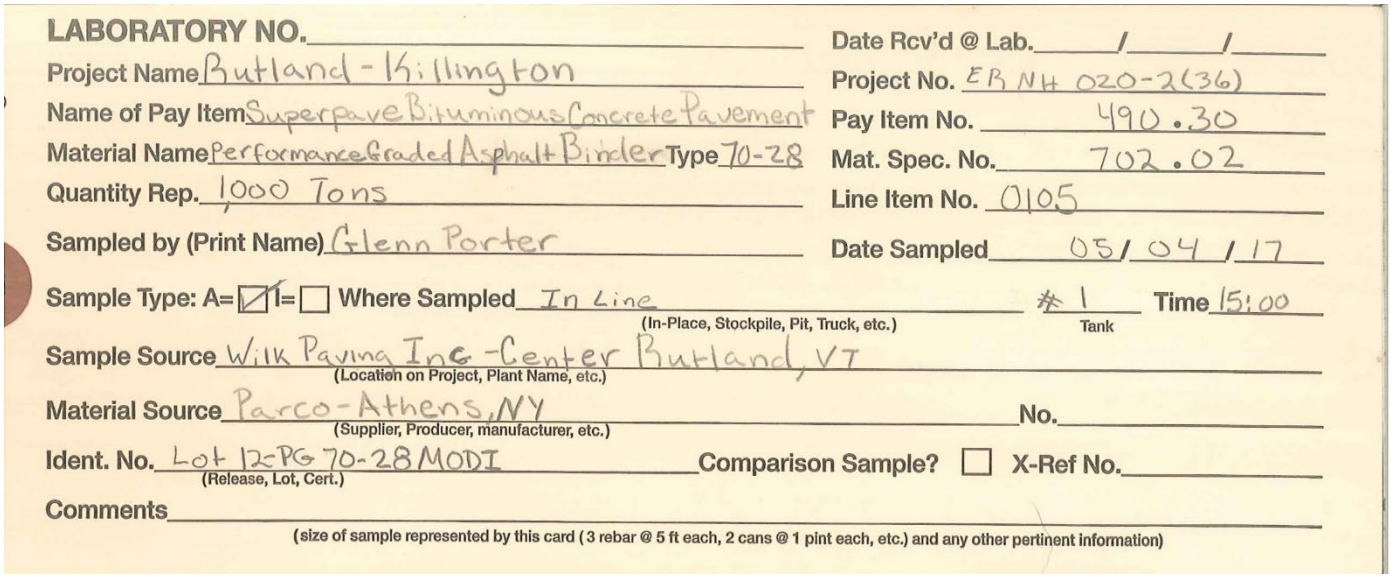
Sample Source Sta 160+00 O/S (SB Shoulder) (Location on Project, Plant Name, etc.)

Material Source MOHAWK ASPHALT EMULSIONS (Supplier, Producer, manufacturer, etc.) No. LOT # 36

Ident. No. _____ (Release, Lot, Cert.) Comparison Sample? ☐ X-Ref No. _____

Comments _____ (size of sample represented by this card (3 rebar @ 5 ft each, 2 cans @ 1 pint each, etc.) and any other pertinent information)

Emulsion Sample Card



LABORATORY NO. _____ Date Rcv'd @ Lab. ___/___/___

Project Name Butland - Killington Project No. ER NH 020-2(36)

Name of Pay Item Superpave Bituminous Concrete Pavement Pay Item No. 490.30

Material Name Performance Graded Asphalt Binder Type 70-28 Mat. Spec. No. 702.02

Quantity Rep. 1,000 Tons Line Item No. 0105

Sampled by (Print Name) Glenn Porter Date Sampled 05/04/17

Sample Type: A=☑ I=☐ Where Sampled In Line (In-Place, Stockpile, Pit, Truck, etc.) # 1 (Tank) Time 15:00

Sample Source Wilk Paving Inc - Center Butland, VT (Location on Project, Plant Name, etc.)

Material Source Parco - Athens, NY (Supplier, Producer, manufacturer, etc.) No. _____

Ident. No. Lot 12-PG 70-28 MODI (Release, Lot, Cert.) Comparison Sample? ☐ X-Ref No. _____

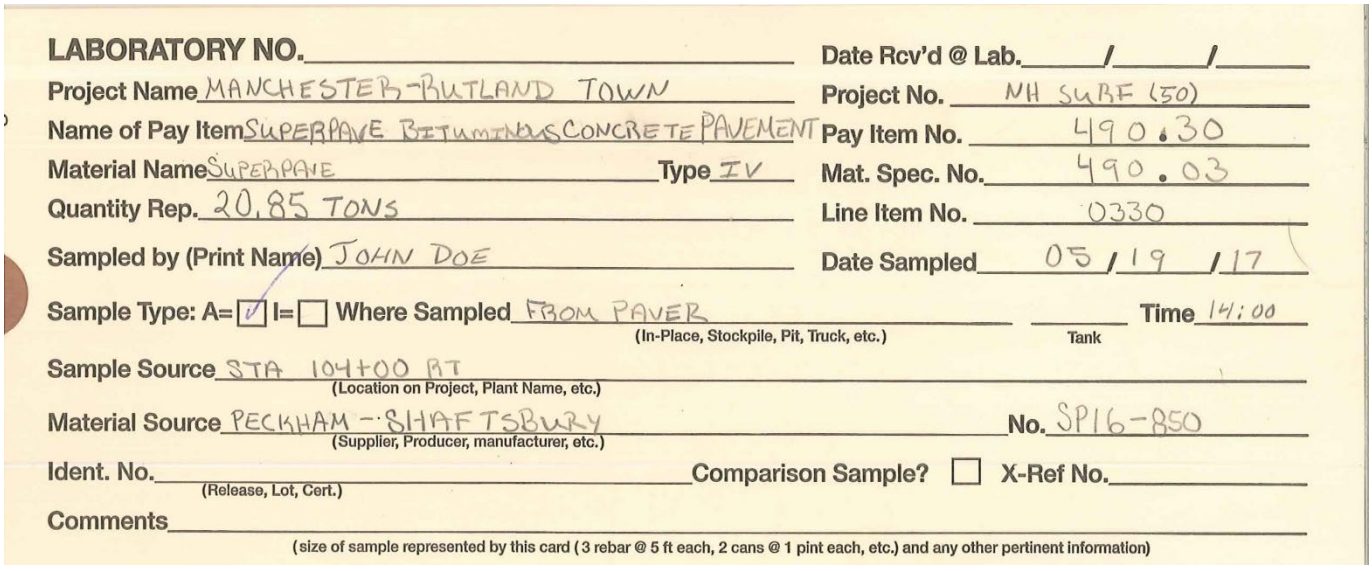
Comments _____

(size of sample represented by this card (3 rebar @ 5 ft each, 2 cans @ 1 pint each, etc.) and any other pertinent information)

Performance Graded Binder Sample Card

Note For PG Binder Samples: In addition to the information required on the sample tag, be sure to include the combined aggregate bulk specific gravity, the mix design number, the load slip number, the computed slip asphalt content, the mix temperature, the asphalt specific gravity, the time batched and the test number. **Do not use the sample container as a sample tag.**

Bituminous Concrete Pavement Sample Card



LABORATORY NO. _____ Date Rcv'd @ Lab. ___/___/___

Project Name MANCHESTER-BUTLAND TOWN Project No. NH SURF (50)

Name of Pay Item SUPERPAVE BITUMINOUS CONCRETE PAVEMENT Pay Item No. 490.30

Material Name SUPERPAVE Type IV Mat. Spec. No. 490.03

Quantity Rep. 20.85 TONS Line Item No. 0330

Sampled by (Print Name) JOHN DOE Date Sampled 05/19/17

Sample Type: A=☑ I=☐ Where Sampled FROM PAVER (In-Place, Stockpile, Pit, Truck, etc.) _____ (Tank) Time 14:00

Sample Source STA 104+00 RT (Location on Project, Plant Name, etc.)

Material Source PECKHAM - SHAFTSBURY (Supplier, Producer, manufacturer, etc.) No. SP16-850

Ident. No. _____ (Release, Lot, Cert.) Comparison Sample? ☐ X-Ref No. _____

Comments _____

(size of sample represented by this card (3 rebar @ 5 ft each, 2 cans @ 1 pint each, etc.) and any other pertinent information)

TA 1820 Rev. 1M 4-92

VERMONT AGENCY OF TRANSPORTATION
MATERIALS AND RESEARCH DIVISION
MONTPELIER, VERMONT 05633

REPORT ON CONCRETE TEST BEAMS OR CYLINDERS

Laboratory No. _____
Pay Item Name CONCRETE, HIGH PERFOMANCE Pay Item No. 501.34
Material Name CONCRETE, H.P. Class B Material Spec. No. 701.02
Quantity Rep CY | LF | CM Date Sampled 2/17/09 Time Sampled 12:00PM
Sample Type U ☐ P ☐ A ☒ I ☐ IA ☐ Sample From LOAD ? TRK.?
Material Source PLANT NAME, LOCATION ☐☐☐☐
Project Name BRADFORD No. STP 9602(33) ☐☐☐☐☐
Resident BOB HOPE Field Tested By JAKE SMITH
Comparison Sample ☐ X-Ref No _____ Lab Tested By _____
Location Used FOOTING Coarse Aggregate (SUPPLIER) 1732
Fine Aggregate (SUPPLIER) 1006 Total Aggregate Wgt. 2732
Cement Brand (MANUFACTURER) ☐☐☐☐ Type 1/11 Lbs./cy 449 lb/cy
Air Entraining Admixture AIR ☐☐☐☐ Dosage 3.5 oz/cy
Admixture WATER REDUCER ☐☐☐☐ Dosage 3 oz/cwt
Admixture RETARDER ☐☐☐☐ Dosage 2 oz/cwt
FLY ASH DOSAGE 50 lbs/cy
SILICA FUME DOSAGE 25 lbs/cy

Front of Concrete Cylinder Sample Card

TEST RESULTS

Unit Weight Fresh Concrete 147.60 Air 5.9% Slump 6.25
Total Water 30.9 gal/cy w/c Ratio 0.40 Temperature, Concrete 70 °F Ambient 68 °F

Specimen No.	Cyl pcf	Date Received	Date Broken	Desired Age at Break	Age At Break	Hour of Break	Cure Type S/F*	Indiv. Break psi	Avg. Break psi
A2A-1					7				
A2A-2					7				
A2A-3					14.				
A2A-4					14				
A2A-5					28				
A2A-6					28				

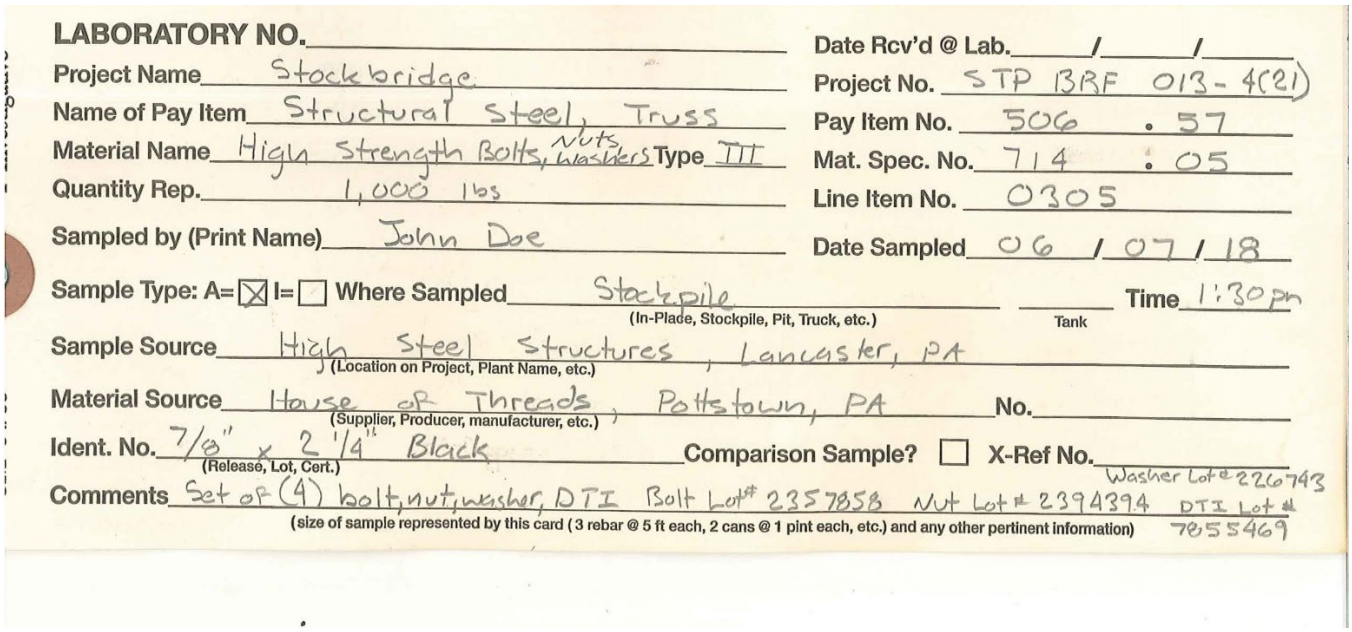
* S = Standard Cure; F = Field Cure

Comments: LINE ITEM Nº _____

NOTE: PLEASE CALL (802-) WITH RESULTS

PMS Nº _____

Back of Concrete Cylinder Sample Card



LABORATORY NO. _____ Date Rcv'd @ Lab. ___/___/___

Project Name Stockbridge Project No. STP BRF 013-4(21)

Name of Pay Item Structural Steel, Truss Pay Item No. 506 . 57

Material Name High Strength Bolts, Nuts, Washers Type III Mat. Spec. No. 714 . 05

Quantity Rep. 1,000 lbs Line Item No. 0305

Sampled by (Print Name) John Doe Date Sampled 06 / 07 / 18

Sample Type: A=☒ I=☐ Where Sampled Stockpile (In-Place, Stockpile, Pit, Truck, etc.) _____ Tank Time 1:30 pm

Sample Source High Steel Structures, Lancaster, PA (Location on Project, Plant Name, etc.)

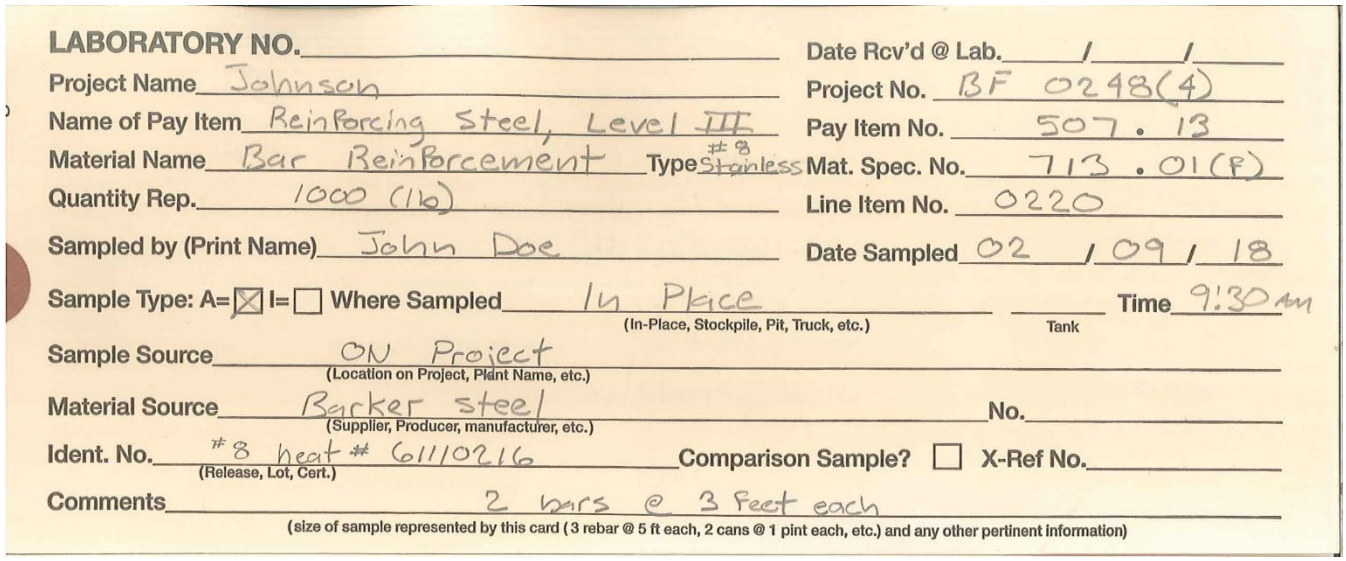
Material Source House of Threads, Pottstown, PA (Supplier, Producer, manufacturer, etc.) No. _____

Ident. No. 7/8" x 2 1/4" Black (Release, Lot, Cert.) Comparison Sample? ☐ X-Ref No. _____

Comments Set of (4) bolt, nut, washer, DTI Bolt Lot# 2357858 Nut Lot # 2394394 DTI Lot # 7855469 Washer Lot # 226743

(size of sample represented by this card (3 rebar @ 5 ft each, 2 cans @ 1 pint each, etc.) and any other pertinent information)

Bolts/Washers/Nuts Sample Card



LABORATORY NO. _____ Date Rcv'd @ Lab. ___/___/___

Project Name Johnson Project No. BF 0248(4)

Name of Pay Item Reinforcing Steel, Level III Pay Item No. 507 . 13

Material Name Bar Reinforcement Type #8 Stainless Mat. Spec. No. 713 . 01(F)

Quantity Rep. 1000 (lb) Line Item No. 0220

Sampled by (Print Name) John Doe Date Sampled 02 / 09 / 18

Sample Type: A=☒ I=☐ Where Sampled In Place (In-Place, Stockpile, Pit, Truck, etc.) _____ Tank Time 9:30 AM

Sample Source ON Project (Location on Project, Plant Name, etc.)

Material Source Barker steel (Supplier, Producer, manufacturer, etc.) No. _____

Ident. No. #8 heat # 6111021G (Release, Lot, Cert.) Comparison Sample? ☐ X-Ref No. _____

Comments 2 bars @ 3 feet each

(size of sample represented by this card (3 rebar @ 5 ft each, 2 cans @ 1 pint each, etc.) and any other pertinent information)

Reinforcing Steel Sample Card

TA 182H Rev. 1000 8-07

VERMONT AGENCY OF TRANSPORTATION
MATERIALS AND RESEARCH DIVISION
MONTPELIER, VERMONT 05602

REPORT ON SAMPLE OF PORTLAND CEMENT

Proj. Name STOCKBRIDGE Proj. No. STP BRF 013-A(21)

Lab No. _____ I.D. Marks ACC. Quant. Represented 10 CY

Name FLY ASH / SLAG Pay Item 501 / 541 Type FA / SLAG

Sample/Submitted By JOHN DOE Title TECH IV Tested By _____

Sampled 02/17/09 Received 02/18/09 Tested _____ Reported _____

~~Date Ground~~ SM. LWE ITEM 0110 Resident D. BASSETT

Sample From TANKER Plant CARROLL CONCRETE, RANDOLPH, VT

Source LAFARGE

Location Used/To Be Used BRIDGE DECK Exam, For 701.XX

Flyash / Slag Cement Sample Card

TA 182H Rev. 1000 8-07

VERMONT AGENCY OF TRANSPORTATION
MATERIALS AND RESEARCH DIVISION
MONTPELIER, VERMONT 05602

REPORT ON SAMPLE OF PORTLAND CEMENT

Proj. Name STOCKBRIDGE Proj. No. STP BRF 013-4(21)

Lab No. _____ I.D. Marks ACC. Quant. Represented 20 CY

Name BLENDED CEMENT / PORTLAND CEMENT Pay Item 501 / 541 Type I / II SF

Sample/Submitted By JOHN DOE Title TECH IV Tested By _____

Sampled 02/21/09 Received 02/22/09 Tested _____ Reported _____

~~Date Ground~~ SM LINE ITEM 0110 Resident D. BASSETT

Sample From BUCKET LOADER Plant CARROLL CONCRETE, W. LEBANON, NH

Source CIMENT QUEBEC

Location Used/To Be Used BRIDGE ABUTMENT Exam, For 701.XX

Portland / Blended Cement Sample Card

LABORATORY NO. _____ Date Rcv'd @ Lab. ___/___/___

Project Name Johnson Project No. BF 0248(4)

Name of Pay Item (6 inch) Yellow Line Pay Item No. 646 . 215

Material Name Waterborne Traffic Paint Type ____ Mat. Spec. No. 708 . 08(d)

Quantity Rep. 75,000 LF Line Item No. 0210

Sampled by (Print Name) John Doe Date Sampled 01 / 15 / 18

Sample Type: A=☐ I=☒ Where Sampled Sprayer Truck on Project (In-Place, Stockpile, Pit, Truck, etc.) ____ Tank Time 9:30 AM

Sample Source L+D Safety Marking (Location on Project, Plant Name, etc.)

Material Source Ennis - Flint (Supplier, Producer, manufacturer, etc.) No. _____

Ident. No. CPP 1707Y 1371 (Release, Lot, Cert.) Comparison Sample? ☐ X-Ref No. _____

Comments 2 cans @ 1 Pint ☆ For addition to ANDPMBL ☆

(size of sample represented by this card (3 rebar @ 5 ft each, 2 cans @ 1 pint each, etc.) and any other pertinent information)

Paint Sample Card

SAMPLING CONSIDERATIONS

SAMPLING REINFORCING BARS

Size of Sample

The minimum length of straight bar or element required for testing is 3 feet, and the minimum number of test sections required is two. These may be obtained either from a single 6 foot straight section or from two bent bars that also contain at least 3 feet of straight bar.

SAMPLING FRESH CONCRETE

Care and Identification of Concrete Cylinders for Compressive Strength Testing

a. Specimens shall be molded on a level, rigid surface, free of vibration and other disturbances. Test cylinders must be stored on a level surface. Specimens received at the Central Laboratory with ends which are not cast with a plane perpendicular to the axis will be discarded.

b. Initial Curing: Immediately after molding and finishing, the specimens shall be stored for a period up to 48 h in a temperature range from 16 to 27°C (60 to 80°F) in an environment preventing moisture loss from the specimens. For concrete mixtures with a specified strength of 40 MPa (6000 psi) or greater, the initial curing temperature shall be between 20 and 26°C (68 and 78°F). Various procedures are capable of being used during the initial curing period to maintain the specified moisture and temperature conditions. An appropriate procedure or combination of procedures shall be used. Shield all specimens from direct sunlight and, if used, radiant heating devices. The storage temperature shall be controlled by the use of heating and cooling devices, as necessary. Record the temperature using a maximum-minimum thermometer. If cardboard molds are used, protect the outside surface of the molds from contact with wet burlap or other sources of water.

c. Standard Curing: On completion of initial curing and within 30 min after removing the molds, cure specimens with free water maintained on their surfaces at all times at a temperature of 23 ± 2°C (73.5 ± 3.5°F) using water storage tanks or moist rooms complying with the requirements of Specification M 201, except immediately before testing. Specimens that are to be transported to the Central Laboratory within the initial 48 hour curing period shall remain in their molds in a moist environment, until they are received in the laboratory. Standard cured specimens which are not to be transported within the initial 48 hour curing period shall be removed from the molds and stored in a concrete curing box conforming to that described in AASHTO M 201.

d. Field Curing: Store cylinders in or on the structure as near to the point of deposit of the concrete represented as possible. Protect all surfaces of the cylinders from the elements in as near as possible the same way as the formed work. Provide the cylinders with the same temperature and moisture environment as the structural work. Test the specimens in the moisture condition resulting from the specified curing treatment. To meet these conditions, specimens made for the purpose of determining when a structure is capable of being put in service shall be removed from the molds at the time of removal of form work.

e. Prior to transporting, cure and protect specimens as required in b, c, and d above. Specimens shall not be transported until at least 8 h after final set. Final set can be safely assumed to occur 10 hours after mixing. During transporting, protect the specimen with suitable cushioning material to prevent damage from jarring. During cold weather, protect the specimens from freezing with suitable insulation material. Prevent moisture loss during transportation by wrapping the specimens in plastic, wet burlap, by surrounding them with wet sand or tight-fitting plastic caps on plastic molds. Transportation time shall not exceed 4 h.

f. Molds shall be labeled with required identification before the specimens are cast, and this identification shall be transferred to the cylinders immediately after removal from the molds. Each cylinder should be identified by number and/ or letter, which is also entered on the back of the "Report on Concrete Cylinders" card.

g. If the Resident Engineer requires “early breaks” to determine the strength of the concrete prior to 28 days, the Resident Engineer shall notify the Central Laboratory 24 hours in advance of the desired time of the cylinder break.

h. Unless otherwise indicated, the Resident Engineer enters appropriate data in the thirty-nine sections of the card, as described on above. The “yellow” cylinder card should be transferred with the first group of cylinders to be tested. Subsequent groups of cylinders from the same batch require an attached photocopy of the original “yellow” cylinder card.

SAMPLING BITUMINOUS MIXTURES

Marking of Samples

Sample identification shall be made out as indicated above. In addition to the information required on the sample identification, be sure to include the combined aggregate bulk specific gravity, the mix design number, the load slip number, the computed slip asphalt content, the mix temperature, the asphalt specific gravity, the time batched and the test number. Do not use the sample container as a sample tag.

Sampling at the Paver

Bituminous mixtures sampled on project shall be sampled from the paver or material transfer vehicle hopper or from the paver auger in accordance with AASHTO R 97. Contractor assisted sampling will be allowed provided sampling is witnessed by a qualified State inspector.

SAMPLING OF LIQUID ASPHALT PRODUCTS, P.G. BINDERS, AND EMULSIONS

Safety Precautions

Bituminous materials may be as hot as 350º F and will cause severe burns if spilled or splashed on the body. The technician performing this operation should inform others (on site) and if possible be observed. In the event that VTrans representative is not permitted to take samples due to producer safety protocols, sampling must be witnessed by VTrans representative and sample immediately taken into custody.

The following safety precautions shall be employed:

a. Gloves and long sleeve shirts with sleeves rolled down shall be worn while sampling and sealing containers.

b. Face shields must be worn while sampling.

c. The person taking the sample shall stand away from the sampling valve as far as practical and upwind of the valve to avoid being splashed with the liquid.

d. The sample shall be taken such that splashing of hot materials is prevented.

e. During sealing, the sample container shall be placed on a firm, level surface to prevent splashing, dropping or spilling of the material.

f. A plug of solidified material can form within the pipe nipple leading from the sampling valve, which could cause a bubble to form and splatter when the sample is drawn off. The nipple should be checked for solidified material prior to sampling. If necessary, **with the valve closed**, the nipple should be reamed or heated to remove any solidified material.

Sample Container – Additional Information

Samples shall be placed in containers that comply with the following:

a. Performance graded binder - 1 quart metal can with double compression lid.

b. Asphalt Emulsion - 1 quart wide mouth plastic jars with screw top containing a fiber board Teflon coated insert.

Only new, clean sample containers shall be used. Suitable containers may be obtained from the Central Laboratory.

Appendix A: Pay Item and Certification Quick Reference

Pay Item and Certification Quick Reference				
Pay Item No.	**Pay Item Name**	**Accept-ance Method**	**Material Specification No.**	**Material Name**
404.65	EMULSIFIED ASPHALT	APL	702.04	Emulsified Asphalt
407.16 (2018)	POLYMER-MODIFIED EMULSIFIED ASPHALT	APL	702.04(c)	Polymer-Modified Emulsified Asphalt
415.25	EMULSIFIED ASPHALT, COLD MIX	APL	702.04	Emulsified Asphalt
418.10 (10/22/2019)	ASPHALTIC APPROACH MATERIAL	APL	707.17	Asphaltic Plug Joint Binder
501.37 - 501.39	HIGH PERFORMANCE CONCRETE	D	715.05	Stay-in-Place Corrugated Metal Forms for Superstructure Slabs
505.10 - 505.20	STEEL PILING	D	730.01	Steel Piling
505.35	PERMANENT STEEL SHEET PILING	D	730.02	Steel Sheet Piling
506.50 - 506.75	STRUCTURAL STEEL	APL	707.03	Mortar, Type IV
		APL	708.03(a)	Structural Steel Coating, Shop Applied
		APL	708.03(b)	Structural Steel Coating, Field Applied
		D	714.02	Structural Steel
		D	714.03	High-Strength Low-Alloy Structural Steel
		D	714.04	Carbon Steel Bolts, Nuts and Washers
		D	714.05	High-Strength Bolts, Nuts and Washers
		D	714.06	Heat-Treated Structural Bolts
		D	714.12	Direct Tension Indicators
		D	714.13	Tension Control Assemblies
507.19	MECHANICAL BAR CONNECTOR	D	713.02	Mechanical Splices for Bar Reinforcement
507.11 - 507.13	REINFORCING STEEL, LEVEL I, II, III	D	713.01	Bar Reinforcement
		D	713.02	Mechanical Splices for Bar Reinforcement
508.15	SHEAR CONNECTORS	Buy America	714.10	Welded Stud Shear Connectors
510.21 - 23	PRESTRESSED CONCRETE BOX BEAMS, VOIDED SLABS, & GIRDERS	APL	707.03	Mortar, Type IV
		D	713.01	Bar Reinforcement
		D	713.06	Prestressing Strands
510.24	GROUTING SHEAR KEYS	APL	707.03	Mortar, Type IV
514.10	WATER REPELLENT, SILANE	APL	514.02	Water Repellent, Silane
516.10	BRIDGE EXPANSION JOINT, ASPHALTIC PLUG	APL	707.15	Asphaltic Plug Joints for Bridges
516.11 - 516.12	BRIDGE EXPANSION JOINT, VERMONT & FINGER PLATE	Buy America	714.02	Structural Steel
		Buy America	714.04	Carbon Steel Bolts, Nuts and Washers
		Buy America	714.05	High-Strength Bolts, Nuts and Washers
		Buy America	714.10	Welded Stud Shear Connectors
519.10 (2018)	MEMBRANE WATERPROOFING, SPRAY APPLIED	APL	519.10	Membrane Waterproofing, Spray Applied
			726.11(a) (10/22/19)	Waterproofing Membrane Systems, Type I
519.20	SHEET MEMBRANE WATERPROOFING, TORCH APPLIED	APL	519.02	Sheet Membrane Waterproofing, Torch Applied
			726.11(b) (10/22/19)	Waterproofing Membrane Systems, Type II
520.10 (2011)	MEMBRANE WATERPROOFING, SPRAY APPLIED	APL	520.02	Membrane Waterproofing, Spray Applied

Pay Item and Certification Quick Reference				
Pay Item No.	**Pay Item Name**	**Accept-ance Method**	**Material Specification No.**	**Material Name**
522.20	STRUCTURAL LUMBER AND TIMBER, UNTREATED	D	709.01	Structural Lumber & Timber
522.25	STRUCTURAL LUMBER AND TIMBER, TREATED	D	709.01	Structural Lumber & Timber
522.35	NONSTRUCTURAL LUMBER, TREATED	D	726.01	Timber Preservative
522.40	STRUCTRUAL GLUED LAMINATED TIMBER	D	709.03	Structural Glue Laminated Timber
525.33 -525.34	BRIDGE RAILING, GALVANIZED 2, 3, 4 RAIL BOX BEAM	D	714.04	Carbon Steel Bolts, Nuts and Washers
		D	714.07	Anchor Bolts, Bridge Railing
		D	732.03	Galvanized Box Beam Bridge Railing
525.41 - 525.44	BRIDGE RAILING, GALVANIZED HDSB/FASCIA MOUNTED & STEEL TUBING	D	714.04	Carbon Steel Bolts, Nuts and Washers
		D	714.07	Anchor Bolts, Bridge Railing
		D	728.02(b) (2018)	Steel Beam and Thrie Beam Rail
		D	728.02(d) (2011)	Steel Beam and Thrie Beam Rail
		D	732.03	Galvanized Box Beam Bridge Railing
		D	732.04(b)	Steel Posts and Components
525.45	BRIDGE RAILING, GALVANIZED STEEL TUBING/CONCRETE COMBINATION	D	713.01	Bar Reinforcement
		D	714.04	Carbon Steel Bolts, Nuts and Washers
		D	714.07	Anchor Bolts, Bridge Railing
		D	732.03	Galvanized Box Beam Bridge Railing
525.50 - 525.55	BRIDGE RAILING REPAIR, TYPE I & II	D	728.02(b) (2018)	Steel Beam and Thrie Beam Rail
		D	728.02(d) (2011)	Steel Beam and Thrie Beam Rail
		D	728.03(a) (2018)	Hardware for Cable, Steel Beam, and Thrie Beam Rail
		D	728.03(c) (2011)	Hardware for Cable, Steel Beam, and Thrie Beam Rail
		D	732.04(b)	Steel Posts and Components
525.60	BRIDGE RAILING REPAIR, TYPE III	D	728.02(b) (2018)	Steel Beam and Thrie Beam Rail
		D	728.02(d) (2011)	Steel Beam and Thrie Beam Rail
		D	728.03(a) (2018)	Hardware for Cble, Steel Beam, and Thrie Beam Rail
		D	728.03(c) (2011)	Hardware for Cable, Steel Beam, and Thrie Beam Rail
		D	732.04(b)	Steel Posts and Components
525.70	BRIDGE RAILING, CONCRETE F-SHAPE	APL	514.02	Water Repellent, Silane
		D	713.01	Bar Reinforcement
531.15	BEARING DEVICE ASSEMBLY, HIGH LOAD MULTI-ROTATIONAL	APL	707.03	Mortar, Type IV
		Buy America	714.03	High-Strength Low-Alloy Structural Steel
		D	714.08	Anchor Bolts, Bearing Devices
		Buy America	731.05	Stainless Steel
531.16	BEARING DEVICE ASSEMBLY, PLAIN ELASTOMERIC PAD	APL	707.03	Mortar, Type IV
		Buy America	714.03	High-Strength Low-Alloy Structural Steel
		D	714.08	Anchor Bolts, Bearing Devices
		D	731.03	Elastomeric Material

Pay Item and Certification Quick Reference				
Pay Item No.	**Pay Item Name**	**Accept-ance Method**	**Material Specification No.**	**Material Name**
531.17	BEARING DEVICE ASSEMBLY, STEEL REINFORCED ELASTOMERIC PAD	APL	707.03	Mortar, Type IV
		Buy America	714.03	High-Strength Low-Alloy Structural Steel
		D	714.08	Anchor Bolts, Bearing Devices
		D	731.03	Elastomeric Material
		Buy America	731.05	Stainless Steel
531.18	BEARING DEVICE ASSEMBLY, ELASTOMERIC PAD W/EXT. LOAD PLATES	APL	707.03	Mortar, Type IV
		D	714.02	Structural Steel
		Buy America	714.03	High-Strength Low-Alloy Structural Steel
		D	714.08	Anchor Bolts, Bearing Devices
		D	731.03	Elastomeric Material
531.19	REMOVE AND REPLACE EXISTING ANCHOR BOLTS	APL	707.03	Mortar, Type IV
		D	714.08	Anchor Bolts, Bearing Devices
540.10	PRECAST CONCRETE STRUCTURE	APL	707.03	Mortar, Type IV
		D	713.01	Bar Reinforcement
		D	713.02 (10/22/2019)	Mechanical Splices for Bar Reinforcement
		D	713.05	Welded Wire Reinforcement
		APL	726.11(c)	Waterproofing Membrane System, Type III
541.58	MORTAR, TYPE IV	APL	707.03	Mortar, Type IV
544.10 (2018)	PREFABRICATED BRIDGE UNIT SUPERSTRUCTURE	APL	707.03	Mortar, Type IV
		D	714.02	Structural Steel
		D	714.03	High-Strength Low-Alloy Structural Steel
		D	714.04	Carbon Steel Bolts, Nuts and Washers
		D	714.05	High-Strength Bolts, Nuts and Washers
		D	714.06	Heat-Treated Structural Bolts
		D	714.12	Direct Tension Indicators
		D	714.13	Tension Control Assemblies
		D	713.01	Bar Reinforcement
		D	713.02	Mechanical Splices for Bar Reinforcement
		Buy America	714.10	Welded Stud Shear Connectors
580.17	RAPID SETTING CONCRETE REPAIR MATERIAL	APL	780.01(a)	Concrete Repair Material, Type I
580.18	OVERHEAD AND VERTICAL CONCRETE REPAIR MATERIAL	APL	780.01(b)	Concrete Repair Material, Type II
580.20	RAPID SETTING CONCRETE REPAIR METERIAL WITH COARSE AGGREGRATE	APL	780.01(c)4	Concrete Repair Material, Type III
580.21	POLYMER CONCRETE REPAIR MATERIAL	APL	780.01(d)	Concrete Repair Material, Type IV
601.0000 to 601.0199	CSP	Buy America	711.01	Corrugated Steel Pipe, Pipe Arches and Underdrains
601.0200 to 601.0399	CAAP	A	711.02	Corrugated Aluminum Pipe, Arches, Underdrains
601.0400 to 601.0599	PCCSP	Buy America	711.03	Polymeric Coated Corrugated Steel Pipe and Pipe Arches
601.0600 to 601.0799	PCCSP(PI)	Buy America	711.03	Polymeric Coated Corrugated Steel Pipe and Pipe Arches
601.0800 to 601.0899	RCP	D	710.01	Reinforced Concrete Pipe

Pay Item and Certification Quick Reference				
Pay Item No.	**Pay Item Name**	**Accept-ance Method**	**Material Specification No.**	**Material Name**
601.0900 to 601.0999	CPEP	APL	710.03	Corrugated Polyethylene Pipe
601.2000 to 601.2199	CSP(SL)	Buy America	711.01	Corrugated Steel Pipe, Pipe Arches and Underdrains
601.2200 to 601.2399	CAAP(SL)	A	711.02	Corrugated Aluminum Pipe, Arches, Underdrains
601.2400 to 601.2599	PCCSP(SL)	Buy America	711.03	Polymeric Coated Corrugated Steel Pipe and Pipe Arches
601.2600 to 601.2799	CPEP(SL)	APL	710.03	Corrugated Polyethylene Pipe
601.2800 to 601.2999	CPPP(SL)	APL	710.07	Corrugated Polypropylene Pipe
601.3000 to 601.3199	CSPA	Buy America	711.01	Corrugated Steel Pipe, Pipe Arches and Underdrains
601.3200 to 601.3399	CAAPA	A	711.02	Corrugated Aluminum Pipe, Arches, Underdrains
601.3400 to 601.3599	PCCSPA	Buy America	711.03	Polymeric Coated Corrugated Steel Pipe and Pipe Arches
601.3600 to 601.3799	PCCSPA(PI)	Buy America	711.03	Polymeric Coated Corrugated Steel Pipe and Pipe Arches
601.4000 to 601.4199	CSPA(SL)	Buy America	711.01	Corrugated Steel Pipe, Pipe Arches and Underdrains
601.4200 to 601.4399	CAAPA(SL)	A	711.02	Corrugated Aluminum Pipe, Arches, Underdrains
601.4400 to 601.4599	PCCSPA(SL)	Buy America	711.03	Polymeric Coated Corrugated Steel Pipe and Pipe Arches
601.5000 to 601.5199	CSP ELBOW	Buy America	711.01	Corrugated Steel Pipe, Pipe Arches and Underdrains
601.5200 to 601.5399	CAAP ELBOW	A	711.02	Corrugated Aluminum Pipe, Arches, Underdrains
601.5400 to 601.5599	PCCSP ELBOW	Buy America	711.03	Polymeric Coated Corrugated Steel Pipe and Pipe Arches
601.5600 to 601.5799	PCCSP ELBOW (PI)	Buy America	711.03	Polymeric Coated Corrugated Steel Pipe and Pipe Arches
601.5800 to 601.5899	CPEP ELBOW	APL	710.03	Corrugated Polyethylene Pipe
601.6000 to 601.6199	CSPES	Buy America	711.01	Corrugated Steel Pipe, Pipe Arches and Underdrains
601.6200 to 601.6399	CAAPES	A	711.02	Corrugated Aluminum Pipe, Arches, Underdrains
601.6800 to 601.6899	RCPES	Buy America	710.02	Reinforced Concrete Pipe End Section
601.7000 to 601.7099	CPEPES	APL	710.03	Corrugated Polyethylene Pipe
601.8000 to 601.8199	CSPAES	Buy America	711.01	Corrugated Steel Pipe, Pipe Arches and Underdrains
601.8200 to 601.8399	CAAPAES	A	711.02	Corrugated Aluminum Pipe, Arches, Underdrains

Pay Item and Certification Quick Reference				
Pay Item No.	**Pay Item Name**	**Accept-ance Method**	**Material Specification No.**	**Material Name**
601.98 (2011)	CONCENTRIC REDUCER SECTION	APL	710.03	Corrugated Polyethylene Pipe
		APL	710.07	Corrugated Polypropylene Pipe
		Buy America	711.01	Corrugated Steel Pipe, Pipe Arches and Underdrains
		A	711.02	Corrugated Aluminum Pipe, Arches, Underdrains
		D	711.03	Polymeric Coated Corrugated Steel Pipe and Pipe Arches
604.10 - 604.11	CONCRETE CATCH BASIN WITH CAST IRON GRATE, CONCRETE MANHOLE WITH CAST IRON COVER	Buy America	713.01	Bar Reinforcement
		Buy America	713.05	Welded Wire Reinforcement
		D	715.01	Iron Casting
604.18	PRECAST REINFORCED CONCRETE DROP INLET WITH CAST IRON GRATE	APL	705.04	Precast Drop Inlets, Catch Basins, and Manholes
		D	715.01	Iron Casting
604.20	PRECAST REINFORCED CONCRETE CATCH BASIN WITH CAST IRON GRATE	APL	705.04	Precast Drop Inlets, Catch Basins, and Manholes
		D	715.01	Iron Casting
604.21	PRECAST REINFORCED CONCRETE MANHOLE WITH CAST IRON COVER	APL	705.04	Precast Drop Inlets, Catch Basins, and Manholes
		D	715.01	Iron Casting
604.22	SANITARY SEWER MANHOLE	Buy America	713.01	Bar Reinforcement
		Buy America	713.05	Welded Wire Reinforcement
		D	715.01	Iron Casting
604.25	PRECAST REINFORCED CONCRETE PIPE DI WITH CAST IRON GRATE	Buy America	710.01	Reinforced Concrete Pipe
		D	715.01	Iron Casting
604.26	PRECAST REINFORCED CONCRETE PIPE DI WITH CONCRETE COVER	Buy America	710.01	Reinforced Concrete Pipe
604.30	PRECAST REINFORCED CONCRETE CURB DI WITH CAST IRON GRATE	Buy America	713.01	Bar Reinforcement
		Buy America	713.05	Welded Wire Reinforcement
		D	715.01	Iron Casting
604.412-604.418	REHAB. DROP INLET, CATCH BASIN, OR MANHOLES, CLASS I - III	D	715.01	Iron Casting
604.45	CAST IRON GRATE WITH FRAME TYPE A	D	715.01	Iron Casting
604.46	CAST IRON GRATE WITH FRAME TYPE B	D	715.01	Iron Casting
604.47	CAST IRON GRATE WITH FRAME TYPE D	D	715.01	Iron Casting
604.48	CAST IRON GRATE WITH FRAME TYPE E	D	715.01	Iron Casting
604.49	CAST IRON GRATE, TYPE C	D	715.01	Iron Casting
604.50 (2011)	STEEL GRATE	D	715.01	Iron Casting
604.55	CAST IRON COVER WITH FRAME	D	715.01	Iron Casting
604.56	CAST IRON COVER WITH FRAME, SEWER	D	715.01	Iron Casting
605.10, 605.11, 605.13	6, 8, and 12 INCH UNDERDRAIN PIPE	APL	710.03	Corrugated Polyethylene Pipe
		Buy America	711.01	Corrugated Steel Pipe, Pipe Arches and Underdrains
		APL	720.05 (2018)	Geotextiles for Underdrain Trench Lining
		D	720	Geotextiles

Pay Item and Certification Quick Reference				
Pay Item No.	**Pay Item Name**	**Accept-ance Method**	**Material Specification No.**	**Material Name**
605.20, 605.21, & 605.23	6, 8, and 12 INCH UNDERDRAIN CARRIER PIPE	APL	710.03	Corrugated Polyethylene Pipe
		Buy America	711.01	Corrugated Steel Pipe, Pipe Arches and Underdrains
605.95	UNDERDRAIN FLUSHING BASIN	APL	710.03	Corrugated Polyethylene Pipe
		Buy America	711.01	Corrugated Steel Pipe, Pipe Arches and Underdrains
		Buy America	715.01	Iron Casting
613.25 (2011)	GABION WALL	Buy America	712.04	Gabion Baskets
616.215 (2018)	VERTICAL GRANITE CURB, MOUNTABLE	APL	707.03	Mortar, Type IV
616.22 (2011)	GRANITE BRIDGE CURB	APL	707.03	Mortar, Type IV
616.225	REPOINTING GRANITE BRIDGE CURB	APL	707.03	Mortar, Type IV
616.25 & 616.26	PRECAST REINFORCED CONCRETE CURB, TYPE A & TYPE B	APL	707.03	Mortar, Type IV
		Buy America	729.04	Precast Reinforced Concrete Curb
616.35	TREATED TIMBER CURB	D	726.01	Timber Preservative
618.30	DETECTABLE WARNING SURFACE	APL	751.08	Detectable Warning Surface
619.14	BOLLARDS	Buy America	728.01(b) (2018)	Steel Posts and Post Accessories
		Buy America	728.01(c) (2011)	Steel Posts and Post Accessories
619.15	WOOD MARKER POSTS	D	726.01	Timber Preservative
619.17	YIELDING MARKER POSTS	D	751.01(a)	Steel Posts and Anchors
620.11, 620.12, 620.13, 620.15, 620.16, & 620.17	CHAIN-LINK FENCE, 4, 6, and 8 FEET, GATE FOR CHAIN LINK FENCE 4, 6, and 8 FEET	Buy America	727.02	Chain-Link Fence
620.20, 620.21, & 620.22	BRACING ASSEMBLY FOR CHAIN-LINK FENCE, 4, 6, & 8 FEET	Buy America	727.02(b)	Posts, Gate Frames, Rails, Braces and Miscellaneous Hardware
620.25	WOVEN WIRE WITH STEEL POSTS	Buy America	727.01(a)	Woven Wire Fabric for Fencing and Gates
		Buy America	727.01(c)	Steel Posts and Braces
620.26	WOVEN WIRE WITH WOOD POSTS	D	726.01	Timber Preservative
		Buy America	727.01(a)	Woven Wire Fabric for Fencing and Gates
		Buy America	727.01(e)	Gates
620.30	DRIVE GATE FOR WOVEN WIRE FENCE	Buy America	727.01(a)	Woven Wire Fabric for Fencing and Gates
		Buy America	727.01(e)	Gates
620.40	STEEL BRACE FOR WOVEN WIRE FENCE	Buy America	727.01(c)	Steel Posts and Braces
620.41	WOOD BRACE FOR WOVEN WIRE FENCE	D	726.01	Timber Preservative
620.45 (2018)	PLANK RAIL	D	726.01	Timber Preservative
620.75 (2011)	SNOW BARRIER	Buy America	727.02(a)	Chain-Link Fabric
		Buy America	727.02(b)	Posts, Gate Frames, Rails, Braces and Miscellaneous Hardware

Pay Item and Certification Quick Reference				
Pay Item No.	**Pay Item Name**	**Accept-ance Method**	**Material Specification No.**	**Material Name**
620.75 (2018)	SNOW BARRIER FENCE	Buy America	727.02(a)	Chain-Link Fabric
		Buy America	727.02(b)	Posts, Gate Frames, Rails, Braces and Miscellaneous Hardware
621.15 (2011)	PLANK RAIL	D	726.01	Timber Preservative
621.17	CABLE GUARDRAIL	D	713.03	Wire Rope or Cable
		D	728.01(b) (2018)	Steel Posts and Post Accessories
		D	728.01(c) (2011)	Steel Posts and Post Accessories
		D	728.03(a) (2018)	Hardware for Cable, Steel Beam, and Thrie Beam Rail
		D	728.03(c) (2011)	Hardware for Cable, Steel Beam, and Thrie Beam Rail
621.173 (2018)	CABLE GUARDRAIL HOOK BOLT, GALVANIZED	D	728.03(a)	Hardware for Cable, Steel Beam and Thrie Beam Rail
621.173 (2011)	CABLE GUARDRAIL J-BOLT, GALVANIZED	D	728.03(c)	Hardware for Cable, Steel Beam and Thrie Beam Rail
621.174	CABLE GUARDRAIL SPLICE UNIT	D	728.03(a) (2018)	Hardware for Cable, Steel Beam, and Thrie Beam Rail
		D	728.03(c) (2011)	Hardware for Cable, Steel Beam, and Thrie Beam Rail
621.175	REPLACEMENT GUARDRAIL CABLE	D	713.03	Wire Rope or Cable
621.18	STEEL BACKED TIMBER GUARDRAIL	D	726.01	Timber Preservative
		D	728.01(a)	Wood Posts and Offset for Rail, Guardrail, Barriers and Guide Posts
		D	728.02(d) (2018)	Steel Backed Timber Guardrail
		D	728.02(f) (2011)	Steel Backed Timber Guardrail
		D	728.03(c) (2018)	Hardware for Steel Backed Timber Guardrail
		D	728.03(e) (2011)	Hardware for Steel Backed Timber Guardrail
621.20, 621.205, 621.206, 621.207, 621.21, 621.215, 621.216	STEEL BEAM GUARDRAIL, GALVANIZED; SBGR, GALV W/8FT POSTS; SBGR, GALV /NESTED; SBGR, GALV /NESTED W/8FT POSTS; HD SBGR, GALV.; HD SBGR, GALV. W/8FT POSTS; HD SBGR, GALV /NESTED; & HD SBGR, GALV /NESTED W/8FT POSTS; HD SBGR, GALV/NESTED.	D	728.01(b) (2018)	Steel Posts and Post Accessories
		D	728.01(c) (2011)	Steel Posts and Post Accessories
		APL	728.01(c) (2018)	Alternative Blockouts
		APL	728.01(d) (2011)	Alternative Blockouts
		D	728.02(b) (2018)	Steel Beam and Thrie Beam Rail
		D	728.02(d) (2011)	Steel Beam and Thrie Beam Rail
		D	728.03(a) (2018)	Hardware for Cable, Steel Beam, and Thrie Beam Rail
		D	728.03(c) (2011)	Hardware for Cable, Steel Beam, and Thrie Beam Rail
621.218 (2011)	STEEL BEAM GUARDRAIL DELINEATOR	A	750.08	Retroreflective Sheeting
621.218 (2018)	TRAFFIC BARRIER DELINEATOR	A	750.08	Retroreflective Sheeting
621.219	STEEL BEAM GUARDRAIL OFFSET BLOCKS	APL	728.01(c) (2018)	Alternative Blockouts
		APL	728.01(d) (2011)	Alternative Blockouts
621.25	THRIE BEAM GUARDRAIL	D	728.01(b) (2018)	Steel Posts and Post Accessories
		D	728.01(c) (2011)	Steel Posts and Post Accessories
		APL	728.01(c) (2018)	Alternative Blockouts
		APL	728.01(d) (2011)	Alternative Blockouts
		D	728.02(b) (2018)	Steel Beam and Thrie Beam Rail
		D	728.02(d) (2011)	Steel Beam and Thrie Beam Rail
		D	728.03(a) (2018)	Hardware for Cable, Steel Beam, and Thrie Beam Rail
		D	728.03(c) (2011)	Hardware for Cable, Steel Beam, and Thrie Beam Rail

Pay Item and Certification Quick Reference				
Pay Item No.	**Pay Item Name**	**Accept-ance Method**	**Material Specification No.**	**Material Name**
621.30	BOX BEAM GUARDRAIL	D	728.01(b) (2018)	Steel Posts and Post Accessories
		D	728.01(c) (2011)	Steel Posts and Post Accessories
		D	728.02(c) (2018)	Box Beam Rail
		D	728.02(e) (2011)	Box Beam Rail
		D	728.03(b) (2018)	Hardware for Box Beam Rail
		D	728.03(d) (2011)	Hardware for Box Beam Rail
621.35 (2011)	STEEL BEAM MEDIAN BARRIER	D	728.01(c)	Steel Posts and Post Accessories
		APL	728.01(d)	Alternative Blockouts
		D	728.02(d)	Steel Beam and Thrie Beam Rail
		D	728.03(c)	Hardware for Cable, Steel Beam and Thrie Beam Rail
621.40 (2011)	THRIE BEAM MEDIAN BARRIER	D	728.01(c)	Steel Posts and Post Accessories
		APL	728.01(d)	Alternative Blockouts
		D	728.02(d)	Steel Beam and Thrie Beam Rail
		D	728.03(c)	Hardware for Cable, Steel Beam and Thrie Beam Rail
621.45 (2011)	CONCRETE MEDIAN BARRIER	APL	621.11	Delineation
		D	713.01	Bar Reinforcement
621.50 (2018)	MANUFACTURED TERMINAL SECTION, FLARED	APL	621.09(b)	Manufactured Terminal Section, Flared
621.50 (2011)	MANUFACTRUED TERMINAL SECTION, FLARED	APL	728.06	Manufactured Terminal Section
621.51 (2018)	MANUFACTURED TERMINAL SECTION, TANGENT	APL	621.09(a)	Manufactured Terminal Section, Tangent
621.51 (2011)	MANUFACTURED TERMINAL SECTION, TANGENT	APL	728.06	Manufactured Terminal Section
621.53	TERMINAL CONNECTOR FOR STEEL BEAM GUARDRAIL	D	728.02(b) (2018)	Steel Beam and Thrie Beam Rail
		D	728.02(d) (2011)	Steel Beam and Thrie Beam Rail
		D	728.03(a) (2018)	Hardware for Cable, Steel Beam, and Thrie Beam Rail
		D	728.03(c) (2011)	Hardware for Cable, Steel Beam, and Thrie Beam Rail
621.55 (2011)	MEDIAN BARRIER TERMINAL	APL	728.06	Manufactured Terminal Section
		D	728.03(c)	Hardware for Cable, Steel Beam and Thrie Beam
621.56 (2011)	ENERGY ABSORPTION ATTENUATOR	APL	728.07	Energy Absorption Attenuators
621.56 (2018)	ENERGY ABSORPTION ATTENUATOR, TEMPORARY	A	621.06(b)	Energy Absorption Attenuator, Temporary
621.57 (2011)	ENERGY ABSORPTION ATTENUATOR, SAND-FILLED PLASTIC BARREL	APL	728.07	Energy Absorption Attenuator
621.575 (2018)	ENERGY ABSORPTION ATTENUATOR, PERMANENT	APL	621.06(a)	Energy Absorption Attenuator, Permanent
621.59 (2011)	ENERGY ABSORPTION ATTENUATOR, LIQUID FILLED	APL	728.07	Energy Absorption Attenuator
621.60	ANCHOR FOR STEEL BEAM RAIL	Buy America	728.05	Concrete Anchors
621.61	ANCHOR FOR STEEL TO BOX BEAM TRANSITION	Buy America	728.05	Concrete Anchors
621.65	ANCHOR FOR CABLE RAIL	Buy America	728.05	Concrete Anchors
621.66 (2011)	ANCHOR FOR CABLE RAIL AT OPENINGS	Buy America	728.05	Concrete Anchors

Pay Item and Certification Quick Reference				
Pay Item No.	**Pay Item Name**	**Accept-ance Method**	**Material Specification No.**	**Material Name**
621.70 - 621.71	GUARDRAIL APPROACH SECTION, GALVANIZED TYPE I & II	D	728.01(a)	Wood Posts and Offset Blocks for Rail, Guardrail, Barriers and Guide Posts
		D	728.01(b) (2018)	Steel Posts and Post Accessories
		D	728.01(c) (2011)	Steel Posts and Post Accessories
		D	728.02(b) (2018)	Steel Beam and Thrie Beam Rail
		D	728.02(d) (2011)	Steel Beam and Thrie Beam Rail
		D	728.03(a) (2018)	Hardware for Cable, Steel Beam and Thrie Beam Rail
		D	728.03(c) (2011)	Hardware for Cable, Steel Beam and Thrie Beam Rail
621.72, 621.725, 621.73	GUARDRAIL APPROACH SECTION, GALVANIZED 2 & 4 RAIL BOX BEAM	D	728.01(a)	Wood Posts and Offset Blocks for Rail, Guardrail, Barriers and Guide Posts
		D	728.01(b) (2018)	Steel Posts and Post Accessories
		D	728.01(c) (2011)	Steel Posts and Post Accessories
		D	728.02(c) (2018)	Box Beam Rail
		D	728.02(e) (2011)	Box Beam Rail
		D	728.03(b) (2018)	Hardware for Box Beam Rail
		D	728.03(d) (2011)	Hardware for Box Beam Rail
621.737, 621.738	GUARDRAIL APPROACH SECTION, GALV HD SB; W/8FT POSTS	D	728.01(b) (2018)	Steel Posts and Post Accessories
		D	728.01(c) (2011)	Steel Posts and Post Accessories
		APL	728.01(c) (2018)	Alternative Blockouts
		APL	728.01(d) (2011)	Alternative Blockouts
		D	728.02(b) (2018)	Steel Beam and Thrie Beam Rail
		D	728.02(d) (2011)	Steel Beam and Thrie Beam Rail
		D	728.03(a) (2018)	Hardware for Cable, Steel Beam and Thrie Beam Rail
		D	728.03(c) (2011)	Hardware for Cable, Steel Beam and Thrie Beam Rail
621.746, 621.747, 621.748	GUARDRAIL APPROACH SECTION TO CONCRETE BRIDGE RAIL, TL-2; TL-3; & COMB BRIDGE RAIL TL-3	D	728.01(a)	Wood Posts and Offset Blocks for Rail, Guardrail, Barriers and Guide Posts
		D	728.01(b) (2018)	Steel Posts and Post Accessories
		D	728.01(c) (2011)	Steel Posts and Post Accessories
		D	728.02(b) (2018)	Steel Beam and Thrie Beam Rail
		D	728.02(d) (2011)	Steel Beam and Thrie Beam Rail
		D	728.03(a) (2018)	Hardware for Cable, Steel Beam and Thrie Beam Rail
		D	728.03(c) (2011)	Hardware for Cable, Steel Beam and Thrie Beam Rail
621.75	REMOVE AND RESET GUARDRAIL	D	728.03(a) (2018)	Hardware for Cable, Steel Beam and Thrie Beam Rail
		D	728.03(c) (2011)	Hardware for Cable, Steel Beam and Thrie Beam Guardrail
621.76	REPLACE GUARDRAIL POST ASSEMBLY	D	728.01(b) (2018)	Steel Posts and Post Accessories
		D	728.01(c) (2011)	Steel Posts and Post Accessories
621.77	REPLACE GUARDRAIL BEAM UNIT	D	728.02(b) (2018)	Steel Beam and Thrie Beam Rail
		D	728.02(d) (2011)	Steel Beam and Thrie Beam Rail
621.85	GUIDE POSTS	D	728.01(b) (2018)	Steel Posts and Post Accessories
		D	728.01(c) (2011)	Steel Posts and Post Accessories
626.20 (2011)	WELL CASING PIPE	Buy America	741.01	Well Casing
628.22 (2011)	REINFORCED CONCRETE SEWER PIPE	Buy America	710.01	Reinforced Concrete Pipe

Pay Item and Certification Quick Reference				
Pay Item No.	**Pay Item Name**	**Accept-ance Method**	**Material Specification No.**	**Material Name**
628.25 (2011)	CAST IRON SOIL PIPE, EXTRA HEAVY	Buy America	715.03	Cast Iron Pipe
628.26 (2011)	CAST IRON PIPE, CEMENT-LINED	Buy America	715.03	Cast Iron Pipe
628.28	DUCTILE IRON SEWER PIPE, CEMENT-LINED	Buy America	740.07	Ductile Iron Pipe, Cement-Lined
629.20	ADJUST ELEVATION OF VALVE BOX	Buy America	715.01	Iron Casting
629.24	DUCTILE IRON PIPE, CEMENT-LINED	Buy America	740.07	Ductile Iron Pipe, Cement-Lined
629.25	EXTENSION SERVICE BOX AND CURB STOP	Buy America	629.25 (2018)	Extension Service Box and Curb Stop
		Buy America	740.09 (2011)	Extension Service Box, Cast Iron
629.26	GATE VALVE	Buy America	629.26(2018)	Gate Valve
		Buy America	740.11 (2011)	Gate Valves
629.27	GATE VALVE WITH VALVE BOX	Buy America	629.27 (2018)	Gate Valve with Valve Box
		Buy America	740.11 (2011)	Gate Valves
629.28	HYDRANT	Buy America	629.28 (2018)	Hydrant
		Buy America	740.13 (2011)	Hydrant
629.34 (2011)	STEEL WATER PIPE, GALVANIZED	Buy America	740.05	Steel Pipe, Galvanized
629.35	TAPPING SLEEVE AND VALVE WITH VALVE BOX	Buy America	629.35	Tapping Sleeve and Valve with Valve Box
646.201-646.321	4, 6, 8, and 12 INCH WHITE and YELLOW LINE, 24 INCH STOP BAR, LETTER OR SYMBOL, CROSSWALK MARKING, RR CROSSING SYMBOL	ANDPMBL	708.08(c) (2018)	Waterborne Traffic Paint
		ANDPMB	708.08(d) (2011)	Waterborne Traffic Paint
		APL	754.01(a)	Optics, Type I
646.400-646.479	DURABLE 4, 6, 8, and 12 INCH WHITE and YELLOW LINE	APL	708.08(a)	Polyurea Pavement Marking
		APL	708.08(b) (2018)	Epoxy Paint
		APL	708.08(c) (2011)	Epoxy Paint
		APL	754.01(a)	Optics, Type I
		APL	754.01(b)	Optics, Type II
		APL	754.01(c)	Optics, Type III
		APL	708.10(a)	Thermoplastic Pavement Markings, Type A
		APL	708.11(a) (2018)	Pavement Marking Tape, Type A
		APL	708.12(a) (2011)	Pavement Marking Tape, Type A
		APL	754.03(a) (5/22/19)	Pavement Marking Tape, Type A
		APL	708.11(b) (2018)	Pavement Marking Tape, Type B
		APL	708.12(b) (2011)	Pavement Marking Tape, Type B
		APL	754.03(b) (5/22/19)	Pavement Marking Tape, Type B
		APL	708.11(c) (2018)	Pavement Marking Tape, Type C
		APL	708.12(c) (2011)	Pavement Marking Tape, Type C

Pay Item and Certification Quick Reference				
Pay Item No.	**Pay Item Name**	**Accept-ance Method**	**Material Specification No.**	**Material Name**
646.400-646.479	DURABLE 4, 6, 8, and 12 INCH WHITE and YELLOW LINE, POLYUREA and RECESSED POLYUREA	APL	708.08(a)	Polyurea Pavement Marking
		APL	754.01(a)	Optics, Type I
		APL	754.01(b)	Optics, Type II
		APL	754.01(c)	Optics, Type III
646.400-646.479	DURABLE 4, 6, 8, and 12 INCH WHITE and YELLOW LINE, EPOXY PAINT and RECESSED EPOXY PAINT	APL	708.08(b) (2018)	Epoxy Paint
		APL	708.08(c) (2011)	Epoxy Paint
		APL	754.01(a)	Optics, Type I
		APL	754.01(b)	Optics, Type II
		APL	754.01(c)	Optics, Type III
646.400-646.479 (2011)	DURABLE 4, 6, 8, and 12 INCH WHITE and YELLOW LINE, METHYL-METHACRYLATE and RECESSED METHYL-METHACRYLATE	APL	708.08(e)	Methyl-methacrylate Paint
646.400-646.479 (2011)	DURABLE 4, 6, 8, and 12 INCH WHITE and YELLOW LINE, THERMOPLASTIC and RECESSED THERMOPLASTIC	APL	754.01(a)	Optics, Type I
		APL	754.01(b)	Optics, Type II
		APL	754.01(c)	Optics, Type III
		APL	708.10(a)	Thermoplastic Pavement Markings, Type A
646.400-646.479	DURABLE 4, 6, 8, and 12 INCH WHITE and YELLOW LINE, TYPE A TAPE and RECESSED TYPE A TAPE	APL	708.11(a) (2018)	Pavement Marking Tape, Type A
		APL	708.12(a) (2011)	Pavement Marking Tape, Type A
		APL	754.03(a) (5/22/19)	Pavement Marking Tape, Type A
646.400-646.479	DURABLE 4, 6, 8, and 12 INCH WHITE and YELLOW LINE, TYPE B TAPE and RECESSED TYPE B TAPE	APL	708.11(b) (2018)	Pavement Marking Tape, Type B
		APL	708.12(b) (2011)	Pavement Marking Tape, Type B
		APL	754.03(b) (5/22/19)	Pavement Marking Tape, Type B
646.400-646.479	DURABLE 4, 6, 8, and 12 INCH WHITE and YELLOW LINE, TYPE C TAPE and RECESSED TYPE C TAPE	APL	708.11(c) (2018)	Pavement Marking Tape, Type C
		APL	708.12(c) (2011)	Pavement Marking Tape, Type C
646.480-646.599	DURABLE 24 INCH STOP BAR, LETTER OR SYMBOL, CROSSWALK MARKING, and RAILROAD CROSSING SYMBOL	APL	708.08(a)	Polyurea Pavement Marking
		APL	708.08(b) (2018)	Epoxy Paint
		APL	708.08(c) (2011)	Epoxy Paint
		APL	754.01(a)	Optics, Type I
		APL	754.01(b)	Optics, Type II
		APL	754.01(c)	Optics, Type III
		APL	708.10(b)	Thermoplastic Pavement Markings, Type B
		APL	708.11(c) (2018)	Pavement Marking Tape, Type C
		APL	708.12(c) (2011)	Pavement Marking Tape, Type C
		APL	708.11(d) (2018)	Pavement Marking Tape, Type D
		APL	708.12(d) (2011)	Pavement Marking Tape, Type D
		APL	754.03(b) (5/22/19)	Pavement Marking Tape, Type B
646.480-646.599	DURABLE 24 INCH STOP BAR, LETTER OR SYMBOL, CROSSWALK MARKING, and RAILROAD CROSSING SYMBOL, POLYUREA and RECESSED POLYUREA	APL	708.08(a)	Polyurea Pavement Marking
		APL	754.01(a)	Optics, Type I
		APL	754.01(b)	Optics, Type II
		APL	754.01(c)	Optics, Type III
646.480-646.599	DURABLE 24 INCH STOP BAR, LETTER OR SYMBOL, CROSSWALK MARKING, and RAILROAD CROSSING SYMBOL, EPOXY PAINT and RECESSED EPOXY PAINT	APL	708.08(b) (2018)	Epoxy Paint
		APL	708.08(c) (2011)	Epoxy Paint
		APL	754.01(a)	Optics, Type I
		APL	754.01(b)	Optics, Type II
		APL	754.01(c)	Optics, Type III

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Pay Item No.	**Pay Item Name**	**Accept-ance Method**	**Material Specification No.**	**Material Name**
646.480-646.599 (2011)	DURABLE 24 INCH STOP BAR, LETTER OR SYMBOL, CROSSWALK MARKING, and RAILROAD CROSSING SYMBOL, METHYL-METHACRYLATE and RECESSED METHYL-METHACRYLATE	APL	708.08(e)	Methyl-methacrylate Paint
646.480-646.599	DURABLE 24 INCH STOP BAR, LETTER OR SYMBOL, CROSSWALK MARKING, and RAILROAD CROSSING SYMBOL, THERMOPLASTIC and RECESSED THERMOPLASTIC	APL	708.10(b)	Thermoplastic Pavement Markings, Type B
646.4071-646.5171	DURABLE (PAVEMENT MARKINGS), TYPE A TAPE	APL	754.03(a)	Pavement Marking Tape, Type A
646.4072-646.5172	DURABLE (PAVEMENT MARKINGS), TYPE B TAPE	APL	754.03(b)	Pavement Marking Tape, Type B
646.6012-646.7012	TEMPORARY (PAVEMENT MARKINGS), TYPE C TAPE	APL	754.03(c)	Pavement Marking Tape, Type C
646.81	PAINTED CURB	APL	754.01(a)	Optics, Type I
		ANDPMBL	708.08(c) (2018)	Waterborne Traffic Paint
		ANDPMBL	708.08(d) (2011)	Waterborne Traffic Paint
646.82	PAINTED ISLAND	ANDPMBL	708.08(c) (2018)	Waterborne Traffic Paint
		ANDPMBL	708.08(d) (2011)	Waterborne Traffic Paint
646.86	PAVEMENT MARKING MASK	APL	708.12(d) (2018)	Pavement Marking Mask
		APL	708.13(d) (2011)	Pavement Marking Mask
649.11	GEOTEXTILE FOR ROADBED SEPARATOR	APL	720.02 (2018)	Geotextile for Roadbed Separator
		D	720 (2011)	Geotextiles
649.21	GEOTEXTILE UNDER RAILROAD BALLAST	APL	720.03 (2018)	Geotextile Under Railroad Ballast
		D	720 (2011)	Geotextiles
649.31	GEOTEXTILE UNDER STONE FILL	APL	720.04 (2018)	Geotextile Under Stone Fill
		D	720 (2011)	Geotextiles
649.41	GEOTEXTILE FOR UNDERDRAIN TRENCH LINING	APL	720.05 (2018)	Geotextile for Underdrain Trench Lining
		D	720 (2011)	Geotextiles
649.51 (2011)	GEOTEXTILE FOR SILT FENCE	D	720	Geotextiles
649.515 (2011)	GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED	D	720	Geotextiles
649.61	GEOTEXTILE FOR FILTER CURTAIN	APL	720.06 (2018)	Geotextile for Filter Curtain
		D	720 (2011)	Geotextiles
651.28 (2011)	HYDRAULIC MULCH	APL	755.10(d)	Fiber Mulch
		APL	755.10(e)	Hydraulic Matrix
653.10 (2011)	TACKIFIER	APL	755.10(f)	Tackifier
653.11 (2018)	HYDRAULIC MULCH	APL	755.10(d)	Fiber Mulch
		APL	755.10(e)	Hydraulic Matrix
653.25 (2011)	TEMPORARY STONE CHECK DAM, TYPE I	D	720	Geotextiles
653.25 (2018)	CHECK DAM, TYPE I	APL	720.04	Geotextile Under Stone Fill
653.26 (2011)	TEMPORARY STONE CHECK DAM, TYPE II	D	720	Geotextiles
653.30 (2011)	PREFABRICATED CHECK DAM	APL	720.05	Prefabricated Check Dam
653.30 (2018)	CHECK DAM, TYPE III	APL	653.30	Check Dam, Type III
653.35 (2011)	VEHICLE TRACKING PAD	D	720	Geotextiles
653.35 (2018)	STABILIZED CONSTRUCTION ENTRANCE	APL	720.04	Geotextile Under Stone Fill
653.41 (2011)	INLET PROTECTION DEVICE, TYPE II	APL	720.06	Inlet Protection Device, Type II
653.41 (2018)	INLET PROTECTION DEVICE, TYPE II	APL	653.09(b)(2)	Inlet Protection Device, Type II
653.45 (2011)	FILTER BAG	APL	720.07	Filter Bag
653.45 (2018)	FILTER BAG	APL	653.09(c)	Filter Bag
653.475 (2018)	SILT FENCE, TYPE I	APL	720.07	Geotextile For Silt Fence
653.476 (2018)	SILT FENCE, TYPE II	APL	720.07	Geotextile For Silt Fence

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660.20 (2011)	TIMBER PAINTING, FIRE RETARDANT	APL	708.05(c)	Fire Retardant
660.30 (2011)	TIMBER PAINTING, INSECTICIDE/FUNGICIDE	APL	708.05(b)	Insecticide/fungicide
661.10 (2011)	METAL ROOFING	Buy America	715.06	Metal Roofing
675.20	TRAFFIC SIGN, TYPE A	A	750.08	Retroreflective Sheeting
675.21	TRAFFIC SIGN, TYPE B	A	750.08	Retroreflective Sheeting
675.301 (2011)	FLANGED CHANNEL SIGN POST	D	750.01(a)(2)	Steel Posts and Anchors
675.31	W-SHAPE STEEL SIGN POST	D	714.05	High-Strength Bolts, Nuts and Washers
		D	750.01(a)	Steel Posts and Anchors
675.32	TUBULAR ALUMINUM SIGN POST	D	750.01(b)	Aluminum Post
675.33	TUBULAR STEEL SIGN POST	D	714.02	Structural Steel
		D	714.05	High-Strength Bolts, Nuts and Washers
		D	750.01(a)(1)	Steel Posts and Anchors
675.341	SQUARE TUBE SIGN POST AND ANCHOR	D	750.01(a)(3)	Steel Posts and Anchors
675.35 (2018)	SOIL BEARING SLIP BASE	APL	675.05	Slip Bases
675.41, 675.42	FOUNDATION FOR W-SHAPE STEEL POST 24 INCH and 30 INCH	D	713.01	Bar Reinforcement
		D	750.01(a) (10/22/2019)	Steel Posts and Anchors
675.43	FOUNDATION FOR TUBULAR STEEL POST	D	713.01 (10/22/2019)	Bar Reinforcement
		D	750.01(a)(1)	Steel Posts and Anchors
676.10	DELINEATOR WITH STEEL POST	A	750.08	Retroreflective Sheeting
		Buy America	751.01(a)	Steel Posts and Anchors
676.15 (2011)	REMOVE AND REPLACE REFLECTOR	A	750.08	Retroreflective Sheeting
676.15 (2018)	REMOVE AND REPLACE DELINEATOR	A	750.08	Retroreflective Sheeting
676.20	DELINEATOR WITH FLEXIBLE POST	A	750.08	Retroreflective Sheeting
677.12 & 677.13	OVERHEAD TRAFFIC SIGN SUPPORT, CANTILEVER & OVERHEAD TRAFFIC SIGN SUPPORT, MULTI-SUPPORT	D	714.11	Steel Tubing
		APL	707.03	Mortar, Type IV
		D	713.01	Bar Reinforcement
		D	714.04	Carbon Steel Bolts, Nuts and Washers
		D	714.05	High-Strength Bolts, Nuts and Washers
		D	714.09	Anchor Bolts, Traffic Signals, Lighting and Overhead Structures
		Buy America	752.15	Grounding Electrodes
677.22, 677.23 & 677.25	OVERHEAD TRAFFIC SIGN SUPPORT, CANTILEVER WITH LIGHTING & OVERHEAD TRAFFIC SIGN SUPPORT, MULTI-SUPPORT WITH LIGHTING, REMOVE AND RESET OVERHEAD TRAFFIC SIGN SUPPORT	D	714.11	Steel Tubing
		APL	707.03	Mortar, Type IV
		D	713.01	Bar Reinforcement
		D	714.04	Carbon Steel Bolts, Nuts and Washers
		D	714.05	High-Strength Bolts, Nuts and Washers
		D	714.09	Anchor Bolts, Traffic Signals, Lighting and Overhead Structures
		Buy America	752.15	Grounding Electrodes
		APL	753.05 (2018)	Luminaires
		A	753.10 (2011)	Luminaires
		A	679.10 (2018)	Street Lighting Control Device
		A	753.12 (2011)	Street Light Control Device

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Pay Item No.	**Pay Item Name**	**Accept-ance Method**	**Material Specification No.**	**Material Name**
678.15	TRAFFIC CONTROL SIGNAL SYSTEM, INTERSECTION	D	713.01	Bar Reinforcement
		D	714.05	High-Strength Bolts, Nuts and Washers
		D	714.09	Anchor Bolts, Traffic Signals, Lighting and Overhead Structures
		D	752.03(a)	Steel Poles and Baseplates
		D	752.03(b)	Cantilever Mast Arms
		Buy America	752.06	Traffic Signal Controllers
		Buy America	752.15	Grounding Electrodes
678.16	FLASHING BEACON, GROUND MOUNTED	Buy America	713.01	Bar Reinforcement
		D	752.01(a)(1)	Steel Posts
		Buy America	752.01(b)(1)	Cast Iron Bases
		Buy America	752.07	Flashing Beacons
		Buy America	752.15	Grounding Electrodes
678.17	FLASHING BEACON, AERIAL MOUNTED	Buy America	713.01	Bar Reinforcement
		Buy America	752.02(b)	Steel Poles and Base Plates
		Buy America	752.04	Span Wire
		Buy America	752.07	Flashing Beacons
		Buy America	752.15	Grounding Electrodes
678.20	INTERCONNECTING CABLE	Buy America	752.04	Span Wire
678.25, 678.27	PULL BOX, STANDARD; PULL BOX, DOUBLE	Buy America	752.12(a)	Pull Box
679.46	STREET LIGHT ASSEMBLY	D	713.01	Bar Reinforcement
		D	714.09	Anchor Bolts, Traffic Signals, Lighting and Overhead Structures
		Buy America	752.15	Grounding Electrodes
		D	753.04(a) (2018)	Bracket Arm, Aluminum
		D	753.04(b) (2018)	Bracket Arm, Steel
		APL	753.05 (2018)	Luminaires
		A	753.10 (2011)	Luminaires
679.47	BRACKET ARM	D	753.04(a) (2018)	Bracket Arm, Aluminum
		D	753.04(b) (2018)	Bracket Arm, Steel
679.50	LUMINAIRE	APL	753.05 (2018)	Luminaires
		A	753.10 (2011)	Luminaires
679.54	STREET LIGHTING CONTROL DEVICE	A	679.10 (2018)	Street Lighting Control Device
		A	753.12 (2011)	Street Light Control Device
679.55	POWER DROP STANCHION, STREET LIGHTING	Buy America	752.15	Grounding Electrodes
680.20	TRAVEL INFORMATION SIGN	A	750.08	Retroreflective Sheeting
680.25	BUSINESS DIRECTIONAL SIGN	A	750.08	Retroreflective Sheeting