CONNECTICUT DEPARTMENT OF TRANSPORTATION

BUREAU OF ENGINEERING AND CONSTRUCTION

OFFICE OF CONSTRUCTION
DIVISION OF MATERIALS TESTING

Quality Assurance (QA) Program for Materials
Acceptance and Assurance Testing Policies and Procedures

January 2017

Prepared by Materials Testing Staff

Chapter 1 – Purpose

This manual describes the organization, functions, and procedures performed by the Connecticut Department of Transportation's (Department) Division of Materials Testing (DMT) relating to sampling, testing, and inspection of materials incorporated into Department projects or State funded municipal projects. In addition, the procedures used to verify Contractor test results and the Department's independent assurance test programs are also described. These functions and procedures comply with the criteria set forth in Federal Regulation 23 CFR 637, CONSTRUCTION INSPECTION AND APPROVAL, which governs quality assurance on all federal-aid highway projects on the National Highway System.

It is the function of the DMT to predetermine in some cases, and determine prior to completion of the work in other cases, if materials used by Contractors and the Department in the construction and maintenance of transportation facilities comply with the specification requirements and plans, and to assist others within the Department with developing and maintaining materials specifications and materials-related project specifications. Occasionally, DMT personnel perform investigational work on new materials and procedures. Testing procedures utilized by DMT personnel are as specified in the current edition of the ConnDOT Standard Specifications; Standard Specifications and Methods of Sampling and Testing by the American Association of State Highway and Transportation Officials (AASHTO); the American Society for Testing and Materials (ASTM); and ConnDOT Reference Files.

The method and frequency of testing of materials used in the construction of Department projects are identified in the "*Minimum Schedule for Acceptance Testing*" and the "*Minimum Schedule for Assurance Testing,*" Chapters 8 and 9 of this manual respectively. The schedules are arranged according to standard contract item nomenclature common to the Department's Standard Specifications and listing of contract items.

All contract items within the Department's highway construction management system (SiteManager) have been, and continue to be, reviewed and where appropriate have material(s) that typically require testing associated to them. Appendix D lists the material codes used in SiteManager. During the course of a project, modifications to these associations may be required on a project-by-project basis due to a changed field condition or Contractor selections. As materials are used on the project, project personnel submit a "Request for Test" at the frequency described in the minimum test schedules to the DMT to perform whatever actions are necessary to make a recommendation to the contract administrator as to the acceptability of these materials in relation to the specific contract item. These actions are typically referred to as "acceptance testing" and may include physical testing, visual inspection, and/or review of pertinent documentation for a sample of the total material used.

Actions showing that the samples meet the acceptance criteria stated within the contract specification generally would prompt a recommendation of acceptance from the DMT for that material quantity represented by the sample. Conversely, actions showing that samples do not meet the acceptance criteria stated within the contract specification generally would prompt a recommendation of rejection.

The typical number of test requests processed annually by the DMT are listed below in decreasing order.

Material Name	Samples	% of total
Hot Mix Asphalt (All)	3300	24
Stone (Broken/Crushed) Gravel	2900	21
Precast Concrete (All)	1650	12
Concrete (PCC)	4400	32
Sand	1100	8
Reinforcing Steel	400	3
Totals	13750	100

The contract administrator, in most cases a District Engineer, is ultimately responsible for the acceptance of the total material quantity used on a project and may accept materials recommended for rejection, or reject materials recommended for acceptance, in accordance with the Department's Specifications.

Assurance testing is performed independently from acceptance testing to assure that personnel are performing the testing procedures in accordance with the applicable sampling and testing specification and that the testing equipment used is calibrated and working properly.

After all construction on a project is completed and all requests for test have been processed, a Final Materials Certificate (FMC) is issued by DMT staff that reconciles the testing for materials that are subject to testing and/or inspection and their installed quantities. Any materials that were subject to testing and were permanently incorporated into the project that were not accepted in accordance with the specifications are listed as exceptions to the project specifications.

Chapter 2 – Division of Materials Testing Overview

The Division of Materials Testing (DMT) consists of three Sections, Project Support and Portland Cement Concrete; Independent Assurance and Field Inspection; and HMA & Final Materials Certification. All are under the jurisdiction of the Division Chief for the Office of Construction (DC) and the Principal Engineer for Materials Testing (PEMT). The DC, as the Department's representative to the AASHTO Subcommittee on Materials (SOM), advises and assists in the preparation and continuous revision of AASHTO specifications used by transportation agencies throughout North America.

The PEMT maintains an association with Materials Testing Engineers of other states through AASHTO correspondence and their annual meeting and maintains a close association with the surrounding states Materials Testing Engineers through the Northeastern States Materials Engineers' Association (NESMEA). The PEMT also maintains a close relationship with professional organizations such as the New England Transportation Technician Certification Program (NETTCP); Northeast Asphalt User /Producers' Group (NEAUPG); and the Northeast Protective Coating Committee (NEPCOAT).

The DC and PEMT are responsible for administering and providing direction for the technical operations such as the personnel policies, affirmative action goals, union contracts, code of ethics, and other pertinent Department technical guidelines/policies that are brought to the attention of, and enforced by, each individual section supervisor in the DMT.

The PEMT is assisted by three Transportation Supervising Engineers (TSEs) who lead the three sections and a complement of 45 employees. The organization of the Division of Materials Testing is graphically represented in the following Organizational Chart. (Figure 1)

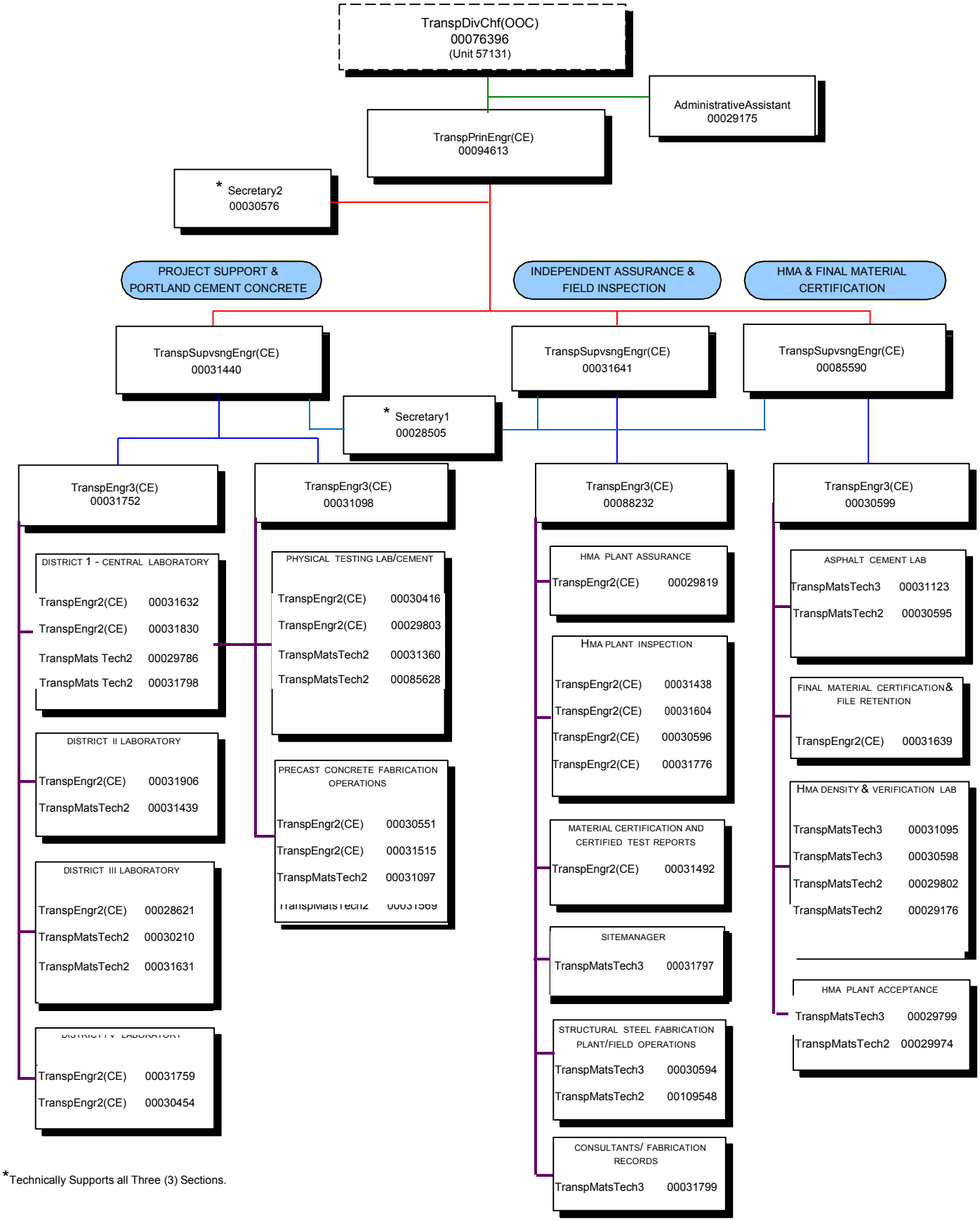
It is the responsibility of the TSEs to supervise the day-to-day operations of the three sections in order to assure that materials are recommended for approval or rejection and the specified sampling and testing procedures are followed. Testing results are input to SiteManager for dissemination to the appropriate construction project and District personnel. This serves as a historical record of materials tested for use on a construction project or maintenance activity and their status during the testing process.

The duties of the three TSEs also include the submission of budget, equipment, and overtime requirements; investigation of materials failures; and communication with Contractors and Engineers on materials specifications and specific project-level issues.

The DMT participates in the AASHTO Accreditation Program (AAP). This program provides accreditation for laboratories that meet strict organization, personnel, equipment, and testing proficiency requirements. The program includes the following construction materials pertinent to the Division of Materials Testing: Asphalt Cement, Performance Graded Binder, Emulsified Asphalt, HMA, HMA Aggregate, Portland Cement Concrete, and Portland Cement Concrete Aggregate.

Figure 1.

STAFFING CHART
CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING AND CONSTRUCTION
DIVISION OF MATERIALS TESTING



*Technically Supports all Three (3) Sections.

Division of Materials Testing Overview (cont.)

Project Support & Portland Cement Concrete (PS) Section

The PS Section is primarily involved with the operation of the satellite laboratories in each of the outlying Districts and the testing and inspection of Portland cement concrete and precast and prestressed concrete members. In conjunction with those materials, this section also performs the physical testing of steel reinforcing material and other steel-related items. A large part of the service provided by this section is the support of the active construction projects and delivering some material samples to the Central Laboratory. Visits to the project sites are commonly done to retrieve all types of samples, assist project personnel in the submittal of all samples, and to assist in the testing of materials on site, or the assurance testing of PC concrete.

The PS Section of the DMT is divided into three functional units: District Laboratories' Operations, Physical Testing Lab/Cement, and Precast Concrete Fabrication Operations.

District Laboratories' Operations

This unit oversees the operations of the three satellite District Laboratories located in each of the outlying three Districts and the Central Laboratory's District 1 Lab in Rocky Hill. These laboratories are located in each District Office within the State to expedite the sampling and testing of common materials, such as aggregates. The unit is also responsible for maintaining an active independent assurance testing program for aggregates and concrete for the satellite District Laboratories consistent with that of the Central Laboratory.

The satellite District Laboratories are primarily assigned materials sampling and testing for projects within the District in which they are located.

The principal duties of the satellite District Laboratories are as follows:

- Perform acceptance testing of fine and coarse aggregates including but not limited to gradation analysis, specific gravity, density, and unit weight.
- Determine laboratory maximum density of soils and processed aggregates.
- Inspect metal pipe and metal culvert ends at project sites.
- Inspect and sample transportation materials at quarries, gravel banks, Portland cement concrete plants, and other sources of supply for Department projects.
- Perform acceptance sampling and testing of fine and coarse aggregates.
- Observe assurance sampling and testing for aggregates and Portland cement concrete.
- Obtain samples and transport them to the Central Laboratory as needed.
- Inspect any new sources of materials.
- Assist Division of Purchasing regarding sampling and testing of road salts.

The District 1 Lab located within the Central Laboratory facility performs the same operations as the satellite District Labs with the additional task of checking the satellite District Labs' test results for aggregates using split samples and performing additional tests on fine and coarse aggregates such as soundness, resistance to degradation by abrasion and impact, specific gravity, absorption, unit weights, angularity, and elongation.

Physical Testing Lab/Cement

The responsibilities of the physical testing unit include the testing for compressive strengths of concrete cylinders, testing of drilled cores, properties of brick and block, the tensile strengths of several ferrous and nonferrous structural steel products, the Rockwell or Brinell hardness of structural steel products, the coating thickness of zinc and epoxy coated products, and evaluating weld coupons for welder certification testing. This subsection may also perform testing on new products and materials being evaluated by the Department.

Precast Concrete Fabrication

This unit acts as a liaison with precast concrete producers and project personnel to schedule on-site inspections and resolve technical and administrative issues. Inspectors in this unit are responsible for the quality assurance of prefabricated concrete products. These products include reinforced concrete pipe, precast and prestressed concrete items. The overall duties of the individual inspectors are to monitor the fabricators compliance to their own Quality Control (QC) Plan on file with the Department. At varying frequencies, the inspectors also sample all component materials for compliance with the Department's specifications; inspect the casting beds and forms to ensure dimensional conformance to the approved drawings; observe the concrete batching operation to ascertain conformance to an approved mix design; witness plastic concrete testing; observe the concrete placement and consolidation operation; witness the compression testing of specimens; inspect the finished product for conformance to dimensional tolerances and finished appearance; and maintain complete and accurate Department records for all phases of the work. Consultants under contract to the Department are used as needed to supplement DMT personnel to meet this responsibility.

Hot Mix Asphalt and Final Material Certification (HMA) Section

The HMA Section is divided into five functional units: Bituminous Materials Lab, Final Materials Certification and File Retention, HMA Density and Verification Lab, and HMA Plant Acceptance.

Bituminous Materials Laboratory

This unit is responsible for testing of various performance graded (PG) binders and other petroleum based products. HMA paving and associated products physically tested by this unit are PG Binders, emulsified asphalts and bituminous component materials used in Ultra-thin HMA. In addition, this unit reviews binder and emulsified asphalt suppliers QC Plans and other required documentation to maintain the supplier certification by AASHTO R 26 and AASHTO R 77.

Final Materials Certification and File Retention

This unit is responsible for tracking material testing data on a project to ensure that all materials permanently incorporated into the project are tested/certified in sufficient quantity and that the results are acceptable or alternative acceptance criteria are met. Upon request from the District, a final materials certificate is provided for all completed projects stating the disposition of all materials incorporated into the project. If applicable, exceptions to the project specifications are listed individually on the certificate. Examples of this certification are in Appendix B.

HMA Density and Verification Lab

This unit is responsible for verifying that mix designs are in compliance with project specifications and for validating Contractor data used for acceptance. Comparison testing during the paving season is performed on test specimens that are fabricated by both Contractor or DMT staff. Test records are maintained for each mixture type produced by each vendor providing materials to the Department. The HMA Density and Verification unit also performs extraction and aggregate tests on samples; processes cores for payment adjustment; and investigates new mix designs, additives, and aggregate sources.

HMA Plant Acceptance

Staff in this unit are responsible for monitoring HMA producer QC testing at the plant used for acceptance on a project-by-project basis and processing the results for payment adjustment purposes. HMA mix designs are also reviewed by staff in this unit for compliance to the project specifications and monitors changes in materials sources and the resulting mix design changes during the paving season. During the winter months, staff review producer generated QC Plans to ensure that the current specification requirements are recognized and any revisions are acceptable to the Department.

Independent Assurance and Field Inspection (IA) Section

The IA Section is divided into six units: HMA Plant Assurance, HMA Plant Inspection, Material Certification and Certified Test Reports, SiteManager, Structural Steel Fabrication Plant/Field Operations, and Consultants/Fabrication Records.

The IA Section of the DMT is primarily responsible to assure that the testing being performed by Department and/or Contractor personnel for acceptance purposes is performed by qualified personnel in accordance with standard test procedures and that the equipment used is adequate and calibrated. This typically includes a review of personnel qualifications, calibration records, witnessing test procedures first hand, and performing verification testing. The schedule for IA inspection is as follows:

<table>
<tr><th>Test</th><th>Acceptance Samples</th><th>Assurance Samples</th></tr>
<tr><td>T-168 Sampling Bituminous Mixtures</td><td rowspan="7">10</td><td rowspan="7">1
(Min 1 per Month per Technician during Construction Season)</td></tr>
<tr><td>R-47 Reducing Samples of HMA</td></tr>
<tr><td>T-308 Asphalt Content Ignition Oven</td></tr>
<tr><td>T-30 Sieve Analysis</td></tr>
<tr><td>T-312 Preparation of Gyratory Sample</td></tr>
<tr><td>T-166 Bulk Specific Gravity</td></tr>
<tr><td>T-209 Theoretical Maximum Specific Gravity</td></tr>
<tr><td>T-331 Standard Method of Test for Bulk Specific Gravity (Gmb) and Density of Compacted Hot Mix Asphalt (HMA) Using Automatic Vacuum Sealing Method</td><td>40</td><td>1</td></tr>
</table>

This section is also responsible for the day-to-day administration of a consultant contract for the testing of structural steel at various out-of-state fabricators, and other seasonal inspection needs within the State; the review and processing of the consultant inspection reports; the update and maintenance of the materials module of SiteManager and interacting with construction field inspectors to revise and maintain materials testing results for individual projects; and addressing building-related issues for all Department personnel within the facility.

HMA Plant and Core Assurance

This unit follows an independent process from that for acceptance testing to ensure that material sampling and testing at the HMA plants and the DMT HMA Density and Verification Lab is being done correctly. The process evaluates personnel sampling and testing material for compliance with established standard test procedures and evaluates the equipment used for acceptance testing for adequacy and calibration.

The evaluation process generally involves witnessing personnel during the testing procedure and documenting what is observed on the “Report of Witness” (MAT-600) form. Test equipment is evaluated through calibration checks, testing split samples, or any combination of these methods. Split sample results that agree with acceptance tests within the limits of Table 2, Column C, will not require any further action. Results that fall outside the limits will require an investigation to determine the cause of the discrepancy and have it corrected.

Any sampling or testing of material for IA purposes is done on a separate schedule and frequency using separate equipment. Personnel assigned to this unit will not test material for acceptance nor will the results of any assurance testing be used for acceptance purposes.

HMA Plant Inspection

This unit is responsible for quality assurance of all HMA material used on construction and maintenance projects. This is accomplished through the inspection of HMA material at the plant. Approximately thirty source locations that provide HMA for State projects are inspected by personnel in the HMA Plant Inspection unit. All producers are required to have a field laboratory to provide a DMT inspector immediate access to test results to assure material meets the specification at the plant. In addition to the testing of HMA, the plant inspectors sample the binder; observe the production process; inspect fine and coarse aggregates; verify batch weights, mix temperatures, and appearance; and check plant machinery and hauling vehicles for specification compliance. Plant inspectors maintain test records at each field lab and complete all applicable DMT forms. The supervisor of this section is responsible for daily field supervision and observation of field technicians sampling and testing techniques; performing plant and field lab inspections; notifying producers of material problems; performing verification and assurance sampling and testing; training and reviewing procedures and specifications with the field personnel; serving as a liaison between material producers and project personnel to remedy material issues; and working closely with the HMA Plant Acceptance unit to carry out QA and investigative tasks.

Material Certification and Certified Test Reports.

This unit is responsible for the review of material certificates and certified test reports to determine if the documentation provides the information necessary to recommend acceptance of the material. Following the issuance of the Final Materials Certificate for a particular project, personnel in this unit also compile and review the project records in accordance with the Department's record retention policies so that they can be transferred to the Department's record storage facility in Newington.

SiteManager

Staff are responsible for updating and maintaining the materials module of the SiteManager Reporting System and interacting with construction field inspectors and DMT personnel to revise and maintain materials testing results for individual projects.

Structural Steel Fabrication Plant/Field Operations

This unit has the responsibility to assure that all materials and physical aspects of structural steel fabrication are in compliance with the applicable specifications. Duties of this unit include the review and approval of shop and field welding procedures; assistance to other Department personnel regarding welding techniques and procedures; on-site audits and review of field welding and in-state fabrication; testing and certification of Department approved welders; and any related duties as they apply to structural steel fabrication.

Consultants/Fabrication Records

DMT personnel monitor consultant contracts for structural steel fabrication inspection on a day-to-day basis. Personnel in this unit are also responsible for the review and processing of steel fabrication inspection reports and making technical recommendations to the TSE of the section.

Chapter 3 – Material Code Definitions

Paint/Coatings/Markings

00001 ENAMEL PAINT (BLACK/BURNT ORANGE)
Scope: All enamel paint
Sampling and Procedure: None
Specification / Report Form: Black, Reference File No. 25, Burnt Orange Reference File No. 104 **/** NA

00031 PAINT – PRIME COAT FOR STRUCTURAL STEEL
00032 (Interim), 00033 (Top), 00039 (Field)

STRUCTURAL STEEL COATINGS
Sampling: Samples of coatings are generally not required unless specified in the Special Provisions.
Procedure: Fabricators of structural steel are responsible for making themselves aware of the entire coating specification for each individual project prior to starting the work. The DMT must be notified in advance of any coating work on structural steel for Department use. Field painting and touch-up work must conform to Standard Specifications, Article 6.03.03-38. Project personnel are responsible for submitting a MAT-100 when the material is delivered to the project site.
Specification: As specified in a Special Provision or Standard Specifications, Section 6.03 and M.07.

00054 PAVEMENT MARKING PAINT, 15-MINUTE DRY, WHITE AND YELLOW
Scope: White and yellow pavement marking paint
Sampling: Two quart samples will be taken by the manufacturer for each Lot Number in accordance with ASTM D3925, and forwarded to the DMT by the manufacturer accompanied by a certified test report.
Procedure: As listed in Specification(s)
Specification/Report Form(s): Federal Specification Paint TT-P-1952, Reference File No. 207D and M.07 **/** MAT-236, MAT-237, or MAT-240.

00060 TRAFFIC PAINT, 3 MINUTE DRY, WHITE AND YELLOW
Scope: White and yellow low-heated, fast-drying pavement marking paint
Sampling: Two quart samples will be taken by the manufacturer for each Lot Number in accordance with ASTM D3925, and forwarded to the DMT by the manufacturer accompanied by a certified test report.
Procedure: Same as 00054
Specification/Report Form: Federal Specification Paint TT-P-1952, Reference File No. 200I and Section M.07 / MAT-235, MAT-238, or MAT-239.

00064 PAINT EPOXY
00091 PAINT EPOXY PAVEMENT MARKINGS
Scope: White and yellow epoxy resin pavement marking paint
Sampling: Two quart samples will be taken by the manufacturer for each Lot Number in accordance with ASTM D3925, and forwarded to the DMT by the manufacturer accompanied by a certified test report. Once per calendar year, one quart sample of the hardener forwarded to the DMT by the manufacturer accompanied by a certified test report.

00097 & 03057 Sand Blasting

00097 SAND BLAST DEBRIS (Toxicity Test)
03057 SAND BLAST ABRASIVE
Scope: Sandblast debris from bridge painting. Sent to third-party laboratory for testing.
Sampling and Procedure: EPA Method 1311
Specification/Report Form: Connecticut DEEP Drinking Water Remediation Standards / NA

00206 Black Pavement Markings
00206 PREFORMED BLACK MARKING TAPE
Scope: Rolled tape for pavement markings.
Sampling and Procedure: None
Specification/Report Form: M.07 / NA

00297 to 00303 Snow & Ice Control
00297 CALCIUM CHLORIDE (LIQUID) 00302 CALCIUM CHLORIDE
Scope: Highway Maintenance use only.
Sampling and Procedure: None
Specification/Report Form: AASHTO M 144 / NA

00298 SODIUM CHLORIDE (INERTIAL BARRIERS)
00303 SODIUM CHLORIDE (ROCK SALT)
Scope: All sodium chloride used for snow and ice control on highways; or for use in inertial barriers.
Sampling: For snow and ice control AASHTO T 2, none for inertial barriers.
Procedure: Sieve analysis, AASHTO T 27; chemical, ASTM E 534; moisture content, AASHTO T 265.
Specification/Report Form: For snow and ice control, ConnDOT Reference File No. 139 / MAT-208. For inertial barriers, Standard Specifications, Section 18.07 (Materials Certificate) / NA.

00306 GLASS SPHERES (GLASS BEADS*)*
NOTE: All other material codes for glass beads are inactive.
Scope: Glass spheres (glass beads) for application on pavement markings.
Sampling: One sample will be provided for each Lot Number and forwarded to the DMT by the manufacturer.
Procedure: AASHTO M 247
Specification/Report Form: AASHTO M 247, Type 1 and 4 / MAT-228 or MAT-229

00327 WATER
Scope: For production of PCC and any other material or process.
Sampling and Procedure: None for potable sources. For other sources, ASTM C 1602.
Specification/Report Form: Standard Specifications, Article M.03.01-4 **/** MAT-230

Landscaping Materials

00496 FERTILIZER
Scope: Fertilizer for use in turf establishment.
Sampling: None.
Procedure: Standard Specifications, M.13.03
Specification/Report Form: Standard Specifications, Article M.13.03 / NA

00497 SEED
Scope: Mixtures to establish turf or grass.
Sampling: None
Procedure: Standard Specifications, Article M.13.04
Specification/Report Form: Standard Specifications, Article M.13.04 **/** NA

00510 PEAT
Scope: Commercially package peat from sedge, sphagnum or reed sources used on planting soil.
Sampling: None - visual inspection by project personnel.
Specification/report Form: Standard Specification, Article M.13.07 / NA

00511 LIMESTONE
Scope: Agricultural ground dolomitic limestone used to increase pH on topsoils.
Sampling: None
Specification/Report Form: Standard Specification, Article M.13.02/ NA

00515 WOOD CHIP MULCH
00534 WOOD MULCH
Scope: To establish quick germinating vegetation and/or prevent erosion.
Sampling: None - visual inspection by project personnel.
Specification/Report Form: Standard Specifications, Article M.13.05 / NA

00514 MULCH (HAY)
04776 BALED HAY
Scope: Used for turf establishment or sedimentation control.
Sampling: None - visual inspection by project personnel.
Specification/Report Form: Standard Specifications, Article M.13.05 (Mulch) or Section 2.18 (Sedimentation Control) / NA.

00518 SOD
Scope: Sod used for the immediate establishment of a grass surface.
Sampling: None - visual inspection by project personnel.
Procedure: Project personnel contact Landscape Design Unit
Specification/Report Form: Standard Specifications, Article M.13.08/ NA

00536 PLANT MATERIALS
07547 TREE
Scope: All living plant materials are to be inspected by staff from the Department's Landscape Design Unit. A MAT-100 is NOT required. Initial contact and follow up is the responsibility of project staff.
Sampling: None - visual inspection by Landscape Design personnel.
Procedure: Project staff contact Landscape Design Unit
Specification/Report Form: Standard Specifications, Article M.13.07/ NA

00542 TOP SOIL
Scope: Cut and fill material taken from the project site and used on the project site.
Sampling: None - visual inspection by project personnel.
Specification/Report Form: Standard Specifications, Article M.13.01 / NA

00542X TOP SOIL
00542P PLANTING SOIL
Scope: Soil brought from off the project site for use under items 0949XXX furnishing and planting trees.
Sampling: None. Materials Certificate and Certified Test Report submitted with MAT-100.
Specification/Report Form: Standard Specifications, Article M.13.01 / NA

Precast Concrete Drainage Materials

00699, 1700, 1708 Reinforced Concrete Pipe
00699 REINFORCED CONCRETE PIPE
01700 PLAIN AND PERFORATED CONCRETE DRAIN PIPE
01708 PIPE – FOR UNDERDRAIN or OUTLET
Scope: Plain and perforated concrete drain pipe.
Sampling: Each size and type of pipe is subject to 3-edge bearing and absorption tests each spring.
Procedure: AASHTO M 170 and AASHTO T 280.
Specification/Report Form: Standard Specifications, Article M.08.01-7 / MAT-314

Precast Units For Drainage Structures

00823 to 01650 Precast Concrete Drainage & Misc.
Refer to Appendix D for material codes

Scope: Precast concrete units to be used in the construction of drainage structures. Precast units shall include, but not be limited to, products such as box culverts, catch basins, drop inlet and manhole tops, riser sections, sumps and other appurtenances. The recommendation for acceptance of precast units is based on the manufacturer's certification that the units conform to the project specifications. Ultimate acceptance of the material should be based on receipt of the manufacturer's certification and a visual inspection by project personnel following delivery.

Pipe

01940 to 2650 PIPE (Metal, Iron, Poly, PVC)

01940 PIPE – CCM, Fittings & Accessories
01949 PIPE – COATED CORRUGATED METAL

Scope: The field inspection of metal and aluminum pipe and structural plate pipe and pipe arches.
Sampling: Depending on the size of the shipment, one or two representative pieces of metal pipe, bands, and accessories are selected by DMT and inspection personnel for testing.
Procedure: Procedures and measurements are shown in the "Field Inspection of Metal and Aluminum Pipe" procedure in Appendix G. Materials Certificates and Certified Test Reports are also required.
Report Form: MAT-200, MAT-201, MAT-202, MAT-203, or MAT-204.

02501 DUCTILE IRON PIPE
02510 DUCTILE IRON PIPE FITTINGS & ACCESSORIES
02724 PIPE- STEEL & FITTINGS & ACCESSORIES

Scope: This section covers welded and seamless steel pipe.
Sampling: ASTM A 53 and as supplemented in Standard Specifications, M.06.02.
Procedure: ASTM A 53 and as supplemented in Standard Specifications, M.06.02.
Specification/Report Form: Standard Specifications, Article M.06.02. / MAT-100

02600 POLYETHYLENE PIPE
02672 POLYETHYLENE PIPE FITTINGS AND ACCESSORIES

Scope: Plastic and polyethylene corrugated pipe or tubing for use in drainage.
Sampling and Procedure: None - visual inspection by project personnel.
Specification/Report Form: Standard Specifications, Article M.08.01. / MAT-100.

02649 POLYVINYL CHLORIDE PLASTIC PIPE

Scope: This section covers polyvinyl chloride plastic pipe, elbows, and couplings for highway drainage.
Sampling and Procedure: None - visual inspection by project personnel.
Specification/Report Form: Standard Specifications, 5.13 and Article M.08.01 **/** NA

04178 PIPE JOINT COMPOUND

Scope: Cold applied bituminous sealer for reinforced concrete pipe.
Sampling: None
Procedure: None
Specification/Report Form: Standard Specifications, M.08.01 / NA

Steel Reinforcement

02998 DEFORMED STEEL BARS, EPOXY COATED
03100 DEFORMED STEEL, REINFORCING

Scope: Deformed steel bars (plain or epoxy coated) for concrete reinforcement.
Sampling: A sample of each size bar will be submitted for each shipment as follows: All sizes-one sample per size from each manufacturer for each 200 tons. Samples submitted for test will be cut from the shipment on the project site and will be not less than 5 ft. (1.5 m) in length.
Procedure: AASHTO T 244
Specification/Report Form: Bar reinforcement will be tested according to procedures prescribed in AASHTO M 31. Epoxy coated reinforcement shall be tested as prescribed in AASHTO M 284. Standard Specifications, Article M.06.01 / MAT-305

07999 WIRE AND WELDED WIRE STEEL WIRE FABRIC (MESH)

Scope: This section covers wire and welded steel wire fabric for use as concrete reinforcement.
Sampling: A 1 yd^2 (0.9 m^2) sample of each type will be submitted for test per 8,000 yd^2 (7,000 m^2) of fabric used.
Procedure: AASHTO T 244
Specification:

- Cold-drawn steel wire: AASHTO M 32
- Welded steel wire fabric: AASHTO M 55
- Deformed steel wire: AASHTO M 225
- Welded Deformed Steel Wire Fabric: AASHTO M 221

Report Form: MAT-306 or 328

03145 DEFORMED BAR MAT-REINFORCEMENT

Scope: Deformed bar mat reinforcement for use in the construction of concrete pavement.
Sampling: 1 yd^2 (m^2) of each type will be submitted for each 1 mile (1.6 km) of pavement.
Procedure: AASHTO T 244
Specification/Report Form: Standard Specifications, Article M.06.01/ MAT-305

Portland Cement Concrete

03014-X Concrete Class - X
03014-SPXK Concrete Spec. Prov. (X000psi/Mpa)
03014-other

Scope: Fresh Portland Cement Concrete Testing
Sampling: Project personnel are responsible for sampling the concrete at the point of placement.
Procedure: Sampling - AASHTO T 141, Slump - AASHTO T 119, Temperature - AASHTO T 309, Air Content - AASHTO T 152 or AASHTO T 196, Making and Curing Concrete Test Specimens in the Field - AASHTO T 23. Project personnel are responsible for filling the cylinder molds, determining air content, temperature, and slump. Cylinders must be immediately placed where they can remain undisturbed for at least 24 hours.
Assurance Report (DMT Only): MAT-224, or MAT-225, and MAT-222
Acceptance Report (Project Personnel): MAT-308

03040 NON-SHRINK, NON-STAINING GROUT

Scope: Non-shrink, nonstaining grout.
Sampling: Project personnel are responsible for reviewing the bags containing the material for markings indicating compliance with the specifications.
Procedure: Visual inspection of bag.
Specification/Report Form: Standard Specifications, Article M.03.01 **/** NA

Prestressed/Post-Tensioned/Concrete Members

08044 RETAINING WALL – PRECAST CONCRETE

Scope: Precast, prestressed, and post-tensioned concrete members for use in structures.
Procedure: Precast, prestressed, and post-tensioned concrete members are inspected at the fabricating plant during fabrication and immediately prior to shipment by a representative of the DMT to ensure conformance with the requirements of the applicable specifications. Representative samples of component materials used in the manufacture of these concrete members may be sampled and tested to determine compliance with Standard Specifications. Details of this inspection are provided in Chapter 4.

FABRICATION INSPECTION OF PRECAST CONCRETE MEMBERS
Scope: Due to the critical function of precast, prestressed, and post-tensioned concrete members as load-bearing units of bridges and structures, the DMT assigns an inspector to the manufacturing plant to inspect, in detail, all phases of manufacture. Details of this inspection are provided in Chapter 4.

03148 PRESTRESSING STEEL

Scope: Uncoated high tensile strength, seven-wire, steel strand.
Sampling: One 7 ft. (2.2 m) length and one 1 ft. (305 mm) length of strand from each reel or coil. Up to five reel packs or coils identified with the same heat number can be represented with a single sample.
Procedure: AASHTO T 244
Specification/Report Form: Standard Specifications, Article M.14.02/ MAT-323

Portland Cement/Chemical Anchor

03060 PORTLAND CEMENT TYPE I
03061 PORTLAND CEMENT TYPE II
03066 PORTLAND CEMENT TYPE I/II

Scope: Portland cement used in the production of concrete for Department projects.
Sampling/Procedure: All Portland cement producers are required to submit quarterly test reports to the DMT in accordance with the requirements of Appendix E, "Criteria for Acceptance of Portland Cement by Certification."
Specification/Report Form: Standard Specifications, Article M.03.01 **/** None

03105 CHEMICAL ANCHOR

Sampling and Procedure: No sample required. Accepted based on Department's Qualified Products List.
Specification: Standard Specifications, Article M.03.07

Joint Materials

03094 JOINT SEALANTS

Scope: This section covers joint sealants for use in PC concrete structures (excluding pavements).
Sampling: None
Procedure: DMT personnel are responsible for reviewing the Materials Certificate and Certified Test Report.
Specification/Report Form: Standard Specifications, Article M.03.01 / MAT-100

03158 PREFORMED EXPANSION JOINT FILLER

Scope: This section covers corrosion-resistant load transfer devices, preformed expansion joint fillers, and wood joint filler.
Sampling and Procedure: None. Project staff reviews the Materials Certificate for compliance with contract specifications.
Specification/Report Form: Standard Specifications, Article M.03.01/ NA.

03444 CLOSED CELL ELASTOMER

Scope: Elastomeric material and lubricant adhesives for use in transverse joints in concrete structures.
Sampling and Procedure: None. Project staff reviews the Materials Certificate for compliance with contract specifications.
Specification/Report Form: Standard Specifications, Article M.17.02 / NA

04177 JOINT SEALER

Scope: Joint sealants of the hot poured type for use in all PC concrete and HMA pavements.
Sampling: None
Procedure: DMT personnel are responsible for reviewing the Materials Certificate and Certified Test Report
Specification/Report Form: Standard Specifications, Article M.04.01/ MAT-100

Brick and Block

03200 & 03201 Brick & Block

Project Staff must submit a Request for Test (MAT-100) indicating manufacturer. A copy of a delivery ticket or receipt from the manufacturer must be attached to the MAT-100. Should the manufacturer not be known DMT personnel may request samples from the project. Project personnel should contact DMT immediately should the manufacturer be unfamiliar to prevent substandard material from being used.

03200 MASONARY BRICK AND BLOCK (Solid)

Scope: Precast, rectangular blocks made from PC concrete.
Procedure: ASTM C 140 and Standard Specifications, Article M.12.12.
Specification/Report Form: Standard Specifications, Article M.12.12 / MAT-313

03201 BRICK (Clay) - RED

Scope: Brick (made from clay or shale and burned)
Procedure: AASHTO T 32
Specification/Report Form: Standard Specifications, Article M.08.02/ MAT-312

Metal Castings

03209 MANHOLE COVERS & FRAMES
03253 METAL CASTINGS

Scope: This section covers castings for general application in highway and bridge construction.
Sampling: None. DMT personnel will review Materials Certificate.
Specification/Report Form: Standard Specifications, Article M.06.02 / MAT-100

ALUMINUM CASTING, TUBING AND FITTINGS

Scope: This section covers aluminum castings, tubing and fittings for ornamental posts, traffic rail posts, bases, post connection splice bars, end caps, etc.
Specification/Report Form: Standard Specifications, Article M.06.02 / MAT-100

Fences

03300 FENCE CHAIN LINK, FABRIC
Including most material codes up to and including
03327 FENCE, PROTECTIVE

Scope: Aluminum-coated or polyvinyl chloride-coated steel chain-link fabric, aluminum alloy fabric, galvanized metal or polyvinyl chloride-coated material or aluminum alloy posts, top and brace rails, and fittings to be used in the construction of chain-link fence.

FABRIC
Sampling: One sample of chain-link fabric at least 3 feet (1 meter) wide and the full height of the fence will be submitted to the DMT for each shipment of 100 rolls or fraction thereof.
Procedure: AASHTO T 244 and the following as applicable:

1. Aluminum-Coated Steel Fabric: Standard Method of Test for Weight [Mass] of coating on aluminum-coated iron or steel articles, AASHTO T 213.
2. Polyvinyl Chloride-Coated Steel Fabric: Standard Specification for Poly (Vinyl-Chloride) (PVC) – Coated Steel Chain Link Fence, ASTM F 668.
3. Aluminum Alloy Fabric: Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire, ASTM B 211.

Specification/Report Form: Standard Specifications, Article M.10.01 Fabric / MAT-303

METAL POSTS, RAILS, AND GATE
Sampling:
Gate: Submit one (1) Request for Test with a Materials Certificate for each shipment.
Metal Posts and Rails: Submit one (1) Request for Test with a Materials Certificate for each size and type.
Procedure: DMT personnel will review Materials Certificate
Specification/Report Form: Standard Specifications, Article M.10.05 / MAT--100

FITTINGS
Sampling: Submit one (1) representative sample for each size and type.
Procedure: Average thickness of coating on hot-dipped galvanized fittings shall be determined with the use of a magnetic thickness gage, ASTM Practice E 376.
Specification/Report Form: Standard Specifications, Article M.10.05 Fittings. / MAT-325.

TENSION WIRE
Sampling: Submit one (1) representative sample for each type of tension wire.
Procedure: AASHTO T 244 and AASHTO T 213
Specification/Report Form: Standard Specifications, Article M.10.05 / MAT-326

WIRE FENCE
Scope: Wire fence and support posts.
Sampling: All fence components will be inspected in the field by project personnel to determine conformance to specifications. Project personnel are responsible for submitting a Request for Test, with a Materials Certificate. For treated wood posts, a certificate of treatment is also required.
Procedure: Laboratory personnel are responsible for reviewing the Request for Test and the Materials Certificate to determine conformance to applicable specifications.
Specification/Report Form: Standard Specifications, Article M.10.04 / MAT-100

03985 GEOTEXTILES
Scope: For use in highway drainage, erosion control, or sedimentation control.
Sampling and Procedure: No Sample required. Accepted based on visual inspection and the Department's Qualified Products List.
Report Form: None

Railings
03405 to 03429 Metal Beam & Bridge Rail
Refer to Appendix D for material codes
Scope: Metal beam elements attached to steel posts by various types of hardware and ending in appropriate terminal treatment for use in various highway guardrail installations.

Sampling: Project personnel will submit Request for Test (MAT-100) indicating the following Brand Registration, which shall be marked on each rail element, rub rail, or terminal section:

1. Name or brand of manufacture.
2. Identification symbols, or code for heat number or coating lot.
3. Class (A or B).
4. Type (1 or 2).

Procedure: DMT personnel will review the submittal for conformance to project specifications.
Specification/Report Form: Standard Specifications, Article M.10.02 / MAT-329

03419 to 03439 Cable Guide Rail & Related

03419 CABLE GUIDE RAIL

Scope: Wire rope and fittings for use in wire rope railing supported by wood or steel posts.
Sampling: Samples are not required. Submit a MAT-100 with a Materials Certificate.
Procedure: DMT personnel will review the submittal for conformance to project specifications.
Specification/Report Form: Standard Specifications, Article M.10.01 / MAT-100

Structural Anchors & Bearings

03504 ANCHOR BOLTS

Scope: This section covers anchor bolts, nuts and washers for structural steel construction.
Sampling: One (1) bolt for each size, heat #, and shipment is required for each project. Each sample must be submitted with a Certified Test Report and Materials Certificate.
Procedure: AASHTO T 244
Specification/Report Form: Standard Specifications, Articles M.06.02 and M.15.02, / MAT-300 or 301.

03505 to 03531 Bearing Pads

03505-L BEARING PADS (Elastomeric Laminated)

03505-P BEARING PADS (Elastomeric Plain)

Scope: Laminated and non-laminated bearing pads and adhesive for use in bridge structures.
Sampling: Submitting a MAT-100 with a Certified Test Report. In addition, a copy of the approved shop drawings must be provided. One test pad must be provided for every fifty (50) pads, or portion thereof, required on a structure. If there are multiple types/sizes of pads on a structure, the test pad shall be representative of the most common type/size.
Procedure: Review the Certified Test Report and test material as required to determine conformance to the project specifications.
Specification/Report Form: Standard Specifications, Article M.17.01 / MAT-310

03531 PREFABRICATED BEARING PADS

Scope: Prefabricated pads for bearing areas.
Sampling: None
Procedure: DMT personnel are responsible for reviewing the Materials Certificate.
Specification/Report Form: Standard Specifications, Article M.12.01. / MAT-100

03540 BEARINGS, POT OR SPHERICAL

Scope: This section covers bronze or copper alloy bridge bearings or expansion plates.
Sampling: None
Procedure: DMT personnel are responsible for reviewing the Materials Certificate.
Specification/Report Form: Standard Specifications, Article M.06.02 / MAT-100

Structural Steel

03541 WELDING ELECTRODES
Sampling: As required during shop or field visits
Specification/Report Form: Standard Specifications, Article M.06.04 / NA

03549 PILES, STEEL
Sampling: Field personnel should contact the DMT for sampling requirements.
Procedure: AASHTO T 244.
Specification/Report Form: Standard Specifications, Article M.09.02 / MAT-327.

07762 SHEET PILING, STEEL
Scope: Sheet piling constructed wholly or substantially of steel. No sample required.
Procedure: Laboratory personnel are responsible for reviewing the Request for Test and the Materials Certificate to determine conformance to applicable specifications.
Specification/Report Form: Standard Specifications, Article M.09.01 / MAT-100.

03571 STRUCTURAL STEEL
Scope: This section covers all structural steel for use in riveted, bolted, or welded construction.
Sampling: Test samples for the grade of structural steel may be specified on the plans or in the project specifications. Samples are not common. Standard Specifications, Article M.06.02 (Charpy V-notch)
Procedure: Submit a MAT-100 when the material is delivered to the project site.
Specification/Report Form: Standard Specifications, Section 6.03 and Article M.06.02./MAT-305 or 100.

03707 HIGH STRENGTH BOLTS
08022 BOLT (HIGH STRENGTH), NUT & WASHER
Scope: High strength bolts, nuts, and washers for use in structural steel construction.
Sampling: Request for Test (one per size) with sample, Certified Test Report, and Materials Certificate.
Procedure: "Standard Method of Test for Mechanical Testing of Steel Products," AASHTO T 244. Certified Test Report and Materials Certificate must show conformance to applicable specifications.
Specification/Report Form: Standard Specifications, Article M.06.02 /MAT-302

Highway Lighting & Traffic Control

03500 to 03799 Highway & Bridge Lighting
Refer to Appendix D for material codes
Scope: Materials used in highway illumination. Typically, the Contractor must submit catalog cuts to the Designer for approval. Refer to the "Materials Approved by Catalog Cut" section in Chapter 2.
Sampling: None
Specification/Report Form: Standard Specifications, Section M.15/ NA

03700 to 03984 Traffic Control Materials (Electric)
Refer to Appendix D for material codes

07687 COMMUNICATION CABLE & HARDWARE
08043 TRAFFIC CONTROL EQUIPMENT
Scope: Materials used in traffic control signal installations. The Contractor may use materials provided they meet the contract specifications and are approved by the Engineer/Designer.
Sampling: The contract documents will generally designate the type of material control (i.e., Certified Test Report or Materials Certificate) required. In the absence of specific requirements, the provisions of Standard Specifications, Article 1.06 apply.
Procedure: None.
Specification/Report Form: Standard Specifications, Section M.16/ NA

03933 to 03974 Signs and Traffic Control Devices
03933 DELINEATOR
03934 REFLECTIVE SHEETING
03943 OBJECT MARKERS
Scope: Aluminum sign blanks, silk-screen ink, reflective sheeting, and object markers.
Sampling: None.
Procedure: AASHTO T 244, AASHTO T 65, and ASTM E 376
Specification/Report Form: Standard Specifications, Article M.18.14 / NA.

03936 SIGN PANELS EXTRUDED ALUMINUM
03938 SIGN FACE - SHEET ALUMINUM
03939 SIGNS
03945 CONSTRUCTION SIGNS
03952 SIGN POSTS
Scope: All signs on Department projects.
Sampling: The contract documents for the project should designate the type of material documentation (i.e., Certified Test Report or Materials Certificate) required for materials used in signing installations. In the absence of specific instructions for individual projects, the method of material control shall be provisions of Standard Specifications, Article 1.06.
Procedure: Submit Request for Test with appropriate documentation.
Specification/Report Form: Standard Specifications, Section M.18 / MAT-100

03948 TRAFFIC CONES
03956 TRAFFIC DRUMS
03970 IMPACT ATTENUATOR
03974 CONSTRUCTION BARRICADE

Hot Mix Asphalt Materials

04000 to 04100 Hot Mix Asphalt & Bituminous Concrete
04003 Curb Mix
04052,3,4 HMA Level 1,2,3 (9.5 mm / 0.375 in.)
04056,7,8 HMA Level 1,2,3 (12.5 mm / 0.5 in.)
04064,5,6 HMA Level 1,2,3 (25mm /1.0 in.)
04076,7,8 HMA Level 1,2,3 (6.25 mm / 0.25 in.)

04128 to 04148 Emulsified Asphalt
Submit a Request for Test (MAT-100) indicating the source of the material. Sources are prequalified by the DMT in accordance with AASHTO R 77. The specific refiner of the material must be indicated on the MAT-100, not the Contractor, subcontractor or vendor, Contractor, subcontractor or vendor can be noted in the comments section of the MAT-100.
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Table 1. Asphalt Emulsions Material Codes and Grades

04128 RS-1	04133 SS-1	04138 CRS-1	04142 CMS-2	04145 CSS-1H
04147 RS-1H	04134 SS-1H	04139 CRS-2		04146 CSS-1
		04148 CRS-1P (polymer modified)		

Scope: Asphalt emulsions composed of a semisolid liquid asphaltic base, water, and emulsifying agent.
Sampling and Procedure: AASHTO T 40 / AASHTO T 59: Testing Emulsified Asphalt
Specification/Report Form: Standard Specifications, Section M.04 / MAT-402

08010 EXPANSION JOINT - Asphaltic Plug

Scope: Components, testing, and application requirements for field molded asphaltic plug material used within expansion joints on bridges with asphalt concrete overlays or PC concrete decks.
Sampling: AASHTO T 40
Procedure: ASTM D 6297 Table 1 and special provision specifications.

1. Thermoplastic polymeric-modified asphalt binder per manufacturer specifications.
2. Aggregate per manufacturer specifications.
3. Foam expansion joint filler per manufacturer specifications.
4. Steel bridge plate per manufacturer specifications.

Specification/Report Form: Special Provision / MAT-100

04199 Membrane Waterproofing

Scope: Fully-adhered built-up bituminous membrane waterproofing system for bridge decks.
Sampling: AASHTO T 40
Procedure: Materials Certificate must be stored in the Project Records.

1. Primer: ASTM D 41:
2. Asphalt: ASTM D 449, Type III:
3. Fabric: ASTM D 1668:
4. Bituminous Plastic Cement: ASTM D 2822, Type I:

Specification/Report Form: Standard Specifications, Section 7.07 / None

04207 to 04208 DAMP PROOFING
04207 DAMP PROOFING (PRIMER)
04208 DAMP PROOFING (SEALER)

Scope: Three asbestos-free asphalt roof coatings of brushing or spraying consistency suitable for use as waterproofing and damp proofing of concrete and concrete masonry.
Sampling and Procedure: None. Project staff reviews the Materials Certificate for compliance with contract specifications.
Specification/Report Form: Standard Specifications, Section 7.08 /NA

Aggregates

SAMPLING OF AGGREGATES

Scope: Obtaining coarse and fine aggregates at the source of supply and/or at the project site.
Sampling: Samples are to be obtained by a representative of the Department. Samples from potential open faced banks or pits are the responsibility of the producer unless an adequate and representative stockpile has been prepared for use on Department projects.
Procedure: AASHTO T 2

REDUCING SAMPLES OF AGGREGATE TO TEST SIZE (DMT Staff only)

Scope: Reduction of large field samples of aggregate by quartering or by use of the mechanical splitter.
Sampling: AASHTO T 2
Procedure: AASHTO T 248

04697 to 04905 & 08034 to 08054 Fine & Coarse Aggregate

04697 SAND MASONRY GRADING A
04700 SAND
04703 SAND FILLER
04704 SAND MASONRY GRADING B
04709 SAND (FOR TRENCHING AND BACKFILLING)
04819 GRAVEL BANK RUN
04820 GRAVEL FILL
04901 BEDDING MATERIAL M08.01-21
04902 BORROW
04905 FREE DRAINING MATERIAL

08034 STONE (BROKEN/CRUSHED)
08032 SAND (WASHED)
08033 SAND (NATURAL)
08035 GRAVEL (CRUSHED)
08036 RECLAIMED MISC. AGGREGATE - 08036X (OFF SITE)
08037 RECLAIMED WASTE - 08037X (OFF SITE)
08038 SUBGRADE
08039 EMBANKMENT MATERIAL
08054 WETLAND SOIL

Scope: Material is tested using various test methods to determine conformance to project specifications. These methods include sieve analysis, washed sieve analysis, soundness, and others listed below. Reclaimed Misc. Aggregate: Glass-free and clinker-free reclaimed waste, which has been crushed, graded and blended, as specified in the Contract, with natural crushed stone or gravel.
Reclaimed Waste: Crushed and graded concrete removed from pavements, structures, or buildings**.**

Sampling: AASHTO T 2 and AASHTO T 248
Specification: Standard Specifications, Sections (M.01, M.02, M.03, M.04, M.05 or M.12)
Procedures:

SIEVE ANALYSIS – AASHTO T 27
Report Form: MAT-205, MAT-206, or MAT-207.

WASHED SIEVE ANALYSIS – AASHTO T 11
Report Form: MAT-205, MAT-206, MAT-207, or MAT-223.

DEGRADATION RESISTANCE OF AGGREGATE (L.A. ABRASION TEST) – AASHTO T 96
Report Form: MAT-211

SOUNDNESS OF AGGREGATE (MAGNESIUM SULFATE) – AASHTO T 104
Report Form: MAT-220 or MAT-221

MOISTURE DENSITY RELATIONSHIP OF SOILS – AASHTO T 99, AASHTO T 180
Report Form: MAT-213, and MAT-217 or MAT-218

TOTAL EVAPORATIVE MOISTURE CONTENT OF AGGREGATE BY DRYING – AASHTO T 255

FLAT AND/OR ELONGATED PARTICLES IN COARSE AGGREGATE – ASTM D4791
Report Form: MAT-104

FRACTURED PARTICLES IN COARSE AGGREGATE– ASTM D5821
Report Form: MAT-104

BULK DENSITY (UNIT MASS) AND VOIDS IN AGGREGATE– AASHTO T 19
Report Form: MAT-104

SPECIFIC GRAVITY AND ABSORPTION OF COARSE AGGREGATE– AASHTO T 85
Report Form: MAT-219

ORGANIC IMPURITIES IN FINE AGGREGATE – AASHTO T 21
Report Form: MAT-206

04771 MASONRY FACING

Scope: Masonry facing stone shall be either dimensioned masonry stone or ashlar masonry stone.
Sampling and Procedure: Field inspection of stone by project personnel unless samples are required.
Specification/Report Form: Standard Specifications, Article M.11.01 / MAT-100.

04909 CURBING - GRANITE STONE

Scope: Granite curbing typically used on highway bridges at the bottom of parapets adjacent to the bridge deck. Shape typically has one sloped face.
Sampling and Procedure: Field inspection of stone by project personnel.
Specification/Report Form: Special Provision / MAT-100.

04910 CURBING - GRANITE SLOPE

Scope: Granite curbing typically used on at the approaches to bridges or parking lots. Shape is typically rectangular.
Sampling and Procedure: Field inspection of stone by project personnel.
Specification/Report Form: Standard Specifications, Article M.12.07 / MAT-100.

Chapter 4 – Materials Evaluation and Testing Procedures

This chapter describes in detail the procedures used by Division of Materials Testing (DMT) personnel to develop recommendations on the conformance to specification of materials purchased by the Department for its own use or used by a Contractor in the construction or maintenance of a facility.

In addition this chapter also describes the procedures used by DMT personnel to inspect and qualify facilities that produce materials for use on a regular basis by the Department or Department contractors.

Materials Evaluation

Material Catalog Cuts

Many materials used on a project are evaluated based on catalog cuts. These materials are typically mass produced items such as louvers, bathroom fixtures, roadway lighting, and electronic equipment available from numerous manufacturers. Due to the variety of choices, the designer typically develops a specification that can be met by several of the manufacturers. The Designer is then responsible for reviewing the catalog cuts submitted by the Contractor to the Contract Administrator and determining if the contractor-selected product meets the project specification. Consequently, the DMT will not repeat the evaluation performed by the Designer and recommend acceptance or rejection of the material. A Request for Test (MAT-100) for the materials reviewed and approved or rejected by the Designer is not required. Project field personnel are responsible for verifying that appropriate materials incorporated into the project were approved by a catalog cut submittal.

Visual Inspection of Materials on Project Site

Many materials used on a project can be initially evaluated or must be evaluated daily by project staff. The acceptance of these materials is most effectively based on the visual inspection of all these materials at the project site and over the course of the entire project. Examples of these materials are, but not limited to, temporary precast concrete barrier curb, bedding material, and topsoil (from project site). The Minimum Schedule for Acceptance Testing clearly defines which materials require a formal Request for Test (MAT-100) for acceptance purposes.

Material Certificate

Many materials used on a project can be evaluated by Project or DMT staff by the review of a material certificate. The Minimum Schedule for Acceptance Testing clearly defines which material certificates require review by project or DMT staff.

Materials Testing Procedures

Materials typically used on highway projects (i.e., concrete, HMA, subbase, etc.) and also used in vertical construction are frequently tested and as such must be tested in accordance with the Minimum Schedule for Sampling Materials for Test (Minimum Schedule). A recommendation of acceptance or rejection of the material will be made by DMT personnel based on the results of this testing.

Sampling Materials for Test

Laboratory personnel regularly sample both fine and coarse aggregates, aggregate blends for roadbase applications, and other various materials used for Construction and/or Maintenance purposes. On a less frequent basis, these personnel also oversee the field sampling of aggregates and plastic PC concrete by construction inspection personnel as required for assurance purposes.

Sampling is a critical component of testing and is performed according to the applicable specification indicated under “sampling” in each section of this manual. DMT personnel collecting samples will utilize every precaution to obtain unbiased samples that represent the nature and condition of the material to be sampled. DMT personnel are certified in the applicable sampling procedures through the New England Transportation Technician Certification Program (NETTCP) and qualified by established procedures as described in *Appendix H* to assure uniform procedures in obtaining random samples.

DMT personnel also regularly transport field samples to the central or satellite laboratories for testing. It is also important that samples are carefully handled and transported to prevent damage to the samples. Containers used to transport samples should be clean and adequate for the particular material being sampled. Furthermore, the containers should be durable and of a type and size that prevents loss, damage, or contamination of any portion of the sample.

Aggregates

Scope: Coarse and fine aggregates are obtained at the source of supply for annual qualification. Qualified sources are listed on the DMT website. Typical sampling locations include sampling from flowing aggregate streams (bins or belt discharge), conveyor belts, roadways, stockpiles, or vehicles typically used to transport material.
Sampling: Samples are to be obtained by a representative of the Department. Preliminary samples and tests for potential open faced banks or pits are the responsibility of the producer unless an adequate and representative stockpile has been prepared for testing for use on Department projects.
Procedure: AASHTO T 2

Precast Concrete Production Facility Inspection

Reinforced Concrete Pipe

Purpose: This outline is a guide to personnel involved in the inspection of the manufacture of reinforced concrete pipe and allied products. The following factors must be considered while inspecting this material.

- Testing and inspection of the various materials selected for use.
- Proper proportioning and adequate mixing of the materials.
- Sufficient reinforcement and proper placement of reinforcement within form work.
- Proper handling, placing, and consolidating procedures.
- Proper curing of the product.

Materials inspector must become familiar with the manufacturing processes, designs, specifications, and procedures followed for any particular plant.

Scope: Reinforced concrete pipe, elliptical pipe, slotted pipe, and culvert ends may be accepted by the DMT on the basis of the manufacturer's certification. Products covered under this section include, but are not limited to, reinforced concrete pipe for use as a culvert, slotted reinforced concrete pipe for use as underdrains, and reinforced concrete culvert ends.

Annual Plant Inspection
This inspection is to ensure that a plant is capable of producing a product that meets AASHTO M 170, AASHTO M 207, and AASHTO M 175 Type II requirements, supplemented by Standard Specifications, Article M.08.01, as applicable.
Inspection MAT-324 indicates the name, address, and plant number of the manufacturer; and lists the number, make, capacity, type, and condition of all scales and seal dates, mixers, and pipe machines.

Materials: The inspector will obtain samples of cement, water, coarse aggregate, fine aggregate, admixtures, and reinforcing steel he proposed for use on the project from the manufacturer and indicate on MAT-324 the suppliers of the materials.

Sampling: All cement must be sampled at the mill and tested by an approved laboratory whose methods and equipment are regularly inspected by the Cement and Concrete Reference Laboratory. One copy of the test report certifying the acceptability of the cement shall be furnished to the Department. At the time of the annual inspection and at any time thereafter, the inspector may obtain a sample of cement currently in use and a copy of the corresponding certified test report.

1. Aggregate: Samples shall be obtained from approved storage piles or bins by the inspector during the annual inspection. Additional samples shall be taken at least once every month or from each new source.
2. Water: Each source of supply shall be sampled annually.
3. Reinforcement: Samples of each size and type of reinforcement shall be taken every six months, or as required.
4. Admixtures: Samples of each type of admixture from each source of supply may be obtained annually or as required.

Fabrication: Reinforced concrete pipe (RCP) must meet the requirements of the contract specifications. The inspector will observe the production process, which shall include checking the splices, spacing, and size of reinforcing at the time cages are assembled. The reinforcing shall be lapped not less than 51 mm and welded with an electric welding machine. The spacing, center-to-center, of adjacent rings of circumferential reinforcement in the cage shall not exceed 102 mm for pipe having a 102 mm wall thickness, nor exceed the wall thickness for larger pipe, and in no case shall exceed 152 mm. The cage shall contain sufficient longitudinal bars or members, extending through the wall of the pipe to maintain the reinforcement rigidly in shape and in the correct position within the form. For multiple layers, a line of circumferential reinforcement for any given total area may be composed of two layers for pipe with a wall thickness of less than 178 mm or three layers for pipe with a wall thickness of 178 mm or greater. The layers shall not be separated by more than the thickness of one longitudinal plus 6.4 mm. The multiple layers shall be fastened together to form a single rigid cage. All other specification requirements such as laps, welds, tolerance of placement in the wall of the pipe, etc., shall apply to this method of fabricating a line of reinforcement.

The reinforcing shall be free of objectionable coatings, particularly heavy corrosion prior to installation in the form. An adherent film of rust or mill scale is not considered objectionable. The reinforcement should be secure so that the placement of the concrete will not displace the steel from its proper position.

Preliminary Tests and Tests for Extended Deliveries - Sampling
As part of the yearly certification process, laboratory personnel will select RCP and witness 3-edge testing in the Spring and Fall of each year that certification is requested, two of each size pipe up through 750 mm diameter and one of each size greater than 750 mm diameter. The pipe sample shall be tested by the 3-edge bearing test as per AASHTO T 280, except as follows:

1. Modified or special design pipe shall be tested to the 0.3 mm (0.01 in.) load and the ultimate load requirements as per AASHTO M 170 and M 207.

2. At the discretion of the Engineer, pipe of standard design, as specified in AASHTO M 170, may be tested to the 0.3 mm (0.01 in.) requirement plus 10 percent additional load in lieu of ultimate load testing. Test pipe attaining 0.3 mm (0.01 in.) crack will not be acceptable for use on Department projects.

Rejection: The manufacturer **must** isolate the rejected pipe in its yard or provide some means to clearly indicate rejected pipe. Any size pipe previously rejected must be retested.

Precast Concrete Drainage Items

The following describes the role of the DMT in monitoring the production, quality assurance, and acceptance of precast concrete units such as catch basins, manholes, and pipe.

Quality Control Manual

Each fabricator, which proposes to manufacture precast units for use by the Department shall develop and maintain a plant-specific Quality Control Manual addressing in detail the production and certification process of products for use on Department projects. This Manual shall be submitted to the Department for initial approval, and resubmitted as required due to either operational changes within the company or changes in source of materials.

Annual Plant Certification

Each plant is subject to an annual inspection by a representative of the DMT. The purpose of this inspection is to determine if the facility has the infrastructure to manufacture precast units to the Department's requirements and the personnel and procedures necessary to adhere to the Quality Control Manual specific to that facility.

The inspector may review all phases of the manufacturing process, and will document the results of his inspection by completing the information required on Inspection MAT-324 "*Yearly Inspection of Precast/Prestressed Concrete Structure, and Concrete Pipe Manufacturers.*"

Periodic Plant Inspection

While the plant is producing precast units for the Department, an inspector from the DMT may visit the plant unannounced to perform the following inspection activities:

1. Ascertain that the fabrication process and equipment used in production and the test procedures, equipment and personnel employed in the manufacturer's quality control program are in continuing compliance with the specifications and the approved Quality Control Plan for that plant.
2. Review the manufacturer's records relative to production, testing, and shipment of the precast units for the purpose of determining that:
   2.1 the compressive strength, air content and slump of the concrete consistently met the requirements at time of shipping; and,
   2.2 the records are complete and accurate.
3. Sample component materials as prescribed previously under "Sampling."

Sampling

The quality of the materials used in the manufacture of precast units shall be determined by tests on samples taken on the following schedule:

Portland Cement: Cement shall conform to AASHTO M 85 or AASHTO M 240 and shall be from a source that participates in the Cement Certification Program (Appendix E). All cement shall be sampled at the mill and tested by an approved laboratory whose methods and equipment are regularly inspected by the Cement and Concrete Reference Laboratory. Test reports certifying the acceptability of the cement shall be furnished to the DMT. Cement shall be subject to sampling and testing at any time by the DMT.

Aggregate: Samples of aggregate shall be obtained from approved storage piles or bins by the inspector during the annual inspection. Additional samples shall be taken at least every month or from each new source.

Water: Each source of supply shall be sampled annually.

Reinforcement: Samples of each size and type of reinforcement shall be taken every six (6) months or as directed by the Engineer.

Miscellaneous Hardware: Manhole steps shall conform to AASHTO M 199. Sampling frequency will be determined by the Engineer. All steel frames and grates incorporated into catch basin and drop inlet tops shall bear the Independent Testing Agency Acceptance stamp.

Admixtures: Only admixtures meeting AASHTO M 194 will be considered during the mix design review.

Fabrication Process Review

During the annual inspection, the inspector will review the standard fabrication process in use at the plant to determine that the precast units are manufactured according to the requirements specified in Standard Specifications, Article M.08.02, and the approved Quality Control Manual for that plant. The following areas of the production operations are to be carefully inspected:

- Storage and handling of component materials.
- Equipment and mixing procedures, including use of approved concrete mix designs.
- Fabrication of reinforcement or reinforcing cages, where applicable.
- Dimensions, condition, and construction of forms.
- Prior to placing concrete, the positioning of reinforcing bars or cages in the forms; and in the case of catch basin or drop inlet tops, the positioning of steel frames.
- Transportation, placement, and consolidation of plastic concrete.
- Curing methods, handling and storage of units.
- Dimensions, details, surface finish, and freedom from defects of finished units.
- Proper marking and identification of units.
- Application of protective compound to surfaces of precast catch basin and drop inlet tops, which will be exposed when in service.

Review of Materials Testing by Plant Personnel

The manufacturer is required to furnish the equipment and personnel necessary to perform compressive strength tests and air content determinations to demonstrate conformance to the contract specifications and plans and to document the results of these tests in the plant records.

During the annual inspection, the inspector will review the testing equipment and procedures employed at the plant for conformance to the following requirements:

1. Sampling Freshly Mixed Concrete - AASHTO T 41.
2. Making and Curing Concrete Test Specimens in the Field - AASHTO T 23.
3. Obtaining and Testing Drilled Cores and Sawed Beams of Concrete - AASHTO T 24.
4. Compressive Strength of Cylindrical Concrete Specimens - AASHTO T 22.
5. Air Content of Freshly Mixed Concrete by the Pressure Method – AASHTO T 52.
6 Slump of Hydraulic Cement Concrete - AASHTO T 119.
7. Frequency of sampling and testing shall be Standard Specifications, Article M.08.02-4.
8. The compressive strength machine shall be calibrated by an approved agency at least once each twelve (12) months.
9. The pressure/volumetric meter is to be calibrated by the plant quality control personnel as required by the Engineer.

The inspector will witness the performance of the required tests by the manufacturer's personnel and shall designate on Inspection MAT-324 those plant employees qualified to perform the respective tests. The inspector will consult the manufacturer's Quality Control Manual for the procedure for recording test results to ensure that said records are accurate, complete, and available to a representative of the DMT upon request.

PRECAST/PRESTRESSED CONCRETE (STRUCTURAL)
BEAMS/PILES/SUBSTRUCTURE

Production Inspection
The DMT will assign personnel to inspect/witness the fabrication of precast/prestressed items such as bridge girders, deck slabs, culverts, or piles. The length of the assignment will be prioritized as to the type of member being produced and the other current resource demands.

In general, any structure or component that primarily carries live load over or beneath a transportation facility will have oversight during production from the DMT or its representative.

Any structure or component that is used to primarily resist dead load such as, but not limited to, retaining walls and proprietary items such as gross particle separators may have oversight during the production time. The DMT may adjust the amount of inspection based on the reputation of the fabrication facility and the producer's daily adherence to their quality control plan.

Plant Inspection Procedure

Sampling and Frequency
The following component materials shall be sampled and tested at the frequencies listed below:

1. Portland cement (PC): PC shall be from an approved source. Each load shall be accepted by certification.
2. Aggregate: Samples from bins or stockpiles each month for each source of supply.
3. Admixtures: Only qualified admixtures are to be used.
4. Prestressing steel strand: Standard Specifications, Article M.14.01.
5. Post-tensioning tendons and anchorages: Sample as per Special Provisions.
6. Reinforcing steel: From each source, a 5 ft. (1.5 m) sample of each size for every 400 tons (181.4 mtons), with a minimum of one sample of each size from each source per project.

Inspection of Plant Facilities and Manufacturing Procedures (MAT-324)

1. Storage and handling of materials.
2. Batching, mixing, transportation and placement of concrete.
3. Curing method and apparatus; i.e., steam, radiant heat or other approved method including provision for recording time and temperature data during the curing cycle.
4. Concrete testing equipment; i.e., compression-testing machine (should be calibrated each 12 months), pressure-type air meters, cylinder molds, slump cones, unit weight apparatus and facilities for moist-curing test cylinders, ASTM C 192.
5. Equipment and procedure for consolidation of concrete.
6. Construction and capacity of casting beds.
7. Dimensions, condition, and construction of forms.
8. Method and equipment for applying prestressing or post-tensioning forces.
9. Method and equipment for measuring prestressing or post-tensioning forces and the procedure for measuring elongation of strands or tendons.
10. Construction details, accuracy, and calibration data of pressure gauges. (Gauges shall be calibrated at intervals not to exceed 6 months.)

Inspection of Casting Bed

1. Check cleanliness, level, and alignment of form liner.
2. Check position of bulkheads for proper length of units and skewed or sloped ends.
3. Inspect stringing of prestressing strands to ensure correct number and position of strands and location of "hold-downs."
4. For each strand: inspect tension, measure elongation, and check gauge reading for proper force application. Force measurement of elongation and gauge reading shall check each other and the theoretical value within 5 percent; if they do not, notify QC manager.
5. Witness back tensioning at the non-jacking end of deflected strands and straight strands to verify application of the required prestressing force. Standard Specifications, Article 5.14.03.
6. Inspect installation of post-tensioning tendons and anchorages, when applicable.
7. Check size, type, and location of in-place reinforcing steel, hardware, and miscellaneous steel.
8. Inspect condition and alignment of side forms.
9. Check proper bracing and anchorage of casting bed and end anchorages.

Inspection of Concrete Operations

1. Check identification marker for required data and placement in unit.
2. For deck units, inspect internal void forms for material, size, and proper installation.
3. Inspect concrete delivered to forms for homogeneity and uniformity of successive batches.
4. Witness/monitor sampling of concrete for quality control testing.
5. Witness slump, air tests, concrete temperature, and unit weight for conformance to specifications; accept or deem unacceptable on basis of results.
6. Spot-check batching and mixing of concrete to assure that approved mix design and procedures are being used.
7. Inspect placement, consolidation, and finishing of concrete for conformance to specifications and accepted concrete practices.
8. Ensure that approved curing method is used and applied at proper time; if steam or radiant heat is used, ensure that required preset period is observed.

Inspection of Fabricated Units

1. Inspect units to determine if they were cured uniformly. Review the time/temperature record of curing cycle for specification compliance.
2. Witness testing of cylinders for required concrete strength prior to removal of forms or detensioning.
3. After removal of side forms, inspect units for honeycomb, cracks, etc. Report major defects to supervisor for structural review by Department Bridge Design Section and or Designer.
4. Inspect detensioning operations for proper sequence, method, and timing of strand release.
5. Witness removal of units from casting bed.
6. Inspect completed units for as-built dimensions, camber, horizontal alignment, etc.
7. When applicable, witness testing of cylinders for required concrete strength prior to post-tensioning.
8. Witness post-tensioning operations (checking elongation of tendons and gauge readings) to assure gauge pressures and elongations are within prescribed limits.
9. Witness grouting of post-tensioning ducts for conformance to approved grout mix, equipment, and pumping procedure.
10. Witness all repairs to determine compliance with approved procedures and use of approved materials.
11. Witness testing of cylinders to determine concrete strength for shipping, when required, and 28-day strength for acceptance.

Report: Results of all tests and inspections shall be reported on appropriate forms. The inspector will maintain accurate records in the form of a daily log and production records of all information concerning the manufacture of each individual member. Final approval of precast, prestressed, and post-tensioned concrete members will be reported on MAT-100.

PORTLAND CEMENT CONCRETE (ALL)

Concrete Batch Plants and Delivery Vehicles

Scope: Each year, Producers must obtain certification of the plants and the hauling/mixing vehicles from the National Ready Mix Concrete Association (NRMCA)
Sampling: NA
Procedure: From NRMCA.
Report: DMT may request copies of the NRMCA inspection reports from the producer.

Compressive Strength of Cylindrical Concrete Specimens

Scope: Compression testing of molded concrete cylinders.
Sampling: Standard Method of Sampling Freshly Mixed Concrete, AASHTO T 141; Standard Method of Making and Curing Concrete Test Specimens in the Lab, AASHTO T 126.
Procedure: Refer to Standard Operating Procedure (SOP) in Appendix G
Specification/Report Form: Standard Specifications, Section 4.01 or 6.01 / MAT-308

Mass, Yield, and Air Content (Gravimetric) of PC Concrete

Scope: Determining the mass (per cubic meter or cubic foot) of plastic PC concrete delivered to project sites. The method also provides procedures for determining yield, cement content, and air content.
Sampling: Standard Method of Sampling Freshly Mixed Concrete, AASHTO T 141.
Procedure: Standard Method of Test for Mass per Cubic Meter (Cubic Foot), Yield and Air Content (Gravimetric) of Concrete, AASHTO T 121
Specification: Standard Specifications, Section 4.01 or 6.01 and M.03 or project Special Provisions.
Assurance Report (DMT Only): MAT-224, or MAT-225, and MAT-222
Acceptance Report (Project Personnel): MAT-308.

Admixtures

Scope: Project specifications normally require that an admixture shall perform the desired function without injurious effect upon the concrete. Proof of conformance to this requirement will be in the form of a certified statement from a recognized laboratory. The certified statement will contain evidence based on tests pertinent to the admixture made in the recognized laboratory by the use of concrete materials and by methods that meet requirements of current AASHTO and ASTM standards. Tests may be made on samples taken from a quantity submitted by the Contractor for use on the project or on samples submitted and certified by the manufacturer as representative of the admixture to be supplied. A recognized laboratory is any cement and concrete laboratory approved by the Engineer and inspected regularly by the Cement and Concrete Reference Laboratory sponsored by ASTM.
Sampling: AASHTO M 154 and AASHTO M 194
Procedure: Approval of the certified statement submitted for an admixture will qualify that admixture for inclusion in the Department's Qualified Products List regarding Admixtures for Portland Cement Concrete.
Specification/Report Form: Standard Specifications, Article M.03.01-9 **/** None

Structural Steel and Welding Shop Inspection

Scope: All structural steel fabricated for permanent incorporation into the project must be inspected by DMT staff during fabrication. DMT staff supplemented by consultant inspection staff can inspect any facility no matter where it is located to determine the adherence to quality control standards and project specifications. Adherence to the "Buy America" requirements of the contract is also an important aspect of this on-site inspection.
Sampling: None Documentation on material sources, quality control test results, and other appropriate topics are kept by the DMT representative until all fabrication is completed. This documentation is then forwarded to the Central Laboratory for inclusion in the project records.
Procedure: DMT staff must be notified where and when fabrication will take place so that inspection can be scheduled. The Contractor is responsible for notifying project staff, who in turn must notify the DMT.
Specification/Report Form: Standard Specifications, Section 6.03/NA

HOT MIX ASPHALT (BITUMINOUS CONCRETE/SUPERPAVE)

Annual Qualification of Hot Mix Asphalt Plants

Scope: Materials, technician qualifications, mix designs procedures, and calibration records and quality control test records are evaluated annually. The Department may perform random spot inspections of any aspect of the operation during the production season to ensure compliance to all specifications.
Sampling: Sampling of materials will be done during annual site inspection.
Procedure: Plants are inspected annually in the Spring.
Report: MAT- 404

Sampling HMA Mixtures

Scope: Procedures for sampling mixtures of HMA paving material.
Sampling: AASHTO T 168 modified.
Procedure: AASHTO M 323: Superpave Volumetric Design Method, AASHTO R 47: Reducing Samples of Hot Mix Asphalt (HMA) to Testing Size. Sampling and testing is required to be performed by a NETTCP certified technician. The sample from the transport vehicle can be taken from one location as specified in AASHTO T 168 modified.
Report Form: MAT-412s

HMA Inspection Personnel Assignment Procedure

Scope: A priority system is utilized in assigning Hot Mix Asphalt plant inspectors, employing a review of performance and current testing results. This priority system is developed by analyzing all test data on a daily basis and rating the plants according to past performance data. The details of this rating are included in the Department's Standard Specifications, Article M.04.02-2c. This information assists supervisors in prioritizing daily assignment of HMA inspectors to bituminous plants based on the following:

- **Poor recent performance** – determined by tabulating the latest 10 test average for each class where the running average is below 70%.
- **Daily tonnage produced** – where larger tonnage will generally get higher priority.
- **Random sampling** – as determined by the DC.

Binder Content by Ignition Method

Scope: This method of test is for the determination of the total percentage of bitumen in HMA mixtures. Aggregate calibration for each class of mixture shall be provided by the DC or may be submitted by the contractor for use during production.
Sampling: AASHTO T 168 modified, AASHTO R 47.
Procedure: AASHTO T 308
Report Form: MAT-412s

Correlation Between Production Pull and Binder Content by Ignition Method

Scope: To monitor the difference between the target plant production binder content and the corrected binder content by ignition method using a five (5) point moving average. If two (2) consecutive differences are more than 0.3%, a new correction factor may be required for the mix.
Sampling: AASHTO T 168 modified, AASHTO R 47.
Procedure:

1. AASHTO T 308, Asphalt Binder Content of HMA by Ignition Method
2. AASHTO T 329, Moisture Content of Hot Mix Asphalt by Oven Method
3. AASHTO R 47, Rducing Samples of HMA to Testing Size

Report Form: MAT-412s

Mechanical Analysis of Extracted Aggregate

Scope: To monitor mix compliance with the specifications and job mix formula (JMF) target values.
Sampling: AASHTO T 168 modified, AASHTO R 47
Procedure: AASHTO T 30 modified
Report Form: MAT-412s

Degree of Particle Coating of HMA Mixtures

Scope: Degree of coating of coarse particles of aggregate in a HMA mixture in relation to the wet mixing time. When HMA is mixed, coarse particles of aggregate are the last and the most difficult to coat, and the degree of their coating may be a measure of the degree of mixing.
Sampling: AASHTO T 195 modified and AASHTO T 168 modified.
Procedure: AASHTO T 195 modified.

1. Only one truck load of mixture is sampled.
2. Sample is taken from opposite sides of the load.

Report Form: NA

Bulk Specific Gravity of Compacted HMA Mixtures

Scope: This method determines of the bulk specific gravity to determine volumetric properties of compacted HMA mixtures.
Sampling: AASHTO T 168 modified, AASHTO R 47
Procedure: AASHTO T 166: Bulk Specific Gravity of Compacted Asphalt Mixtures Using Saturated-Surface Dry Specimens
Report Form: MAT-412s

Volumetric Calculations of VMA

Scope: These methods cover the formulas used to calculate VMA.
Sampling: AASHTO T 168 modified, AASHTO R 47.
Procedure:

1. AASHTO M 323: Superpave Volumetric Mix Design
2. AASHTO R 35: Superpave Volumetric Design for Hot Mix Asphalt
3. AASHTO T 329: Moisture Content of Hot Mix Asphalt by Oven Method
4. AASHTO T 312: Preparing and Determining the Density of Hot-Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor

Report Form: MAT-412s

Preparation of Gyratory Specimens

Scope: Preparation of test specimens using the gyratory compactor.
Sampling: AASHTO T 168 modified, AASHTO R 47.
Procedures:

1. AASHTO M 323: Superpave Volumetric Mix Design
2. AASHTO R 35: Superpave Volumetric Design for Hot Mix Asphalt
3. AASHTO T 329: Moisture Content of Hot Mix Asphalt by Oven Method
4. AASHTO T 312: Preparing and Determining the Density of Hot-Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor

Testing of HMA materials, fabrication of gyratory molds, and theoretical, and liquid content must be started and fabricated within 1/2 hour from the time of sampling from the delivery truck and completely finished within 2 hours. Physical, volumetric and other properties shall be calculated in accordance with the contract specifications and AASHTO M 323 and AASHTO R 35.

Maximum Specific Gravity of HMA Paving Mixtures

Scope: Determination of the maximum specific gravity of uncompacted HMA paving mixtures.
Sampling: AASHTO T 168 modified, AASHTO R 47.
Procedure: AASHTO T 209 modified.

1. Water bath temperature correction shall not be utilized provided that the water bath temperature is 77 ± 0.9°F

Report Form: MAT-412s

Production Inspection at HMA Plants

Scope: The purpose of production inspection is to monitor compliance with the quality assurance program and the specifications. The aggregate must be of uniform quality and gradation and must be fed into the plant in a uniform manner; the heating and drying of the aggregates must be uniform; the separation of the aggregates must be controlled; and the components must be combined and mixed in a uniform, consistent manner. For these reasons, the inspector must be thoroughly familiar with all phases of the manufacturing process. HMA production activities includes the following:

1. **Process Control (PC):** Typically performed by the HMA producer prior to shipment.
2. **Quality Control (QC):** The sum total of activities performed by the seller (producer, manufacture, contractors) to make sure that a product meets contract specification requirements.
3. **Acceptance System (Acceptance/Verification Plan)**: All factors that comprise the Agency's determination of degree of compliance with contract requirements and value of a product. These factors include Agency sampling, testing, acceptance limits, risk evaluation, and inspection. These factors should also include validated results of contractor sampling and testing.
4. **Independent Assurance (IA):** IA is an unbiased and independent verification of the Quality Assurance system used as a method of determining the reliability of the test results obtained in the regular sampling and testing activities. These results are not to be used elsewhere.

Report Form: MAT-412s

Duties of the HMA Plant Inspector

Scope: The inspection includes but is not limited to checking component materials in the stockpile, cold bins, hot bins; PG binder, and additive; inspection of processing, sampling; and testing the finished product for conformance to the specifications.
Sampling and Procedure: NA
Report Form: Daily Inspector Report \ MAT-431.

Status of New Mixes, Existing Mixes From Previous Year's Production

Scope: Each plant will have each class of HMA material evaluated based on previous year's production compliance for Va and VMA. Based on the ranking a class receives, it will determine whether the material can be produced without the prior completion of a PPT. Rankings will be provided to each HMA producer annually at the beginning of the paving season.
Sampling: NA
Procedure: Included in the Standard Specifications Section M.04
Report Form: NA

Mix Design / Job Mix Formula(JMF) Submittal and Change Procedure

Scope: The Producer shall submit an annual JMF as specified in Article M.04.02. The JMF will be reviewed by the DC and a mix status will be provided in accordance to Article M.04.02.2.c. Based on acceptance test results, the Contractor may be required to submit an updated JMF using MAT-429 (JMF Changes tab) for that class of material in order to continue supplying material.
Sampling: NA
Procedure: Included in the Standard Specifications Section M.04
Reports: JMF annual submittal MAT-429, MAT-440

HMA Verification Testing Procedures

Scope: Verification testing will be performed by the DC to validate Contractor's QC tests used for acceptance. Samples will be randomly obtained by Department personnel from acceptance samples produced by the Contractor or their representative.

For non-PWL lots, the ratio of verification tests to the Contractor tests will be a minimum 1 to 10. The samples will be tested by the DC at the Central Laboratory and the difference in results compared to the Tolerances shown in Table 1. Results will be considered acceptable when the difference falls within the tolerances.

TABLE 1: Tolerances for Verification of Non-PWL lots [(1)]

Properties	Tolerance	Properties	Tolerance
#200	0.7	Pb	0.25
#100	2.0	Va	0.66
#50	2.0	VMA	0.66
#30	2.0	VFA	3.5
#16	2.0	Gmm[(1)]	0.018
#8	3.0	Gmb[(1)]	0.009
#4	3.0	Pbe	0.25
3/8"	4.0	Pba	0.25
1/2"	4.0	PD@Ni	0.71
3/4"	4.0	PD@Nd	0.71
1"	4.0	PD@Nm	0.71
1 1/2"	4.0	Gse[(1)]	0.018
2"	4.0	#200/Pbe	0.15
		Masses(% of total)	0.1
		Heights (average of 4) (mm of final height)	2.0

[(1)] Tolerance is the absolute difference in the measured values, not a percentage of the values.

For PWL lots, the ratio of verification tests to the Contractor tests will be a minimum of 1 to 3.5. Verification samples will be obtained and compacted by DMT personnel at the Plant and tested at the Central Laboratory. Test results will be compared using a F-test and t-test at a 0.01 significance level.

Sampling: All verification samples are transported to the Central Laboratory by Department staff.

Procedure:

1. AASHTO T 308: Method for Determining the Asphalt Content of HMA by the Ignition Method.
2. AASHTO T 30 modified: Mechanical Analysis of Extracted Aggregate.
3. AASHTO T 209: Theoretical Maximum Specific Gravity and Density of HMA Mixtures.
4. AASHTO T 166: Bulk Specific Gravity of Compacted Asphalt Mixtures using Saturated Surface-Dry Specimens.
5. AASHTO T 168: Sampling of Paving Mixtures.
6. AASHTO T 312: Preparing and Determining the Density of Hot Mix Asphalt Specimens by Means of the Superpave Gyratory Compactor.
7. AASHTO T 329: Moisture Content of Hot-Mix Asphalt (HMA) by Oven Method

Using PWL, a complete lot will be considered to consist of two acceptance lots of 3500 tons each (7000 tons total) with 14 contractor test results and 4 Department's test results.

For partial lots (less than 3500 tons) the lot may be considered complete after a minimum of three (3) verification tests have been obtained and the last acceptance test in the lot has been completed. Results will be considered verified when the F- and t- tests pass.

When any single sieve or volumetric result fails verification, HMA staff will notify IA staff. HMA staff shall review past tests specific to the type of material that failed to look for trends. The HMA staff shall contact the contractor's Quality Control manager to notify them of the deficiency and request that the contractor investigate.

Table 2 will be used to verify PPT samples and for HMA Independent Assurance. When testing a PPT sample, if any single sieve result or any of the individual volumetric results are rated a "D," the PPT fails and the mix shall remain on PPT status. If the sample is rated a "C" or better, the mix will be placed on an "A" status.

TABLE 2: Independent Assurance and PPT Verification Tolerances [1]

Properties	Tolerance (maximum)	Tolerance (maximum)	Tolerance (maximum)	Tolerance
	A (C x 0.25)	B (C x 0.5)	C	D (>C)
#200	0.18	0.35	0.7	> 0.7
#100	0.5	1.0	2.0	> 2.0
#50	0.5	1.0	2.0	> 2.0
#30	0.5	1.0	2.0	> 2.0
#16	0.5	1.0	2.0	> 2.0
#8	0.5	1.0	3.0	> 3.0
#4	0.5	1.0	3.0	> 3.0
3/8"	1.0	2.0	4.0	> 4.0
1/2"	1.0	2.0	4.0	> 4.0
3/4"	1.0	2.0	4.0	> 4.0
1"	1.0	2.0	4.0	> 4.0
1 1/2"	1.0	2.0	4.0	> 4.0
2"	1.0	2.0	4.0	> 4.0
Pb	0.06	0.12	0.25	> 0.25
Va	0.18	0.35	0.71	> 0.71
VMA	0.18	0.35	0.71	> 0.71
VFA	3.5	3.5	3.5	> 3.5
Gmm	0.005	0.009	0.018	> 0.018
Gmb	0.003	0.006	0.011	> 0.011
Pbe	0.06	0.12	0.25	> 0.25
Pba	0.06	0.12	0.25	> 0.25
PD@Ni	0.18	0.35	0.71	> 0.71
PD@Nd	0.18	0.35	0.71	> 0.71
PD@Nm	0.18	0.35	0.71	> 0.71
Gse	0.005	0.009	0.018	> 0.018
#200/Pbe	0.03	0.07	0.15	> 0.15
Masses(% of total)	0.025%	0.05%	0.1%	> 0.1%
Heights (average of 4) (mm of final height)	0.5	1.0	2.0	> 2.0

[1] Tolerance is the absolute difference in the measured values, not a percentage of the values.

Report Form: MAT-408

Mix Design / Job Mix Evaluation

Scope: In order for a JMF to be approved, the properties of the aggregate components or mix shall meet the verification tolerances shown in Table 3.

Sampling: As part of the JMF submittal, the Producer shall submit the following samples to the Division of Material Testing:

- 4 - one quart cans of PG binder, with corresponding Safety Data Sheet (SDS)
- 1 - 50 lbs bag of RAP
- 2 – 50 lbs bag of plant blended virgin aggregate
- 2 - 10,000 kg boxed split sample material for TSR design

Procedure: Testing will be performed by the DMT to evaluate each proposed JMF and will include:

Aggregate Components Consensus Properties Verification:

1. AASHTO T27: Mechanical Analysis of Aggregate
2. AASHTO T85: Coarse Aggregate Specific Gravity
3. AASHTO T84: Fine Aggregate Specific Gravity
4. ASTM D 5821: Coarse Aggregate Angularity
5. AASHTO T304, Method A: Fine Aggregate Angularity
6. ASTM D 4791: Flat and Elongated Particles (1:5)
7. AASHTO T176: Sand Equivalent

Mix Verification:

1. AASHTO T209: Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.
2. AASHTO T166: Bulk Specific Gravity of Compacted Asphalt Mixtures using Saturated Surface-Dry Specimens.
3. AASHTO T312: Preparing and Determining the Density of Hot Mix Asphalt Specimens by Means of the Superpave Gyratory Compactor
4. AASHTO R35: Air Voids, VMA, VFA, Density to Nini
5. AASHTO T283: Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage

TABLE 3: JMF EVALUATION TOLERANCES [(1)]

Properties	Tolerance b		Properties	Tolerance b
#200	1.0		Gmm	0.022
#100	3.0		Gmb	0.020
#50	3.0		Pba	0.6
#30	4.0		PD@Ni	1.5
#16	4.0		Gse	0.052
#8	5.0		Gsb	0.028
#4	5.0		Gsa	0.025
3/8”	5.0		CAA (1 face/2 faces)	10
½”	4.0		SE	15
¾”	4.0		FAA	0.8
1”	3.0		F & E	5.0
Va	1.3		TSR	15 & Minimal Stripping
VMA	1.3			
VFA	6.0			

[(1)] Tolerance is the absolute difference in the measured values, not a percentage of the values.

Report Form: MAT-418

Resistance of Compacted HMA to Moisture Induced Damage

Scope: Preparation of specimens and measurement of the change of diametral tensile strength resulting from the effects of saturation and accelerated water conditioning of compacted HMA mixtures in the laboratory. This test may be performed on HMA laboratory mixture, mixtures sampled from newly loaded trucks, field pavement samples, and pavement cores.
Sampling and Procedure: AASHTO T 283 modified
Report Form: AASHTO T 283 modified Table 1, Moisture Damage Laboratory Data Sheet or MAT-428

Volumetric and Specific Gravity Using Gyratory Compactor

Scope: These methods cover the determination of volumetric and specific gravity calculations of test specimens made by Superpave gyratory compactor.
Sampling: AASHTO T 168 modified, AASHTO R 47
Procedure: AASHTO M 323, and AASHTO R 35
Report Form: MAT-412s

Performance Graded Asphalt Binder (PGAB)

Scope: PGAB suppliers are prequalified by the DMT in accordance with AASHTO R 26 modified. To maintain qualified status, suppliers must submit monthly split samples to the DMT. HMA producers must maintain a log of binder deliveries using a MAT-435 or equivalent approved ny the Engineer.
Requirements: A Certified Test Report and bill of lading representing each delivery must be provided to the producer in accordance with AASHTO R 26 modified. Upon material delivery, plant personnel shall record lot number, date, grade of binder, witnessed by, hauler name, liquid supplier, ticket number, receiving storage tank number, quantity received, and previous tank status (quantity) in the binder log (MAT-435). The Contractor shall provide binder samples from the delivery upon request of DC. The blending of PG binder from different suppliers is not allowed unless the HMA producer submits a QC plan for this purpose.
Sampling: In accordance with AASHTO T 40
Procedure: In accordance with all AASHTO standard methods of test listed in AASHTO 332

Report Form: QC Plan / MAT-401

DENSITY OF SOIL AND SOIL - AGGREGATES

Scope: The Contractor shall determine of the in-place density of soil and soil aggregate by using a measurement device approved by the Engineer. Density measurements shall be performed where specified in the Contract.
Procedure: Field testing shall be performed in accordance with AASHTO T 310 or other approved industry standard test method. The density results obtained shall be reported as a percent of the maximum dry density as determined by AASHTO T 180 Method D.
Correlation: All gauges shall be correlated annualy prior to use on Department projects. Correlation blocks shall be provided by the Department or the gauge manufacturer. The gauge shall be correlated in accordance with manufacturer's recommendations.

Standardization: As a minimum, standardization of the gauge shall be performed daily prior to its use. This process shall be performed in accordance with the manufacturer's recommendations.

Report Form: Form CON-125

DENSITY OF IN-PLACE ASPHALT PAVEMENT BY THE CORE METHOD

Procedure: Refer to Standard Operating Procedure (SOP) in Appendix G

Chapter 5 – AMRL Document

Chapter 6 – Independent Assessment/Verification Program

INDEPENDENT ASSESSMENT

Independent assessment of DMT methods and equipment is performed through the AASHTO Accreditation Program (AAP). This program entails on-site inspection by personnel from the AASHTO Materials Reference Laboratory (AMRL) and the Cement and Concrete Reference Laboratory (CCRL). After the inspection by AMRL or CCRL, any deficiencies noted in equipment, personnel, or procedures are addressed in a timely fashion.

In addition to the on-site inspection, AMRL and CCRL also send samples of various materials for testing (proficiency samples). The results of these tests are compared with the test results for the same material from other testing facilities. If proficiency sample results vary by more than two standard deviations, an internal investigation will be undertaken to determine what may have affected the results. This investigation will include, but not be limited to, the following: review of work sheets and data entry; equipment check; scale check; test procedure; and a review of previous proficiency test results. Corrective action is taken as soon as possible. The determination is documented and kept on file before forwarding to AMRL or CCRL.

EQUIPMENT CALIBRATION AND CHECKING

The following tables indicate testing equipment that is calibrated and checked according to requirements set forth by the AASHTO Accreditation Program. Included are the frequency, range, procedure, and method for tractability to the National Institute of Standards and Technology (NIST). To assure proper compliance with calibration, verification, and checking requirements, a list based on these tables is maintained by the room supervisors where the equipment is located. The list includes equipment numbers, date of calibration, and must be updated at a minimum at the indicated frequency. Should equipment be damaged, moved, or provide suspect results, a recalibration or check will be requested by the room supervisor and documented on the list.

Table 1 EQUIPMENT TO BE CALIBRATED

	AASHTO REFERENCE	FREQ. (Months)	PROCEDURE	TRACEABILITY to NIST
Analytical Balances	Methods for HMA, Soils Aggregates	12	Calibration Performed by Outside Agency	Test Weights
G.P. Balances Scales & Weights	Methods for Bituminous, Soils, Aggregates	12	Calibration Performed by Outside Agency	Test Weights
HMA Mech. Compactor	T 245	36	Calibrated with the Hand Operated Hammer	Not Applicable
Mechanical Compactor	T 180	12	Calibrated with the Hand Operated Hammer	Not Applicable
Pressure Air Meters	T 152	36	AASHTO T 152 (Section 4 Calibration of Apparatus)	Not Applicable
Saybolt Viscometers	T 59	36	AASHTO T 72 (Section 9)	AASHTO T 72 (Section 9)
Test Thermometers	T 201, T 202, T 49, T 51	6	ASTM E-77 (Section 9)	Thermometers
Unit Weight Measures Scales	T 19	12	AASHTO T 19 (Section 8)	Not Applicable
Viscometers	T 201 T 202	36	Zeithfuchs Cross-arm Viscometer AASHTO T 201 (Section A3) Vacuum Capillary Viscometer	AASHTO T 201 (Section A3.2) AASHTO T 202 (Section A4.2)
Compression Testing Machines	T 22, T 245	12	Verification Performed by third party in Accordance with AASHTO T 67	Proving Ring by third party

Table 2 EQUIPMENT TO BE CHECKED

	AASHTO REFERENCE	CHECKING FOR	FREQUENCY (months)	PROCEDURE
Autoclave	T 107	Heating Time, Temperature, Pressure, Cooling Time	24	Performed by CCRL AASHTO T 107 (Section 4.5)
Autoclave Safety Valve Agency	T 84	Proper Relief of Pressure	6	Checked by Outside AASHTO T 107 (Section 6.4)
Conical Mold, Tamper	T 84	Critical Dimensions	24	Performed by AMRL AASHTO T 84 (Section 4.3, 4.4)
Testing Equipment for Portland Cement	T 106 T 137 T 131	Critical Dimensions Critical Dimensions Critical Dimensions	24 24 24	Performed by CCRL AASHTO T 106 (Section 3.4) AASHTO T 137 (Section 5) AASHTO T 131 (Section 3)
L.A. Machine	T 96	RPM & Critical Dimensions	24	In-house procedure #42
Steel Spheres	T 96	Individual Weight and Charge Weight	24	In-house procedure #42
Mechanical Shakers	T 27	Sieving Thoroughness	12	In-house procedure #45
Sulfate Oven	T 104	Rate of Evaporation	12	In-house procedure #44
Sulfate Soundness Containers	T 104	Physical Condition	12	In-house procedure #43
Sieves	All applicable	Physical Condition and Measure Openings as Required	6	M-92 via applicable In-house procedures
Drying Ovens	All applicable	Verify Temperature Settings	4	Applicable in-house procedures
Manual Hammer	T 180	Weight and Critical Dimensions	12	In-house procedure #31
Molds	T 180	Critical Dimensions	12	In-house procedure #32
Straight Edge	T 180	Planeness of Edge	6	In-house procedure #33

Note: In-house procedures are maintained by the supervisor of the room where the equipment is located.

Chapter 7 - Suggested Minimum Schedule of Acceptance Testing (LOTCIP)

Local Transportation Capital Improvement Program (LOTCIP) **1/22/15**

Municipal Adminstered LOTCIP Projects ***not*** *on National Highway System ONLY*

Material Name	Unit	Test/Documentation	Frequency 1 per	Notes
Anchor Bolts	ea.	MC	project	1 per size
Asphalt Emulsions (CSS-1, RS-1 or SS-1)	gal	MC	10k	
Bituminous Concrete (HMA)	ton	D 2950 FLDT	day	See Note 3
Cement - Portland Type I/II	bag	FLDT	project	empty bag
Chemcial Anchor	lb.	QPL MC	project	
Concrete-Ready Mixed	c.y.	T22 FLDL	75	4 cylinders
Construction Signing	ea.	MC	project	
Geotextile	s.y.	QPL MC	project	
Gravel (Bank Run or Crushed)	c.y.	T27 LABT	5k	
Grout, Non-shrink	bag	MC	project	
Masonry Brick & Block (Solid)	ea.	FLDT	project	See Note 1
Pipe - Reinforced Concrete	l.f.	PC-1	project	See Note 1
Pipe (Metal & Plastic) All types	lf	MC	project	See Note 1
Pipe Arch - Aluminum	lf	MC	project	See Note 1
Precast Concrete Items (not pipe)	ea.	PC-1	Item type	
Prestressed Concrete Members	ea.	LABT	1	See Note 2 & 3
Reclaimed Misc. Aggregate	c.y.	T27/Chem Analysis	2500	See Note 5
Reclaimed Waste	c.y.	T180 LABT	50k	See Note 5
Sand (Masonry /Trenching & Backfilling)	c.y.	T27 LABT	2500	
Sheet Piling	l.f.	MC	project	See Note 4
Sign Post	ea	MC	project	See Note 1
Span Pole - Steel or Wood	ea.	MC	project	See Note 3
Steel Reinforcing Bars (Plain or Epoxy)	lb.	T244 MC	200t	
Stone (Broken/Crushed)	c.y.	T27 LABT	20k	
Structural Steel	cw	Shop Drawings	project	Notes 2, 3 & 4
Traffic Signal Equipment	ea.	MC	project	NA

Notes

1	Material should be inspected on the project site prior to use. Suspect material should be physically tested to determine conformance.
2	QC Inspection should be provided and documented during fabrication.
3	Contact the Department of Transportation Division of Materials Testing to determine vendor qualifications and QA inspection availablity.
4	Documentation should be provided to determine conformance to Buy America requirements.
5	FORM MAT-212 should be completed and provided by the Contractor prior to use of material.

Test Method/Test Type

LABT	Laboratory Test
FLDT	Test performed in the field
QPL	ConnDOT Qualified Products List (http://www.ct.gov/dot/lib/dot/documents/dresearch/conndot_qpl.pdf)
PC-1	MAT-308 Required from producer with shipment
MC*	Materials Certificate

*Should comply with ConnDOT Standard Specification Section 1.06.07

Legend

Item: Standard Specification Section and the first four digits of the Contract Item number.
Title: Generally the overall subject of the Standard Specification Section and the Contract Item numbers.
Item Unit: Generally the pay unit of the Contract Item.
Material #: Code used in SiteManager and by the Division of Materials Testing to identify component materials used in Contract Items.
Material Name: Definition of the Material #.
Material Unit: Unit of Material that defines a quantity represented by a sample. Example: A sample of concrete represents 50 CY of material regardless of what the item unit is.
Sample Type: Acceptance (Prod) or Information requires a MAT-100 to be submitted. Accept (Field) does not require a MAT-100 to be submitted.
Test Method: AASHTO or ASTM test method. See below.
Test Type: Describes the test, where the test is performed, or what is required to be submitted with the MAT-100.
Responsibility: Person who performs the test.
Frequency: Number of tests required per quantity of material using the material units: (E) English (M) Metric.

1 per "quantity" indicates that **all** the quantity of each type (size/shape/composition) of material, per item, from a single vendor and manufacturer **must be represented** on a single or multiple Request for Test(s) (MAT-100). MAT-100(s) total represented quantity must match total quantity installed.

Sample Size: Size of Sample.

Test Type:

FLDT	**Test performed in the field**
LABT	**Laboratory Test**
FLABT	**Field and Laboratory Testing**
LMCT*	**Lab Test, Mat Cert and Cert Test Report (Originals Required)**
MC*	**Materials Certificate (Original Required)**
MCCTR*	**Materials Certificate and Certified Test Report (Originals Required)**
PC1	**Self Certification from producer supplied per shipment**
QPL	**Qualified Product List**
Visual	**Project Inspector must visually inspect upon delivery/installation. Visual inspection by DMT staff denotes witnessing fabrication of material where it is being fabricated. Documentation of visual inspection on the project by project staff is in accordance with District/Office of Construction policies.**

***Materials Certificates and Certified Test Reports must comply with Standard Specification Section 1.06.07. Note: Materials Certificates for items composed of, or containing, steel or cast iron must also indicate where the steel and cast iron was produced and fabricated.**

Chapter 8 - Minimum Schedule for Acceptance Testing

Item	Title	Unit	Material #	Material Name	Material Unit	Sample Type	Test Method	Test Type	Test Responsibility	Frequency 1 per (E)	Frequency 1 per (M)	Sample Size lbs	Sample Size kg
	X=Not Standard, A=Spec Pro												
00.00	A Bit. Surface	ton	04015	Bit. Conc. Surface Course FAA	ton	See Special Provision							
01.01	Environmental Items		00307	Absorbing Compound	lb.	No Req for Test	NA	Visual	Project Staff			NA	
			03166	Sheeting, Polyethylene	s.y.	No Req for Test	NA	Visual	Project Staff			NA	
			04XXX	Bit. Concrete (Various)	ton	No Req for Test	NA	Visual	Project Staff			NA	
			04776	Hay, Baled	ea.	No Req for Test	NA	Visual	Project Staff			NA	
			04901	Bedding Material	c.y.	No Req for Test	NA	Visual	Project Staff			NA	
			08044	Retaining Wall - Precast Conc.	ea.	Accept (Prod)	NA	PC1	Central Lab	1	1	NA	
02.01	Clearing & Grubbing	l.s.	00000	No Request for Test Required.									
02.02	Rdwy Ex, Formation of Embankment and Disposal of Surplus Material	c.y.	08037X	Reclaimed Waste (OFFSITE)	c.y.	Accept (Prod)	Chem(offsite ONLY)	MCCTR	District Lab	2.5k	1.9k	160	72
			08037	Reclaimed Waste		Information	T180	LABT	District Lab	20k	15k	160	72
			08039	Embankment Material		Accept(Field)	D 6938	FLDT	Project Staff	2.5k	1.9k	See Note 13	
02.03	Structure Excavation	c.y.	00000	No Request for Test Required.									
02.04	Cofferdam	l.f.	00000	No Request for Test Required.									
02.05	Trench Excav	c.y.	00000	No Request for Test Required.									
02.06	Ditch Excav	c.y.	00000	No Request for Test Required.									
02.07	Borrow	c.y.	08031	To Be Determined.	c.y.	Information	T180	LABT	District Lab	20k	15k	160	72
						Accept(Field)	D 6938	FLDT	Project Staff	2.5k	1.9k	See Note 13.	
02.08	Free-Draining Material	c.y.	08037X	Reclaimed Waste (OFFSITE)	c.y.	Accept (Prod)	Chem (Offsite ONLY)	MCCTR	District Lab	2.5k	1.9k	160	72
			08037	Reclaimed Waste		Accept (Prod)	T27	LABT	District Lab	5k	3.8k	160	72
			08039	Embankment Material		Information	T180	LABT	District Lab	20k	15k	160	72
						Accept(Field)	D 6938	FLDT	Project Staff	2.5k	1.9k	See Note 13.	
02.09	Subgrade, Form	s.y.	00000	No Request for Test Required.									
02.10	Water Pollution Control	est.	03496	Sheeting, Reinforced Plastic	l.f.	No Req for Test	NA	Visual	Project Staff			NA	
			04XXX	Bit. Concrete (Various)	ton	No Req for Test	NA	Visual	Project Staff			NA	
			03985	Geotextile	s.y.	No Req for Test	NA	QPL/MC	Project Staff			NA	
		See 06.01 for Portland Cement Concrete materials, 06.51 for pipe, 07.03 for Riprap, and 09.53 for Sod.											
02.12	Subbase	c.y.	04819	Gravel (Bank Run)	c.y.								
			08034	Stone (Broken/Crushed)		Accept (Prod)	T27	LABT	District Lab	5k	3.8k	160	72
			08035	Gravel (Crushed)		Information	T180	LABT	District Lab	20k	15k	160	72
			08036	Recl. Misc. Agg.		Accept(Field)	D 6938	FLDT	Project Staff	2.5k	1.9k	See Note 13.	
			08036X	Recl. Misc. Agg. (OFFSITE)		Accept (Prod)	Chem (Offsite ONLY)	MCCTR	District Lab	2.5k	1.9k	160	72
02.13	Granular Fill	c.y.	All Materials and Frequencies as listed under 02.12, except Lab (T180) and Field Density (D6938) are not required for this item.										
02.14	Comp Gran Fill	c.y.	All Materials and Frequencies as listed under 02.12.										

Chapter 8 - Minimum Schedule for Acceptance Testing

Item	X=Not Standard, A=Spec Pro / Title	Unit	Material #	Material Name	Material Unit	Sample Type	Test Method	Test Type	Test Responsibility	Frequency 1 per (E)	Frequency 1 per (M)	Sample Size lbs	Sample Size kg
02.16	A Pervious Structr Backfill	c.y	All Materials and Frequencies as listed under 02.12.										
			03014 SP CLSM	Contolled Low Strength Material	c.y.	Accept (Prod)	D 4832	FLABT	Central Lab	100	76	TBD	
02.18	Sedimentation Control Bales	l.f.	04776	Hay, Baled	ea.	No Req for Test	NA	Visual	Project Staff			NA	
02.19	Sedimentation Control Sys.	l.f.	03985	Geotextile	s.y.	No Req for Test	NA	QPL/MC	Project Staff			NA	
			04776	Hay, Baled	ea.	No Req for Test	NA	Visual	Project Staff			NA	
03.02	Rolld Gran Base	c.y.	All Materials and Frequencies as listed under 02.12, except Lab (T180) and Field Density (D6938) are not required for this item.										
03.03	Concrete Base	c.y.	03014-PAV	Concrete-Pavement (3500/25)	c.y.	Accept (Prod)	T22	FLABT	Central Lab	75(60)/day		4 cyl	4 cyl
03.04	Processed Aggregate Base	ton	04819	Gravel (Bank Run)	c.y.								
			08034	Stone (Broken/Crushed)		Accept (Prod)	T27	LABT	District Lab	5k	3.8k	160	72
			08035	Gravel (Crushed)		Information	T180	LABT	District Lab	20k	15k	160	72
			08036	Reclaimed Misc. Aggregate		Accept(Field)	D 6938	FLDT	Project Staff	2.5k	1.9k	See Note 13.	
			08036X	Recl. Misc. Agg. (OFFSITE)		Accept (Prod)	Chem(Offsite ONLY)	MCCTR	Central Lab	2.5k	1.9k	160	72
03.05	Processed Agg	ton	Use of Stone (Broken.Crushed) with requirements as listed under 03.04.										
04.01	Concrete Pavement	c.y.	03014-PAV	Conc. Pvmnt (3500psi/25MPa)	c.y.	Accept (Prod)	T22	LABT	Central Lab	50(40)/day		4 cyl	4 cyl
			Other materials as listed under 06.01.										
04.06	Bituminous Concrete	ton	04052,3,4	Level 1,2,3 (6.25mm / 0.25 in)	ton	**Material properties at production facility:**				Project quantities ≥ 3500 tons			
			04056,7,8	Level 1,2,3 (9.5 mm / 0.375 in)		Accept (Prod)	Table M.04.03-3	LABT	Producer	Use Percent Within Limits (PWL).			
			04064,5,6	Level 1,2,3 (12.5 mm / 0.5 in)		Project personnel must register paving operations with DMT 24 hours prior to paving using PAVETRACK. Project personnel must submit one MAT-100 per day for quantities >150 tons. Multiple days of production, each under 150 tons, can be combined on a single MAT-100.				1 test per 500 tons			
			04076,7,8	Level 1,2,3 (25.0 mm / 1.0 in)						Project quantities <3500 tons Non-PWL See Table M.04.03-2 of Specification.			
						Material density in-place (cores):				See Section 4.06.03-10 of Specification.			
						Accept (Prod)	T331	LABT	Central Lab				
04.06	Emulsified Asphalt	gal	04128	RS-1, RS-1H	gal	Accept (Prod)	M140 & M208	LABT	Central Lab	≤1000 gal None		≤1000 gal None	
			04133	SS-1, SS-1H		Total project quantities up to 1000 gallons requires only a Materials Certificate and Certified Test Report from certified source. Total project quantities >1000 gals also require sample(s) for testing, which must be submitted within 15 days of sampling.							
			04146	CSS-1, CSS-1H						>1000 gal		>1000 gal	
			04147	CRS-1						10k	38kl	2 qts	2L
04.06	Curb Mix	ton	04003	Curb Mix	ton	Same production facility testing listed above for Bituminous Concrete at Non-PWL frequency.							
04.15	Press Rlf Joint	s.y.	See 04.06 for Bituminous Materials and 2.12 for unbound material.										
05.01	General Clauses		00000	No Request for Test Required.									
05.02	X Temp Crossings		00000	No Request for Test Required.									
05.04	RR Protection	hr.	00000	No Request for Test Required.									
05.06	Retaining Walls, and Steps	c.y.	03014-X	Concrete-Class (Various)	c.y.	Accept (Prod)	T22	FLABT	Central Lab	75(60)/day		4 cyl	
			All non-precast materials that may be used for 05.06 items are listed under 05.07 and must be tested at the same frequency.										

Chapter 8 - Minimum Schedule for Acceptance Testing

Item	X=Not Standard, A=Spec Pro / Title	Unit	Material #	Material Name	Material Unit	Sample Type	Test Method	Test Type	Test Responsibility	Frequency 1 per (E)	Frequency 1 per (M)	Sample Size lbs	Sample Size kg
05.07	Catch Basins, Manholes & Drop Inlets	ea.	00327	Water	gal	No Req for Test	NA	Visual	Project Staff			See Note 4.	
			01422	Precast Concrete Section	ea.	Accept (Prod)	NA	PC1	Central Lab	1	1	NA	
			01440A	Catch Basin - Precast (Complete)									
			01441A	Manhole - Precast (Complete)									
			03025	Mortar (prebagged)	bag	No Req for Test	NA	Visual	Project Staff			See Note 9.	
			03066	Cement - Portland Type I/II									
			06552	Lime - Hydrated									
			03200	Masonry Brick & Block (Solid)	ea.	Accept (Prod)	NA	LABT	Central Lab			See Note 1.	
			03201	Brick (Clay)									
			03209	Manhole Cover and/or Frame	ea.	Accept (Prod)	NA	MC	Central Lab	1	1	See Note 12.	
			03212	Catch Basin Frame and/or Grate									
			04697	Sand (Masonry) - Grading A	c.y.	Accept (Prod)	T27	LABT	District Lab	2.5k	1.9k	25	12
			04704	Sand (Masonry) - Grading B									
			04819	Gravel (Bank Run)	c.y.	Accept (Prod)	T27	LABT	District Lab	5k	3.8k	160	72
			08034	Stone (Broken / Crushed)									
			08035	Gravel (Crushed)									
			08036	Reclaimed Misc. Aggregate									
			08036X	Recl. Misc. Agg. (OFFSITE)		Accept (Prod)	Chem (Offsite ONLY)	MCCTR	District Lab	2.5k	1.9k	160	72
05.08	Shear Connectors	l.s.	03542	Stud Shear Connector	ea.	Accept (Prod)	AWS D1.5	MCCTR	Central Lab	quantity		1 per size	
05.09	Welded Studs	ea.	03543	Studs - Welding	ea.	Accept (Prod)	AWS D1.5	MCCTR	Central Lab	quantity		1 per size	
05.13	PVC Pipe	l.f.	02649	Pipe - Polyvinyl Chloride	l.f.	No Req for Test	NA	Visual	Project Staff				
05.14	Pstrsd Concrete Members	l.f.	03040	Grout, Non-shrink	bag	No Req for Test	NA	Visual	Project Staff			See Note 9.	
			03050	Concrete Members, Prestressed	l.f.	Accept (Prod)	NA	Visual	Lab & Project			See Note 2.	
05.20	X Asphalt Plug Joint	c.f.	08010	Exp. Jnt Asphalt Plug	c.f	No Req for Test	NA	MC	Project Staff			See Note 5.	
05.21	Elastomeric Bearing Pads	c.i.	03040	Grout, Non-shrink	See requirements for material #03040 under item 05.14.								
			03505-L	Bearing Pads (Laminated)	ea.	Accept (Prod)	NA	MCCTR	Central Lab	See Note 3.		See Note 3.	
			03505-P	Bearing Pads (Plain)	ea.								
			03506	Bonding Adhesive - Bearing Pads	tbd	Accept (Prod)	NA	MCCTR	Central Lab	quantity		NA	
05.22	Elastomeric Comp. Seal	l.f.	03432	Elastomeric Compression Seal	l.f.	No Req for Test	NA	MC	Project Staff			NA	
			03040	Grout, Non-shrink	See requirements for material #03040 under item 05.14.								
06.01	Concrete for Structures	c.y.	00804	Box Culvert (Precast)	ea.	Accept (Prod)	NA	Visual	Lab & Project			See Note 2.	
			01422	Precast Concrete Section									
			03014-X	Concrete-Class X (A, C or F)	c.y.	Accept (Prod)	T22	FLABT	Central Lab	75(60)/day		4 cyl	
			03014-SP_K	Concrete Special Provision									
			03014-HE	Concrete, High Early									
	(Cont)		03040	Grout, Non-shrink	bag	No Req for Test	NA	Visual	Project Staff			See Note 9.	
			03016	Grout (Batched)	c.y.	Accept (Prod)	T106	FLABT	Central Lab				
			03094	Joint Sealer	gal	No Req for Test	NA	MC	Project Staff			NA	
			03158	Preformed Expansion Joint Filler	ea.							NA	

Chapter 8 - Minimum Schedule for Acceptance Testing

Item	Title	Unit	Material #	Material Name	Material Unit	Sample Type	Test Method	Test Type	Test Responsibility	Frequency 1 per (E)	Frequency 1 per (M)	Sample Size lbs	Sample Size kg
06.01 (Cont)	Concrete for Structures		03444	Closed Cell Elastomer	l.f.	No Req for Test	NA	MC	Project Staff			NA	
			Note: All steel reinforcement under 06.01 will be tested as described in 06.02.										
06.02	Reinforcing Steel		02995	Dowel Splice System (Epxy Ctd)	ea.	Accept (Prod)	T244	LMCT	Central Lab	quantity		1	
			02997	Dowel Splice System									
		lb.	02998	Deformed Steel Bars, Epxy Ctd	lb.	Accept (Prod)	T244	LMCT	Central Lab	200t	180t	5ft	1.5m
			03040	Grout, Non-shrink	See requirements for material #03040 under item 06.01.							NA	
			03100	Deformed Steel, Reinforcing	lb.	Accept (Prod)	T244	LMCT	Central Lab	200t	180t	5ft	1.5m
			03105	Chemical Anchor	lb.	No Req for Test	NA	QPL/MC	Project Staff			NA	
			03138	Dowels, Steel	ea.	Accept (Prod)	T244	LMCT	Central Lab	quantity		NA	
			03145	Fabric, Wire and Welded Steel	s.y.	Accept (Prod)	T244	LMCT	Central Lab	60k ft^2	6k m^2	$1yd^2$	1 m^2
06.03	Structural Steel	cwt.	00031	Paint - Prime Coat for Existing	gal	No Req for Test	NEPCOAT www.nepcoat.org	MC	Project Staff	quantity		NA	
			00032	Paint - Interm. Coat for Existing									
			00033	Paint - Top Coat for Existing									
			03537	Steel, Structual	cwt.	Accept (Prod)	NA	Visual	Lab & Project			See Note 2.	
			03691	Nuts and/or Washers	ea.	Accept (Prod)	TBD	LMCT	Central Lab	quantity			
			03707	Bolts, High strength	ea.	Accept (Prod)	TBD	LMCT	Central Lab	quantity			
			03543	Shear Connectors	See item 5.08.								
			03040	Grout, Non-shrink	See requirements for material #03040 under item 06.01.								
06.05	Masonry Facing	s.y.	04771	Stone (Masonry)	tons	No Req for Test	NA	Visual	Project Staff			NA	
			03138	Dowels, Steel	lb.	Accept (Prod)	NA	LMCT	Central Lab	quantity		NA	
			Note: Mortar components to be tested as described in 05.07.										
06.06	Cement Rubble Masonry	c.y.	04765	Stone for Dry Rubble Masonry	c.y.	No Req for Test	NA	Visual	Project Staff			NA	
			Note: Mortar components to be tested as described in 05.07.										
06.07	Dry Rubble Masonry	c.y.	04765	Stone for Dry Rubble Masonry	c.y.	No Req for Test	NA	Visual	Project Staff			NA	
06.09	Repointed Masonry	s.y.	**Note:** All materials under 06.09 will be tested as described in 05.07.										
06.11	Shotcrete	c.y.	**Note:** All materials under 06.11 will be tested as described in 06.01.										
06.12	Curing Box	ea.	00000	No Request for Test Required.									
06.51	Culverts/Pipe	l.f.	00327	Water	gal	No Req for Test	NA	Visual	Project Staff			See Note 4.	
			00699	Pipe - Reinforced Concrete	l.f.	Accept (Prod)	NA	PC1	Central Lab	size		See Note 7.	
			various	Pipe (Metal) All types	l.f.	Accept (Prod)	NA	MC	District Lab	quantity		See Note 8.	
			01790	Pipe Arch - Aluminum	l.f.	No Req for Test	NA	MC	Project Staff			See Note 8.	
		l.f.	03066	Cement - Portland Type I/II	bag	No Req for Test	NA	Visual	Project Staff			See Note 9.	
			03040	Grout, Non-shrink	See requirements for material #03040 under item 06.01								
			03016	Grout (Batched)	c.y.	Accept (Prod)	T106	FLABT	Central Lab				
			04704	Sand (Masonry) - Grading B	c.y.	Accept (Prod)	T27	LABT	District Lab	2.5k	1.9k	25	12
	(cont.)		04901	Bedding Material	c.y.	No Req for Test	NA	Visual	Project Staff			NA	

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Item	X=Not Standard, A=Spec Pro / Title	Unit	Material #	Material Name	Material Unit	Sample Type	Test Method	Test Type	Test Responsibility	Frequency 1 per (E)	Frequency 1 per (M)	Sample Size lbs	Sample Size kg
06.51	Culverts/Pipe (cont.)		04819	Gravel (Bank Run)	c.y.	Accept (Prod)	T27	LABT	District Lab	5k	3.8k	160	72
			08034	Stone (Broken / Crushed)									
			08035	Gravel (Crushed)									
			08036	Reclaimed Misc. Aggregate									
			08036X	Recl. Misc. Agg. (OFFSITE)		Accept (Prod)	Chem(Offsite)	MCCTR	District Lab	2.5k	1.9k	160	72
06.52	Culvert Ends	ea.	00823	Culvert End - Reinforced Concrete	ea.	Accept (Prod)	NA	PC1	Central Lab	quantity		NA	
			Note: All non-precast materials that may be used for 06.52 items are listed under 06.51 and must be tested at the same frequency.										
06.53	Clean Drng Sys	ea.	00000	No Request for Test Required.									
07.02	Piles	lb.	03040	Grout, Non-shrink	See requirements for material #03040 under item 06.01								
			03549	Steel H Piles	ton	Accept (Prod)	NA	MCCTR	Central Lab	See Note 1.		See Note 1.	
			07369	Pile Point Reinforcement	ea.	Accept (Prod)	NA	MCCTR	Central Lab	quantity		NA	
07.03	Riprap (all types)	c.y.	04819	Gravel (Bank Run)	c.y.	No Req for Test	NA	Visual	Project Staff			NA	
			08034	Stone (Broken/Crushed)									
			08035	Gravel (Crushed)									
07.04	Gabions	c.y.	03546	Gabions	ea.	Accept (Prod)	NA	MC	Central Lab	quantity		NA	
07.05	Slope Paving	s.y.	08031	To Be Determined.									
07.07	Membrane Waterproofing (Woven Glass)	s.y.	04199	Membrane Waterproofing	s.y.	No Req for Test	NA	MC	Project Staff	quantity		See Note 1.	
07.08	Dampproofing	s.y.	04207	Dampproofing Primer	gal	No Req for Test	NA	MC	Project Staff			See Note 1.	
			04208	Dampproofing Sealer	gal	No Req for Test	NA	MC	Project Staff				
07.11	X Conc Crib Wall		08031	To Be Determined.									
07.13	Permanent Steel Sheet Piling	s.f.	07762	Sheet Piling	l.f.	Accept (Prod)	NA	MCCTR	Central Lab	quantity		NA	
07.14	Temp Steel Sheet Piling	s.f.	00000	No Request for Test Required.	All welders must be certified. See Standard Spec 1.05.17.					NA		NA	
07.15	Sht Piling Left	s.f.	07466	Sheet Pile, Temporary left in place	l.f.	Accept (Prod)	NA	MCCTR	Central Lab	quantity		NA	
07.25	Bagged Stone		04769	Bagged Stone - Bag	No Request for Test Required.								
				Stone within the bag should be visually inspected and taken from suitable material tested under another item.									
07.28	Crushed Stone for Slope Protection	ton	08034 08035	Stone (Broken/Crushed) Gravel (Crushed)	c.y.	No Req for Test	NA	Visual	Project Staff			NA	
07.32	Conc. Block Slope Prot.	s.y.	03197	Concrete Blocks	See requirements for material #03200 under item 05.07.								
		lb	03025	Mortar (prebagged)	See requirements for material #03025 under item 05.07.								
07.51	Underdrain and Outlets	l.f.	01708	Pipe - For Underdrain or Outlet	See requirements for Pipe, Metal (All types) under item 06.51.								
			03985	Geotextile	s.y.	No Req for Test	NA	QPL/MC	Project Staff			NA	
			04178	Pipe Joint Cmpnd		No Request for Test							
			04901	Bedding Material	c.y.	No Req for Test	NA	Visual	Project Staff			NA	
07.55	Geotextile	s.y.	03985	Geotextile	s.y.	No Req for Test	NA	QPL/MC	Project Staff			NA	

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08.03	Paved Ditches and Channels	s.y.	04003	Curb Mix	See requirements under 04.06.								
			04819	Gravel (Bank Run)	c.y.	Accept (Prod)	T27	LABT	District Lab	5k	3.8k	160	72
			08034	Stone (Broken/Crushed)									
			08035	Gravel (Crushed)									
			08036	Reclaimed Misc. Aggregate									
			08036X	Recl. Misc. Agg. (OFFSITE)		Accept (Prod)	Chem(Offsite ONLY)	MCCTR	District Lab	2.5k	1.9k	160	72
08.11	Concrete Curbing	l.f.	01511	Curb, Precast	l.f.	Accept (Prod)	NA	PC1	Central Lab	quantity		NA	
			03014-C	Concrete-Class C	c.y.	Accept (Prod)	T22	FLABT	Central Lab	75	60	4 cyl	4 cyl
			03155	Expansion Joint filler	l.f.	No Req for Test	NA	MC	Project Staff			NA	
			03158	Preformed Expansion Joint Filler	s.f.								
08.13	Stone Curbing	l.f.	04909	Curbing, Granite Stone	l.f.	No Req for Test	NA	Visual	Project Staff			NA	
08.14	Reset Stone Curbing	l.f.	00000			No Request for Test							
08.15	Bit. Conc. Lip Curbing	l.f.	04003	Curb Mix	See requirements under 04.06.					day	day	NA	
		gal	04128,47	RS-1 or RS-1H	See requirements under 04.06.								
08.16	Granite Slope Curbing	l.f.	04910	Curbing, Granite Slope	l.f.	No Req for Test	NA	Visual	Project Staff			NA	
08.18	Prtctve Cmpnd for Bridges	s.y.	00328	Protective Coating	gal	No Req for Test	NA	QPL/MC	Project Staff			NA	
08.21	Precast Concrete Barrier Curb	l.f.	00895	Concrete Barrier, Precast	l.f.	Accept(Prod)	NA	PC1	Central Lab	size		See Note 7.	
			03014-F	Concrete-Class F	c.y.	Accept (Prod)	T22	FLABT	Central Lab	75	60	4 cyl	4 cyl
08.22	Temp Precast Conc. Barrier	l.f.	00000	No Request for Test Required.									
09.01	A Bollard	ea.	07351	Bollard	ea.	Accept (Prod)	NA	MC	Central Lab	quantity		NA	
09.04	Metal Br Rail	l.f.	03429	Metal Bridge Rail	l.f.	Accept(Prod)	NA	Visual	Lab and Project	quantity		See Note 2.	
09.05	Stone Wall Fence	l.f.	00000	No Request for Test Required.									
09.06	Wire Fence	l.f.	03325	Fence, Wire	l.f.	Accept(Prod)	TBD	MC	Central Lab	quantity		NA	
			03326	Fence - Wire, Posts & Hardware									
09.10	Metal Beam Rail	l.f.	03406	Metal Beam Rail (MBR)	l.f.	Accept (Prod)	NA	MC	Central Lab	quantity		NA	
09.11	Metal Beam Rail Anchorages (cont.)	ea.	01435	End Anchor (Precast)	ea.	Accept (Prod)	NA	PC1	Central Lab	quantity		NA	
			03405	Metal Beam Rail, Anchorages for	ea.	Accept (Prod)	NA	Visual	Lab and Project	quantity		See Note 2.	
			03014-A	Concrete-Class A	c.y.	Accept (Prod)	T22	FLABT	Central Lab	75	60	4 cyl	4 cyl
09.11			03100	Deformed Steel, Reinforcing	lb.	Accept (Prod)	T244	LMCT	Central Lab	200t	180t	5ft	1.5m
09.12	Remove and Reset Posts, ...	l.f.	08031	To Be Determined.									
09.13	Chain Link Fence	l.f.	03300	Fence - Chain Link - Fabric	l.f.							3 lf	1m
			03309	Fence - Chain Link	l.f.			MC				3 lf	1m
			03310	Fence - Chain Link - Post	ea.	Accept(Prod)	NA	LABT	Central Lab	quantity		1	1
			03320	Fence - Chain Link - Hardware & Accessories	ea.							1	1

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X=Not Standard, A=Spec Pro													
09.14	Metal Handrail	l.f.	03414	Metal Handrail	l.f.	Accept(Prod)	NA	Visual	Lab and Project	quantity		See Note 2.	
09.16	Noise Bar Wall	s.f.	07822	Noise Barrier Wall	s.f.	Accept (Prod)	NA	MC	Central Lab	quantity		NA	
09.18	Three-Cable Guide Railing (I_Beam Posts) and Anchorages	ea.	03014-A	Concrete-Class A	c.y.	Accept (Prod)	T22	FLABT	Central Lab	75	60	4 cyl	4 cyl
			03100	Deformed Steel, Reinforcing	lb.	Accept (Prod)	T244	LMCT	Central Lab	200t	180t	5ft	1.5m
			03419	Cable Guide Rail	l.f.	Accept (Prod)	NA	MC	Central Lab	quantity		NA	
			03421	Cable Guide Railing Anchorage	ea.								
			03424	Cable Guide Railing, Components	ea.								
09.21	Concrete Sidewalks		01467	Slab, Precast	ea.	Accept (Prod)	NA	PC1	Central Lab	quantity		NA	
			02998	Deformed Steel Bars, Epxy Ctd	lb.	Accept (Prod)	T244	LMCT	Central Lab	200t	180t	5ft	1.5m
			03014-C	Concrete-Class C	c.y.	Accept (Prod)	T22	FLABT	Central Lab	75	60	See Note 14.	
			03100	Deformed Steel, Reinforcing	lb.	Accept (Prod)	T244	LMCT	Central Lab	200t	180t	5ft	1.5m
			03145	Fabric, Wire & Welded Steel	s.y.	Accept (Prod)	T244	LABT	Central Lab	60k ft^2	6k m^2	$1yd^2$	1 m^2
			03158	Preformed Expansion Joint Filler	s.f.	No Req for Test	NA	MC	Project Staff			See Note 1.	
			04819	Gravel (Bank Run)	c.y.	Accept (Prod)	T27	LABT	District Lab	5k	3.8k	160	72
			08034	Stone (Broken/Crushed)									
			08035	Gravel (Crushed)									
			08036	Reclaimed Misc. Aggregate									
09.22	Bituminous Concrete Sidewalk Driveway	s.y.	04053	HMA, Level 1 (9.5mm/0.375 in)	ton	Accept(Prod)	TBD	FLDT	Project Staff	day	day	NA	
			04819	Gravel (Bank Run)	c.y.	Accept (Prod)	T27	LABT	District Lab	5k	3.8k	160	72
			04820	Gravel Fill									
			08035	Gravel (Crushed)									
			08036	Reclaimed Misc. Aggregate									
09.24	Concrete Ramp/Driveway	c.y.	See materials listed under 06.01 and 06.02.										
09.25	Pvmnt for Railing		04003	Curb Mix	See requirements under 04.06.					day	day	NA	
09.30	Object Marker	ea.	03943	Object Marker	ea.	No Req for Test	NA	QPL/MC	Project Staff	quantity		NA	
		ea.	03952	Sign Post	ea.	Accept(Prod)	TBD	MC	Central Lab	quantity		See Note 1.	
09.39	Sweeping for Dust Control	hr.	00000	No Request for Test Required.									
09.41	Service Bridges	ea.	08031	To Be Determined.									
09.42	Calc Chloride Dust Control	ton	00302	Calcium Chloride	gal	No Req for Test	NA	Visual	Project Staff			NA	
09.44	Topsoil	s.y.	00542X	Topsoil (from offsite)	c.y.	Accept (Prod)	NA	MCCTR	Central Lab	1k	765	NA	
09.45	Wildflowers	lb.	00000	No Request for Test Required.									
09.46	Liming	ton	00533	Lime	lb.	No Req for Test	NA	Visual	Project Staff			NA	
09.47	Bus Shelter	ea.	06538	Shelter	ea.	TBD							

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	X=Not Standard, A=Spec Pro												
09.49	Planting and Mulching Trees, Shrubs Vines and Groundcover Plants	ea.	00327P	Water (plantings)	No request for test required.								
			00510	Peat	c.y.	No Req for Test	NA	Visual	Project Staff				NA
			00533	Lime	ton	No Req for Test	NA	Visual	Project Staff				NA
			00496	Fertilizer	lb.	No Req for Test	NA	MC	Project Staff				See Note 10.
			00536	Plant Materials	No Request for Test required.				Landscape Design Unit Approval				See Note 11.
			00542P	Topsoil - plantings (no turf estab)	c.y.	Accept (Prod)	NA	MCCTR	Central Lab	1k	765		NA
			07547	Tree	No Request for Test required.				Landscape Design Unit Approval				See Note 11.
09.50	Turf Establishment Erosion Control	s.y.	00327P	Water (plantings)	gal	No Req for Test	NA	Visual	Project Staff				NA
			00512	Fertilizer	lb.	No Req for Test	NA	MC	Project Staff				See Note 10.
			00497	Seed	lb.	No Req for Test	NA	MC	Project Staff				See Note 10.
			00514	Hay Mulch	s.y.	No Req for Test	NA	Visual	Project Staff				NA
			00533	Lime	lb.	No Req for Test	NA	Visual	Project Staff				NA
			00534	Mulch - Wood Fiber	lb.	No Req for Test	NA	Visual	Project Staff				NA
			00542	Topsoil (from project)	c.y.	No Req for Test	NA	Visual	Project Staff				NA
			00542X	Topsoil (from offsite)	c.y.	Accept (Prod)	NA	MCCTR	Central Lab	1k	765		NA
			03982	Geotextiles, Erosion Control	s.y.	No Req for Test	NA	QPL	Project Staff				NA
09.53	Sodding	s.y.	00518	Sod	s.y.	No Req for Test	NA	MC	Project Staff				See Note 11.
				Other materials as listed in 09.50.									
09.76	Barricade Warning Lights	day	03603	Warning Lights	ea.	No Req for Test	NA	Visual	Project Staff				NA
09.77	Traffic Cone	ea.	03934	Reflective Sheeting	s.f.	No Req for Test	NA	QPL/MC	Project Staff				NA
			03948	Traffic Cones	ea.	No Req for Test	NA	Visual	Project Staff				
09.78	Traffic Drum	ea.	03934	Reflective Sheeting	s.f.	No Req for Test	NA	QPL/MC	Project Staff				NA
			03927	Traffic Drums	ea.	No Req for Test	NA	Visual	Project Staff				
09.79	Construction Barricades	ea.	03934	Reflective Sheeting	s.f.	No Req for Test	NA	QPL/MC	Project Staff				NA
			03974	Construction Barricade	ea.	No Req for Test	NA	MC	Project Staff				
09.81	42in Traffic Cone	ea.	03934	Reflective Sheeting	s.f.	No Req for Test	NA	QPL/MC	Project Staff				NA
			03948	Traffic Cones	ea.	No Req for Test	NA	Visual	Project Staff				
10.01	Trenching and Backfilling	l.f.	04709	Sand (trenching and backfilling)	c.y.	No Req for Test	NA	Visual	Project Staff				NA
				Other materials as listed elsewhere.									
10.02	Light Standards and Traffic Control Foundations		01432	Foundation (Precast)	ea.	Accept (Prod)	NA	PC1	Central Lab	size			See Note 7.
			03014-A	Concrete Class A	c.y.	Accept (Prod)	T22	FLABT	Central Lab	75	60	4 cyl	4 cyl
			03100	Deformed Steel (Reinforcing)	lb.	Accept (Prod)	T244	LMCT	Central Lab	200t	180t	5ft	1.5m
			03504	Anchor Bolts	ea.	Accept (Prod)	TBD	LMCT	Central Lab	quantity		1 per size	
			03711	Ground Rod	ea.	No Req for Test	NA	Visual	Project Staff				NA
10.03	Light Standards	ea.	03704	Light Standard	ea.	Accept (Prod)	TBD	MC	Central Lab	quantity			See Note 6.
10.04	Roadway Luminaire	ea.	07645	Luminaire	ea.	No Request for Test - Catalog Cut - Designer							
10.06	Underbridge Luminaire	ea.	03713	Luminaire - Under Bridge	ea.								

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10.08	Elec. Conduit	l.f.	03693	Conduit & Fittings (all types)	l.f.	No Request for Test - Catalog Cut - Designer							
10.09	Cast Iron Junction Box	ea.	03724	Junction Box & Cover	ea.	Accept (Prod)	NA	MC	Central Lab	quantity		NA	
10.10	Conc Handhole	ea.	01462	Handhole & Cover, Precast	ea.	Accept (Prod)	NA	PC1	Central Lab	size		See Note 7.	
10.11	4" Drain Pipe	l.f.	01700	Pipe - Drain	l.f.	No Request for Test - Catalog Cut - Designer							
10.12	Single Conductor	l.f.	03730	Single Conductor	l.f.								
10.14	Cable In Duct	l.f.	03612	Cable In Duct	l.f.								
10.15	Grounding Conductor	l.f.	03709	Ground Wire	l.f.	No Req for Test	NA	Visual	Project Staff			NA	
			03711	Ground Rod	ea.	No Req for Test	NA	Visual	Project Staff			NA	
10.17	Service Entrance & Cabinet	ea.	00000	No Request for Test Required.		Catalog Cut Approval			Designer of Record				
10.18	Navigation Light	ea.	03729	Navigation Lights		No Request for Test - Catalog Cut - Designer							
11.01	Pole Anchor	ea.	08031	To Be Determined.									
11.02	Pedestals	ea.	03801	Pedestals, Aluminum or Steel	ea.	Accept(Prod)	TBD	MC	Central Lab	quantity		NA	
11.03	Span Pole	ea.	03802	Span Pole - Steel	ea.	Accept(Prod)	NA	MC	Central Lab	quantity		See Note 2 & 6.	
			03804	Span Pole - Wood	ea.	No Req for Test	NA	MC	Project Staff			NA	
11.04	X Mast Arm		03806	Mast Arm Assembly	ea.	Accept(Prod)	NA	MC	Central Lab	quantity		See Note 2 & 6.	
11.05	Traffic Signals	ea.	03766	Traffic Signal Equipment	ea.	No Request for Test - Catalog Cut - Designer							
			03807	Traffic Signal	ea.								
11.06	Pedestrian Signal	ea.	00000	No Request for Test Required.		Catalog Cut Approval			Designer of Record				
11.07	Pedestrian Push Button	ea.	00000										
11.08	Controllers	ea.	00000										
11.10	X Press. Veh. Det.		00000										
11.11	Loop Detector & Sawcut	ea.	00000										
11.12	Mag. Veh. Det.	ea.	00000										
11.13	Control Cable	l.f.	00000										
11.14	A Msngr Spn Wire	l.f.	00000										
11.15	X PVC Conduit		00000	No Request for Test Required.		Catalog Cut Approval			Designer of Record				
11.16	Illum. Signs	ea.	00000										
11.17	A Alt. Flsh Sig for Wrnng Sgns	ea.	00000										

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	X=Not Standard, A=Spec Pro												
11.18	Rmvl/ Relo Traff Sig. Equip	l.s.	08031	To Be Determined.									
11.30	High Mounted Inter Illum. Flashing Arrow	day	00000	No Request for Test Required.		Catalog Cut Approval			Designer of Record				
11.31	Changeable Message Sign / Remote Controlled Sign	day	03764	Sign (Variable Message)	ea.	No Req for Test	NA	MC	Project Staff			NA	
12.00	Gen. Clauses for Hwy Signing		00000	No Request for Test Required.									
12.01	Ohead Sign Sup.	ea.	03928	Sign Support (Overhead)	ea.	Accept(Prod)	NA	MC	Central Lab	quantity		See Note 2 & 6.	
12.02	Overhead Sign Support Foundation	ea.	03014-A	Concrete-Class A (3000/21)	c.y.	Accept (Prod)	T22	FLABT	Central Lab	75	60	4 cyl	4 cyl
			03100	Deformed Steel, Reinforcing	lb.	Accept (Prod)	T244	LMCT	Central Lab	200t	180t	5ft	1.5m
			03504	Anchor Bolts	ea.	Accept (Prod)	TBD	LMCT	Central Lab	quantity		1 per size	
			03711	Ground Rod	ea.	No Req for Test	NA	Visual	Project Staff			NA	
12.03	Side Mntd Sign Fndtn	ea.	All Materials and Frequencies as listed under 12.02.										
12.04	Sign Panel Overlay	s.f.	00000	No Request for Test Required.		Catalog Cut Approval			Designer of Record				
12.05	Delineators	ea.	03933	Delineator	ea.	No Req for Test	NA	QPL/MC	Project Staff			NA	
			03952	Sign Post	ea.	Accept(Prod)	TBD	MC	Central Lab	quantity		See Note 1.	
12.07	Sign Face - Extrdd Alum.	s.f.	03936	Sign Panels, Extruded Aluminum	s.f.	No Req for Test	NA	QPL/MC	Project Staff			NA	
12.08	Sign Face - Sheet Alum.	s.f.	03938	Sign Face - Sheet Aluminum	s.f.	No Req for Test	NA	QPL/MC	Project Staff			NA	
		ea.	03952	Sign Post	ea.	Accept (Prod)	NA	MC	Central Lab	quantity		See Note 1.	
12.09	Painted Pvmnt Markings	l.f.	00060	Paint Wtrbrn Pvmt Mrk (3 min)	gal	No Req for Test	NA	MC	Project Staff			See Note 5.	
		lb.	00306	Glass Spheres	lb.	No Req for Test	NA	MC	Project Staff				
12.10	Epoxy Pavement, Symb and Lgnds	l.f.	00064	Paint - Epoxy Pvmt Mark	gal	No Req for Test	NA	MC	Project Staff			See Note 5.	
		s.f.	00306	Glass Spheres	lb.	No Req for Test	NA	MC	Project Staff				
12.11	Removal of Pvmnt Markings	s.f.	00000	No Request for Test Required.									
12.12	Temp Pvmnt Mrkng Tape	l.f.	00000	No Request for Test Required.									

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12.14	Black Mrkng Tape	l.f.	00206	Preformed Black Marking Tape	l.f.	No Req for Test	NA	MC	Project Staff			NA	
12.15	X Tublr Sign Sup.	ea.	See 06.03 Structural Steel requirements.										
12.16	Black Epoxy Resin Pvmnt	l.f.	00064	Paint - Epoxy Pvmt Mark	l.f.	No Req for Test	NA	MC	Project Staff			See Note 5.	
	Mrkings Symbls and Lgnds	s.f.	00064	Paint - Epoxy Pvmt Mark	s.f.	No Req for Test	NA	MC	Project Staff			See Note 5.	
12.20	Constr. Signs - Encap. Lens Refl Sheeting	s.f.	03945	Construction Signing	s.f.	No Req for Test	NA	QPL/MC	Project Staff			NA	
13.00	X Utilities			Utilities Special Provisions No Request for Test Required.									
18.00	Gen. Clss Imp Att Sys		00000	No Request for Test Required.									
18.01	X Repair Impact Att Sys.		00000	No Request for Test Required.									
18.02,3,4	Impact Att Sys. (A, B or C)	ea.	03970	Impact Attenuator	ea.	No Req for Test	NA	QPL	Project Staff	quantity		NA	
18.06	Type D Prtbl Imp Att Sys.	hr.	03970	Impact Attenuator	ea.	No Req for Test	NA	MC	Project Staff	quantity		NA	
18.07	Temp Impact Atten Sys.	ea.	00298	Sodium Chloride	lb.	No Req for Test	NA	MC	Project Staff			NA	
			03970	Impact Attenuator	ea.	No Req for Test	NA	QPL	Project Staff	quantity		NA	
			04703	Sand Filler	c.y.	No Req for Test	NA	MC	Project Staff			NA	

General Note: Materials used within an item not referenced in the table must be tested as specified in the special provision for that item, or as they would be typically tested with other items.

Notes

1 Sample may be required depending on source of material. DMT personnel will request sample from project if needed.
2 Notify Division of Materials Testing prior to fabrication to schedule plant inspection. Submit Request for Test after items are inspected by project staff upon delivery.
3 Submit one test pad per 50 of the same type or portions thereof. If there are less than 50 pads total and more than one type, submit the type with the greatest quantity.
4 DO NOT submit a Request for Test unless the water is non-potable. Water may be tested if drawn from a suspect source. (1qt/1 lt sample if needed - 1 per project)
5 Confirm Batch # on Materials Certificate matches information provided on Qualified Materials List (QML) http://www.ct.gov/dot/cwp/view.asp?a=1410&Q=538842
6 Material Certificate must indicate conformance for entire assembly including, but not limited to, base, shaft, bracket arm, galvanized coating and deflection testing (if required).
7 Mat-100 can contain multiple sizes, each size on the project must be documented with a MAT-100. Total project quantity per size does not require testing.
8 Notify District Laboratory to schedule a field inspection.
9 Project staff should verify bags used are labeled as meeting ASTM C150; mortar must meet C1714 or C387; Lime must meet C207; Grout must meet C1107.
10 Material Certificate may be substituted for affadavit.
11 Send request for inspection to Landscape Design Unit, Newington Room 3401 NWA (860) 594-3336
12 PC1 for item will cover frames and grates if incorporated into precast items. Material Certification applies when material is not integral with a precast item.
13 Summary of density testing to be submitted with Final Materials Certificate Request **is not required.** MAT-100 NOT REQUIRED.
14 Represented quantity can be adjusted based on field testing results. Contact DMT for direction.

Legend

Item: Standard Specification Section and the first four digits of the Contract Item number. Column also includes section headings

Title: Generally the overall subject of the Standard Specification Section and the Contract Item numbers.

Material Code: Code used in SiteManager and by the Division of Materials Testing to identify component materials used in Contract Items

Material Name: Definition of the Material #

Test Type: Describes where the test is performed

Sample Resp: Who performs the sampling

Frequency: Number of tests required per quantity of material using the sample units.

Sample Units: Units of the amount of material represented by a single sample or test.

Sample Size: Size of Sample

Item	Title	Material Code(s)	Material Name	Test Type	Sample Resp.	Freq. 1 per	Freq Units	Sample Size
	Earthwork							
02.02	Roadway Excavation, Formation of	08037	Recl. Waste	Field	Central Lab	50000	tons	na
	Embankment and Disposal of	08037X	Recl. Waste (OFFSITE)					
	Surplus Material	08039	Embankment Material					
02.03	Structure Excavation	08037	Recl. Waste	Field	Central Lab	50000	tons	na
		08037X	Recl. Waste (OFFSITE)					
		08039	Embankment Material					
02.07	Borrow	04902	Borrow	Field	Central Lab	50000	tons	na
02.12	Subbase	04819	Gravel (Bank Run)	Laboratory	District Lab	50000	tons	80 lbs
		08034	Stone (Broken/Crushed)		Central Lab	30000	tons	na
		08035	Gravel (Crushed)					
		08036	Recl. Misc. Agg.					
		08036X	Recl. Misc. Agg. (OFFSITE)					
03.03	Concrete Base	03014-PAV	Concrete-Pavement (3500psi/25MPa)	Field	Project Personnel	2500	c.y.	na
03.04	Processed Aggregate Base	04819	Gravel (Bank Run)	Laboratory	District Lab	30000	tons	80 lbs
		08034	Stone (Broken/Crushed)		Central Lab	30000	tons	na
		08035	Gravel (Crushed)					
		08036	Recl. Misc. Agg.					
		08036X	Recl. Misc. Agg. (OFFSITE)					
03.05	Processed Aggregate	04819	Gravel (Bank Run)	Laboratory			tons	
		08034	Stone (Broken/Crushed)		District Lab	30000		80 lbs
		08035	Gravel (Crushed)		Central Lab	30000		na
		08036	Recl. Misc. Agg.					
		08036X	Recl. Misc. Agg. (OFFSITE)					

Item	Title	Material Code(s)	Material Name	Test Type		Sample Resp.	Freq. 1 per	Freq Units	Sample Size
Surface Courses or Pavements									
04.01	Concrete Pavement	03014-PAV	Concrete-Pavement (3500psi/25MPa)	Field		Project Personnel	2500	c.y.	4 cyl na
04.06	Bituminous Concrete	04003	Curb Mix		Laboratory[2]	Central Lab		ea	
		04052,3,4,5	HMA, Level 1,2,3 (9.5 mm / 0.375 in)	Density[1]			40		
		04056,7,8,9	HMA, Level 1,2,3 (12.5 mm / 0.5 in)						
		04060,1,2,3	HMA, Level 1,2,3 (19.0 mm / 0.75 in)						
		04064,5,6,7	HMA, Level 1,2,3 (25.0 mm / 1.0 in)						
		04068, 9, 70, 71	HMA, Level 1 (37.5 mm / 1.5 in)						
		04076, 7, 8, 9	HMA, Level 1,2,3 (6.25 mm / 0.25 in)						
Structures									
05.06	Retaining Walls, Endwalls and Steps	03014-A 03014-C	Concrete-Class A (3000psi/21MPa) Concrete-Class C (3000psi/21MPa)	Field		Project Personnel	2500	c.y.	na
06.01	Concrete for Structures	03014-A	Concrete-Class A (3000psi/21MPa)	Field		Project Personnel	2500	c.y.	na
		03014-C	Concrete-Class C (3000psi/21MPa)						
		03014-F	Concrete-Class F (4000psi/28MPa)						
Notes:									
1	Test performed on Core samples using AASHTO T-331.								
2	Test performed: AASHTO T-30; T-166; T-209; T-308; T-312								

Appendix A - Forms

Form	Name	Spec
MAT-100	Request for Test	
MAT-103	Report of Rejected Material	
MAT-104	Report of Test of Miscellaneous Material	
MAT-106	DMT Contact List	
MAT-107	Quality Assurance – Notable Observation	
MAT-108	Daily Work Report	
MAT-108HMA	Daily Work Report (Hot Mix Asphalt)	
MAT-108PCC	Daily Work Report (Precast Concrete)	
MAT-109	Core Sample Documentation	
MAT-110	Welding Operator Qualification Record	
MAT-111	Welding Certification Application	
MAT-112	Welding Call In Report	
MAT-200	Report of Test of Metal Pipe (Steel)	
MAT-202	Report of Test of Perforated Metal Pipe	
MAT-203	Report of Test of Structural Plate and Pipe Arches	
MAT-204	Report of Test of Culvert End	
MAT-205	Report of Tests of Bank Run Gravels or Processed Aggregate	
MAT-206	Report of Test of Sand	
MAT-207	Report of Test of Coarse Aggregate	
MAT-208	Report of Test of Rock Salt	
MAT-209	Report of Test of Calcium Chloride	
MAT-211	Report of Test of L.A. Abrasion	
MAT-213	Report of Test of Moisture/Density (Proctor)	
MAT-217	Worksheet: Moisture Density (Proctor) 6” mold	
MAT-218	Worksheet: Moisture Density (Proctor) 4” mold	
MAT-219	Worksheet for Specific Gravity and Absorption of Coarse Aggregate	
MAT-220	Worksheet for Soundness of Fine Aggregate - AASHTO T-104	
MAT-221	Worksheet for Soundness of Coarse Aggregate- AASHTO T-104	
MAT-222	Assurance Report: Material Testing Personnel and equipment in the field.	
MAT-224	Assurance Report: Plastic PC Concrete	
MAT-225	Assurance Report: Plastic PC Concrete (Metric)	
MAT-228	Report of Test: Glass Beads	
MAT-229	Report of Test: Visi Beads	
MAT-235	Report of Test: Paint-Solvent White &Yellow Pav. Mark (FastDry)	
MAT-236	Report of Test: Paint-Solvent White &Yellow Pav. Mark (Reg.Dry)	
MAT-239	Report of Test: Paint - Waterborne White & Yellow Paint (Fast Dry)	
MAT-240	Report of Test: Paint - Waterborne White & Yellow Paint (Reg. Dry)	
MAT-241	Independent Assurance Report: Concrete Fine Aggregates	
MAT-242	Independent Assurance Report: Concrete Coarse Aggregate	
MAT-243	Independent Assurance Report: Subbase & Processed Agg Base	
MAT-244	Independent Assurance Report: Plastic PC Concrete	
MAT-245	Report of Test – Aggregate Variation Limits	

MAT-246	Tracking Report: Asphaltic Plug Joint	
MAT-248	Tracking Report: Pavement Marking Materials	
MAT-300	Report of Test: Anchor Bolts (Straight)	
MAT-301	Report of Test: Anchor Bolts (w/Hook)	
MAT-302	Report of Test: Hex Bolt	
MAT-303	Report of Test: Chain Link Fence Fabric	4.58
MAT-304	Report of Test: Reinforced Concrete Pipe	
MAT-305	Report of Test: Steel Bars and Shapes	
MAT-306	Report of Test: Steel Fabric Reinforcement	
MAT-307	Report of Test: General Tensile Strength	
MAT-308	Report for Test on Cylinders	
MAT-308A	Report of Test on Cylinder Diameter	
MAT-309	Report of Test: Masonry Concrete Units	4.48
MAT-310	Report of Test: Elastomeric Bearing Pad	
MAT-312	Report of Test: Clay Brick	4.48
MAT-313	Report of Test: Concrete Block for Slope Protection	
MAT-314	Certification of Precast Concrete Prod.	
MAT-316	Report of Test: Portland Cement (All Types)	
MAT-323	Report of Test: Steel Strand	4.25
MAT-324	Field Report : Yearly inspection for certification of prestress/precast concrete and pipe manufacturers	
MAT-325	Report of Test: Chain Link Fence Hardware	
MAT-326	Report of Test: Chain Link Fence Tension Wire	
MAT-327	Report of Test: H-Piles and Wide Flange Shapes	
MAT-328	Report of Test: Deformed Steel Wire for Concrete Reinforcement	
MAT-329	Certification of Brand Registry	
MAT-330	Guideline: Visual Inspection of Reinforcing Steel	
MAT-401	Report of Test: Asphalt Binder	
MAT-402	Report of Test: Emulsified Asphalts	
MAT-404	Field Report: Bituminous Concrete Plant Inspection	
MAT-406	Field Report: Inspection of HMA Field Laboratory	
MAT-407	Field Report: Plant and Laboratory Deficiency Report	
MAT-408	Field Report: QA Verification Form	
MAT-412cm	Report of Test: Bituminous Curb Mix Quality	
MAT412S	Report of Test: Bituminous SuperPave Quality (2 sided)	
MAT-412s-ppt	Report of Test: Bituminous SuperPave Quality (Pre-Production Trial)	
MAT-412ut	Report of Test: Bituminous Ultrathin Quality	
MAT-417	Worksheet: Random Lot Selection at Plant	
MAT-418	Worksheet: Job Mix Formula Verification	
MAT-419	Template: Quality Control Plan for Fine Aggregate. used in HMA.	
MAT-429cm	Template: Job Mix Formula (curb mix)	
MAT-429s	Template: Job Mix Formula (SuperPave)	
MAT-429ut	Template: Job Mix Formula (Ultrathin)	

MAT-433	Worksheet: Ignition Oven Correction	
MAT-438NonPWL	Worksheet: Daily Plant Adjustment (Non-PWL Lots)	
MAT-438PWL	Worksheet: Daily Plant Adjustment (PWL Lots)	
MAT-440	Field Report: Producer Facility Mix Design Status	
MAT-600	Report of Witness Test – HMA Independent Assurance	

State of Connecticut
Department of Transportation
Material Test Report

SAMPLE ID	
REVISED SAMPLE ID	
Material Code	
Material Description	
Sample Date	
Sampled By	
Source of Supply	
Producer/Supplier Code	
Material Rep Qty	
Sample Unit	
Sample Test Type	
Acceptance Method Type	
Control Type	
Control Number	
Sample Taken From	
Purpose/Intended Use	
Location of Sample	
Plant ID / TYPE	/
Plant Name	
Contract Number	
District Number	
Federal Aid Number	
Field Office Phone Number	
Sample Status	
Date of Assigned Status	
Creator User ID	

REMARKS

Project Number	LIN	Item Code	CAT	Item Description	Material Rep Qty
				Total Material Represented Quantity:	

The MAT-100 must accompany all samples and documentation submitted to the Division of Materials Testing. The form is normally produced electronically through CMR/SiteManager. All samples other than PC concrete cylinders must have a MAT-100 attached or included so that the sample can be tracked by DMT personnel. Samples or documentation received without a MAT-100 may be returned to the project or discarded without any action by the DMT.

STATE OF CONNECTICUT - DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING

MAT-103 REV 11/16 **REPORT OF REJECTED MATERIAL**

Project Number	ITEM # (If multiple, only list first from MAT-100)	Date

Material	Sample ID.

Source of Material	Quantity Represented	Reason for Rejection

Complete section 1 ***OR*** 2. **See below for instructions.**

1. ACTION TAKEN - ***DOES NOT INCLUDE RETESTING THE SAME MATERIAL WITH A DIFFERENT TEST METHOD.***
(i.e., Windsor Probe, Swiss Hammer)

	Source	Sample ID.	Sample Status
New Sample			
Material Replaced			

Signature

Inspector _____ Print _____

Project Engineer _____ Print _____

District or Assistant District Engineer _____ Print _____

Town Official/Title (municipal projects only) _____ Print _____

2. ACCEPTANCE OF REJECTED MATERIAL WITHOUT ACTION

In accordance with ConnDOT Standard Specifications Section 1.06.02 or 1.06.04, the non-complying material is hereby accepted by the District.

Section Applied
☐ **1.06.02** ☐ **1.06.04**
Check one

Signature/Print

Inspector _____ Print _____

Project Engineer _____ Print _____

District or Assistant District Engineer _____ Print _____

Town Official/Title (Municipal Projects Only) _____ Print _____

For acceptance by Section 1.06.02, all the following criteria must be met.

1. Results of prior and subsequent series of tests of the material or materials from the same source or sources are found satisfactory.
2. The incidence and degree of non-conformance with the Contract requirements are, in the Engineer's judgement, within reasonable limits.
3. The Contractor, in the Engineer's judgement, had diligently exercised material controls consistent with good practices.
4. No adverse effect on the value or serviceability of the completed work could result.

For acceptance by Section 1.06.04, any credits, allowances, warranties, or other conditions of acceptance must be described below.

Orig - Division of Materials Testing Copy -District Copy - Project Records

Report of Rejected Material (MAT-103) Instructions

The Report of Rejected Material form serves the following purpose:

1. Identify the project and material that did not meet specification.

2. Report action taken (if any) **which only includes retesting** the material with an additional sample and achieving acceptable results or **removing** and replacing the deficient material with acceptable material. When such an action is taken, the MAT-103 provides the DMT with information on how rejected material was addressed. Signatures are required in this section to acknowledge the rejection and the action taken.

Please Note: Portland Cement (PC) Concrete is recommended for acceptance or rejection based on concrete cylinder test results at 28 days of age. Windsor Probe or Swiss Hammer results are for information only and will not override the test cylinder results at 28 days regardless of when they are performed. The PC concrete will be listed as an exception to the specifications on the Final Materials Certificate unless the District accepts the concrete using the acceptance criteria described below.

3. In the case where no action was taken, the District may formally accept the non-complying or deficient material in accordance with Sections 1.06.02 or 1.06.04. Signatures in this section are intended for formal acceptance of the non-complying or deficient material by the District. In the case where a Town Official or Consulting Engineer accepts material, if the District agrees, it must formally concur with the signatures. The DMT may still take exception to the District acceptance and list the material as an exception to the specification on the Final Materials Certificate if it is unable to concur.

MAT-104 REPORT OF TEST MISCELLANEOUS MATERIAL

	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS REPORT OF TEST OF MISCELLANEOUS MATERIAL MAT 104 Revised July 2003	DATE LABORATORY NO.	PROJECT/SAMPLE NO.
	RECOMMENDED FOR	REMARKS	

The MAT-104 will be used by DMT personnel to report the results of testing on materials that are not otherwise covered by any specific reporting form.

CONNECTICUT DEPARTMENT OF TRANSPORTATION — DIVISION OF MATERIALS TESTING

Mat 106 Contact List — REV 04/16

REPRESENTATIVE (DMT - Rocky Hill)			
MATERIAL TO BE TESTED			
MATERIALS		**STAFF**	**Telephone (860)**
AGGREGATES (COARSE & FINE)		**See District Labs Below***	
BRICK, CONCRETE BLOCK, CONCRETE CYLINDER RESULTS		***email:***	**(860)**
	MARK BROTHWELL	Mark.Brothwell@ct.gov	258 - 0378
CALCIUM CHLORIDE, FERTILIZER, PAINT (TRAFFIC), SODIUM CHLORIDE,			
	DANIEL GUZZO	Daniel.Guzzo@ct.gov	258 - 0339
CEMENT (TYPE I, I/II, III), GROUT			
	MOSES MARINO	Moses.Marino@ct.gov	258 - 0379
CERTIFICATIONS, PIPE – PLASTIC			
	STEPHEN MANN	Stephen.Mann@ct.gov	258 - 0344
CHAIN LINK FENCE, GUARD RAIL, STEEL ITEMS (REBAR, BOLTS, ETC.)			
	MARK BROTHWELL	Mark.Brothwell@ct.gov	258 - 0378
CONCRETE MIX DESIGNS (NON-STANDARD), PRECAST/ CONCRETE, BOX CULVERTS			
	DANIEL GUZZO	Daniel.Guzzo@ct.gov	258 - 0339
CONCRETE MIX, (STANDARD) MIXES *(Check SiteManager Terminal Server Materials Folder)*			
	CHARLES GARDON	Charles.Gardon@ct.gov	258 - 0717
CORROGATED METAL PIPE		**See District Labs Below***	
CRACK SEALERS, JOINT SEALERS, MEMBRANES			
	DANIEL GUZZO	Daniel.Guzzo@ct.gov	258 - 0339
FENCE, CHAINLINK, GUARD RAIL			
	MARK BROTHWELL	Mark.Brothwell@ct.gov	258 - 0378
HOT MIX ASPHALT			
HMA PLANT – DMT Office	DAVID HOWLEY	David.Howley@ct.gov	258 - 0350
HMA Plant Operation's / Field Inspection	DAVID PARILLO	David.M.Parillo@ct.gov	258 - 0389
HOT MIX ASPHALT (Density Acceptance by Cores)	DAVID HOWLEY	David.Howley@ct.gov	258 - 0350
HOT MIX ASPHALT (Mix Assurance)	ANDREW BEDNAR	Andrew.Bednar@ct.gov	258 - 0708
STRUCTURAL STEEL/ WELDING/ COATINGS			
	DAVID PARILLO	David.M.Parillo@ct.gov	258 - 0389
CERTIFICATIONS/ PRECAST CONCRETE CATCH BASINS, MANHOLES and TOPS, PIPE – REINFORCED CONCRETE			
	STEPHEN MANN	Stephen.Mann@ct.gov	258 - 0344
FINAL MATERIAL CERTIFICATION			
	LAURA PELLETIER	Laura.Pelletier@ct.gov	258 - 0323
	DAVID HOWLEY	David.Howley@ct.gov	258 - 0350
SITEMANAGER			
	DAVID PARILLO	David.M.Parillo@ct.gov	258 - 0389
DISTRICT LABORATORY*			
AGGREGATES and RIP RAP, PIPE, METAL, ALUMINUM CORRUGATED ***See District Labs Below****			

DISTRTICT 1		**DISTRICT 3**	
Justin Labossiere	(860) 258 - 0335	Steve Parkosewich	(203) 389 - 3128
DISTRICT 2		**DISTRICT 4**	
Mark Tice	(860) 537 – 8935/36	Gerald Smith	(203) 591 - 3739

S:\User_Folders\RodriguesR\Forms\Contact List_2016.doc

STATE OF CONNECTICUT
Department of Transportation
Division of Materials Testing
280 West Street
Rocky Hill, CT 06067

NOTABLE OBSERVATION

MAT-107

Rev. 12/16

Project Number: _____ **District:** _____ **Date:** _____

Project Description: _____ **Prime Contractor:** _____

Producer/Supplier: _____ **P/S Location:** _____

QA Inspector: _____ **QA Firm:** _____

THE FOLLOWING OBSERVATION(S) AND/OR DISCREPANCY(IES) WAS/WERE NOTED:

Photos Attached: ☐ **YES** ☐ **NO** **If yes, number of photos:** ☐

Verbally provided to: _____ of _____ on _____
Name **Company/Project** **Date**

Distribution:
Project Engineer (District)
Project Manager (District)
Supervising Engineer (DMT)
Principal Engineer (DMT)

Inspector: _____
Print

_____
Signature

If you have any questions or require further information, please contact the Division of Materials Testing as noted below:

Email: DOT.MatTesting@ct.gov • Tel: (860) 258 – 0321 • Fax: (860) 258 – 0399

CONNECTICUT DEPARTMENT OF TRANSPORTATION

DIVISION OF MATERIALS TESTING

DAILY WORK REPORT

MAT-108

Rev. 12/16

DATE	INSPECTOR

PLANT / PROJECT LOCATION	PROJECT #	MATERIAL	MATERIAL QUANTITY

COMMENTS / DEFICIENCIES:

TRAVEL INFORMATION
Enter Start and End times for time from and to work station or home.
Start: _____ **End:** _____
Enter Start and End times for actual time at the plants or projects.
Start: _____ **End:** _____

CONNECTICUT DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING
HMA INSPECTOR'S REPORT
MAT-108 HMA

REV. 12/16

PLANT #: _____ **DATE:** _____

PRODUCER NAME: _____ **STATE INSPECTOR:** _____

LOCATION: _____ **PLANT TECHNICIAN:** _____

Project #	Route	Town	Material Code	Material Description	RAP	WMA	Contract	Mix Status On Departure	State Test	Load #	IA	Load #
						☐			☐		☐	
						☐			☐		☐	
						☐			☐		☐	
						☐			☐		☐	
						☐			☐		☐	
						☐			☐		☐	

COMMENTS / DEFICIENCIES:

✓	AASHTO TESTS WITNESSED
☐	T 168 - Sampling Bituminous Mixtures
☐	R 47 - Sample Reduction
☐	T 312 - Preparation of Gyratory Sample
☐	T 308 - Asphalt Content - Ignition Sample
☐	T 209 - Theoretical Maximum Gravity (Gmm)
☐	T 30 - Sieve Analysis
☐	T 166 - Bulk Specific Gravity (Gmb)
☐	T 255 - Moisture Content

✓	ADDITIONAL INFORMATION
☐	Verify plant settings are in accordance with JMF.
☐	Verify proper PG Binder in accordance with JMF & Contract.
☐	Verify the use of anti-strip if required by JMF.
☐	Inspect aggregate and RAP stockpiles.
☐	Testing equipment is functioning properly.
☐	Check the temperature of the mix.
☐	Inspect haul units for proper canvas covers and release agents.
☐	Technician performed Quality Control testing (aggregates, HMA, etc.).

Enter Start & End times from and to work station or home.			
Start:		End:	
Enter Start & End times for actual time at Plant.			
Start:		End:	

Total Shift Hours:	
Regular Hours:	
Overtime Hours:	
Vacation / Sick / PL:	

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING
PORTLAND CEMENT CONCRETE (PCC) INSPECTOR'S DAILY WORK REPORT
MAT-108 PCC

Rev. 12-16

PLANT INFORMATION
DATE:
PLANT NAME:
LOCATION:
PLANT MANAGER & PHONE NUMBER:
INSPECTOR'S NAME:
PROJECT #:

ITEM BEING INSPECTED		
ITEM DESCRIPTION:		
FORM INSPECTED BY:		
DID FORM MEET REQUIREMENTS?	**Yes**	**No**
NON CONFORMANCE:		
REMARKS:		

CONCRETE POUR		
TIME:		
TEMP. OF CONCRETE:		
TEMP. OF BUILDING:		
AIR:		
SLUMP:		
DID CONCRETE POUR MEET REQUIREMENTS?	**Yes**	**No**
NON CONFORMANCE:		
REMARKS:		

WITNESS CYLINDER BREAKS		
BREAKS:		
DID BREAKS MEET REQUIREMENTS?	**Yes**	**No**
NON CONFORMANCE:		
REMARKS:		

END OF DAY REMARKS

TRAVEL INFORMATION
Enter Start and End times for time from and to work station or home. **Start: _____ End: _____**
Enter Start and End times for actual time at the plants or projects. **Start: _____ End: _____**

Core Sample Documentation
Mat – 109 Rev 4/14

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING

Security ID Tag:

SEAL NO. 1: _____

SEAL NO. 2: _____

Project No.: _____ **Route:** _____

Town: _____ **District No.:** _____

Paving Contractor: _____ **HMA Plant:** _____

HMA Mix Size: _____ **Level:** _____ **Lift Thickness:** _____

Inspector: _____ **Project Phone Number:** _____

Core Sample Label Lot (M or J)# - # *FORM 816 Section 4.06.03*	**Date Paved** (If paving at Night, date before midnight applies)	**Date Cored**	**Base Material**		**Location**		**Offset (ft)**
			leveling	milled	**Bridge Number** *(if applies)*	**Station Number**	
			☐	☐			
			☐	☐			
			☐	☐			
			☐	☐			
			☐	☐			
			☐	☐			
			☐	☐			
			☐	☐			
			☐	☐			
			☐	☐			

Do any of the Core Sample(s) above complete a lot(s)? Yes ☐ No ☐

If ***"Yes"***, list the Lot(s): _____

_____ _____

Inspector Signature *Contractor Rep. Signature*

If you have any questions or require further information,

280 West Street, Rocky Hill, CT 06067 □ Tel: (860) 258 – 0350 or Tel: (860) 258 – 0340

State of Connecticut
Department of Transportation
Division of Materials Testing
280 West Street
Rocky Hill, Ct 06067
MAT-110

WELDER AND WELDING OPERATOR QUALIFICATION RECORD

PHOTO

Welder's Name: _____ Identification No.: _____

Address: _____ City: _____

State: _____ Zip Code: _____ Telephone No.: _____

Email Address: _____ Test Site: _____

WELDING PERFORMANCE QUALIFICATION TEST RECORD

Welding process: _____ ☐ Manual ☐ Semi-automatic ☐ Machine

Position: _____ **(Flat, horizontal, overhead or vertical – if vertical, state whether upward or downward)**

In conformance with **WPS N**o.: _____

Material Specification: _____ Thickness range this qualifies: _____

FILLER METAL

Specification No.: _____ Classification: _____

Describe filler metal (if not covered by AWS specification): _____

Is backing used? _____

Filler metal diameter and trade name: _____ Flux for SAW or gas for GMAW or FCAW-G: _____

VISUAL INSPECTION (6.26.1 OR 9.21.1)

Appearance: _____ Undercut: _____ Piping porosity: _____

GUIDED BEND TEST RESULTS

Type	Result	Type	Result

Test Conducted By: _____ Laboratory Test No.: _____

Per: _____ Test Date: _____

FILLET TEST RESULTS

Appearance: _____ Fillet Size: _____

Fracture Test Root Penetration: _____ Macroetch: _____

(Describe the location, nature, and size or any crack or tearing of the specimen.)

Test Conducted By: _____ Laboratory Test No.: _____

Per: _____ Test Date: _____

RADIOGRAPHIC TEST RESULTS

Film Identification	Results	Remarks	Film Identification	Results	Remarks

Test Witnessed By: _____ Test No. _____

Per: _____ Test Date: _____

We the undersigned certify that the statements in this record are correct and that the welds were prepared and tested in conformance with the requirements of AASHTO/AWS D1.5M/D1.5 (2010) Bridge Welding Code.

Manufacturer or Contractor: _____

Authorized By: _____

Date: _____

If you have any questions or require further information, please contact
Thomas Lynch at Tel: (860) 258-0329 or Jonathan Boardman at Tel: (860) 258-0327
Email: DOT.WelderCertification@ct.gov or Fax: (860) 258-0399 / 280 West Street, Rocky Hill, CT 06067

State of Connecticut
Department of Transportation
Division of Materials Testing
280 West Street
Rocky Hill, CT 06067
MAT-111

WELDER'S CERTIFICATION PROGRAM REQUIREMENTS

Rev. 12-16

Listed below are the requirements necessary to obtain or renew a Welder Certification Card from the Connecticut Department of Transportation (ConnDOT), which is needed in order to weld on ConnDOT projects.

1. New applicants must receive a Welder Qualification Test from an approved Contractor listed on page 2. ConnDOT also reserves the right to require a Welder Qualification Test at any time.
2. The Welder Certification card must be carried on the welder's person whenever welding is performed on ConnDOT Projects and is prohibited to be used as certification for other business.
3. The Welder Certification card shall remain the property of ConnDOT and as such reserves the right to revoke any Welder Certification at any time.
4. The Welder Certification must be updated by emailing **DOT.WelderCertification@ct.gov** or calling 860-258-0374 every six months after the date of issue or six months from the date of the last valid update. A Welder must be performing welding on ConnDOT projects to be updated.
5. Only authorized representatives of ConnDOT shall update the Welder Certification. Unauthorized updating of the Welder Certification shall be cause for revocation. To schedule updates with ConnDOT, please contact Mr. Thomas Lynch or Mr. Jonathan Boardman as noted below.

For a Welder Certification card to be issued or re-issued, the following conditions must be met:

- Adherence to the requirements stated above.
- Completion of the contact information form below along with an attached **current photo** and forwarded to ConnDOT in **one** of the following ways:
  a. Mail form and hard copy photo to: Connecticut Department of Transportation, Central Laboratory, 280 West Street, Rocky Hill, CT 06067 Attention: Thomas Lynch
  b. Email form and digital photo to: **DOT.WelderCertification@ct.gov**

Contact Information:

FILLABLE FORM (Blue Area)

Full Name: _____ (*Last* / *First* / *M.I.*)

Address: _____ (*Street Address* / *Apartment/Unit #*)

_____ (*City* / *State* / *ZIP Code*)

Mailing Address: ***(IF DIFFERENT)*** _____ (*Street Address* / *Apartment/Unit #*)

_____ (*City* / *State* / *ZIP Code*)

Home Phone: _____ Alternate Phone: _____ Cell Phone: _____

Email: _____ ❖ **PLEASE PROVIDE AN EMAIL ADDRESS**

Any questions can be directed to:

Thomas Lynch
Connecticut Department of Transportation
Central Laboratory
280 West Street, Rocky Hill, CT 06067
Email: Thomas.Lynch@ct.gov
Phone: (860) 258-0329; Fax: (860) 258-0399

Jonathan Boardman
Connecticut Department of Transportation
Central Laboratory
280 West Street, Rocky Hill, CT 06067
Email: Jonathan.Boardman@ct.gov
Phone: (860) 258-0327; Fax: (860) 258-0399

STATE OF CONNECTICUT
Department of Transportation

Division of Materials Testing
280 West Street
Rocky Hill CT 06067
860-258-0374

Welder Qualification Testing Agencies

Agency	CONTACT PERSON	TELEPHONE NUMBER
Asnutuck Community College (AC) 170 Elm Street Enfield, CT 06782	Steven Goodrow	(860) 253-3189
Materials Testing Inc. (AA) 55 Laura Street New Haven, CT 06512	Bill Soucy	(203) 468-5216
Naugatuck Valley Community College (NV) 750 Chase Parkway Waterbury, CT 06708	Sharon Lutkus	(203) 596-8743
National Welding Lab & Inspection, LLC (NW) 3 Stacey Lane Enfield, CT 06082	Rick Munroe	(860) 394.7461
Weldtech (WT) P.O Box 168 Peru, Vermont 05152	John Acosta	(860) 303-8695
Iron Worker (IW) Local - 15 49 Locust Street Hartford, CT 06114	Joseph M. McGloin	(860) 246-7353

Any question about this list may be directed to:

Mr. Thomas Lynch
Connecticut Department of Transportation
Division of Materials Testing
Materials Tech III
Phone: 860-258-0329
Email: Thomas.Lynch@ct.gov

State of Connecticut
Department of Transportation
Division of Materials Testing
280 West Street
Rocky Hill, Ct 06067
MAT-112

WELDER'S CALL IN REPORT

Date Call Received: _____ Certification Number: _____

Full Name: _____
First *Last*

Address: _____
Street Address *Apartment/Unit #*

_____
City *State* *Zip Code*

Cell Phone: _____ Home Phone: _____

Email: _____

Current / Past Project: _____

Contact Name: _____

Phone Number: _____

❖ **Make sure you ask for the following information:**

1. Certification Number.
2. Address if it has changed.
3. Cell phone number.
4. Email address if they have one.

State of Connecticut
Department of Transportation
Division of Materials Testing
280 West Street
Rocky Hill, Ct 06067
MAT-112

WELDER'S CALL IN REPORT

Date Call Received: _____ Certification Number: _____

Full Name: _____
First *Last*

Address: _____
Street Address *Apartment/Unit #*

_____
City *State* *Zip Code*

Cell Phone: _____ Home Phone: _____

Email: _____

Current / Past Project: _____

Contact Name: _____

Phone Number: _____

❖ **Make sure you ask for the following information:**

1. Certification Number.
2. Address if it has changed.
3. Cell phone number.
4. Email address if they have one.

METAL PIPE (Steel)

Note: Attach Manufacturer's/Fabricator's Material Certifications

KIND OF MATERIAL	**State of Connecticut** **Department of Transportation** **Bureau of Engineering & Construction** **Inspection Report of Metal Pipe** **MAT-200**	**Date**	**Project #**
SOURCE OF SUPPLY		**Sample ID #**	
LOCATION OF SOURCE OF SUPPLY			
SAMPLE TAKEN FROM	**Nominal Size of Pipe (inches/mm):** _____		
LOCATION OF	**Thickness of Steel (inches/mm):** _____		
SAMPLED BY	**Type of Seam:** _____		
DATE SAMPLED	**Thickness of Asphalt (inches/mm):** _____		
USING AGENCY	**Paved Invert (inches/mm):** _____		
QUANTITY PRESENTED	**Type of Coupling Bands (inches/mm):** _____		
PURPOSE FOR WHICH MATERIAL WILL BE USED	**Thickness of Steel - Bands (inches/mm):** _____		
	Width of Coupling Bands (inches/mm): _____		
	Corrugation or Helical Rib Size (inches/mm): _____		
SAMPLE RECEIVED	**NOTE: Aluminized Steel Pipe does not require asphalt coating or paved invert**		
	Person Performing Inspection (Initials): _____		
DATE MATERIAL WILL BE USED	**Recommended For:**	**Remarks:**	
WHERE MATERIAL WILL BE USED			
Division of Materials Testing			

PERFORATED METAL PIPE (Steel)

Note: Attach Manufacturer's/Fabricator's Material Certifications

KIND OF MATERIAL	**State of Connecticut** **Department of Transportation** **Bureau of Engineering & Construction** **Inspection Report of** **Perforated Metal Pipe** **MAT-202**	**Date**	**Project #**
SOURCE OF SUPPLY		**Sample ID #**	
LOCATION OF SOURCE OF SUPPLY			
SAMPLE TAKEN FROM	**Nominal Size of Pipe (inches/mm):** _____ **Thickness of Steel (inches/mm):** _____ **Type of Seam:** _____ **Number of Rows of Perforations:** _____ **Diameter of Perforations (inches/mm):** _____ **Height of Uppermost Rows of Perforations Above bottom of Invert (inches/mm):** _____ **Chord Length of Unperforated Segment (inches/mm):** _____ **Type of Coupling Bands:** _____ **Thickness of Steel Bands (inches/mm):** _____ **Width of Coupling Bands (inches/mm):** _____ **Corrugation or Helical Rib Size (inches/mm):** _____ **Person Performing Inspection (initials) :** _____		
LOCATION OF			
SAMPLED BY			
DATE SAMPLED			
USING AGENCY			
QUANTITY PRESENTED			
PURPOSE FOR WHICH MATERIAL WILL BE USED			
SAMPLE RECEIVED			
DATE MATERIAL WILL BE USED			
WHERE MATERIAL WILL BE USED			
	Recommended For	**Remarks**	
Division of Materials Testing			

STRUCTURAL PLATE AND PIPE ARCHES

Note: Attach Manufacturer's/Fabricator's Material Certifications

<table>
<tr><td>KIND OF MATERIAL</td><td rowspan="3">State of Connecticut
Department of Transportation
Bureau of Engineering & Construction
Inspection Report of Structural
Plate and Pipe Arches
MAT-203</td><td>Date</td><td>Project #</td></tr>
<tr><td>SOURCE OF SUPPLY</td><td colspan="2">Sample ID #</td></tr>
<tr><td>LOCATION OF SOURCE OF SUPPLY</td><td colspan="2"></td></tr>
<tr><td>SAMPLE TAKEN FROM</td><td colspan="3" rowspan="9">Steel ☐ Aluminized Steel ☐ Aluminum ☐
Nominal Size of Structural Plate (inches/mm): _____
Thickness of Plates (inches/mm): _____
Diameter of Perforations (inches/mm): _____
Size of Corrugations or Helical Ribs (inches/mm): _____
Location of Longitudinal Bolt Holes: _____
Location of Circumferential Bolt Holes: _____
Center of Bolt Hole to Edge of Plate: _____
Type of Coating: _____

Person Performing Inspection (initials) : _____</td></tr>
<tr><td>LOCATION OF</td></tr>
<tr><td>SAMPLED BY</td></tr>
<tr><td>DATE SAMPLED</td></tr>
<tr><td>USING AGENCY</td></tr>
<tr><td>QUANTITY PRESENTED</td></tr>
<tr><td>PURPOSE FOR WHICH MATERIAL WILL BE USED</td></tr>
<tr><td>SAMPLE RECEIVED</td></tr>
<tr><td>DATE MATERIAL WILL BE USED</td><td>Recommended For</td><td colspan="2">Remarks</td></tr>
<tr><td>WHERE MATERIAL WILL BE USED</td><td colspan="3"></td></tr>
<tr><td colspan="4">Division of Materials Testing</td></tr>
</table>

CULVERT END

Note: Attach Manufacturer's/Fabricator's Material Certifications

KIND OF MATERIAL	**State of Connecticut** **Department of Transportation** **Bureau of Engineering & Construction** **Inspection Report of Culvert End** **MAT-204**	**Date**	**Project #**
SOURCE OF SUPPLY		**Sample ID #**	
LOCATION OF SOURCE OF SUPPLY			
SAMPLE TAKEN FROM	**Steel** ☐ **Aluminized Steel** ☐ **Aluminum** ☐		
LOCATION OF	**Nominal Size of Pipe (inches/mm):** _____		
SAMPLED BY	**Thickness of Sheet (inches/mm):** _____		
DATE SAMPLED	**Thickness of Asphalt (inches/mm):** _____		
USING AGENCY	**Dimension "B" (inches/mm):** _____		
QUANTITY PRESENTED	**Dimension "H" (inches/mm):** _____		
PURPOSE FOR WHICH MATERIAL WILL BE USED	**Dimension "L" (inches/mm):** _____		
SAMPLE RECEIVED	**Dimension "W" (inches/mm):** _____		
	Attachment System: _____		
	Edge Reinforcement: _____		
	Type of Seam: _____		
	NOTE: Aluminized Steel Pipe does not require asphalt coating or paved invert.		
DATE MATERIAL WILL BE USED	**Recommended For:**	**Remarks**:	
WHERE MATERIAL WILL BE USED			
Division of Materials Testing			

T27/C136 **Non-cumulative RETAINED MASSES**

					2 1/2″ 63 mm										
5″ 125 mm					2″ 50 mm										
3 1/2″ 90 mm					1 1/2″ 37.5 mm										
1 1/2″ 37.5 mm					1″ 25 mm										
3/4″ 19 mm					3/4″ 19 mm										
1/4″ 6.3 mm					1/4″ 6.3 mm										
PAN					PAN										

1/4″ 6.3 mm					1/4″ 6.3 mm										
No. 10 2.0 mm					No. 10 2.0 mm										
No. 40 425 µm					No. 40 425 µm										
No. 100 150 µm					No. 100 150 µm										
No. 200 75 µm					No. 200 75 µm										
PAN					PAN										

KIND OF MATERIAL	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION BUREAU OF ENGINEERING & CONSTRUCTION REPORT OF TESTS OF BANK RUN GRAVELS OR PROCESSED AGGREGATE MAT-205				DATE	PROJECT #
SOURCE OF SUPPLY					SAMPLE ID #	
LOCATION OF SOURCE OF SUPPLY	SIEVES	% PASS	SIEVES	% PASS	% WEAR & LAB NO.	MAXIMUM DENSITY
SAMPLE TAKEN FROM	5″ 125 mm		5″ 125 mm			
LOCATION OF	3 1/2″ 90 mm		3 1/2″ 90 mm		SOUNDNESS LOSS & LAB NO.	OPTIMUM MOISTURE
SAMPLED BY	2 1/2″ 63 mm		2 1/2″ 63 mm			
DATE SAMPLED	2″ 50 mm		2″ 50 mm		% LIQUID ASPHALT	
USING AGENCY	1 1/2″ 37.5 mm		1 1/2″ 37.5 mm		PLASTICITY & LAB NO. (PLASTIC OR NON-PLASTIC)	
QUANTITY REPRESENTED	1″ 25 mm		1″ 25 mm			
PURPOSE FOR WHICH MATERIAL WILL BE USED	3/4″ 19 mm		3/4″ 19 mm		***RECOMMENDED FOR:***	
	1/4″ 6.3 mm		1/4″ 6.3 mm			
DATE MATERIAL WILL BE USED	No. 10 2.0 mm		No. 10 2.0 mm		***REMARKS:***	
WHERE MATERIAL WILL BE USED	No. 40 425 µm		No. 40 425 µm			
DATE SAMPLED	No. 100 150 µm		No. 100 150 µm			
	No. 200 75 µm		No. 200 75 µm		Person Performing Test (Initials):	
Division of Materials Testing						

T11/C117			T11/C117	
ORIGINAL MASS	gm		ORIGINAL MASS	gm
LESS WASHED MASS	gm		LESS WASHED MASS	gm
MASS OF SILT	gm		MASS OF SILT	gm
SILT	%		SILT	%

T27/C136 **T27/C136**

	RETAINED MASS	IND.RETAINED %	PASSING %	RETAINED %		RETAINED MASS	IND.RETAINED %	PASSING %	RETAINED %
5/8″ 16.0 mm					5/8″ 16.0 mm				
1/2″ 12.5 mm					1/2″ 12.5 mm				
3/8″ 9.5 mm					3/8″ 9.5 mm				
No. 4 4.75 mm					No. 4 4.75 mm				
No. 8 2.36 mm					No. 8 2.36 mm				
No. 16 1.18 mm					No. 16 1.18 mm				
No. 30 600 µm					No. 30 600 µm				
No. 50 300 µm					No. 50 300 µm				
No. 100 150 µm					No. 100 150 µm				
PAN					PAN				
TOTAL MASS			F.M.		TOTAL MASS			F.M.	

KIND OF MATERIAL	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION BUREAU OF ENGINEERING & CONSTRUCTION REPORT OF TEST OF SAND MAT-206			DATE	PROJECT #
SOURCE OF SUPPLY				SAMPLE ID #	
LOCATION OF SOURCE OF SUPPLY	PASSING SIEVE	PERCENT	PERCENT	COLOR (GARDNER COLOR STANDARD) T21/C40 UNDER #11 ☐ OVER #11 ☐	
SAMPLE TAKEN FROM	1/2″ 12.5 mm			COMPRESSIVE STRENGTH (MPa)	
LOCATION OF	3/8″ 9.5 mm				7 day / 28 day
SAMPLED BY	No. 4 4.75 mm			SAMPLE SAND	
DATE SAMPLED	No. 8 2.36 mm			OTTAWA SAND	
USING AGENCY	No. 16 1.18 mm			PERCENT OF OTTAWA	
QUANTITY REPRESENTED	No. 30 600 µm			RECOMMENDED FOR	
PURPOSE FOR WHICH MATERIAL WILL BE USED	No. 50 300 µm				
DATE MATERIAL WILL BE USED	No. 100 150 µm			REMARKS	
WHERE MATERIAL WILL BE USED	FINENESS MODULUS				
	SILT %			Person Performing Test (initials) : _____	

Division of Materials Testing

T27/C136 Non-cumulative RETAINED MASSES

NO. 3				NO. 6				NO. 8			
2 1/2″ 63 mm											
2″ 50 mm				1″ 25 mm				1/2″ 12.5 mm			
1 1/2″ 37.5 mm				3/4″ 19 mm				3/8″ 9.5 mm			
1 1/4″ 31.5 mm				1/2″ 12.5 mm				No. 4 4.75 mm			
1″ 25 mm				3/8″ 9.5 mm				No. 8 2.36 mm			
1/2″ 12.5 mm				No. 4 4.75 mm				No. 16 1.18 mm			
PAN				PAN				PAN			

NO. 4				NO. 67							
2″ 50 mm											
1 1/2″ 37.5 mm				1″ 25 mm							
1 1/4″ 31.5 mm				3/4″ 19 mm							
1″ 25 mm				1/2″ 12.5 mm							
3/4″ 19 mm				3/8″ 9.5 mm							
1/2″ 12.5 mm				No. 4 4.75 mm							
3/8″ 9.5 mm				No. 8 2.36 mm							
PAN				PAN				PAN			

MAT-207
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING
REPORT OF TEST OF COARSE AGGREGATE

KIND OF MATERIAL

SOURCE OF SUPPLY

LOCATION OF SOURCE OF SUPPLY

SAMPLE TAKEN FROM

LOCATION OF

SAMPLED BY

DATE SAMPLED

USING AGENCY

QUANTITY REPRESENTED

PURPOSE FOR WHICH MATERIAL WILL BE USED

DATE MATERIAL WILL BE USED

WHERE MATERIAL WILL BE USED

SAMPLE RECEIVED

DATE

PROJECT #

SAMPLE ID #

PERCENTAGE OF WEAR

SOUNDNESS % LOSS

RECOMMENDED FOR

REMARKS

Person Performing Test (initials): _____

SQUARE MESH SIEVES	PERCENT PASSING			
2 1/2″ 63 mm				
2″ 50 mm				
1 1/2″ 37.5 mm				
1 1/4″ 31.5 mm				
1″ 25 mm				
3/4″ 19 mm				
1/2″ 12.5 mm				
3/8″ 9.5 mm				
No. 4 4.75 mm				
No. 8 2.36 mm				
No. 16 1.18 mm				
No. 100 150 µm				

Division of Materials Testing

Rock Salt

Sample Weight	1/2 inch	% passing
ml $AgNO_3$ Sample	3/8 inch	% passing
Wt of Standard	# 4	% passing
ml $AgNO_3$ Standard	# 8	% passing
% NaCl	# 30	% passing
Salt Wt	Pan	
Dry Salt Wt	Project #	Sample ID#
% moisture	Date	Analyst

Specification Reference

Standard Specification _____

Supplemental Specification _____

Project Specification _____

Other _____

Person Accepting Technical Responsibility

Name: _____

Title: _____

Specification: Reference File 139 - AASHTO M143, Type 1 (except sections 9.1.2 and 11.2)
Methods: M143 Rapid, T27, T265

_____

Lab use only

Material #

Vendor #

Date Sampled

Destination Code

Material Quantity

Material Unit

Date Received

C or M

Dates ----

State of Connecticut
Department of Transportation
Bureau of Engineering & Construction
Report of Test of Rock Salt
MAT-208

Date

Project #

Sample ID #

	Spec.	**Results**
% NaCl	**95 % min**	_____
Moisture	**3% max**	_____
% Passing ½ inch	**100**	_____
% Passing 3/8 inch	**95 – 100**	_____
% passing # 4	**20 – 90**	_____
% passing # 8	**10 – 60**	_____
% passing # 30	**0 – 15**	_____

Person Performing Test (initials) : _____

Recommended For	**Remarks**

Division of Materials Testing

Calcium Chloride

Project #	Sample ID #
Date	Analyst
Sample Wt.	
N $KmnO_4$	
ml $KmnO_4$	
CaCl Factor	
% CaCl	

Specification Reference

Standard Specification _____

Supplemental Specification _____

Project Specification _____

Other _____

Person Accepting Technical Responsibility

Name: _____

Title: _____

Specification: AASHTO M144 via Form 815 Section (9.42.02)
Methods: AASHTO T143, ASTM E449

_____
Lab use only

Material #

Vendor #

Date Sampled

Destination Code

Material Quantity

Material Unit

Date Received

Batch #

C or M

Dates ----

State of Connecticut
Department of Transportation
Bureau of Engineering & Construction
Report of Test of Calcium Chloride
MAT-209

Date

Project #

Sample ID #

Grade	% CaCl
Grade 1	min. 77%
Grade 2	min. 90%
Grade 3	min. 94%

% CaCl _____

Person Performing Test (initials) :_____

Recommended For	Remarks

Division of Materials Testing

T96/C131 Los Angeles Abrasion Test

	Pass. (inches/mm)	Ret. (inches/mm)			
Class A:	1 ½ (37.5)	1 (25) -	+ 12 (1.7mm)		
	1 (25)	¾ (19) -			
	¾ (19)	½ (12.5) -	+ 12 (1.7mm)	_____	
	½ (12.5)	3/8 (9.5) -	_____		Total of +12 (1.7mm)
		Total Weight =			
			Total Wt. -		
			Minus +12 (1.7mm)	_____	
					Total of –12 (1.7mm)
Class B:	¾ (19)	½ (12.5) -			
	½ (12.5)	3/8 (9.5) -			
		Total Weight =	_____		

$$\frac{\text{Total of -12 (1.7)mm)}}{\text{Total Weight}} = \_\_\_\_\_ = \_\_\_\_\_ \%$$

A: 1250 each required size – 12 spheres
B: 1250 each required size – 11 spheres

Dust = _____

KIND OF MATERIAL	**State of Connecticut** **Department of Transportation** **Bureau of Engineering & Construction** **Report of Test of L. A. Abrasion & Soundness MAT-211**	**Date**	**IN-HOUSE TEST**
SOURCE OF SUPPLY		**Sample ID #**	
LOCATION OF SOURCE OF SUPPLY			
SAMPLE TAKEN FROM	**Class** _____ **Wear, %:** _____ %		
LOCATION OF	**Soundness, % Loss (if applicable):** _____ %		
SAMPLED BY	(If Soundness reported, attach worksheet.)		
DATE SAMPLED	**Material #**		
USING AGENCY	**Vendor #**		
QUANTITY PRESENTED			
PURPOSE FOR WHICH MATERIAL WILL BE USED			
SAMPLE RECEIVED			
DATE MATERIAL WILL BE USED	**Recommended For**	**Remarks**	
WHERE MATERIAL WILL BE USED			

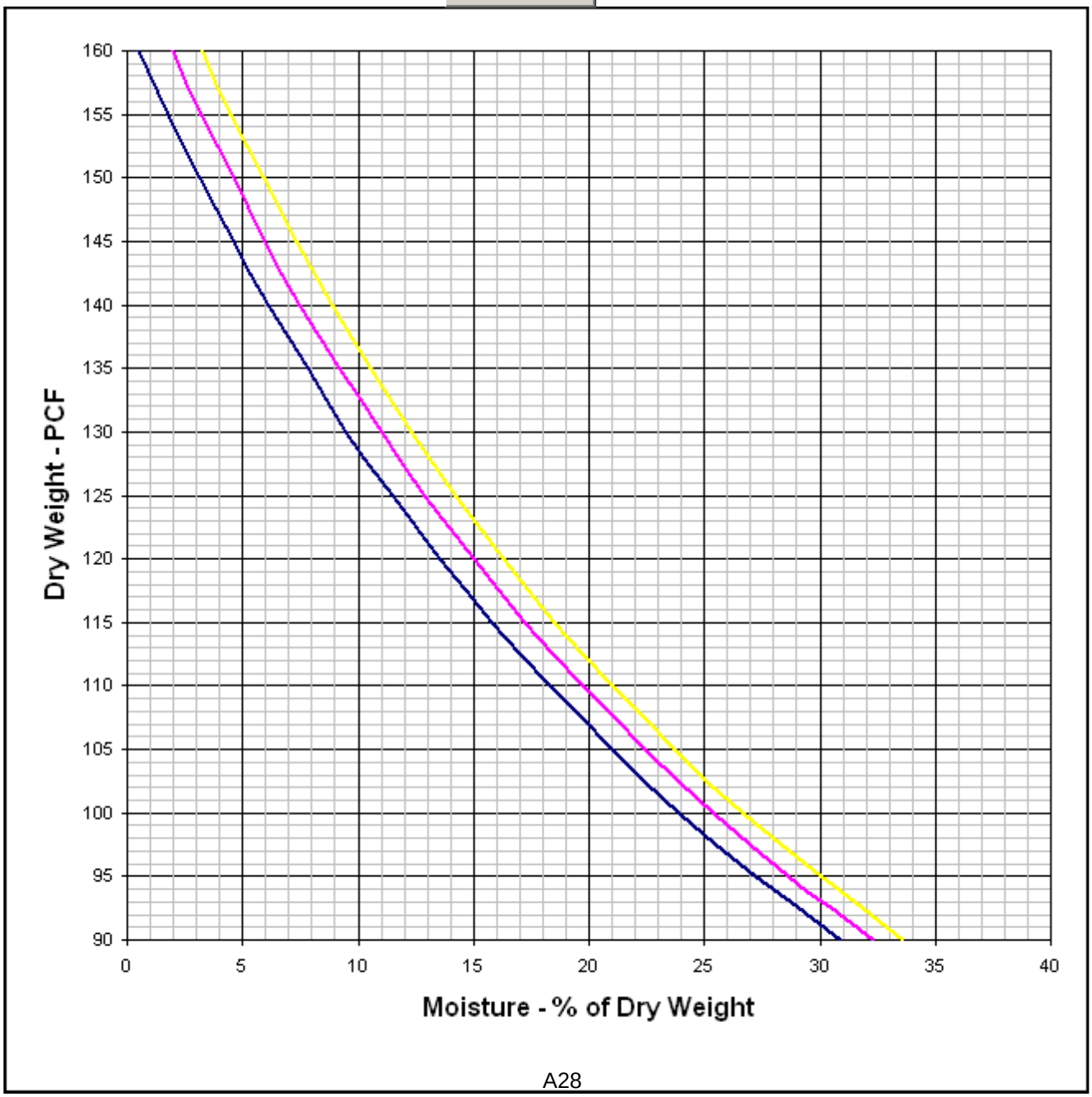
MOISTURE/DENSITY

	State of Connecticut **Department of Transportation** **Bureau of Engineering and Construction** **Report of Test of Moisture/Density** **MAT 213**	**Date**	**Project #**
		Sample ID #	
	AASHTO T180 ☐ **ASTM METHOD** ☐ **D** _____ **Maximum Density (Kg/cu.m-Lbs/cu.ft)** _____ **Optimum Moisture** _____ **Person Performing Test (initials) :** _____		
	Recommended For **Information**	**Remarks**	
	Division of Materials Testing		

Connecticut Department of Transportation
Moisture Density Data Computation Sheet
MAT-217 - 6" Mold

Date Tested				**1**	**2**	**3**	**4**
Project No.			**Soil & Tare**				
Sampled From			**Tare**				
Sampled By			**Wet Weight**				
Date Sampled				**X**	**X**	**X**	**X**
Type of Material			**Volume**	**13.33**	**13.33**	**13.33**	**13.33**
Tested By			**Wet Density**				
			W.C.				
Sample ID No.			**Dry Density**				
% Stone Replaced	**lbs.**		**Wet**	**500**	**500**	**500**	**500**
Maximum Density =	**pcf**	**kg/m^3**	**Dry**				
Optimum Moisture =	**%**		**W.C.**				

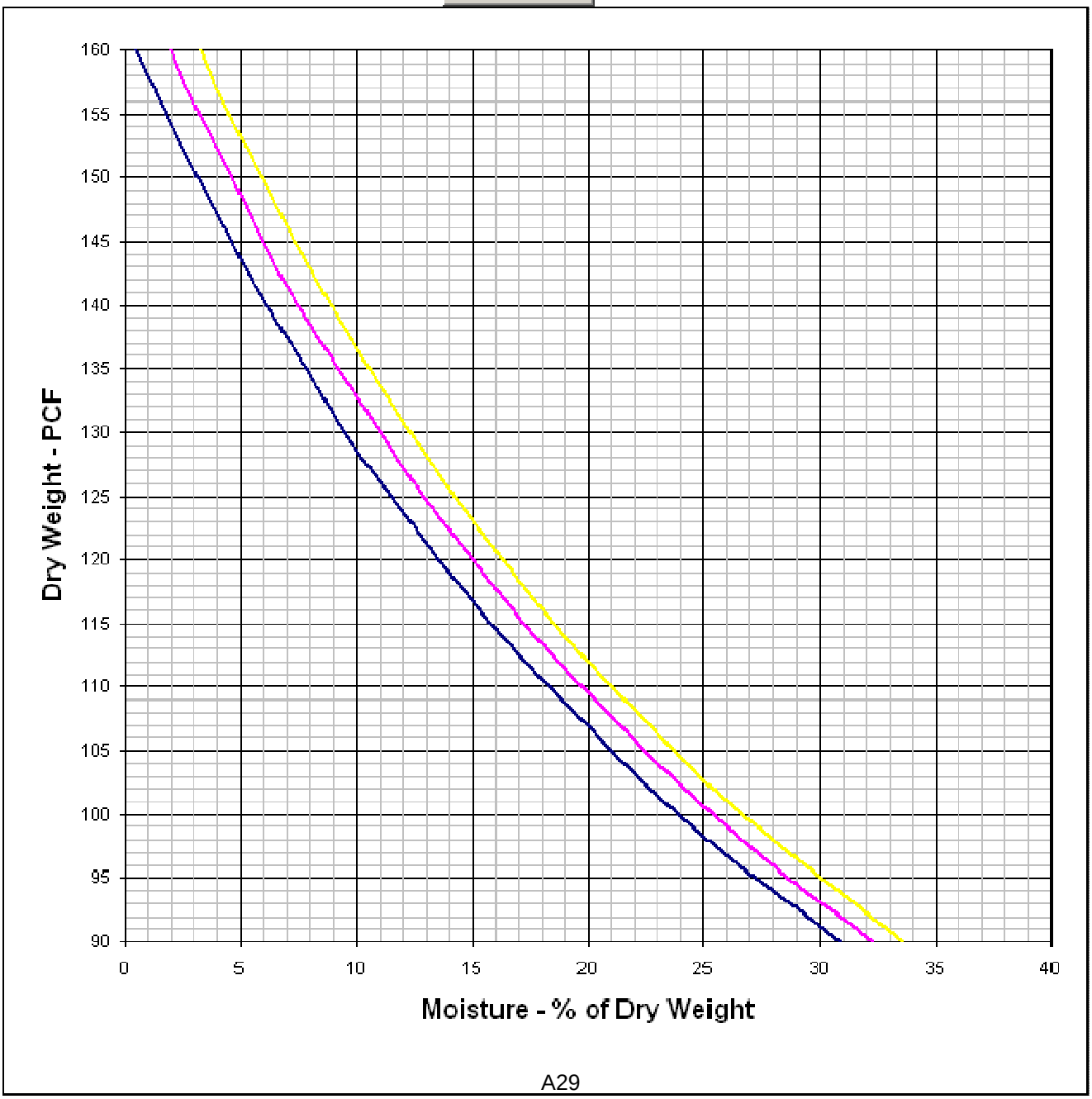
Clear Sheet



Connecticut Department of Transportation
Moisture Density Data Computation Sheet
MAT-218 - 4" Mold

Date Tested				1	2	3	4
Project No.			Soil & Tare				
Sampled From			Tare				
Sampled By			Wet Weight				
Date Sampled				X	X	X	X
Type of Material			Volume	30	30	30	30
Tested By			Wet Density				
			W.C.				
Sample ID No.			Dry Density				
% Stone Replaced	lbs.		Wet	500	500	500	500
Maximum Density =	pcf	kg/m^3	Dry				
Optimum Moisture =	%		W.C.				

Clear Sheet



SPECIFIC GRAVITY AND ABSORPTION OF COARSE AGGREGATE – T 85/C127
DIVISION OF MATERIALS TESTING - MAT-219

Source: _____ **Location:** _____

Tested By: _____ **Date:** _____

SAMPLE #		1	2	3
Mass of SSD Sample + Basket in Air				
Less Mass of Basket in Air				
Mass of SSD Sample	B			
Mass of Saturated Sample in Water + Basket in Water				
Less Mass of Basket in Water				
Mass of Saturated Sample in Water	C			
Mass of SSD Sample	B			
Less Mass of Saturated Sample in Water	C			
Loss in Mass (Volume of SSD Sample)	B - C			
Mass of Oven-Dry Sample + Pan				
Less Mass of Pan				
Mass of Oven-Dry Sample in Air	A			
Mass of SSD Sample in Air	B			
Less Mass of Oven-Dry Sample	A			
Mass of Water (Volume of Permeable Voids)	B - A			
Mass of Oven-Dry Sample	A			
Less Mass of Saturated Sample in Water	C			
Loss in Mass (Volume of Oven-Dry Sample)	A - C			
Bulk Specific Gravity	A / B - C			
Bulk Specific Gravity (SSD Basis)	B / B - C			
Apparent Specific Gravity	A / A - C			
Absorption %	B - A / A x 100			

Connecticut Department of Transportation - Division of Materials Testing
Fine Aggregate Soundness Worksheet T104/C88 - MAT-220

Kind of Material:	Source:	Tech/Eng. Initials:
Date Sampled:	**Location:**	**Date Completed:**

Original Grading (Plus #4)

Sieve In(mm)	Retained Mass	Pass & Ret. %	% Pass
			100
1/2 (12.5)			
3/8 (9.5)			
#4 (4.75)			
#8 (2.36)			
#16 (1.18)			
#30 (600 µ)			
#50 (300 µ)			
Totals		100	

Sample Sizes For Original Grading

Note:

Grading of Original Sample

Pass	Ret. On	
3/8 (9.5)	#4 (4.75)	%
#4 (4.75)	#8 (2.36)	%
#8 (2.36)	#16 (1.18)	%
#16 (1.18)	#30 (600 µ)	%
#30 (600 µ)	#50 (300 µ)	%
	Total	100

Soak – Dry Schedule

Date in Sol.	Time	Date in oven

(Required Sample Not Less Than 100g For Each Size)

Passing	Retained	Actual Mass	Mass Before Test Grams.	Mass After Test Grams.	Loss in Grams	Loss in %	Grading of Orig. Sample	Weighted Average %
3/8 (9.5)	#4 (4.75)							
#4 (4.75)	#8 (2.36)							
#8 (2.36)	#16 (1.18)							
#16 (1.18)	#30 (600 µ)							
#30 (600 µ)	#50 (300 µ)							

Connecticut Department of Transportation - Division of Materials Testing
Coarse Aggregate Soundness Worksheet T104/C88 - MAT-221

Kind of Material:	Source:	Tech/Eng. Initials:
Date Sampled:	**Location:**	**Date Completed:**

Original Grading (Plus #4)

Sieve In(mm)	Retained Mass	Pass & Ret. %	% Pass
			100
2 ½ (63)			
2 (50)			
1 ½ (37.5)			
1 (25)			
3/4 (19)			
1/2 (12.5)			
3/8 (9.5)			
# 4 (4.75)			
Totals		100	

Sample Sizes For Original Grading

#	lbs. (kg)
#	lbs. (kg)
#	lbs. (kg)
#	lbs. (kg)
Total	lbs. (kg)

Grading of Original Sample

Pass	Ret. On	
2 ½ (63)	1 ½ (37.5)	%
1 ½ (37.5)	3/4 (19)	%
3/4 (19)	3/8 (9.5)	%
3/8 (9.5)	# 4 (4.75)	%
	Total	100

Soak – Dry Schedule

Date in Sol.	Date	Date in oven

Sieve Size	Not Less Than	Consisting of	Actual Mass	Mass Before Test Grams.	Mass After Test Grams.	Loss in Grams	Loss in %	Grading of Orig. Sample	Weighted Average %
2 ½ to 1 ½ (63) (37.5)	5000	3000 2 (50)							
		2000 1½ (37.5)							
1 ½ to ¾ (37.5) (19)	1500	1000 1 (25)							
		500 ¾ (19)							
¾ to 3/8 (19) (9.5)	1000	670 ½ (12.5)							
		330 3/8 (9.5)							
3/8 to # 4 (9.5) (4.75)	300	300 # 4 (4.75)							

CONNECTICUT DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING
ASSURANCE REPORT: FIELD TESTING PERSONNEL AND EQUIPMENT
MAT-222

Project Number:	Date:

Location:

Inspected By:	
☐ Consultant	☐ State

Name of Inspector(s) Certification(s) (NETTCP, ACI, Etc.) and Certification #s

Required Testing Equipment			
☐	Air Meter	☐	Thermometer
☐	Slump Cone	☐	Small Tools (scoops, measures, etc.)
☐	Tamping Rod (24” ok for all)	☐	Sampling Receptacle
☐	Strike Off Bar (⅛ x ¾ x 12)	☐	Cylinder Curing Box (operating to manufacturer specs)
☐	Mallet (1.25 ± .5 lbs)		

Air Meter Calibration Date:	

Remarks/Observations

Form Completed By	District lab

CONNECTICUT DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING
ASSURANCE REPORT

PLASTIC PC CONCRETE - MAT-224

DATE:	**PROJECT NUMBER:**
CLASS OF CONCRETE:	**PROJECT LOCATION:**
TRUCK NUMBER:	**CONCRETE PRODUCER:**
CYLINDER NUMBERS:	**PRODUCER LOCATION:**
MIX TEMP. (T309/C1064): o	**NOTE: COMPLETED MAT 222 MUST BE ATTACHED TO THIS REPORT**

BATCH MASS PER CUBIC METER

	CEMENT lb.	OTHER ____ lb.	SAND + ____% Moisture lb.	STONE ____ lb.	STONE ____ lb.	STONE ____ lb.	TOTAL MIXING WATER lb.	TOTAL MASS lb.
ACTUAL								
MIX DESIGN								
TOLERANCE	± 1%	± 1%	± 2%	± 2%	± 2%	± 2%	± 1% (Central Mix)	

AIR TEST (T152/C231) (side by side check of test equip. required)				SLUMP TEST (T119/C143)		
TIME TAKEN	PROJECT TEST RESULTS	TIME TAKEN	COMPARISON TEST RESULTS	TIME TAKEN	TOTAL WATER PER BATCH (gal.)	AMOUNT OF SLUMP
	% air		% air			
TOLERANCE – results should not differ by more than 1 %						

UNIT MASS (T121/C138)

		-	=	÷	=
TIME TAKEN	MASS OF MEASURE & SAMPLE lb.	MASS OF MEASURE lb.	NET MASS OF CONCRETE lb.	VOLUME OF MEASURE (ft^3)	MASS PER CUBIC METER lb./ ft^3

YIELD (T121/C138)

		÷	=	÷	=	÷	=
TIME TAKEN	TOTAL BATCH WEIGHT lb.	UNIT WEIGHT lb./ ft^3	YIELD PER BATCH (ft^3 / batch)	BATCH SIZE (y^3)	YIELD PER CUBIC YARD (ft^3 / y^3)	27	RELATIVE YIELD

Witnessed By **(Print Name)**

Signature

Project Inspector **(Print Name)**

Signature

CONNECTICUT DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING

ASSURANCE REPORT

PLASTIC PC CONCRETE (METRIC) - MAT-225

DATE	**PROJECT NUMBER:**
CLASS OF CONCRETE	**PROJECT LOCATION:**
TRUCK NUMBER	**CONCRETE PRODUCER:**
CYLINDER NUMBERS	**PRODUCER LOCATION:**
MIX TEMP. (T309/C1064)	**NOTE: COMPLETED MAT 222 MUST BE ATTACHED TO THIS REPORT**
o	

BATCH MASS PER CUBIC METER

	CEMENT kg	OTHER _____ kg	SAND + ____% Moisture kg	STONE _____ kg	STONE _____ kg	STONE _____ kg	TOTAL MIXING WATER kg	TOTAL MASS kg
ACTUAL								
MIX DESIGN								
TOLERANCE	± 1%	± 1%	± 2%	± 2%	± 2%	± 2%	± 1% (Central Mix)	

AIR TEST (T152/C231) (side by side check of test equip.

TIME TAKEN	PROJECT TEST RESULTS	TIME TAKEN	COMPARISON TEST RESULTS
	% air		% air
TOLERANCE – results should not differ by more than 1 %			

SLUMP TEST (T119/C143)

TIME TAKEN	TOTAL WATER PER BATCH (L)	AMOUNT OF SLUMP

UNIT MASS (T121/C138)

		-	=	÷	=
TIME TAKEN	MASS OF MEASURE & SAMPLE kg	MASS OF MEASURE kg	NET MASS OF CONCRETE kg	VOLUME OF MEASURE (m^3)	MASS PER CUBIC METER kg / m^3

YIELD (T121/C138)

		÷	=	÷	=
TIME TAKEN	TOTAL MASS OF BATCH kg	MASS PER CUBIC METER kg / m^3	YIELD PER BATCH (m^3 / batch)	BATCH SIZE (m^3)	RELATIVE YIELD

Witnessed By **(Print Name)**

Signature

Project Inspector **(Print Name)**

Signature

Glass Beads

Grams	% Passing	Moisture Resistance
# 20		Imperfect Wt
# 30		Round Wt
# 40		% Perfect
# 50		Refractive index
# 80		Date
# 100		Analyst
Pan		Project #
Totals		Sample ID #

Specification Reference

Standard/Project Specification _____

Supplemental Specification _____

Other _____

Person Accepting Technical Responsibility

Name: _____

Title: _____

Specifications: AASHTO M 247 Type 1 (via Form 815 M.07.03), and Federal Specification TT-8-1325C (contract for glass beads)
Methods: In accordance with above specifications.

Lab use only

Material #

Vendor #

Date Sampled

Destination Code

Material Quantity

Material Unit

Date Received

Batch #

C or M

Dates ----

State of Connecticut
Department of Transportation
Bureau of Engineering & Construction
Report of Test of Glass Beads
MAT-228

Date

Project #

Sample ID #

% Passing	Type 1A	Type1B	Results
# 20	100	----	----------
# 30	75 – 95	100	----------
# 40	-----	90 – 100	----------
# 50	15 – 35	50 - 75	----------
# 80	-----	0 - 5	----------
# 100	0 – 5	----	----------
% Perfect	> 70%		----------
Moisture Resistance			----------
Refractive Index	> 1.50		----------

Person Performing Test (initials) :_____

Recommended For	Remarks

Division of Materials Testing

Visi Beads

	% Retained	Project #
# 10		Sample ID #
# 12		Date
# 14		Analyst
# 16		
# 18		
# 20		
pan		

Specification Reference

Standard Specification _____

Supplemental Specification _____

Project Specification _____

Other _____

Person Accepting Technical Responsibility

Name: _____

Title: _____

Specifications: Form 815 M.07.22, Specification for Large Beads (via contract for glass beads), and Reference File 199 – (beads for epoxy resin pavement markings).
Methods: In accordance with above specifications.

Lab use only

Material #

Vendor #

Date Sampled

Destination Code

Material Quantity

Material Unit

Date Received

C or M

Dates ----

State of Connecticut
Department of Transportation
Bureau of Engineering & Construction
Report of Test of Visi Beads
MAT-229

Date

Project #

Sample ID #

% Retained	Specs.	Results
#10	0	----------
# 12	0 – 5	----------
# 14	5 – 20	----------
# 16	40 – 80	----------
#18	10 – 40	----------
# 20	0 – 5	----------
Pan	0 – 2	----------

Person Performing Test (initials) :_____

Recommended For	Remark

Division of Materials Testing

Water

Appearance	Color
pH	Water Factor
ml Silver Nitrate	Chlorides
Project #	Sample ID #
Date	Analyst

Specification Reference

Standard Specification _____

Supplemental Specification _____

Project Specification _____

Other _____

Person Accepting Technical Responsibility

Name: _____

Title: _____

Specification: Form 815 M.03.01-4
Methods: In accordance with AASHTO T26

Note:
If tests indicate unfavorable results, further testing may be required. (T107, T131, or T154 and T106, or other recommended tests in cooperation with Concrete/Steel Section)

State of Connecticut
Department of Transportation
Bureau of Engineering & Construction
Report of Test of Water
MAT-230

Date

Project #

Sample ID #

Appearance _____

Color _____

pH (T26, range 4.5 – 8.5) _____

Chloride Ion Concentration (D512) _____

Person Performing Test (initials) :_____

Recommended For	**Remarks**

Division of Materials Testing

White & Yellow Fast Dry, Solvent Based Pavement Markings

Color (Fed. 595 – 33538)	**Dry times** (ASTM D 711)	**% Pigment** (ASTM D 3720)
Contrast Ratio (Fed. Test 141-4121))	**Direct Reflect.** (Fed. Ref. 141-6121)	1 _____ (100) =
Viscosity @ 77 (ASTM D 562)	**Weight /Gal** (ASTM D 1475)	2 _____ (100) =

Specification Reference

Standard Specification _____

Supplemental Specification _____

Project Specification _____

Other _____

Person Accepting Technical Responsibility

Name: _____

Title: _____

Specification: M.07.21 (814A) for 3 minute dry paint
Method: FTMS #141

Material #

Vendor #

Date Sampled

Destination Code

Material Quantity

Material Unit

Date Received

Batch #

C or M

Dates ----

State of Connecticut
Department of Transportation
Bureau of Engineering & Construction
Report of Test of White & Yellow Fast Dry Solvent Based Pavement Markings
MAT-235

Date

Project #

Sample ID #

	White	Yellow	
Viscosity	**80 – 100 KU**	**80 – 100 KU**	_____
Dry Time	**- 3 min.**	**3 min.**	_____
Direct Reflectance	**85% +**	**50 % +**	_____
Color		**Visual**	_____
Contrast Ratio	**0.96 +**	**0.96 +**	_____
Weight/Gal	**11.8 +**	**11.8 +**	_____
% Pigment	**55% +**	**55% +**	_____

Person Performing Test (initials) :_____

Recommended For	**Remarks**

Division Chief – Division of Materials Testing

White & Yellow Regular Dry Solvent Based Pavement Markings

Weight/Gal (ASTM D 1475)	**Viscosity @ 77** (ASTM D 562)	**% Pigment** (ASTM D 3720)
Direct Reflect. (Fed. Ref. 141-6121)	**Contrast Ratio** (Fed.Test 141-4121)	**1 _____ (100) =**
Dry times (ASTM D 711)	**Color** (Fed. 595 – 33538)	**2 _____ (100) =**

Specification Reference

Standard Specification _____

Supplemental Specification _____

Project Specification _____

Other _____

Person Accepting Technical Responsibility

Name: _____

Title: _____

Specification: M.07.20 (814A) for 15 minute dry paint
Method: FTMS #141

Material #

Vendor #

Date Sampled

Destination Code

Material Quantity

Material Unit

Date Received

Batch #

C or M

Dates ----

State of Connecticut
Department of Transportation
Bureau of Engineering & Construction
Report of White & Yellow Regular Dry Solvent Based Pavement Markings
MAT-236

Date

Project #

Sample ID #

	White	Yellow	
Viscosity	**70 – 80 KU**	**70 – 80 KU**	_____
Dry Time	**- 15 min.**	**15 min.**	_____
Direct Reflectance	**85% +**	**50 % +**	_____
Color	**Visual**	**Visual**	_____
Contrast Ratio	**0.96 +**	**0.96 +**	_____
Weight/Gal	**12.8 +**	**11.4 +**	_____
% Pigment	**50% +**	**50% +**	_____

Person Performing Test (initials) :_____

Recommended For

Remarks

Division Chief – Division of Materials Testing

Fast Dry White & Yellow Waterborne Paint

% Non Volatile (ASTM D 2697)	% Pigment (ASTM D 3723)	Color test (595-33538 yellow)	Scrub Resist. (ASTM D 2486)
1_____ _____ _____ _____ (100) = 2_____ _____ _____ _____ (100) =	1_____(100)= 2_____(100)= Avg. _____	Flash Point (Ref. 200G)	Dry times (ASTM D 711)
		Flexibility (Fed Test 141c-6223)	Viscosity @ 77 (ASTM D 562)
		Dry Opacity (Fed. Test 141c-4121)	
		Wt/Gal @ 77 (ASTM D 1475) (X)(0.10) = lbs/gal cup – cup & sample = X	

Specification Reference

Standard Specification _____
Supplemental Specification _____
Project Specification _____
Other _____
Person Accepting Technical Responsibility
Name: _____
Title: _____

Specification: M.07.21 (Note: for next maintenance contract review delete reference file 200 and refer to M.07.21 as the spec) **Method: FTMS #141** **Material #**	**State of Connecticut** **Department of Transportation** **Bureau of Engineering & Construction** **Report of Fast Dry White & Yellow Waterborne Paint** **MAT-239**	**Date**	**Project #**
		Sample ID #	
Vendor # **Date Sampled** **Destination Code** **Material Quantity** **Material Unit** **Date Received**	**Viscosity (80 – 90 KU)** _____ **Flexibility (NO Flaws)** _____ **Weight/Gal. (12.5 +)** _____ **Dry Opacity (0.96 +)** _____ **Nonvolatile (76% +)** _____ **Flash Point (145°F+)** _____	**Dry Time (-120 sec)** _____ **Color (visual)** _____ **Lead (-0.06%)** _____ **Pigment (58-63)** _____ **Scrub Resistance (500+)** _____	
	Person Performing Test (initials) :_____		
Batch # **C or M** **Dates ----**	**Recommended For**	**Remarks**	
Division of Materials Testing			

Regular Dry White & Yellow Waterborne Paint

% Non Volatile (ASTM D 2697)	% Pigment (ASTM D 3723)	Color test (595-13538 yellow)
1_____ _____ 2_____ _____ _____ _____ _____ (100) = _____ (100) =	1_____(100)= 2_____(100)=	Flexibility (Fed Test 141c-6223) Flash Point (Ref. 207)
Wt/Gal @ 77 (ASTM D 1475) (X)(0.10) = lbs/gal cup – cup & sample = X	Viscosity @ 77 (ASTM D 562) Dry Opacity (Fed.Test 141c-4121)	Dry times (ASTM D 711)

Specification Reference

Standard Specification _____
Supplemental Specification _____
Project Specification _____
Other _____
Person Accepting Technical Responsibility
Name: _____
Title: _____

Specification: M.07.20 (Note: for next maintenance contract review delete reference file 207 and refer to M.07.20 as the spec)
Method: FTMS #141

Material #

Vendor #

Date Sampled

Destination Code

Material Quantity

Material Unit

Date Received

Batch #

C or M

Dates ----

State of Connecticut
Department of Transportation
Bureau of Engineering & Construction
Report of Test of Regular Dry White & Yellow Waterborne Paint
MAT-240

Date	**Project #**
Sample ID #	

Viscosity (75 – 85 KU)	_____	**Dry Time (-15 min)**	_____
Flexibility (NO Flaws)	_____	**Color (visual)**	_____
Weight/Gal. (12.5 +)	_____	**Dry Time (-15 min)**	_____
Dry Opacity (0.96 +)	_____	**Lead (-0.06%)**	_____
Nonvolatile (70% +)	_____	**Pigment (50-60)**	_____
Flash Point (145°F+)	_____	**Freeze/Thaw (+8 can)**	_____
Scrub Resistance (500+)	_____	**Freeze/Thaw (-10KU)**	_____

Person Performing Test (initials): _____

Recommended For	**Remarks**

Division of Materials Testing

State of Connecticut Department of Transportation
Division of Materials Testing MAT-241
Independent Assurance Program Evaluation Report
Concrete Aggregates – Fine Aggregates

Purpose: This form is for evaluation of assurance testing of concrete aggregates. In accordance with the minimum requirements for testing, concrete aggregates are sampled and tested for acceptance purposes randomly on a bi-weekly basis, and assurance testing of these processes is required each ten tests. This assurance testing evaluates in-house (not directly related to the projects) sample reducing and gradation analysis of concrete aggregates tested at various satellite locations utilizing various equipment and personnel. See MAT 245 for assurance testing criteria.

Assurance Testing Period (Dates): From: To:

Number of assurance tests performed.	Number of assurance tests not meeting assurance criteria.	Percentage of assurance tests not meeting assurance criteria.	Was corrective action taken and noted for tests not meeting criteria?
District II Lab			
District III Lab			
District IV Lab			
Totals for Concrete Aggregate Assurance Testing in the Period			

NOTES: _____

State of Connecticut Department of Transportation
Division of Materials Testing MAT-242
Independent Assurance Program Evaluation Report
Concrete Aggregates – Coarse Aggregates

Purpose: This form is for evaluation of assurance testing of concrete aggregates. In accordance with the minimum requirements for testing, concrete aggregates are sampled and tested for acceptance purposes randomly on a bi-weekly basis, and assurance testing of these processes is required each ten tests. This assurance testing evaluates in-house (not directly related to the projects) sample reducing and gradation analysis of concrete aggregates tested at various satellite locations utilizing various equipment and personnel. See MAT 245 for assurance testing criteria.

Assurance Testing Period (Dates): From: To:

Number of assurance tests performed.	Number of assurance tests not meeting assurance criteria.	Percentage of assurance tests not meeting assurance criteria.	Was corrective action taken and noted for tests not meeting criteria?
District II Lab			
District III Lab			
District IV Lab			
Totals for Concrete Aggregate Assurance Testing in the Period			

NOTES: _____

State of Connecticut Department of Transportation
Division of Materials Testing MAT-243
Independent Assurance Program Evaluation Report
Subbase and Processed Aggregate Base

Purpose: This form is for evaluation of assurance testing of Subbase and Processed Aggregate Base. In accordance with the minimum requirements for testing, roadbase aggregates are sampled and tested for acceptance and assurance processes. To meet project related minimum testing requirements, project personnel notify the District Laboratories for required acceptance and assurance testing of these materials. The process starts at the project site, where laboratory personnel witness and critique the sampling procedure at the site. Laboratory acceptance testing is then performed and split samples are sent to the Central Laboratory for in-house (not directly related to the projects) assurance testing, which evaluates sample reducing and gradation analysis of the materials tested at various satellite locations utilizing various equipment and personnel. See MAT 245 for assurance testing criteria.

Assurance Testing Period (Dates): From: To:

Number of assurance tests performed.	Number of assurance tests not meeting assurance criteria.	Percentage of assurance tests not meeting assurance criteria.	Was corrective action taken and noted for tests not meeting criteria?
District II Lab			
District III Lab			
District IV Lab			
Totals for Subbase & Processed Aggregate Base Assurance Testing in the Period			

NOTES: _____

State of Connecticut Department of Transportation
Division of Materials Testing MAT-244
Independent Assurance Program Evaluation Report
Plastic PC Concrete

Purpose: This form is for evaluation of assurance testing of plastic PC concrete. In accordance with the minimum requirements for testing, plastic PC concrete is required to be sampled and tested by project personnel for required acceptance and assurance testing. After notifying project staff of the need for required assurance testing, laboratory personnel evaluate the sampling and testing procedure, verify that adequate and calibrated testing equipment is utilized and readily available, and verify use of qualified personnel for NHS projects. Side-by-side air content testing is performed to validate project test equipment. When requested, technical expertise is also provided to the project personnel during the subject assurance testing. Forms MAT 222 and MAT 224 (MAT 225 for metric projects) are required to be completed by laboratory personnel during the assurance testing, and if testing deficiencies are encountered, they are noted. NOTES: 1) This form does not evaluate the projects on an individual basis for conformance to minimum acceptance and assurance testing requirements as specified in the "Schedule of Minimum Requirements for Sampling Materials for Test." As stated above, this form is for evaluation of the assurance testing of plastic PC concrete. 2) Comparison concrete specimens are not required to be fabricated by laboratory personnel during the assurance test.

Assurance Testing Period (Dates): From: To:

Number of assurance tests performed.	Number of assurance tests noting any testing deficiencies.	Percentage of assurance tests noting testing deficiencies.	Was the project notified via memorandum of any testing deficiencies?
District I Lab			
District II Lab			
District III Lab			
District IV Lab			
Totals for Plastic PC Concrete Assurance Testing in the Period			

NOTES: _____

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING AND CONSTRUCTION
DIVISION OF MATERIALS TESTING
MAT-245

AGGREGATE ASSURANCE SAMPLES – VARIATION LIMITS

If assurance samples tested at the Central Laboratory vary from the samples tested at the District Laboratories by more than the percent shown below, the cause of the variations shall be investigated. These limits were derived from historical experience, along with engineering expertise.

NO. 4 AGGREGATE		NO. 6 AGGREGATE		NO. 67 AGGREGATE		NO. 8 AGGREGATE	
37.5 mm (1 1/2")	- 4.0	19.0 mm (3/4")	- 4.0	19.0 mm (3/4")	- 4.0	9.5 mm (3/8")	- 5.0
25.0 mm (1")	- 9.0	12.5 mm (1/2")	- 6.0	9.5 mm (3/8")	- 3.0	4.75 mm (#4)	- 5.0
19.0 mm (3/4")	- 6.0	9.5 mm (3/8")	- 3.0	4.75 mm (#4)	- 3.0	2.36 mm (#8)	- 3.0
9.5 mm (3/8")	- 3.0	4.75 mm (#4)	- 3.0	2.36 mm (#8)	- 3.0	1.18 mm (#16)	- 3.0

CONCRETE SAND		SUBBASE		PROCESSED AGGREGATE BASE	
4.75 mm (#4)	- 3.0	37.5 mm (1 1/2")	- 6.0	19.mm (3/4")	- 6.0
2.36 mm (#8)	- 6.0	6.3 mm (1/4")	- 6.0	6.3 mm (1/4")	- 6.0
1.18 mm (#16)	- 10.0	2.0 mm (#10)	– 6.0	425 µm (#40)	- 5.0
600 µm (#30)	- 10.0	425 µm (#40)	- 5.0	150 µm (#100)	-4.0
300 µm (#50)	- 9.0	150 µm (#100)	- 4.0		
150 µm (#100)	- 4.0	75 µm (#200)	- 3.0		
F.M. – 0.40 SILT – 1.5					

CONNECTICUT DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING (DMT)
TRACKING REPORT: PAVEMENT MARKING MATERIALS

MAT-248 **Rev. 11/16**

Date:

Company:

Material:

Batch/ Lot #	Quantity

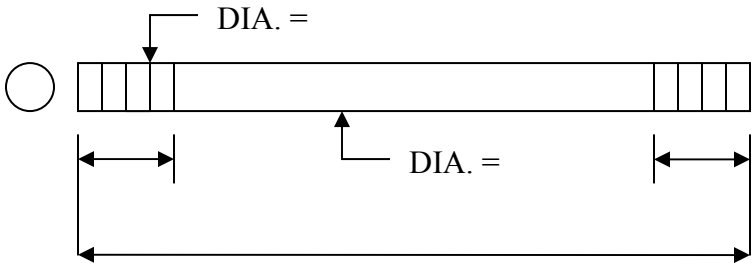
Remarks/Observations:

DMT Tracking Number:
DMT XXXXXXXX

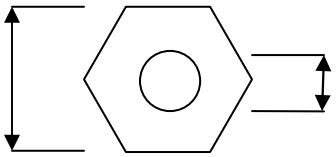
Form Completed By:

Recommendation Made For This Material:
Choose an item.

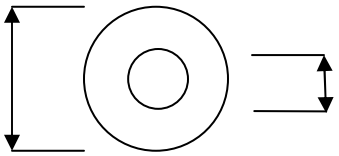
MAT-300



	GALVANIZATION oz/ft² (g/m²)		
	BOLT	NUT	WASHER
	Mils (µm)	Mils (µm)	Mils (µm)
SUM			
AVE.			
AVE x 1.7 (AVE x7.067)			



THK. =



THK. =

PROJECT NUMBER:	**MAT-300** STATE OF CT D.O.T. DIV. OF MATERIALS TESTING REPORT OF TEST: ANCHOR BOLTS (STRAIGHT)	DATE	MATERIAL CODE **3504**
SAMPLE NUMBER:		LAB #	

SPECIFICATION REFERENCE
STANDARD SPECIFICATION _____
SUPPLEMENTAL SPECIFICATION _____
PROJECT SPECIAL PROVISION _____
OTHER _____

PERSON ACCEPTING TECHNICAL RESPONSIBILITY
NAME : _____
TITLE: _____

ITEM	BOLT	SPEC.	NUT	WASHER
SIZE (Nom. Dia.)				
GRADE				
AREA in² (mm²)				
HARDNESS				
EST. T.S. psi (MPa)				
GALV. oz/ft² (g/m²)				

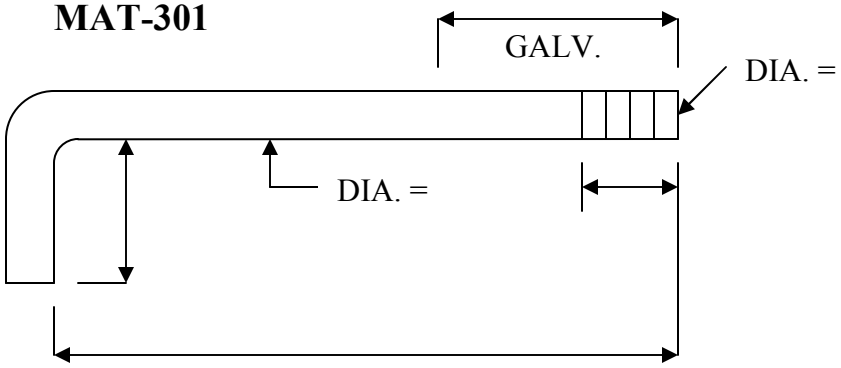
Begin Test	End Test	Tested By

Recommendations

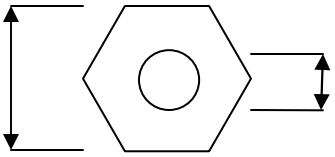
REMARKS

DIVISION CHIEF – MATERIALS TESTING

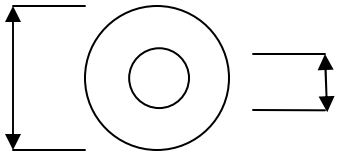
MAT-301



	GALVANIZATION oz/ft² (g/m²)		
	BOLT	NUT	WASHER
	Mils (µm)	Mils (µm)	Mils (µm)
SUM			
AVE.			
AVE x 1.7 (AVE x7.067)			



THK. =



THK. =

PROJECT NUMBER:	**MAT-301** STATE OF CT D.O.T. DIV. OF MAT. TESTING REPORT OF TEST: ANCHOR BOLTS (WITH HOOK)	DATE	MATERIAL CODE
SAMPLE NUMBER:		LAB #	**3504**

SPECIFICATION REFERENCE

STANDARD SPECIFICATION _____

SUPPLEMENTAL SPECIFICATION _____

PROJECT SPECIAL PROVISION _____

OTHER _____

PERSON ACCEPTING TECHNICAL RESPONSIBILITY

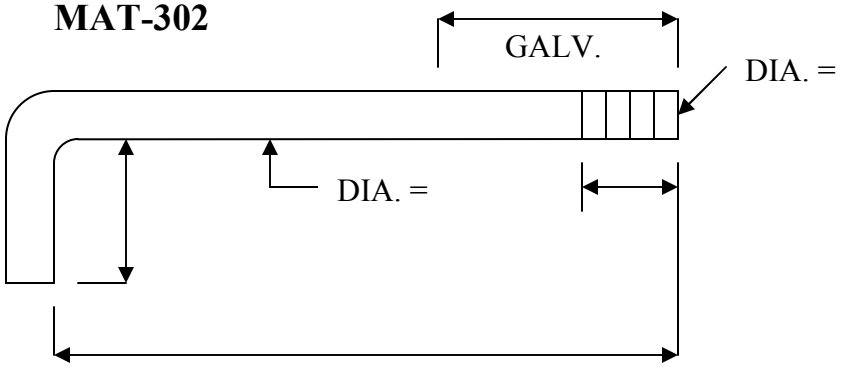
NAME : _____ TITLE: _____

ITEM	BOLT	SPEC.	NUT	WASHER
SIZE (Nom. Dia.)				
GRADE				
AREA in² (mm²)				
HARDNESS				
EST. T.S. PSI (MPa)				
GALV. Oz/ft²(g/m²)				
RECOMMENDED FOR		REMARKS		

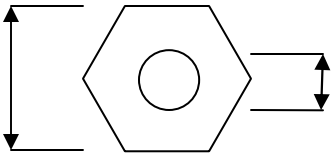
c:\jwh\forms\Anchor Bolt with Hook combo.doc

DIVISION CHIEF – MATERIALS TESTING

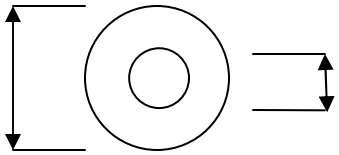
MAT-302



	GALVANIZATION oz/ft² (g/m²)		
	BOLT	NUT	WASHER
	Mils (µm)	Mils (µm)	Mils (µm)
SUM			
AVE.			
AVE x 1.7 (AVE x7.067)			



THK. =



THK. =

PROJECT NUMBER:	**MAT-302** STATE OF CT D.O.T. DIV. OF MATERIALS TESTING REPORT OF TEST: HEX BOLTS	DATE	MATERIAL CODE
SAMPLE NUMBER:		LAB #	

SPECIFICATION REFERENCE

STANDARD SPECIFICATION _____

SUPPLEMENTAL SPECIFICATION _____

PROJECT SPECIAL PROVISION _____

OTHER _____

PERSON ACCEPTING TECHNICAL RESPONSIBILITY

NAME : _____

TITLE: _____

ITEM	BOLT	SPEC.	NUT	WASHER
SIZE (Nom. Dia.)				
GRADE				
AREA (mm^2)				
HARDNESS				
EST. T.S. (MPa)				
GALV. (g/m^2)				

Begin Date	End Date	Tested By	REMARKS

DIVISION CHIEF – MATERIALS TESTING

MAT-303

PROJECT NUMBER:	**MAT-303** STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION DIVISION OF MATERIALS TESTING REPORT OF TEST: CHAIN LINK FENCE FABRIC	PROCESSING DATE	MATERIAL CODE
SAMPLE NUMBER:		LABORATORY NO.	**3300**

SPECIFICATION REFERENCE
STANDARD SPECIFICATION
SUPPLEMENTAL SPECIFICATION
PROJECT SPECIAL PROVISION
OTHER

PERSON ACCEPTING
TECHNICAL RESPONSIBILITY
NAME :
TITLE:

	Actual	Specification
Height of Fabric, inches (mm)		As specified on plans or spec. prov.
Gage of Wire		No. 9 gage
Size of Mesh, inches (mm)		2-inch (50 mm) mesh
Edge of Finish		Knuckled
Tensile Strength, psi (MPa)		See above
Weight of Coating, oz/ft^2 (g/m^2)		See above

BEGIN DATE	END DATE	TESTED BY	REMARKS

RECOMMENDATION

DIVISION CHIEF – MATERIALS TESTING

MAT-304 REPORT OF TEST: REINFORCED CONCRETE PIPE (Reduced for inclusion in manual)

Source and Location of Fine Aggregate Supply:

Source and Location of Coarse Aggregate Supply:

Tests Witnessed by:

									Machine Readings															
RCP Size (in.)	RCP Length (ft)	RCP Class	RCP Wall	Slot (Y/N)	Method of Manufacture	Date Cast	Date Broken	Age (days)	Req'd .01 Crack (lbs.)	Req'd .01+10% (lbs.)	Req'd Ultimate (lbs.)	Actual Visible (lbs.)	Actual .01 Crack (lbs.)	Actual .01+10% (lbs.)	Actual Ultimate (lbs.)	Core (Y/N)	Absp. (%)	Req'd Reinf. (in^2/ft) i	Req'd Reinf. (in^2/ft) o	Actual Reinf. (in^2/ft) i	Actual Reinf. (in^2/ft) o	Remarks	Status

PROJECT NUMBER:	**MAT-305** STATE OF CONNECTICUT DEPT. OF TRANSPORTATION DIV. OF MATERIALS TESTING REPORT OF TEST: STEEL BARS AND SHAPES	DATE	MATERIAL CODE
SAMPLE NUMBER:		LAB #	

SPECIFICATION REFERENCE

____ STANDARD SPECIFICATION

____ SUPPLEMENTAL SPECIFICATION

____ PROJECT SPECIAL PROVISION

____ OTHER

PERSON ACCEPTING TECHNICAL RESPONSIBILITY

NAME : _____

TITLE: _____

Size					
Grade					
Area, in^2 (mm^2)					
Load, lbf (kN)					
Y.P., psi (MPa)					
Load, lbf (kN)					
T.S., psi (MPa)					
Elong. (%)					
Cold Bend					
Epox, mils (µm)					
Test No.					

Begin Test	End Test	Tested By	REMARKS

Recommendations

DIVISION CHIEF – MATERIALS TESTING

MAT-306

Tables From ASTM A 82
Steel Wire, Plain, For Concrete Reinforcement

Table 1 Tension Test Requirements	
Tensile strength, min, ksi (MPa)	80 (550)
Yield strength, min, ksi (MPa)	70 (485)
Reduction of area, min, %	30[A]

[A]For material testing of 100 ksi (690 MPa) tensile strength, the reduction of area shall be not less than 25%.

Table 2 Tension Test Requirements (Material for Welded Wire Reinforcement)

	Size W1.2 and Larger	Smaller than Size W1.2
Tensile strength based on wire nom. area, min, ksi (MPa)	75 (515)	70 (485)
Yield strength based on wire nom. Area, min, ksi (MPa)	65 (450)	56 (385)
Reduction of area, min, %	30[A]	30[A]

[A]For material testing over 100 ksi (690 MPa) tensile strength, the reduction of area shall be not less than 25 %.

Table 4 Permissible Variation in Wire Diameter		
Size Number	Nominal Diameter, in. (mm)	Permissible Variation Plus and Minus, in. (mm)
Smaller than W5	Under 0.252 (6.40)	0.003 (0.08)
W5 to W12, incl	0.252 (6.40) to 0.391 (9.93), incl	0.004 (0.10)
Over to W20, incl	Over 0.391 (9.93) to 0.505 (12.83), incl	0.006 (0.15)
Over W20	Over 0.505 (12.83)	0.008 (0.20)

PROJECT NUMBER:	**MAT-306** STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION DIVISION OF MATERIALS TESTING REPORT OF TEST: PLAIN WIRE FOR WELDED WIRE FABRIC	PROCESSING DATE	MATERIAL CODE **3145**
SAMPLE NUMBER:		LABORATORY NO.	

SPECIFICATION REFERENCE
___ STANDARD SPECIFICATION
___ SUPPLEMENTAL SPECIFICATION
___ PROJECT SPECIAL PROVISION
___ OTHER

PERSON ACCEPTING
TECHNICAL RESPONSIBILITY
NAME : _____
TITLE: _____

	Horizontal	Horizontal Spec.	Vertical	Vertical Spec.
Spacing (in.)		—		—
Size Number				
Act. Diam. (in)				
Nom. Area (in^2)		—		—
Load (lbf)		—		—
T.S. (psi)				
Condition		—		—

BEGIN DATE	END DATE	TESTED BY	REMARKS

RECOMMENDATION

DIVISION CHIEF – MATERIALS TESTING

MAT-307

PROJECT NUMBER:	**MAT-307** STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION DIVISION OF MATERIALS TESTING REPORT OF TEST: GENERAL TENSILE STRENGTH	PROCESSING DATE	MATERIAL CODE
SAMPLE NUMBER:		LABORATORY NO.	

SPECIFICATION REFERENCE

____ STANDARD SPECIFICATION

____ SUPPLEMENTAL SPECIFICATION

____ PROJECT SPECIAL PROVISION

____ OTHER

PERSON ACCEPTING

TECHNICAL RESPONSIBILITY

NAME : _____

TITLE: _____

Size					
Grade					
Area (in^2)					
Load (lbf)					
Y.P. (psi)					
Load (lbf)					
T.S. (psi)					
Elong. (%)					
Cold Bend					
Galv (mils)					
Test No.					

BEGIN DATE	END DATE	TESTED BY	REMARKS

RECOMMENDATION

DIVISION CHIEF – MATERIALS TESTING

State of Connecticut - Department of Transportation
Division of Materials Testing
280 West Street, Rocky Hill, CT 06067

REPORT OF TEST ON PORTLAND CEMENT CONCRETE CYLINDERS

MAT-308 REV. 10/16

Sample ID:		**Curing Box Used?**	☐ YES ☐ NO (Check one)
Structure/Location: (Where concrete was placed.)		**Source/Location**	
		Sampled From: (i.e.chute/pump)	
Item Number:*		**Sampled By:**	
Item Quantity:**		**Item Units:**	
Material Quantity***		**Unit**	☐C.Y. ☐CU.M (Check one)
Brand of Cement:		**Tested By:**	
Required Strength:		**Contractor:**	

Field Test Results	Test 1	Test 2 (Required if material fails test 1.)
Air (ASTM C173/C231)		
Conc. Temp. (ASTM C1064)		
Slump (ASTM C143)		
Date Sampled:		

* ***Measured at point of placement.***

Specimen ID:	(1)	(2)	(3)	(4)	(5)	(6)
Age(s) Requested:						
Date Received:						
Date Tested:						
Age Tested:						
☐ **4 in. cylinder**						
Average Diameter:*						
Area :						
☐ **6 in. cylinder**						
Average Diameter:*						
Area:						
Maximum Load: (AASHTO T-22)						
Compressive Strength:(PSI/Mpa)						
Fracture Type: (a-e)						
Status:						

NOTES:

***Item Number** : Contract Item under which Contractor is being paid for concrete that is represented by sample.

****Item Quantity**: Amount of concrete/Number of items represented by sample in pay units for that contract item. It is never the number of cylinders submitted.

*****Material Quantity:** Amount of Concrete represented by sample. Mininum Schedule for Test requires one sample every 75 CY (60 m^3) for structures and 50 CY (40 m^3) for pavement. It is never the number of cylinders submitted.

******Average Diameter:** Value is taken from MAT-308A.

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING AND CONSTRUCTION

DIVISION OF MATERIALS TESTING

DAILY CONCRETE CYLINDER DIAMETER LOG

MAT-308A
Rev. 10-12-16

DATE Month: Year:	CYLINDER DIAMETER #1	CYLINDER DIAMETER #2	CYLINDER DIAMETER #3	AVERAGE DIAMETER OF THE THREE CYLINDERS
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				

Compression Units

Specimen:	#1	#2	#3
Received Weight (W_R), lb or kg			
Gross Area (A_g), in^2 or mm^2			
Max. Comp. Load (P_{MAX}), lbf or N			

Absorption Units

Specimen:	#1	#2	#3
Ave. Height (H), in or mm			
Immersed Weight (W_i), lb or kg			
Saturated Weight (W_s), lb or kg			
O.D. Weight – Final (W_d), lb or kg			

Oven Dry Density (D), $lb/ft^3 = [W_d/(W_s-W_i)] \times 62.4$
Oven Dry Density (D), $kg/m^3 = [W_d/(W_s-W_i)] \times 1000$
Absorption, $lb/ft^3 = [(W_s-W_d)/(W_s-W_i)] \times 62.4$
Absorption, $kg/m^3 = [(W_s-W_d)/(W_s-W_i)] \times 1000$
Net Volume (V_n), ft^3 or $mm^3 = W_d/D$
Average Net Area (A_n), $in^2 = (V_n \times 1728)/H$
Average Net Area (A_n), $mm^2 = V_n/H$

PROJECT NUMBER:

SAMPLE NUMBER:

MAT-309

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING
REPORT OF TEST:
MASONRY CONCRETE UNITS/BRICK

PROCESSING DATE

LABORATORY NO.

MATERIAL CODE

	#1	#2	#3	Ave.	Spec. Ave.	Spec. Ind.
Height, in (mm)						
Length, in (mm)						
Width, in (mm)						
Comp. Strength, psi (MPa)						
Absorption, lb/ft^3 (kg/m^3)						

SPECIFICATION REFERENCE
___ STANDARD SPECIFICATION
___ SUPPLEMENTAL SPECIFICATION
___ PROJECT SPECIAL PROVISION
___ OTHER

PERSON ACCEPTING
TECHNICAL RESPONSIBILITY
NAME: _____
TITLE: _____

BEGIN DATE	END DATE	TESTED BY	REMARKS

RECOMMENDATION

DIVISION CHIEF – MATERIALS TESTING

MAT-310

Durometer Readings
1.

2.

3.

4.

5.

Average =

Identification
Conn.:

Proj. No.:

Manufacturers I.D.:

Pad Type No.:

Month and Year:

Bridge Number:

Lot Number:

Pad Number:

PROJECT NUMBER:	**MAT-310** STATE OF CT D.O.T. DIV. OF MAT. TESTING REPORT OF TEST: ELASTOMERIC BEARING PAD	DATE	MATERIAL CODE **3505**
SAMPLE NUMBER:		LAB #	

SPECIFICATION REFERENCE
____ STANDARD SPECIFICATION
____ SUPPLEMENTAL SPECIFICATION
____ PROJECT SPECIAL PROVISION
____ OTHER

PERSON ACCEPTING TECHNICAL RESPONSIBILITY
NAME: _____
TITLE: _____

	PAD DATA	SPECIFICATIONS
Size		
Slope		
Spacing (Lam.)		
No. & Thickness		
Edge Cover		
Elast. Layer		
Comp. Strain		
Duro. Hardness		
Shop Drawing		
Cert. Test Report		

Test Date	Report Date	Tested By	Remarks

Recommendation

DIVISION CHIEF – MATERIALS TESTING

MAT-311 (Deleted)

MAT-312

Compression Units

Specimen:	#1	#2	#3	#4	#5
Gross Area (A), in^2 (mm^2)					
Maximum Load (W), lbf (N)					

Absorption Units

Specimen:	#1	#2	#3	#4	#5
Saturated Weight 5-h boil(W_b), lb (kg)					
Oven Dry Weight – Final (W_d), lb (kg)					

Compressive Strength, psi = W/A

Absorption, % = $100(W_b-W_d)/W_d$

PROJECT NUMBER:

SAMPLE NUMBER:

MAT-312

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING
REPORT OF TEST:
CLAY BRICK

PROCESSING DATE

LABORATORY NO.

MATERIAL CODE

SPECIFICATION REFERENCE
___ STANDARD SPECIFICATION
___ SUPPLEMENTAL SPECIFICATION
___ PROJECT SPECIAL PROVISION
___ OTHER

PERSON ACCEPTING
TECHNICAL RESPONSIBILITY
NAME: _____
TITLE: _____

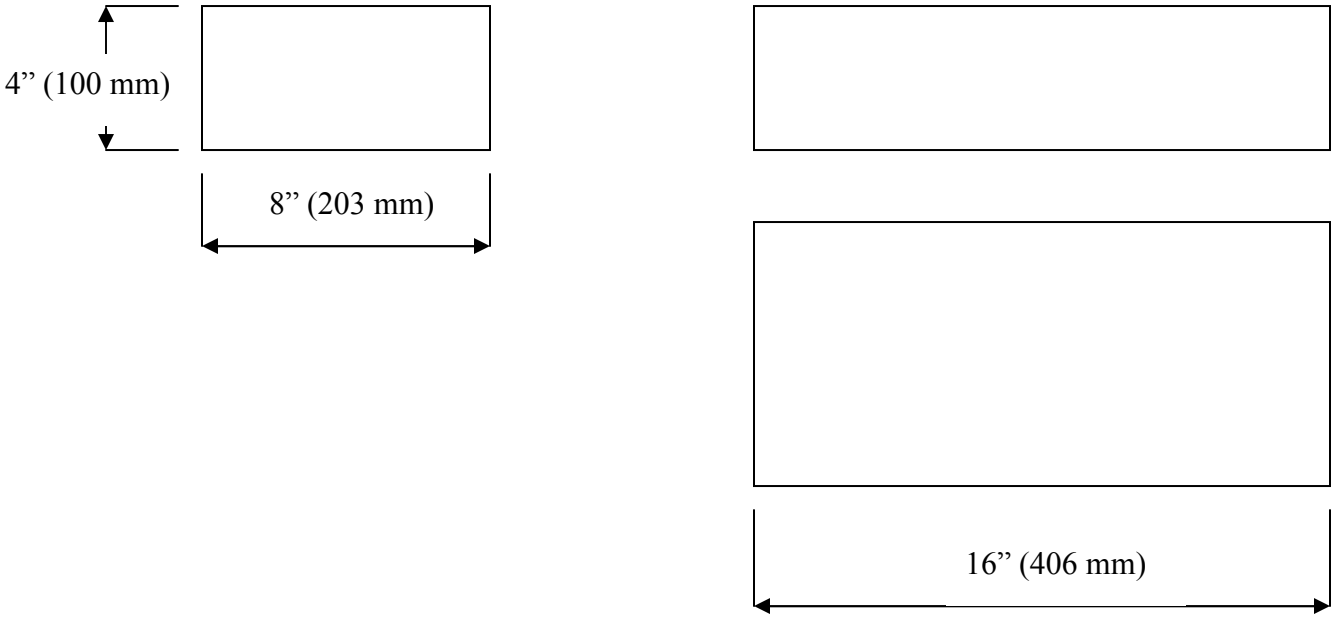
	#1	#2	#3	#4	#5	Ave	Spec. Ave.	Spec. Ind.
Depth, in (mm)								
Length, in (mm)								
Width, in (mm)								
Strength, psi (MPa)								
Absorption by 5-hour boiling (%)								

BEGIN DATE	END DATE	TESTED BY	REMARKS

RECOMMENDATION

DIVISION CHIEF – MATERIALS TESTING

MAT-313



PROJECT NUMBER:	**MAT-313** STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION DIVISION OF MATERIALS TESTING REPORT OF TEST: CONCRETE BLOCK FOR SLOPE PROTECTION	PROCESSING DATE	MATERIAL CODE **3197**
SAMPLE NUMBER:		LABORATORY NO.	

	SAMPLE 1	SAMPLE 2	SAMPLE 3	SPEC.
L, Length, inches (mm)				16 +/- ½ in 406 +/- 12.5 mm
W, Width, inches (mm)				8 +/- ½ 203 +/- 12.5 mm
H, Height, inches (mm)				4 +/- ½ 100 +/- 12.5 mm
A, Area, in^2 (mm^2)				----
Load, lbf (N)				----
Stength, psi (MPa)				3000 psi 21 MPa

BEGIN DATE	END DATE	TESTED BY	REMARKS

RECOMMENDATION

SPECIFICATION REFERENCE
____ STANDARD SPECIFICATION
____ SUPPLEMENTAL SPECIFICATION
____ PROJECT SPECIAL PROVISION
____ OTHER

PERSON ACCEPTING
TECHNICAL RESPONSIBILITY
NAME : _____
TITLE: _____

DIVISION CHIEF – MATERIALS TESTING

CERTIFICATION OF PRECAST CONCRETE PRODUCTS

MAT-314 (PC-1)

REV. 1/15

STATE OF CONNECTICUT

DEPARTMENT OF TRANSPORTATION

DIVISION OF MATERIALS TESTING

280 West Street , Rocky Hill CT 06067-3502

DATE OF SHIPMENT

Project Personnel: Submit with Request for Test ***AFTER*** visual inspection on project site.

List one type of product per cast date per line.

DISTRIBUTION: Original to Lab, Copy to Project Engineer, Copy to be kept by Manufacturer.

MANUFACTURER	LOCATION

SHIPPED TO: (Contractor's Name)	PROJECT NO. OR PURCHASE ORDER NO.

Description of Products	Cast Date	Quantity

Remarks

This document certifies that all the products listed above conform to all applicable Department and project specifications, including but not limited to the “Buy America” requirements regarding all steel components.

Authorized Agent of Manufacturer	
Signed:	Date:

MAT-315 (Deleted)

MAT-316

SAMPLE	
BRAND	
TYPE	
IN LAB	
94 Lbs. Bag 42 Kgs. Bag	
GAL CAN	
OTHER	

SPECIFICATION REFERENCE
STANDARD SPECIFICATION _____
SUPPLEMENTAL SPECIFICATION _____
PROJECT SPECIAL PROVISION _____
OTHER _____

PERSON ACCEPTING
TECHNICAL RESPONSIBILITY

NAME _____

TITLE _____

DATE TO CHEM. RM.		FULL CHEMICAL		PROJECT #
DATE RESULTS RETURNED		FINENESS ONLY		SAMPLE #

Mat-316	**AASHTO M – 85** (ASTM C – 150)	LAB NO.

REPORT OF TEST: PORTLAND CEMENT (ALL TYPES)

PHYSICAL SECTION TEST RESULTS				CHEMICAL SECTION TEST RESULTS			
TEST	LAB RESULT	AASHTO SPEC.		TEST	LAB RESULT	AASHTO SPEC.	
AIR CONTENT %		12 MAX.		FINENESS SoCm/Gm		2600 - 4200	
				SiO_2 %		NONE	
AUTOCLAVE EXPANSION %		.80 MAX		Al_2O_3 %		NONE	
COMPRESSIVE STRENGTH				Fe_2O_3 %		NONE	
1 Day MPa PSI		NONE		MgO %		6.0 MAX.	
3 Day MPa PSI		12 MPa Min. 1740 PSI Min.		SO_3 %		a) 3.0 MAX. b) 3.5 MAX.	
7 Day MPa PSI		19 MPa Min. 2760 PSI Min.		LOSS ON IGNITION %		3.0 MAX.	
				INSOLUABLE RESIDUE %		0.75 MAX.	
				C_3S %		NONE	
TIME OF SETTING				C_2S %		NONE	
VICAT, MIN		45 to 375		C_3A %		NONE	
				a) WHEN $C_3A < 8\%$ b) WHEN $C_3A > 8\%$ NOTES:			

RECOMMENDED FOR:	REMARKS:

MAT-316 - Page 2

CEMENT_____TYPE_____ LAB NO._____

T – 106 C – 109 DATE: TIME:			T – 137 C – 185			
CUBES MADE:			AIR CONTENT			
AGE			WATER %			
DATE			WATER ml			
1.			FLOW %			
2.			GROSS WT			
3.			- CUP WT			
AVG			= NET WT			
			FACTOR			
			NET WT* FACTOR			
			AIR CONT %			

DATE	

T-107 C-151 AUTOCLAVE		T-129 C-187 NORMAL CONSISTENCY			
TIME BARS MADE		WATER %			
BARS MEASURE		WATER ml			
SWITCHES ON		PENETRATION mm			
VENT CLOSED					
295 PSI		T-131 C-191 VICAT – TIME OF SET			
ADD 3 HOURS			MADE	INITIAL	
SWITCHES OFF		TIME OF DAY			
DOWN 1 ½ HRS		HR: MIN			
COOL 30 MIN		MINUTES			
AFTER STEAM					
BEFORE STEAM					
DIFFERENCE					
% EXPANSION					

MAT-323

Description	Sample #1	Sample #2	Sample #3	Specifications
Overall Diam. Across Crowns, in (mm)				
Diameter of Exterior Wire #1, in (mm)				
Diameter of Exterior Wire #2, in (mm)				
Diameter of Exterior Wire #3, in (mm)				
Diameter of Exterior Wire #4, in (mm)				
Diameter of Exterior Wire #5, in (mm)				
Diameter of Exterior Wire #6, in (mm)				
Diameter of Center Wire, in (mm)				
Diff Betwn. Center & Any Ext. Wire, in (mm)				
Pitch, in (mm)				
Load @ 1% Extension, lbf (kN)				
Breaking Load, lbf (kN)				
Breaking Strength, psi (MPa)				
No. Wires Broken				
Type of Break				
Location of Break				
Length Meas. @ 1% Extension, "A", in (mm)				
Length Meas. @ Breaking Load, "B", in (mm)				
Total Elongation Under Load (%)				

Total Elongation Under Load = (100%)[(B-A)/A] + 1%

PROJECT NUMBER:

SAMPLE NUMBER:

MAT-323
STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING
REPORT OF TEST: STEEL STRAND

PROCESSING DATE

LABORATORY NO.

MATERIAL CODE **3148**

SPECIFICATION REFERENCE
___ STANDARD SPECIFICATION
___ SUPPLEMENTAL SPECIFICATION
___ PROJECT SPECIAL PROVISION
___ OTHER

PERSON ACCEPTING
TECHNICAL RESPONSIBILITY
NAME : _____
TITLE: _____

	Sample 1	Sample 2	Sample 3
Reel No.			
Heat No.			
Diameter of Strand, in (mm)			
Min. Ext. Wire Diameter, in (mm)			
Center Wire Diameter, in (mm)			
Diff in Diameter of Center Wire, in (mm)			
Total Area of 7 Wires, in.^{2}, mm^2			
Load @ 1% Elongation, lbf (kN)			
Total Elongation (%)			
Breaking Load, lbf (kN)			

BEGIN DATE	END DATE	TESTED BY	REMARKS

RECOMMENDATION

DIVISION CHIEF – MATERIALS TESTING

Field Report: Inspection of Prestressed, Precast and Reinforced Concrete Pipe Manufacturers

Date: _____ **Inspection by:** _____

Phone: _____

Fax No: _____

E-Mail: _____

Plant Name _____

Address _____

Plant Manager _____

NPCA Certified _____

Items of Manufacture _____

_____

MIXERS

Manufacturer	Type	Capacity

PIPE MACHINES

Manufacturer	Type	Sizes

CALIBRATION of SCALES

Scale	Date of Calibration	Calibration Company
Cement		
Aggregate		
Water		
Other		

TESTING EQUIPMENT

Testing Machine	Date of Calibration	Calibration Company
3-Edge		
Compression		

Concrete Testing Equip.	Condition	Calibration Info. Available
Air Meter		
Slump Cone		
Thermometers		

PLANT QUALITY CONTROL PERSONNEL

Employee	ACI / PCI Certified	NETTCP Conc. Tech.

Additional remarks _____

SOURCE of CEMENT AND POZZOLANS

AGGREGATES AND WATER

Material	Source	Size

SOURCE OF CATCH BASIN FRAMES AND GRATES

REINFORCEMENT

Domestic Steel _____

Foreign Steel Onsite _____

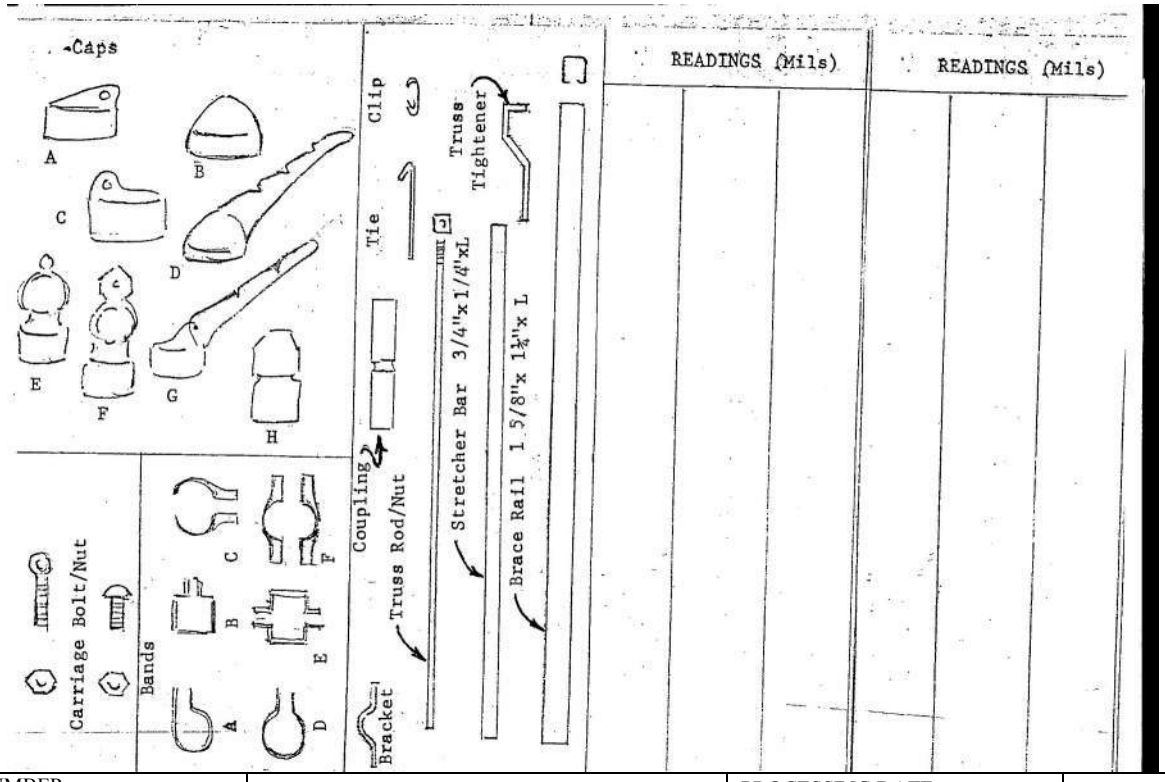
ADMIXTURES

Manufacturers of Admixtures

Name	Type

Q.C. PLAN DEFICIENCIES

MAT-325



PROJECT NUMBER:	**MAT-325** STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION DIVISION OF MATERIALS TESTING REPORT OF TEST: CHAIN LINK FENCE HARDWARE	PROCESSING DATE	MATERIAL CODE **3320**
SAMPLE NUMBER:		LABORATORY NO.	

SPECIFICATION REFERENCE
___ STANDARD SPECIFICATION
___ SUPPLEMENTAL SPECIFICATION
___ PROJECT SPECIAL PROVISION
___ OTHER

PERSON ACCEPTING TECHNICAL RESPONSIBILITY
NAME: _____
TITLE: _____

ITEM	Galv. Oz/in^2 (g/m^2)	ITEM	Galv. Oz/in^2 (g/m^2)

BEGIN DATE	END DATE	TESTED BY	REMARKS

RECOMMENDATION

DIVISION CHIEF – MATERIALS TESTING

MAT-326

PROJECT NUMBER:	**MAT-326** STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION DIVISION OF MATERIALS TESTING REPORT OF TEST: CHAIN LINK FENCE TENSION WIRE	PROCESSING DATE	MATERIAL CODE
SAMPLE NUMBER:		LABORATORY NO.	

SPECIFICATION REFERENCE
____ STANDARD SPECIFICATION
____ SUPPLEMENTAL SPECIFICATION
____ PROJECT SPECIAL PROVISION
____ OTHER

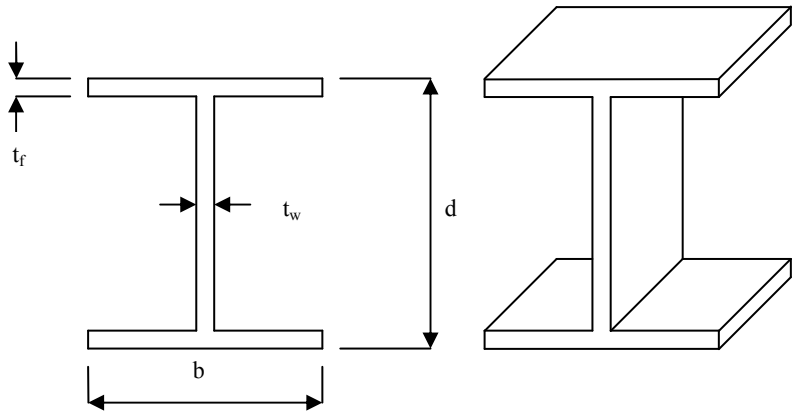
PERSON ACCEPTING
TECHNICAL RESPONSIBILITY
NAME : _____
TITLE: _____

	Actual	Specification
Gage of Wire		
Tensile Strength, psi (MPa)		
Weight of Coating, oz/ft^2 (g/m^2)		

BEGIN DATE	END DATE	TESTED BY	REMARKS

RECOMMENDATION

DIVISION CHIEF – MATERIALS TESTING



PROJECT NUMBER:	**MAT-327** STATE OF CONNECTICUT DOT REPORT OF TEST: H-PILES AND WIDE FLANGE SHAPES	POST DATE	LAB #	MAT. CODE **3549**
SAMPLE NUMBER:		DATE RECEIVED		RECEIVED BY

SPECIFICATION REFERENCE

STANDARD SPECIFICATION _____

SUPPLEMENTAL SPECIFICATION _____

PROJECT SPECIAL PROVISION _____

OTHER _____

PERSON ACCEPTING TECHNICAL RESPONSIBILITY

NAME : _____

TITLE: _____

Item	Sample	Specification	
		U.S. Cust. (in)	Metric (mm)
b, flange width		+ 1/4 - 3/16	+ 4 - 3
d, depth		+1/4 -3/16	+6 -5
t_f, flange thickness		---	---
t_w, web thickness		---	---
wt/ft		+/-2.5%	+/-2.5%
Tensile Strength (ksi, MPa)		Gr. 36: 58-80 Gr. 50: 65-95	Gr. 36: 400-550 Gr. 50: 450-655

Begin Date	End Date	Tested By	REMARKS

DIVISION CHIEF – MATERIALS TESTING

ASTM A 496
Steel Wire, Deformed, for Concrete Reinforcement

Table 4 Tension Test Requirements (Material for Welded Wire Reinforcement)

	psi (MPa) min
Tensile strength	80000 (550)
Yield strength	70000(485)

Section 9 Permissible Variation in Weight

9.1 The permissible variation in weight of any deformed wire is +/-6% of its nominal weight. The theoretical weights shown in Table 1, or similar calculations on unlisted sizes, shall be used to establish the variation.

PROJECT NUMBER:	**MAT-328** STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION DIVISION OF MATERIALS TESTING REPORT OF TEST: DEFORMED STEEL WIRE FOR CONCRETE REINFORCEMENT	PROCESSING DATE	MATERIAL CODE **3145**
SAMPLE NUMBER:		LABORATORY NO.	

	Horizontal	Horizontal Spec.	Vertical	Vertical Spec.
Spacing (in.)		—		—
Size Number				
Unit Wt. (lb/ft)				
Nom. Area (in^2)		—		—
Load (lbf)		—		—
T.S. (psi)				
Condition		—		—

BEGIN DATE	END DATE	TESTED BY	REMARKS

RECOMMENDATION

SPECIFICATION REFERENCE
___ STANDARD SPECIFICATION
___ SUPPLEMENTAL SPECIFICATION
___ PROJECT SPECIAL PROVISION
___ OTHER

PERSON ACCEPTING
TECHNICAL RESPONSIBILITY
NAME: _____
TITLE: _____

DIVISION CHIEF – MATERIALS TESTING

MAT-329 and MAT-330 (Deleted)

Laboratory:	**Central Lab Rocky Hill, CT**
Sample Date Tested:	
Kind of Material:	
Source of Supply:	
Location of Source or Supply:	
Sample Taken From:	
Source of Supply:	
Location of:	
Sampled By:	
Date Sampled:	
Using Agency:	**ConnDOT**
Quantity Represented:	
Lot Number:	
Tank Number:	
Sample Received:	
Remarks:	

State of Connecticut Department of Transportation

Bureau of Engineering & Highway Operations

Report of Test: Asphalt Binder MAT-401

Standard Specifications CONNDOT: M04 Bit. Concrete, AASHTO M320 AND AASHTO M332

Procedures in conformace with AASHTO R-29

Rocky Hill Binder Results

Original Binder						**Specification**
SG @ 25°C						
Temperature (°C)	58	64	70	76	82	
Viscosity (Pa-s) @ 135°C						max. 3
Viscosity (Pa-s) @ 165°C						
Mixing Temperature Range						
Compaction Temperature Range						
Complex Modulus, G (kPa)*						
Phase Angle (δ)						
Original G/sin δ @ T°C*						min. 1

Binder True Grade

High Temp	
Inter Temp	
Low (BBR)	
T(S)-T(m)	

RTFO Binder						
Mass change (%)						-1 to +1
Temperature (°C)	58	64	70	76	82	
Complex Modulus, G (kPa)*						
Phase Angle (δ)						
RTFO G/sin δ @ T°C*						min. 2.2
RTFO Jnr 3.2 (kPa^{-1}) @ T°C						max. 4.5 (S), 0.5 (E)
RTFO R3.2 @ T°C						
RTFO Jnr 0.1 (kPa-1)@ T°C						
RTFO Jnr Diff (%) @ T°C						max. 75
Modified by an acceptable elastomeric poly?						Yes (E)

PAV Binder						
Temperature (°C)	34	31	28	25	22	
Complex Modulus, G (kPa)*						
Phase Angle (δ)						
PAV G sin δ @ T°C*						max. 5000 (S), 6000 (E)
Temperature (°C)	-6	-12	-18	-24		
PAV BBR Stiffness (MPa) @ T°C						max. 300
PAV BBR m-value @ T°C						min. 0.3
Failure Stress						
Failure Strain (%)						min. 1

Laboratory: **Central Lab Rocky Hill, CT**	
Sample Date Tested:	
Kind of Material:	
Source of Supply:	
Location of Source or Supply:	
Sample Taken From:	
Source of Supply:	
Location of:	
Sampled By:	
Date Sampled:	
Using Agency: **ConnDOT**	
Quantity Represented:	
Lot Number:	
Mat-100:	
Sample Received:	
Remarks:	

State of Connecticut Department of Transportation

Bureau of Engineering & Highway Operations

Report of Test: Emulsified Asphalt MAT-402

Standard Specifications CONNDOT: M.04 Bit. Concrete, AASHTO M 140 AND AASHTO M 208

Procedures in conformace with AASHTO T 59 and AASHTO T 49

Rocky Hill Emulsified Asphalt Results

Residue by Evaporation

Set	1	2	3	4	Specification
M_{br} Beaker + Rod + Screen (if used) weight, g					
M_{brr} Beaker + Rod + Screen (if used) + residue, g					
Residue, %					
Residue by Evaporation, %					*

* Residue by distillation limits: For RS-1, RS-1h, CRS-1 and CRS-1h, min 60; SS-1, SS-1h, CSS-1 and CSS-1h, min 57

Penetration at 77°F

Trial	1	2	3	Specification
Penetration at 77°F				
Average Penetration				*
Difference between highest and lowest				**

* Requirement for testing on residue by distillation: For grades RS-1h, SS-1h, CRS-1h and CSS-1h, 40-90; RS-1 and CRS-1, 90-150; SS-1 and CSS-1, 90-250

*** For Penetration 0-49, max. 2; 50-149, max. 4; 150-249, max. 12*

Mass per Gallon

Measure Mass, g	
Measure and Emulsion Mass, g	
M_e, mass in measure at 77°F g	
*D_e, density of the emulsififed asphalt, lb/gal at **77 and 60** °F*	
0 and 0	
Specific Gravity of emulsififed asphalt, 60/60	

Sieve Test

Trial	1	2	Specification
M_{spr} Mass of Sieve, Pan, and Residue, g			
M_{sp} Mass of Sieve and Pan, g			
Sample Retained, %			0.10

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING
MAT-404 (REV 12-16)
BITUMINOUS CONCRETE PLANT INSPECTION

Producer: _____ **Location:** _____

Inspected By: _____ **Date:** _____

The mixing plant used in the preparation of bituminous concrete shall conform to the following requirements:

Plant Type: ☐ **Batch** _____ **Capacity** ☐ **Drum** _____ **Capacity**

Aggregates:

TYPE	SOURCE OF SUPPLY	TYPE	SOURCE OF SUPPLY
☐ **Trap Rock**		☐ **Crushed Gravel**	
☐ **1/4”**		☐ **1/4”**	
☐ **3/8 ”**		☐ **3/8 ”**	
☐ **1/2”**		☐ **1/2”**	
☐ **3/4”**		☐ **3/4”**	
☐ **1”**		☐ **1”**	
☐ **1 1/4”**		☐ **1 1/4”**	
☐ **Natural Sand**		☐ **Stone Sand**	
☐		☐	
☐		☐	
☐		☐	
☐ **Screenings**		☐ **Other**	
☐		☐	
☐		☐	
☐		☐	

Cold Bins:

_____ Number of cold feed storage bins (minimum of 4 required)

☐ Scalping Screens

Dust Return:

Method of Introduction:

- ☐ Pneumatic
- ☐ Screwed
- ☐ Separate Bin

Bag House Options:

- ☐ Reversible Screw
- ☐ Knockout Box
- ☐ Other: _____

Hot Bins:

_____ Number of compartments (minimum of 3 required)

- ☐ Overflow pipes
- ☐ Snug fitting gate: _____

Miscellaneous:

- ☐ Individual belt feeders
- ☐ Vibrating pan
- ☐ Electronic belt weighing devices for aggregates and RAP
- ☐ Belt scale accurate to +/- 0.5%
- ☐ Means for diverting aggregate on conveyor belt before dryer
- ☐ Interlocking system of feeders and conveyors
- ☐ RAP capability
- ☐ Moisture compensating device
- ☐ WMA Technology Device: _____

Asphalt Delivery System:

- ☐ Spray Bar Pressure System (Batch)
- ☐ Spray Bar Gravity Fed System (Batch)
- ☐ Measures accurately to within +/-0.1% of the total weight of mixture
- ☐ Delivers asphalt cement in thin, uniform sheet full width of the mixer: _____
- ☐ Interlock to halt production

Liquid Asphalt Storage Tanks:

☐ **Lines to be separated or equipped with a reverse pump to eliminate contamination**

☐ **Thermostatically controlled with a thermometer in bulkhead**

☐ **Sampling valves located in lower half of an end bulkhead and on mixer supply line.**

☐ **Agitation system to ensure homogenous state**

Number of storage tanks on site:

Tank Number:	Tank Capacity:	Type of Asphalt:

Hot Storage Silos:

Number of Silos:_____

☐ **Heated** ☐ **Unheated**

Type of Heat:

☐ **Cone Hot Oil**

☐ **Cone Electric**

Silo Number	Capacity	Brand	Manufacturer

☐ **The silos shall be equipped with a light or indicator to show when the level of material reaches the top of the discharge cone.**

Automation and Recordation of Bituminous Concrete Plant:

☐ **The plant shall be equipped with an automated digital weighing, cycling, and monitoring system installed with displays located in full view of the operator.**

Batch Recording

The automatic proportioning system shall be capable of consistently delivering materials within the full range of batch sizes with the following tolerances:

☐ **Each Aggregate Component: ±1.5% of individual of cumulative target weight for each bin**

☐ **Mineral Filler: ±0.5% of the total batch**

☐ **Bituminous Material: ±0.1% of the total batch**

☐ **Zero Return (Aggregate): ±0.5% of the total batch**

☐ **Zero Return (Bituminous Material): ±0.1% of the total batch**

An asterisk (*) shall be automatically printed next to any batch weight(s) exceeding tolerances shown below.

Equipment shall monitor the batching sequence of each component of the mixture and produce a printed record.

A printed character shall automatically be printed on the batch plant printout when the automatic batching sequence is interrupted or switched to auto-manual or manual during proportioning.

Plant Scales:

Scales will be checked and sealed by the Weights and Measures Division at least annually and more often if deemed necessary to ensure their accuracy.

☐ **Ten standard 50 lb. (22.7 kg.) test weights for checking plant scales.**

Seal Dates	
Plant Scale:	
Truck Scale:	
Silo(s):	

☐ **D.E.P. Operating Permit (Obtain Copy)** _____

Batch/Drum/Delivery Ticket:

All vendors producing bituminous concrete for the State of Connecticut must have their truck-weighing scales, silo scales, and mixing plant automated so as to provide a detailed ticket containing the following information:

- ☐ **State of Connecticut printed on ticket**
- ☐ **Name of producer and Identification of the Plant or specific storage silo if used**
- ☐ **Date and time**
- ☐ **Mixture designation; Mix type and level***
- ☐ **If WMA technology is used, the additive name and dosage rate or water injection rate must be listed**
- ☐ **Net weight of material (Including RAP (Dry weight) percentage and moisture content, if used)**
- ☐ **Tare weight of vehicle**
- ☐ **Gross weight (equal to the net weight plus the tare weight or the loaded scale weight)**
- ☐ **Project number, purchase order number, name of Contractor (If Contractor is other than the Producer)**
- ☐ **Vehicle number or other means of unique identification of vehicle**
- ☐ **Individual aggregate, RAP, and virgin asphalt max/target/min weights**
- ☐ **Running daily total delivered and sequential load number**

*** NOTE:** Curb Mixture to be used for machine-placed curbing must be shown on ticket as **"Curb Mix Only"**.

☐ **Copy of Printout(s) (Plant & Delivery Ticket)** _____

Please note any variations/comments from inspection below:

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING
MAT-406 (REV 12-16)
BITUMINOUS CONCRETE PLANT LABORATORY – EQUIPMENT INSPECTION

Producer: _____ **Location:** _____

Inspector: _____ **Date:** _____

Contractor's Representative: _____

PLANT LABORATORY REQUIREMENTS

At all points during the production season, this lab must comply with all requirements. The Producer shall ensure that the State's representatives are given priority in the use of the laboratory.

GENERAL:

☐ **A laboratory that is equipped for performing all tests referenced in AASHTO R 35 and AASHTO M 323.**

☐ **The laboratory shall include a PC, printer, and telephone with a dedicated hard-wired phone line. The PC shall have Microsoft Office 2003 or later and a high speed internet connection with a functioning web browser with unrestricted access to https://ctmail.ct.gov. The PC shall have the most recent ConnDOT forms. This equipment shall be made available for use by the State's representative.**

☐ **The field laboratory shall have a potable water source (with documentation stating the source of the potable water) and drainage for use with testing equipment.**

The field laboratory shall:

☐ **be a separate room with minimum floor space of 300 ft^2(27.9 m^2) and a minimum counter space of 20 ft^2(1.9 m^2);**

☐ **have windows installed that allow for sufficient light and ventilation;**

☐ **have a source of fresh air from a door and/or from windows that can be opened;**

☐ **have a ventilation fan that will not adversely affect the room temperature;**

☐ **be equipped with a suitable heating and air conditioning cooling system able to maintain the temperature between 65°F and 80°F(18°C to 27°C); and**

☐ **be clean and be free of all materials and equipment not associated with the laboratory.**

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING
MAT-406 (REV 12-16)
BITUMINOUS CONCRETE PLANT LABORATORY – EQUIPMENT INSPECTION

EQUIPMENT:

☐ **A list of laboratory equipment used in acceptance testing processes including, but not limited to, balances, scales, manometer/vacuum gauge, thermometers, gyratory compactor. The list shall include calibration and/or inspection dates in accordance with AASHTO R 18.**

☐ **Paint brush: 1 in to 1 ½ in (25 mm to 38 mm) wide.**

☐ **Hand brush: suitable for cleaning sieves.**

☐ **Two, 6 in. (152 mm) spatulas.**

☐ **Two stem thermometers for mix temperatures with a range of 50°F to 450°F (10°C to 230°C).**

☐ **Thermometers: Calibrated liquid-in-glass, total immersion type, of suitable range with gradations at least over 0.2°F (0.1°C) and a maximum scale error of 0.2°F (0.1°C) as prescribed in ASTM Specification E2.**

☐ **Vacuum pump or water aspirator for evacuation of air from the container: The vacuum pump or water aspirator shall be equipped with a needle valve to maintain constant vacuum.**

☐ **Water bath: Shall be capable of maintaining constant temperature between 20 and 30°C and constant suitable water level.**

☐ **Residual pressure manometers or vacuum gauges (Mercury manometers are not allowed for use.): See diagram below for proper placement of manometer or gauge.**

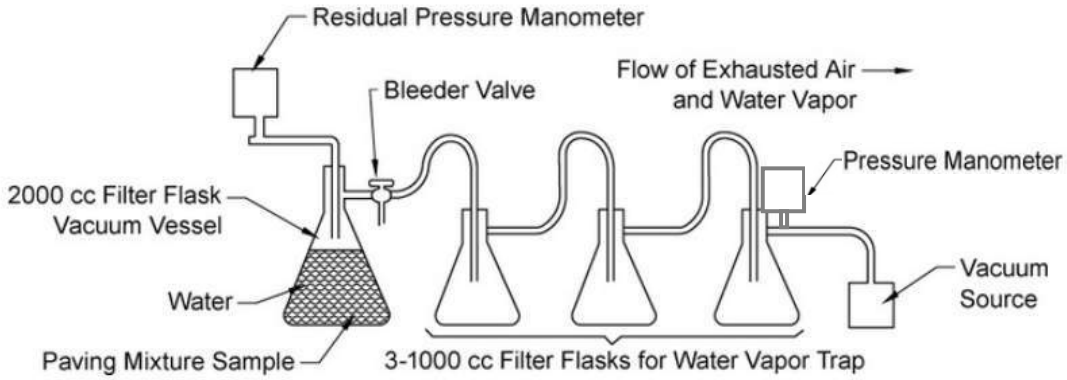


Figure 1—Example of Correct Arrangement of Testing Apparatus

Date manometer/gauge was last standardized: ☐

Date manometer/gauge was last standardized: ☐

EQUIPMENT (Continued):

☐ **Superpave gyratory compactor: Capable of providing a consolidation pressure of 600 ± 18 kPa, an internal angle of gyration of 1.16 ± 0.02 degrees, and a speed of gyration of 30 ± 0.5 rpm. Gyratory compactor shall be directly connected to printer.**

Manufacturer's Name: ☐

Date gyratory compactor was last standardized: ☐

☐ **Three (3) Superpave cylindrical molds: Large enough to accommodate the following specimen requirements: 150 mm diameter, 90 to 150 mm heights. Molds shall have an inside diameter of 149.9 to 150.0 mm and be at least 250 mm high.**

☐ **Extrusion jack or Arbor press: Capable of extruding compacted specimens from molds without distortion or damage.**

☐ **Timer: Accurate to one-minute increments and capable of measuring from 1 min. to 60 min. The timer shall have audible alert when the time has expired.**

☐ **Pans: Four (4) metal pans of adequate size to hold 5000 grams of material and for reheating gyratory sample to compaction temperature.**

☐ **Mechanical agitator device: Capable of running two samples simultaneously and applying consistent agitation.**

☐ **Putty knife or scraper.**

☐ **Trowel or quartering device.**

☐ **Eye wash station: A double (two-eye) wash station (2,000 ml minimum) or sink mounted (potable water source with documentation stating the source of the potable water) capable of cleaning both eyes simultaneously, installed in the laboratory for ready access. Contents shall be tamperproof and dated.**

Solution Expiration Date: ☐

☐ **Large scoop.**

☐ **Heavy (Kraft) wrapping paper or other suitable paper.**

☐ **Long handled shovel.**

☐ **Five, 3 gal (12L) sample buckets.**

EQUIPMENT (Continued):

☐ **Sample splitter suitable to split aggregate samples (coarse and fine).**

☐ **Fire extinguisher for electrical or chemical fires effective on all solvents used in the laboratory.**

Date refilled or checked (within one year): ☐

☐ **A 12 ft^3 forced draft oven**

☐ **Thermostatically controlled so as to maintain temperature within ± 5°F (3°C)**

☐ **Temperature range of 104°F to 395°F (40°C to 200°C)**

☐ **Ignition Oven(s)**

☐ **Correction Factors for each ignition oven (See MAT-433)**

Oven 1: Date Internal Balance was last standardized: ☐

Oven 2: Date Internal Balance was last standardized: ☐

☐ **Truck Body Release Agent**

Brand Name: ☐

☐ **Sieve Shaker**

☐ **Motorized shaker having a horizontal sieving motion and a tapping action**

☐ **Equipped with an automatic 0 to 30 minute timer capable of turning off the shaker**

Brand Name: ☐

Shaking Action: ☐ **Good** ☐ **Fair** ☐ **Unacceptable**

Sieve retaining & hold-down: ☐ **Good** ☐ **Fair** ☐ **Unacceptable**

Able to hold a 15 in. (380 mm) nest of sieves: ☐ **Yes** ☐ **No**

Timer accuracy: ☐ **Acceptable** ☐ **Unacceptable**

EQUIPMENT (Continued):

☐ **Sieves (U.S. Standard)**

☐ **Set of 8 in. (200 mm) sieves**

☐ **Set of 12 in. (300 mm) sieves**

A minimum of one for each of the above sieve sizes:

☐ **Pan (may be half height)**
☐ **#200 (75 µm) (may be half height)**
☐ **#100 (150µm) (may be half height)**
☐ **#50 (300µm) (may be half height)**
☐ **#30 (600µm) (may be half height)**
☐ **#16 (1.18mm) (may be half height)**
☐ **#8 (2.36mm) (may be half height)**
☐ **#4 (4.75 mm)**
☐ **3/8" (6.3mm)**
☐ **½" (9.5 mm)**
☐ **¾" (19 mm)**
☐ **1" (25 mm)**
☐ **$1\ ^{1}/_{2}$" (37.5 mm)**
☐ **2" (50mm)**

☐ **Electronic Balances**

☐ **Two 20 kg (42 lb) capacity scales with sufficient sensitivity to read to ± 0.1 grams. For the AASHTO T 209 - mass determination in water method, one of the balances shall be equipped with a suitable suspension apparatus and holder to permit weighing the sample while suspended from the center of the scale plan or balance.**

Brand Name	Type	Last Calibration Date

EQUIPMENT (Continued):

- ☐ **Workbench: Adequate in size**
- ☐ **Sampling table (minimum dimensions: 36 in. x 36 in. (914 mm x 914 mm))**
- ☐ **Sampling Platform or Catwalk**
  - ☐ **Step access and railing**
  - ☐ **Located a safe distance from the plant and a maximum of 75 ft (25 m) from the laboratory entrance. The platform must be as close to the laboratory as traffic patterns allow.**
  - ☐ **Located so that plant traffic flow is not impeded.**
  - ☐ **Height of platform is adequate to sample any size vehicle.**
  - ☐ **Platform permanently anchored.**
  - ☐ **Sampling platform structure: no visible weak or rotted materials.**

    General Condition: ☐ **Acceptable** ☐ **Unacceptable**
  - ☐ **Sufficient lighting for night work. Describe:** ☐

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING
MAT-407 (REV 12-16)
PLANT AND LABORATORY DEFICIENCY REPORT

Producer: _____ **Location:** _____

Inspector: _____ **Date:** _____

On the above date, the following deficiencies were found in your Plant/Laboratory.

Item	Deficiency	Correction/Response
1)		
2)		
3)		
4)		
5)		
6)		
7)		
8)		
9)		
10)		

Please make the necessary corrections before the first day of production and email responses to the following email address: DOT.Materials-HMA@ct.gov.

Failure to correct the indicated deficiencies may result in loss of State approval.

QA VERIFICATION FORM
FORM MAT-408

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING AND CONSTRUCTION
DIVISION OF MATERIALS TESTING

Project #:		Vendor #	
Project Date		Plant Location	
Mix Size		Level:	
Tech ID			

				QA DATA				QC DATA		
				Mixture Mass:				Mixture Mass:		
				Aggregate Mass:				Aggregate Mass:		
		Tol ±	JMF	Mass loss:				Mass loss:		
Pb by extraction		0.4		Pb by extraction				Pb by extraction		
Pb by ignition oven		0.4		Pb by ignition				Pb by ignition		
Sieve Size				mass	% Ind.	% Acc.		mass	% Ind.	% Acc.
mm	in	Tol ±	JMF	passing	passing	passing		passing	passing	passing
0.075	#200	2								
0.150	#100	3								
0.300	#50	3								
0.600	#30	4								
1.18	#16	4								
2.36	#8	6								
4.75	#4	6								
9.5	3/8"	6								
12.5	1/2"	6								
19.0	3/4"	6								
25.0	1"	6								
37.5	1-1/2"	6								
50.0	2"	6								
	Total									
Gmb			Mold			Average				Average
(1) Specimen mass in air										
(2) Saturated Spec. mass in air										
(3) Mass of speciment in water										
(4) Volume of specimen (2-3)										
Gmb @ Nmax (1/4)		0.040								
Gmm			Bowl			Average				Average
(A) Mass of HMA plus bowl										
(B) Mass of bowl in air										
(C) Mass of HMA in air (A-B)										
(D) Mass of HMA plus bowl in water										
(E) Mass of bowl in water										
(F) Mass of HMA in water (D-E)										
(G) Volume of HMA (C-F)										
Gmm (C/G)		0.030								

S:\MT Manual\FORM-MAT-408 QA Verification

State of Connecticut Department of Transportation
Division of Materials Testing
MAT-412cm revision 12/16

Project Number:				**Material Code:**	**Curb Mix**					**Production Date:**				
Vendor Number:				**Mix Time (Dry-Wet):**						**Contract:**				
Plant:				**Technician Name(Print):**						**Departure Tonnage:**				
Location:				**Test Date**		**Test Date**				**Test Date**				
Mix Size:	**9.5 mm 50 gyrations**			**Test Time**		**Test Time**				**Test Time**				
Percent RAP:				**Load Number**		**Load Number**				**Load Number**				
Rap AC:		**Total AC**	**AC Range**	**Truck Temp.**		**Truck Temp.**				**Truck Temp.**				
Production AC:			**6.5 - 0.4**	**Sublot Number**		**Sublot Number**				**Sublot Number**				
Input only one value for each test below (Oven).				**Plant / Silo Number**		**Plant / Silo Number**				**Plant / Silo Number**				
Correction Factor / Ignition Oven Ticket Information				**Mixture Mass on Ticket**		**Mixture Mass on Ticket**				**Mixture Mass on Ticket**				
Test	**Correction Factor**		**Oven ID**	**Wt. Loss**		**Wt. Loss**				**Wt. Loss**				
Test 1				**% Loss**		**% Loss**				**% Loss**				
Test 2				**Temp Comp**		**Temp Comp**				**Temp Comp**				
Test 3				**Mix Moisture**		**Mix Moisture**				**Mix Moisture**				
D.O.T. INSPECTORS ENTER YOUR NAME IN THE CELLS TO THE RIGHT PER TEST WITNESSED				**Pb by Ignition oven**		**Pb by Ignition oven**				**Pb by Ignition oven**				

Inch	mm	Production Tolerance	JMF	Sieve Weights	Passing	Cumm. Passing	Sieve Weights	Passing	Cumm. Passing	Sieve Weights	Passing	Cumm. Passing
JMF Binder Content												
#200	0.075	2.0										
#100	0.150											
#50	0.300	4										
#30	0.600	5										
#16	1.18											
#8	2.36	6										
#4	4.75	7										
3/8"	9.5	8										
1/2"	12.5											
3/4"	19.0											
		Total Wt.										

Temperature / Weather		**JMF DATE / Notes**							
Binder	**Aggregate**	**1"/Other**	**1/2"**	**3/8"**	**RAP**	**Sand #1**	**Sand #2**	**Sand #3/Other**	**Virgin Binder**
Binder Grade	Source								
Binder Source	JMF Cold Feed %								
Antistrip Source	Plant Cold Feed Setting								
Antistrip %	Cold Feed Setting to 100%								N/A

WMA Technology	**Only for Batch Plants**	**Aggregate**	**Bin 5/Other**	**Bin 4**	**Bin 3**	**Bin 2**	**Bin 1**	**RAP**	**Virgin Binder**
Technology		JMF Hot Bin %							
Name		Plant Hot Bin Settings							
Rate (%)		Hot Bin Settings to 100%							N/A

State of Connecticut Department of Transportation Division Of Materials Testing
MAT-412s revision 11/16

Project Number:		**Rt/Town**		**Gyrations:**		**Material Code:**		**Production Date:**			
Vendor Number:		**Lot**		**Mix Time (Dry-Wet):**		**NETTCP ID #:**		**Contract:**			
Plant / Location:	/			**Technician Name(Print):**				**Daily Departure Tonnage in Lot :**			
Estimated Total Project Tonnage for mix				**Test Date/Time**		**Test Date/Time**		**Test Date/Time**			
Type of Lot				**Load Number**		**Load Number**		**Load Number**			
Today Results Complete Lot ?				**Truck Temp.**		**Truck Temp.**		**Truck Temp.**			
Mix Size:		**RAP Daily (dried & w/o IO CF) Ignition Oven Pb**		**Sublot Number**		**Sublot Number**		**Sublot Number**			
				Gyro Temp. (1)-(2)		**Gyro Temp. (1)-(2)**		**Gyro Temp. (1)-(2)**			
Percent RAP:		**JMF RAP IO CF**		**Plant / Silo Number**		**Silo Number**		**Silo Number**			
Corrected Rap Pb:		**Total AC**	**Minimum AC**	**Mixture Mass on Ticket**		**Mixture Mass on Ticket**		**Mixture Mass on Ticket**			
Virgin Pb:				**Wt. Loss**		**Wt. Loss**		**Wt. Loss**			
Correction Factor / Ignition Oven Ticket Information				**Ext. Weight After Test**		**Ext. Weight After Test**		**Ext. Weight After Test**			
Test	**Correction Factor**		**Oven ID**	**% Loss**		**% Loss**		**% Loss**			
				Temp Comp		**Temp Comp**		**Temp Comp**			
Test 1				**Mix Moisture (T 329)**		**Mix Moisture (T 329)**		**Mix Moisture (T 329)**			
Test 2				**Pb by AASHTO T 308**		**Pb by AASHTO T 308**		**Pb by AASHTO T 308**			
Test 3				**Pb from Plant/Truck Ticket**		**Pb from Plant/Truck Ticket**		**Pb from Plant/Truck Ticket**			
D.O.T. INSPECTORS ENTER YOUR NAME IN THE CELLS TO THE RIGHT PER TEST WITNESSED				**Pb Difference**		**Pb Difference**		**Pb Difference**			

Inch	**mm**	**Control Points**	**Prod Range for +Adj**	**JMF Target**	**Sieve Weights**	**Passing**	**Cumm. Passing (AASHTO T 30)**	**Sieve Weights**	**Passing**	**Cumm. Passing (AASHTO T 30)**	**Sieve Weights**	**Passing**	**Cumm. Passing (AASHTO T 30)**
Total Binder Content													
#200	0.075												
#100	0.150												
#50	0.300												
#30	0.600												
#16	1.18												
#8	2.36												
#4	4.75												
3/8"	9.5												
1/2"	12.5												
3/4"	19.0												
1"	25.0												
1 1/2"	37.5												
2"	50.0												
			Total Wt.										
JMF Date:			**Pba**										
JMF Gsa:			**VFA**										
JMF Gsb:			**Gse**										
JMF Pba:			Info only: VMA(Pb ticket, Est Gsb from Gse)										
Specimen mass in air													
Saturated specimen mass in air (I)													
Less mass of specimen in water (J)													
Volume of specimen (I-J)													
Gmb @ Ndes (AASHTO T 166)													
Mass of HMA plus bowl in air (A)													
Less mass of bowl in air													
Mass of HMA in air													
Mass of HMA plus bowl in water													
Less mass of bowl in water													
Mass of HMA in water													
Volume of HMA													
Gmm (AASHTO T 209)	**JMF Gmm**		0.030										
Va (100-(Gmb @ Ndes / Gmm)*100))			1.0	**4.0**									
VMA (AASHTO R 35)			1.0										
Calculated Gsb from Gse / INFORMATION ONLY			Gse-(0.8/0.6)*(JMG Gsa-JMFGsb)										
VMA from calculated Gsb / INFORMATION ONLY			From Gsb(F=0.6 / F=0.8)										
HEIGHT (Hi) @ Nini													
Density to Nini													
HEIGHT(Hd) @ Ndes													

Temperature / Weather

JMF Changes / Notes

Binder		**Aggregate**	**1"/Other**	**1/2"**	**3/8"**	**RAP**	**Sand #1**	**Sand #2**	**Sand #3/Other**	**Virgin Binder**
Binder Grade		Source								
Binder Source		JMF Cold Feed %								
Antistrip Source		Plant Cold Feed Setting								
Antistrip %		Cold Feed Setting to 100%								N/A

WMA Technology			**Aggregate**	**Bin 5/Other**	**Bin 4**	**Bin 3**	**Bin 2**	**Bin 1**	**RAP**	**Virgin Binder**
Technology		**Only for Batch Plants**	JMF Hot Bin %							
Name			Plant Hot Bin Settings							
Rate (%)			Hot Bin Settings to 100%							N/A

State of Connecticut
Department of Transportation
MAT-412s_ppt revision 2/15
VIP and Construction 2009 and up

Project Number				**Gyrations:**			**Material Code:**			**PPT Date**		
Vendor Number				**Mix Time (Dry-Wet):**			**NETTCP ID #:**			**Contract**		
Plant				**Technician Name(Print)**						**Departure Tonnage:**		
Location				**Test Date/Time**			**Test Date/Time**			**Test Date/Time**		
Mix Size:				**PPT #**			**PPT #**			**PPT #**		
Percent RAP:				**Truck Temp.**			**Truck Temp.**			**Truck Temp.**		
Rap AC		**Total AC**	**Minimum AC**	**Option used for PPT**			**Option used for PPT**			**Option used for PPT**		
Production AC				**Gyro Temp. (1)-(2)**			**Gyro Temp. (1)-(2)**			**Gyro Temp. (1)-(2)**		
Input only one value for each test below (Oven)				**Plant / Silo Number**			**Plant / Silo Number**			**Plant / Silo Number**		
Correction Factor / Ignition Oven Ticket Imformation				**Mixture Mass on Ticket**			**Mixture Mass on Ticket**			**Mixture Mass on Ticket**		
Test	**Oven**			**Wt. Loss**			**Wt. Loss**			**Wt. Loss**		
Test 1				**% Loss**			**% Loss**			**% Loss**		
Test 2				**Temp Comp**			**Temp Comp**			**Temp Comp**		
Test 3				**Mix Moisture**			**Mix Moisture**			**Mix Moisture**		
D.O.T INSPECTORS ENTER YOUR NAME IN THE CELLS TO THE RIGHT PER TEST WITNESSED				**Pb by Ignition oven**			**Pb by Ignition oven**			**Pb by Ignition oven**		

Inch	mm	Control Points	JMF Information Only	Sieve Weights	Passing	Passing	Sieve Weights	Passing	Passing	Sieve Weights	Passing	Passing
#200	0.075											
#100	0.150											
#50	0.300											
#30	0.600											
#16	1.18											
#8	2.36											
#4	4.75											
3/8"	9.5											
1/2"	12.5											
3/4"	19.0											
1"	25.0											
1 1/2"	37.5											
2"	50.0											
		Total Wt.										

JMF Pba:		JMF Gsa:			JMF Gsb:				JMF Gse:			
Specimen mass in air												
Saturated specimen mass in air (I)												
Less mass of specimen in water (J)												
Volume of specimen (I-J)												
Gmb @ Nmax (AASHTO T 166)												
Mass of HMA plus bowl in air (A)												
Less mass of bowl in air												
Mass of HMA in air												
Mass of HMA plus bowl in water												
Less mass of bowl in water												
Mass of HMA in water												
Volume of HMA												
Gmm (AASHTO T 209)		0.030										
Va (100-(Gmb @ Ndes / Gmm)*100))		1.0	**4.0**									
VMA (AASHTO R 35)		1.0										
VFA (AASHTO R 35)												
DUST/ASPHALT =(-0.075mm/Pbe)		0.3	**0.9**									
Gse												
HEIGHT (Hi) @ Nini												
HEIGHT(Hd) @ Ndes												
HEIGHT(Hm) @ Nmax												
DENSITY @ Nini		Max.										
DENSITY @ Ndes		1.0	**96.0**									
DENSITY @ Nmax		Max.	**98.0**									

J.M.F DATE				**Hot Bin Pulls From Plant %**	**Bin 4**	**Bin 3**	**Bin 2**	**Bin 1**	**Other Bin**	**RAP**	**Binder**	
Change(s)												
Temp / Weather					**Sand # 1 %**		**Sand #2 %**		**Sand #3 %**			
Binder Grade		**WMA Technology**		**Cold Feed Pulls From Plant %**	**1/2"**	**3/8"**	**Sand #1**	**Sand #2**	**Other Agg**	**RAP**	**Binder**	
Binder Source		**Name**										
Antistrip (%)		**Rate (%**		**Aggregates Sources**	**CA**			**FA**				

State of Connecticut Department of Transportation
Division of Materials Testing
MAT-412ut revision 06/13

Project Number:				**Material Code:**	**Ultra-Thin Bonded HMA Type B**					**Production Date:**				
Vendor Number:				**Mix Time (Dry-Wet):**						**Contract:**				
Plant:				**Technician Name(Print):**						**Departure Tonnage:**				
Location:				**Test Date**			**Test Date**			**Test Date**				
Mix Size:	**9.5 mm**			**Test Time**			**Test Time**			**Test Time**				
Percent RAP:				**Load Number**			**Load Number**			**Load Number**				
Rap AC:		**Total AC**	**AC Range**	**Truck Temp.**			**Truck Temp.**			**Truck Temp.**				
Production AC:			**4.8 - 5.4**	**Sublot Number**			**Sublot Number**			**Sublot Number**				
Input only one value for each test below (Oven).				**Plant / Silo Number**			**Plant / Silo Number**			**Plant / Silo Number**				
Correction Factor / Ignition Oven Ticket Information				**Mixture Mass on Ticket**			**Mixture Mass on Ticket**			**Mixture Mass on Ticket**				
Test	**Correction Factor**		**Oven ID**	**Wt. Loss**			**Wt. Loss**			**Wt. Loss**				
Test 1				**% Loss**			**% Loss**			**% Loss**				
Test 2				**Temp Comp**			**Temp Comp**			**Temp Comp**				
Test 3				**Mix Moisture**			**Mix Moisture**			**Mix Moisture**				
D.O.T. INSPECTORS ENTER YOUR NAME IN THE CELLS TO THE RIGHT PER TEST WITNESSED				**Pb by Ignition oven**			**Pb by Ignition oven**			**Pb by Ignition oven**				

Inch	mm	Production Tolerance	JMF	Sieve Weights	Passing	Cumm. Passing	Sieve Weights	Passing	Cumm. Passing	Sieve Weights	Passing	Cumm. Passing
#200	0.075											
#100	0.150											
#50	0.300											
#30	0.600											
#16	1.18											
#8	2.36											
#4	4.75											
1/4"	6.3											
3/8"	9.5											
1/2"	12.5											
3/4"	19.0											
		Total Wt.										

Temperature / Weather		**JMF DATE / Notes**							
Binder		**Aggregate**	**1"/Other**	**1/2"**	**3/8"**	**RAP**	**Sand #1**	**Sand #2**	**Sand #3/Other**	**Virgin Binder**
Binder Grade		Source								
Binder Source		JMF Cold Feed %								
Antistrip Source		Plant Cold Feed Setting								
Antistrip %		Cold Feed Setting to 100%								N/A

WMA Technology	**Only for Batch Plants**	**Aggregate**	**Bin 5/Other**	**Bin 4**	**Bin 3**	**Bin 2**	**Bin 1**	**RAP**	**Virgin Binder**
Technology		JMF Hot Bin %							
Name		Plant Hot Bin Settings							
Rate (%)		Hot Bin Settings to 100%							N/A

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING

MAT- 417 Worksheet : Random Lot Selection at Plant

RANDOM LOCATIONS BY ASTM D-3665

Immediately after the random numbers are generated, email this file to: DOT.Materials-HMA@ct.gov

Project Number:	
Vendor Number:	
Plant:	
Location:	
Lot Number:	
Material Code:	
Mix Size:	

Estimated Total Tonnage		Average Tonnage per Truck	

Production Day #	1	2	3	4	5	6	7
Date							
Actual Daily Tonnage in Lot							
Cumm. Tonnage in Lot	0						

Sub Lot #	Random #	Sublot Tonnage	Load Number on Date						
	0.000								
	0.000								
	0.000								
	0.000								
	0.000								
	0.000								
	0.000								

Table 1. Random Numbers Working Table

State of Connecticut
Department of Transportation
Division of Materials Testing - Job Mix Formula Verification
Form MAT-418

Mix

Plant Information

Vendor Number:	
Plant:	
Location:	

Aggregate Properties

	JMF Target	DMT Result	Difference	Tolerance
0.075				1.0
0.15				3
0.3				3
0.6				4
1.18				4
2.36				5
4.75				5
9.5				5
12.5				4
19				4
Gsb				0.028
Gsa				0.025
SE				15
FAA				0.8

Mix Properties **Binder Content (%)**

	JMF Target	DMT Result	Difference	Tolerance
Gmb				0.020
Gmm				0.022
Va				1.3
VMA				1.3
VFA				6.0
Pba				0.6
Factor				NA
Dust/Pbe				NA
Density to Nini				1.5
Gse				0.025

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING

Quality Control Plan for Fine Aggregates (QCPFA) used in HMA

1. Basic Information	
A. Origin of Materials	
1. Name and address of property owner or lessee.	
Name	
Address	

2. Name, title, and telephone number of company contact person.	
Name	
Title	
Telephone number	

3. Name, title, telephone number and certifications, if applicable, of the person(s) responsible for the QCPFA.	
Name	
Title	
Telephone number	
Certifications	
Name	
Title	
Telephone number	
Certifications	

Quality Control Plan for Fine Aggregates (QCPFA) used in HMA

2. Controls Implemented During Excavation	
A. Overburden Removal	
1. To what depth is the overburden removed?	
Depth	

2. What is the minimum separation between the edge of overburden and the production face?	
Separation	

3. How will sloughed overburden be avoided?	
Method of Avoidance	

B. Mining Controls	
1. Describe how excavation will be performed so that intended materials are being mined.	
Description	

2. Who will make the determination?	
Name	
Title	
Telephone number	
Certifications	

Quality Control Plan for Fine Aggregates (QCPFA) used in HMA

2. Controls Implemented During Excavation (continued)	
B. Mining Controls (cont.)	
3. How will clean-out materials from old ramps, overlying lifts, striping or floor leveling be handled?	
Description	

4. What tests are being utilized to verify that intended materials are being mined?	
Description	

5. How will it be assured that your material meets all specifications as required by the latest ConnDOT M.04 criteria before it is shipped?	
Description	

C. Product Uniformity Controls	
1. Describe method of loading out shot rock or sand & gravel from a face to minimize non-uniformity?	
Description	

Quality Control Plan for Fine Aggregates (QCPFA) used in HMA

2. Controls Implemented During Excavation (continued)	
C. Product Uniformity Controls (cont.)	
2. Describe any other procedure(s) used to minimize non-uniformity?	
Description	

3. Processing Controls	
A. Type of processing	
1. Describe the type of processing being done on the material.	
Description	

2. Describe the type of equipment used during processing.	
Description	

3. Describe how non-uniformity will be minimized during aggregate processing.	
Description	

4. Describe how aggregate quality will be improved by processing.	
Description	

Quality Control Plan for Fine Aggregates (QCPFA) used in HMA

4. Stockpiling	
A. Stockpiles	
1. Describe the height and width of stockpile.	
Height	
Width	

2. Describe the method by which the stockpile is created (by haul unit, belt system etc.).	
Description	

3. Describe how non-uniformity will be minimized in the stockpiles.	
Description	

4. Describe how contamination will be minimized in the stockpiles.	
Description	

Quality Control Plan for Fine Aggregates (QCPFA) used in HMA

4. Stockpiling (continued)	
A. Stockpiles (cont.)	
5. Describe how the stockpiles will be monitored for non-uniformity and contamination.	
(How will non-uniformity and contamination be visually monitored and by who?)	
Description	
Who will be monitoring?	

6. What physical tests will be employed to monitor quality of fine aggregate?	
Description	

7. What is the minimum testing frequency?	
Description	

8. Who will do the test?	
Description	

Quality Control Plan for Fine Aggregates (QCPFA) used in HMA

4. Stockpiling (continued)	
A. Stockpiles (cont.)	
9. What actions will be taken when the material does not meet the requirements?	
Description	

5. Records	
A. Method	
1. What quality monitoring records are maintained?	
Description	

2. Where are the quality monitoring records maintained?	
Description	

3. Who is responsible for maintaining these records?	
Name	
Title	
Telephone number	
Name	
Title	
Telephone number	

Please submit to the DMT via e-mail at DOT.MatTesting@ct.gov.

MAT - 429cm

State of Connecticut
Department of Transportation
Division of Materials Testing

Plant		**MIX #**	**Curb Mix**
Location			
Plant Type/Capacity			
Submitted By			
Date Submitted			

Description	Size/Type of Aggregate	Source of Supply	Source Location	Blend Percent
CA-Aggregate 1				
CA-Aggregate 2				
CA-Aggregate 3				
CA/RAP-Aggregate 4				
FA-Aggregate 5				
FA-Aggregate 6				
FA-Aggregate 7				

Description		Source of Supply	Laboratory Temperature Ranges		Production Temperature Ranges	
Asphalt Binder Grade			**Mfg recommended mix temp range**		**Mfg recommended mix temp range**	
Antistrip Percentage			**Mfg recomm compaction temp range**		**Mfg recomm compaction temp range**	

Warm Mix Technology	Water inject rate per weight of binder or	additive rate per weight of binder	or additive rate per total weight of mix

Nom. Size	**Contractor Data**								Specifications		*Contractor JMF*
9.5mm L1	Agg 1	Agg 2	Agg 3	Agg 4	Agg 5	Agg 6	Agg 7	Calc.	**Control Points**		
	CA	CA	CA	CA/RAP	FA	FA	FA	JMF			
Description								Comp.			*Submitted*
Blend Percent									Min %	Max %	
0.075									**3.0**	**8.0**	
0.150											
0.300									**10.0**	**30.0**	
0.600									**20.0**	**40.0**	
1.18											
2.36									**40.0**	**70.0**	
4.75									**65.0**	**87.0**	
9.5									**95.0**	**100.0**	
12.5									**100.0**	**100.0**	
19.0											
25.0											

Production Virgin Pb		**RAP AC**		**Total/Target AC**	
Total binder in RAP					

Test Results		**MIX TEMP**		**COMPACTION TEMP**		**Mix Times**	**WET**	
Gmm		**AC Range**		**6.5 - 9.0**			**DRY**	
Gmb - Ndes								
Gmb - Nini								
Height-Ndes								
Height-Ndes								
Height-Nini								
% Gmm at Nini								
Gse								
Va - Ndes								
Ignition Oven Corr. Factor								

User Notes:

- White cells to be completed by the Contractor.
- Production Pb (w/ RAP) = The total production binder in the HMA.
- Contractor JMF should reflect extracted asphalt and washed sieved analysis.
- List all the JMF Changes in the "JMF Changes" sheet.
- Volumetric data for total asphalt content.
- Complete the % passing per each specimen up to at least the 25.0mm sieve.
- Add binder specific gravity data if it differs from 1.033.

Remarks:

Accepted By		**Date**	

State of Connecticut
Department of Transportation
Division of Materials Testing

MAT-429s rev 11/2016

Plant		**MIX # Example "4000" or "4000R" or "4000-W" or "4000R-W"**	
Location			
Plant Type/Capacity			
Submitted By			
Date Submitted			

Description	Size/Type of Aggregate	Source of Supply	Source Location	Blend Percent
CA-Aggregate 1				
CA-Aggregate 2				
CA-Aggregate 3				
CA/RAP-Aggregate 4				
FA-Aggregate 5				
FA-Aggregate 6				
FA-Aggregate 7				

Description		Source of Supply	Temperature Ranges (Without WMA)		Temperature Ranges (With WMA)	
Asphalt Binder Grade			**Mfg recommended mix temp range**		**Mfg recommended mix temp range**	
Antistrip Percentage			**Mfg recomm compaction temp range**		**Mfg recomm compaction temp range**	

Warm Mix Technology	Where WMA Additive is Added?	Water injection or additive rate per weight of binder	or additive rate per total weight of mix

Nom. Size	**Contractor Data**								Specifications		*Contractor JMF*
	Agg 1	Agg 2	Agg 3	Agg 4	Agg 5	Agg 6	Agg 7	Calc.	**Control Points**		
	CA	CA	CA	CA/RAP	FA	FA	FA	JMF			
Description								Comp.			*Submitted*
Blend Percent									Min %	Max %	
0.075											
0.150											
0.300											
0.600											
1.18											
2.36											
4.75											
9.5											
12.5											
19.0											
25.0											
37.5											
50.0											
Production Virgin Pb			**RAP AC**			**Total/Target AC**					
Total binder in RAP											
Gsa											
Gsb											

Test Results		**MIX TEMP**		**COMPACTION TEMP**		**Mix Times**	**WET**	
Gmm		**Minimum AC**		**PCS**			**DRY**	
Gmb - Nmax								
Gmb - Ndes								
Gmb - Nini								
Height-Nmax								
% Gmm at Nmax								
Height-Ndes								
Height-Nini								
% Gmm at Nini								
Gse								
Multiplier (AASHTO R35 App. X1.2)								
Va - Ndes								
VMA								
VFA - Ndes								
Pba								
Pba/Pw								
Pbe								
Dust/Pbe								
TSR (AASHTO T283 (M))								
Ignition Oven Corr. Factor								

User Notes:

- White cells to be completed by the Contractor.
- Production Pb (w/ RAP) = The total production binder in the HMA.
- Contractor JMF should reflect extracted asphalt and washed sieved analysis.
- List all the JMF Changes in the "JMF Changes" sheet.
- Volumetric data for total asphalt content.
- Complete the % passing per each specimen up to at least the 25.0mm sieve.
- Add binder specific gravity data if it differs from 1.033.

Remarks:

Accepted By		**Date**	

State of Connecticut
Department of Transportation
Division of Materials Testing

Form-429ut rev 02-15

Plant		**MIX #**	**Ultra-Thin HMA Type B**
Location			
Plant Type/Capacity			
Submitted By			
Date Submitted			

Description	Size/Type of Aggregate	Source of Supply	Source Location	Blend Percent
CA-Aggregate 1				
CA-Aggregate 2				
CA-Aggregate 3				
CA/RAP-Aggregate 4				
FA-Aggregate 5				
FA-Aggregate 6				
FA-Aggregate 7				

Description		Source of Supply	Laboratory Temperature Ranges		Production Temperature Ranges	
Asphalt Binder Grade			**Mfg recommended mix temp range**		**Mfg recommended mix temp range**	
Antistrip Percentage			**Mfg recomm compaction temp range**		**Mfg recomm compaction temp range**	

Warm Mix Technology	Water inject rate per weight of binder or	additive rate per weight of binder	or additive rate per total weight of mix

Nom. Size	**Contractor Data**								Specifications		*Contractor JMF*
9.5mm	Agg 1	Agg 2	Agg 3	Agg 4	Agg 5	Agg 6	Agg 7	Calc.	**Control Points**		
	CA	CA	CA	CA/RAP	FA	FA	FA	JMF			
Description								Comp.			*Submitted*
Blend Percent									Min %	Max %	
0.075									4.0	7.0	
0.150									5.0	10.0	
0.300									8.0	16.0	
0.600									12.0	20.0	
1.18									16.0	26.0	
2.36									21.0	32.0	
4.75									24.0	40.0	
6.5									30.0	50.0	
9.5									85.0	100.0	
12.5									100.0	100.0	
19.0											
25.0											
37.5											
50.0											
Production Virgin Pb	**5.00**		**RAP AC**			**Total AC / JMF Pb Total**					**5.00**
Total binder in RAP											
Gsa									**Mix Times**		**WET**
Gsb									**DRY**		

Test Results		**AC**	**4.8-5.4**
Gmm			
Gse			
Multiplier (AASHTO R35 X1.2)			
Pba (%)			
SA (m^2/kg)			
Pbe (%)			
Tf (μ_m)			
Draindown (%)			
TSR (%)			
Ignition Oven Corr Factor			

User Notes:

- White cells to be completed by the contractor
- Production Pb (w/ RAP) = The total production binder in the HMA
- Contractor JMF should reflect extracted asphalt and washed sieved analysis
- List all the JMF Changes in the "JMF Changes" sheet
- In the table on the left, provide the HMA volumetric data for the Total AC= 5
- Complete the % passing per each specimen up to at least the 25.0mm sieve
- Add binder Specific Gravity data if it differs from 1.033

Remarks:

Accepted By		**Date**	

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING
IGNITION OVEN CORRECTION FACTOR SUMMARY
MAT-433

REV. 12/16

Plant: _____ Location: _____

State Inspector: _____ Date: _____

Contractor's Representative: _____

Ignition Oven Make/Model: _____

Ignition Oven ID#: _____

Correction factors are in accordance with AASHTO T 308.

Mix	Mix Design Date	RAP (%)	Total Pb (%)	Mix Correction Factor	Previous Years' Correction Factors*		
					2014	2015	2016
4076							
4077							
4078							
4052							
4053							
4054							
4056							
4057							
4058							
4064							
4065							
4066							
Curb Mix							
Porous							
UTHMA							
RAP	---	100					
Other							

* Prior to 2015, correction factors were in accordance with AASHTO T 308 (M).

State of Connecticut Department of Transportation
Division of Materials Testing
Daily Plant Adjustment Form MAT-438non-PWL

Project #	0	Day/Night	Day	Contract Year	0
Location (RT/Town)	0	PO #		Payable Tons	
Date Placed	1/0/1900	District #		Cost per ton (US$)	

Mix	*Level*	*Material Code*	*DMT ID*	*Min Pb*	
		0			
Producer	*Plant Location*	*Vendor #*			
		0			

Plant Adjustment Detail

Plant Test	*Va Result*	*Va Adjustment*	*Pb Result*	*Pb Adjustment*
1				
2				
3				
4				
5				
6				
AVa				
APb				
Plant Adjustment Tsd=(Ava + APb) X Tons		0.0000	Adjusted Tons	0.00
Cost Adjustment Tsd X Unit Price				$0.00

Data entered by:
Checked by:

State of Connecticut Department of Transportation
Division of Materials Testing
Daily Plant Adjustment Form MAT-438PWL

Project #	0	Day/Night	Day	Contract Year	0
Location (RT/Town)	0	PO #		Payable Tons	
PWL Lot Number	0	District #		Cost per ton (US$)	

Mix	Level	Material Code	DMT ID	Producer	Plant Location	Vendor #
		0				0

Targets		4	#VALUE!	

Sublot	Production Date	AV	Pb	VMA	Lot Size	PWL (AV/Pb/VMA)			PWL Adj (AV/Pb/VMA)			Production Lot PWL Adjustment
1					0							
2												
3												
4												
Average												
Standard Deviation												
Number of Results		0	0	0								
USL		5.2	#VALUE!	#VALUE!								
LSL		2.8	#VALUE!	#VALUE!								
Qu												
Ql												
PDu												
PDl												

Plant Adjustment Tsd= PWL Adj X Tons	
Cost Adjustment Tsd X Unit Price	

Data entered by: _____
Checked by: _____

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIAL TESTING

MIX DESIGN STATUS

MAT-440 (Revised 12/16)

YEAR:

HOT MIX ASPHALT PRODUCER'S NAME AND ADDRESS

QC Plan Date _____

Plant Inspection Date _____

Laboratory Inspection Date _____

Ignition Oven Aggregates Correction Factor Date _____

MIX	JMF DATE	STATUS	NOTES
4029 (UTHMA)			
4053			
4054			
4057			
4058			
4065			
4066			
4077			
4078			
4093			
4094			
4096			
4097			
4099			
4100			
4102			
4103			

NOTES:

- Mixes in "PPT" or "U" status cannot be shipped to ConnDOT projects.
- This Form shall be posted in the plant laboratory.
- Mixes with no JMF Date have not been received for this paving season and cannot be used in ConnDOT projects.
- All the information on this Form is current to the day listed in "Date" section below.

Prepared by (print name)	Date

STATE OF CONNECTICUT
Department of Transportation
Division of Materials Testing
280 West Street
Rocky Hill, CT 06067
Rev. 12/16

INDEPENDENT ASSURANCE
Report of WITNESS TEST
MAT-600

Name (Tester): _____ NETTCP#: _____

IA Sampled By: _____ Date (Witness Test): _____

Location: _____

Type of Material: _____ Project No.: _____

AASHTO TEST METHODS WITNESSED	YES	NO	REMARKS
T 168 – SAMPLING BITUMINOUS MIXTURES	☐	☐	
R 47 – SAMPLE REDUCTION	☐	☐	
T 308 – ASPHALT CONTENT – IGNITION OVEN	☐	☐	
T 30 – SIEVE ANALYSIS	☐	☐	
T 312 – PREPARATION OF GYRATORY SAMPLE	☐	☐	
T 166 – BULK SPECIFIC GRAVITY **(Gmb)**	☐	☐	
T 209 – THEORETICAL MAXIMUM **(Gmm)**	☐	☐	
T 185 – SPECIFIC GRAVITY – **COARSE AGGREGATE**	☐	☐	
T 184 – SPECIFIC GRAVITY – **FINE AGGREGATE**	☐	☐	
T 283 – MOISTURE INDUCED DAMAGE – **(TSR)**	☐	☐	
T 255 – MOISTURE CONTENT	☐	☐	
T 304 – UN-COMPACTED VOID CONTENT	☐	☐	
T 176 – SAND EQUIVALENT TEST	☐	☐	
BOWL WEIGHTS	☐	☐	
GYRATORY ANGLE	☐	☐	
THERMOMETER CHECK	☐	☐	

COMMENTS:

WAS A SPLIT SAMPLE TAKEN **YES** ☐ **NO** ☐ SAMPLE NO.: _____

SAMPLE GRADE:	**Pb:**		**Sieve:**		**Gmb:**		**Gmm:**		

Enter **Start** and **End** times for time from and to work station or home.				Total **Shift** Hours	
Start:		End:		Total Regular Hours:	
				Total Overtime Hours:	
Enter **Start** and **End** times for actual time at the plant.					
Start:		End:		Vacation / Sick / PL:	

Appendix B – Final Materials Certification

A Final Materials Certificate (FMC) summarizes the results of acceptance testing of the material used on each FHWA-funded project and select state-funded projects. Materials used on these projects that require acceptance testing must be sampled and tested in accordance with the "Schedule of Minimum Requirements for Acceptance Testing," Chapter 8 of this manual. It is imperative that the represented quantity of each material with a sampling frequency of "one per quantity" or "one per x units" accumulate to or exceed the total quantity of that material used on the project. For some materials the minimum schedule does not indicate a testing frequency. In this instance, a single sample will be adequate to represent that material incorporated into the project.

In addition, the Division of Materials Testing (DMT) documents the process of materials testing on the project site by checking the sampling and testing procedures performed by inspection personnel in accordance with the "Schedule of Minimum Requirements for Assurance Testing," Chapter 9 of this manual. Testing equipment is also checked to ensure that the test results are valid. Discrepancies in this testing are investigated and rectified immediately. The DMT reports the results of this testing to the Federal Highway Administration on an annual basis.

To initiate the development of a FMC, a request from the appropriate District office staff for a FMC is sent to the DMT. Following a review of project records, DMT staff issue a memorandum to the project personnel entitled "Test Coverage Required for FINAL CERTIFICATION" that lists all testing deficiencies and rejected materials not previously documented.

It is the responsibility of the Transportation Supervising Engineers of each DMT section to identify material that did not meet the project specifications, was not documented correctly, and was permanently incorporated into the project. This is accomplished through the issuance of a FMC listing exceptions to the specifications. When all materials used on the project are sampled and found to meet the specification or are documented properly, the DMT issues a FMC without exceptions.

When tested material does not meet specification, a MAT-103 "Report of Rejected Material" form is used to document how the deficiency was addressed. This form must be completed for any rejected material samples and must include the signatures of appropriate Project and District personnel acknowledging the rejection.

Section 1 of the Mat-103 form under the heading "Action Taken" describes the physical action taken to retest or replace the material. This addresses when rejected materials were removed and replaced with acceptable material or were resampled and found acceptable. The Sample ID of the acceptable re-test is required on this form. If physical action was not taken, Section 2 of the MAT-103 must be completed.

Section 2 of the Mat-103 form under the heading "Acceptance of Rejected Material without Action" documents the acceptance of noncompliant materials or minor quantities

of untested materials in accordance with Section 1.06.02 or Section 1.06.04 of the Department's Standard Specification. Section 1.06.02 states that the Engineer may accept material or combination of materials and thereby waive noncomplying test results, provided that the following conditions are met:

1. Results of prior and subsequent series of tests of the material or materials from the same source or sources are found satisfactory.
2. The incidence and degree of nonconformance with the Contract requirements are, in the Engineer's judgment, within reasonable limits.
3. The contractor, in the Engineer's judgment, had diligently exercised material controls consistent with good practices.
4. No adverse affect on the value or serviceability of the completed work could result.

Section 1.06.04 states that the Engineer may accept a material or combination of materials provided that an equitable reduction of the payment is made. Any credits, allowances, warranties, or other conditions of acceptance must be listed.

Projects that did not perform any testing would obviously not meet the above criteria, while a project that utilized minor amounts of nonconforming material from a producer who generally meets requirements may meet the above criteria. Exception can be taken and noted on the FMC if it is determined by DMT staff and the Transportation Principal Engineer in the DMT that the alternate acceptance criteria has not been met for the materials in question.

Adequate Assurance Testing: Project related assurance testing is required as specified in the Schedule of Minimum Requirements for Assurance Testing (Chapter 9) or exceptions for deficiencies in assurance testing will be noted on the FMC as such. This testing does not include independent assurance testing that is performed within the DMT and is not directly associated with a project.

For projects classified as vertical or non-roadway: In accordance with section 1-2207 of the Construction Manual, "A FMC will not be provided by the DMT for facilities (vertical/non-roadway) projects; this information will be retained by the DMT for information only purposes."

Examples of Final Materials Certificates follow.

(THE FOLLOWING MEMORANDUM IS ADDRESSED TO THE DISTRICT ENGINEER AND IS REQUIRED FOR ALL FEDERAL AID PROJECTS.)

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

m e m o r a n d u m

subject: FINAL MATERIALS CERTIFICATION
STATE PROJECT NUMBER: [XXXX-XXXX]
FAP NUMBER: [XXXX (XXX)]

date: [Month, Day, Year]

to: [Name]
District Engineer
District [X] Construction
Bureau of Engineering and Construction

from: [Name]
Transportation Principal Engineer
Division of Materials Testing
Bureau of Engineering and Construction

THIS IS TO CERTIFY THAT:

Results of tests on acceptance samples indicate the materials incorporated in the construction work and the construction operations controlled by sampling and testing were in conformity with approved plans and specifications, and that such results compare favorably with the results of independent assurance sampling and testing.

Exceptions to the plans and specifications are documented in the project records and are also listed below:

NONE (or exceptions included as follows:)

Item #	Description	Quantity	Reason

If you have any questions regarding this certification, please contact [Name], Transportation Supervising Engineer, at (860) 258-[XXXX] or [Email address].

[Author]:[Typist]/[Drive location/file name]

cc: [Name of Construction Division Chief]
[Name of Federal Billing Representatives]
[Name of Assistant District Engineer]
[Name of District OOC Liaison]
[DMT Representatives]
[DMT Author] – DMT Files
DOT FedBilling
DOT ConstD[#]

(THE FOLLOWING MEMORANDUM IS ADDRESSED TO THE DISTRICT MAINTENANCE DIRECTOR AND IS REQUIRED FOR ALL MAINTENANCE PROJECTS FUNDED WITH FEDERAL AID FUNDS.)

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

memorandum

subject: FINAL MATERIALS CERTIFICATION
STATE PROJECT NUMBER: [XXXX-XXXX]
FAP NUMBER: [XXXX (XXX)]

date: [Month, Day, Year]

to: [Name]
Transportation Maintenance Director
District [X] Maintenance
Bureau of Engineering and Construction

from: [Name]
Transportation Principal Engineer
Division of Materials Testing
Bureau of Engineering and Construction

THIS IS TO CERTIFY THAT:

Results of tests on acceptance samples indicate the materials incorporated in the construction work and the construction operations controlled by sampling and testing were in conformity with approved plans and specifications, and that such results compare favorably with the results of independent assurance sampling and testing.

Exceptions to the plans and specifications are documented in the project records and are also listed below:

NONE (or exceptions included as follows:)

Item #	Description	Quantity	Reason

If you have any questions regarding this certification, please contact [Name], Transportation Supervising Engineer, at (860) 258-[XXXX] or [Email address].

[Author]:[Typist]/[Drive location/file name]

cc: [Name of Construction Division Chief]
[Name of Federal Billing Representatives]
[Name of District OOC Liaison]
[DMT Representatives]
[DMT Author] – DMT Files
DOT FedBilling
DOT ConstD[#]

APPENDIX C
SCOPE OF WORK
FABRICATION INSPECTION
For third-party testing agency

As determined by the Connecticut Department of Transportation's (Department) Division Chief, the testing agency shall provide qualified inspection and testing personnel to perform inspections, sampling, and testing of materials in the following areas:

- General Requirements
- Steel Fabrication - Scope
- Structural Steel Inspection - General
- Coatings Process Inspection
- Precast, Prestressed and Post- Tensioned Concrete Inspection

All inspections, sampling, and testing are to be done in accordance with applicable standards including, but not limited to, those described by the American Welding Society (AWS), National Association of Corrosion Engineers (NACE), American Association of State Highway Transportation Officials (AASHTO), and the American Society of Testing Materials (ASTM).

Personnel performing the inspection, sampling, or testing of specific materials may require certification that is administered by agencies such as the New England Transportation Technician Certification Program (NETTCP), American Concrete Institute (ACI), and others.

The purpose of this inspection, sampling, or testing is to assure conformance of the material to project specifications. As such, the Quality Assurance (QA) inspector may visually inspect, witness, sample, or test material during all phases of manufacture/fabrication/production. The primary function of the QA inspector is to assure the Engineer that the fabricator/producer is exercising adequate quality control during the entire fabrication/production process.

General Requirements

The testing agency shall:

1. Assume responsibility for the assigned inspection, sampling, or testing of materials as of the date stipulated by the Department in the formal notice to the testing agency to proceed with the work. This includes any partially completed work performed by the Department's former testing agency under the "Contract for Inspection, Sampling and Testing of Materials" concluded February 14, 2016.

2. Make no decisions and offer no advice or opinion to a proposed action by the manufacturer/fabricator/producer/contractor without first consulting with the Engineer. The Engineer is defined as the Division Chief or his duly authorized representative.

3. Provide all equipment required for the safe and comprehensive execution of the work including personal safety equipment such as clothing, hard hats, safety glasses, shoes, and gloves. This may also include appropriate means of transportation for some job classifications. All such equipment may be subject to the approval of the Engineer.

4. Adhere to the Travel Expense Guidelines dated April 19, 2016 for the purpose of determining travel expenses and work locations.

The Inspector shall:

1. Be certified in the applicable field and have a thorough knowledge of the State of Connecticut - Department of Transportation - Standard Specifications for Roads, Bridges and Incidental Construction (Form 816 as supplemented), and project specifications, including approved shop drawings.

Specific information on scope of work, personnel, and reporting requirements for each area are provided in the following pages.

Steel Fabrication - Scope

The testing agency shall submit to the Department of Transportation, Division of Materials Testing, 280 West Street, Rocky Hill, CT 06067, three copies of daily reports on a weekly basis, or as directed, for each Department project where inspection services were performed indicating the status of each member in fabrication and the shipping status of each completed member. Report cover sheets and the body of the reports must be generated with a word processing computer application and output on 8.5” X 11” white paper. Handwritten reports will not be accepted. The reports shall include daily notes of the testing agency’s plant inspector and any nondestructive testing reports and shipping documents that were obtained during the day. These reports shall further include a daily summary of the number of hours worked. Weekly reports shall be due at the Department of Transportation’s Division of Materials Testing (DMT) no later than seven days after the close of the period covered by such reports. The final weekly report submitted for a single project shall include all certified mill test reports documenting all steel used in the project work.

Due to their critical function as load-bearing units of bridges and structures, structural steel members must be constructed in strict conformance with the specifications. To assure this conformance, the DMT assigns a QA inspector to the manufacturing/fabrication plant to inspect, in detail, all phases of manufacture/fabrication. The primary function of the QA inspector is to assure the Engineer that the fabricator is exercising adequate quality control during the entire fabrication process. Should the inspector discover deficiencies or witness a lack of quality control, it is imperative that the Engineer be notified immediately so that corrective action can be initiated.

These specifications are not to be considered as covering every aspect of the testing agency's responsibilities, and they shall in no way relieve the testing agency of the responsibility for the inspection of all requirements of the plans, specifications, and special provisions that are pertinent to the work.

Structural Steel Inspection - General

The inspector shall:

1. Commence inspection with the beginning of fabrication and continue throughout the entire fabrication process, or as directed by the Engineer.

2. Throughout the fabrication, document information on standardized forms provided by the Engineer or on an acceptable substitution to the Engineer. All such documentation shall be neat and legible to the satisfaction of the Engineer.

3. Confirm that the proper approval has been granted for all shop drawings used during fabrication/manufacture. This should be accomplished before fabrication; however, it may be done during or after fabrication. Should the fabricator decide to commence, continue, or deliver work without proper approval; the inspector is required to immediately notify the fabricator's Quality Control (QC) Manager that the fabricator is proceeding at his own risk, and notify the Engineer that work began, is ongoing, or is being shipped without approved drawings. Inspector must note names, times, and summary of the discussion in his daily report.

4. Be cognizant of the conditions of fabrication including the time of delivery, desired order of shipment, and any special features in connection with delivery.

5. Obtain the records of the chemical and physical tests of the heat numbers of material from the mill. Review mill test reports for conformance to specifications and report status to the Engineer through daily reports.

6. Compare heat marks with those on the mill test reports. Should there be any doubt about the identity of correctness of the metal, samples of the metal may be taken and tested by the fabricator to ascertain conformance with the appropriate specifications.

7. See that material is properly identified throughout the entire fabrication process.

8. Conduct a surface inspection of a sample of incoming metals with attention to defects such as piping, cracks, laminations, buckles and kinks.

9. Observe that material not immediately used is properly stored and identified.

10. Ensure that no material from shop stock is used without approval or without properly documented test reports. Pitted or corroded material shall not be used.

11. Document the position of heat numbers in main members by means of diagrams showing member elevations and associated heat numbers.

12. Check a sample of cuts for neatness and trueness, and ensure that the proper method of cutting is used.

13. Inspect a sample of templates for accuracy.

14. Check a sample of splices, joints, and connections in accordance with appropriate specifications.

15. Check the fit and positioning of a sample of shop assemblies, and ensure that members are clearly match-marked when members that are to be field-spliced are given a shop laydown assembly.

16. Be present when material is being cambered or straightened by the application of heat to ensure use of proper procedures and temperature requirements. Confirm that only approved methods are being utilized.

17. Inspect a sample of completed work for general finish and workmanship. Check a sample of finished members for dimensions, proper section, connection locations, detailing and other related features. Measure and record on approved forms the overall length, length center-to-center of bearings, and camber of a sample of main members.

18. Check that surfaces of “weathering” steel and surface areas to receive protective coatings are properly prepared and that coatings are applied in accordance with specifications. The coating dates of all material shall be recorded in the daily report.

19. Ascertain that all welders, welding operators, and tackers have been properly qualified and that welding procedures have been properly followed. Copies of welder certifications and approved welding procedures shall be incorporated into the project records. Actual welding should be inspected regularly to ensure that the minimum temperature requirements for welding are being maintained, that the specified joint-welding procedures are being followed, and that the required preheat, interpass and postheat temperatures are being utilized.

20. Witness all nondestructive testing of welds and sign all reports of such testing. Ultrasonic inspection shall be witnessed and the interpretation of the results verified by the testing agency personnel, who shall be qualified NDT Level II or better in accordance with requirements of the American Society for Nondestructive Testing’s Recommended Practice Number SNT-TC-1A and Supplement C, Ultrasonic Testing Method.

21. Check to ensure use of proper electrodes, electrode-flux combination, or grade of weld metal for the steel specified. Review materials certification for electrodes or electrode-flux combinations. Regularly inspect storage conditions and care of electrodes and flux for conformance to specifications. Check welding equipment for proper operation and proper calibration.

22. Perform visual inspection of a sample of completed welds and the base metals for cracks, notches, undercutting, and other defects.

23. Check a sample of the finished welds for proper profile and cross-section.

24. Prior to shipment of the material, ensure that the fabricator’s QC representative has inspected the members and reviewed the shipping documents for completeness. Determining the acceptability of each piece prior to shipping is the sole responsibility of the fabricator. The testing agency shall ensure that members are marked in such a manner as to enable the Department’s field representative to correlate shop inspection reports and shipping reports with the appropriate members.

25. Report and record all defects or problems observed, as well as all corresponding corrective action taken within their daily reports submitted to the Department.

Coatings Process Inspection

The NACE coating inspector shall fully complete a paint inspection checklist for all coated materials, take necessary samples of protective coatings for testing as directed by the Department's DMT, and permit only approved material to be used. The NACE inspector shall be present at the fabrication/coating shop during all cleaning and coating operations. The daily coating activity shall be recorded in the latest edition of the NACE Coating Inspector's log book and shall commence prior to the structural steel surface preparation. The testing agency shall be responsible for the purchase of the log books and shall provide them to each NACE inspector. At the time of material shipment from the fabricator's plant, the NACE inspector shall stamp the front page of each inspector's log book used during the coating operation. The stamped book shall indicate the inspector's NACE certification number, expiration date, printed name of the inspector, and shall be signed by the inspector. The log book(s) shall then be furnished to the Senior Fabrication Inspector to be included with the submission of the weekly reports.

Precast, Prestressed and Post-Tensioned Concrete Inspection

Due to their critical function as load-bearing units of bridges and structures, precast, prestressed, and post-tensioned concrete members must be constructed in strict conformance with the specifications. To assure this conformance, the DMT assigns a QA inspector to the manufacturing/fabrication plant to inspect, in detail, all phases of manufacture/fabrication. The primary function of the QA inspector is to assure the Engineer that the fabricator is exercising adequate quality control during the entire fabrication process. Should the inspector discover deficiencies or witness a lack of quality control, it is imperative that the Engineer be notified immediately so that corrective action can be initiated.

The inspector shall perform the following:

Sampling

The following component materials shall be sampled for testing in accordance with standard Department procedures and frequencies listed below:

1. *Portland cement:* Shall be from a qualified source. Each load shall be accepted by certification. Samples shall be taken as directed by the Engineer.

2. *Aggregate:* Samples from bins or stockpiles each month for each source of supply, or as directed by the Engineer.

3. *Admixtures:* Only qualified admixtures are to be used. Samples are to be taken as directed by the Engineer.

4. *Prestressing steel strand:* Sample each reel or coil in accordance with Standard Specifications, Article M.14.01-2.

5. *Post-tensioning tendons and anchorages:* Sample as per Special Provisions.

6. *Reinforcing steel:* From each source, a 5-foot (1.5 m) sample of each size for every 200 tons (181.4 metric tons), with a minimum of one sample of each size from each source per project.

Inspection of Plant Facilities and Manufacturing Procedures

The plant facilities shall be inspected annually or as directed by the Engineer. A form provided by the Department shall be utilized as a guide to plant facilities inspection. As a minimum, the following shall be inspected:

1. Storage and handling of materials.

2. Batching, mixing, transportation and placement of concrete.

3. Curing method and apparatus (i.e., steam, radiant heat or other approved method) including provision for recording time and temperature data during the curing cycle.

4. Concrete testing equipment (i.e., compression-testing machine - should be calibrated every 12 months, pressure-type air meters, cylinder molds, slump cones, and unit weight apparatus) and facilities for moist-curing test cylinders in accordance with ASTM C 192.

5. Equipment and procedure for consolidation of concrete.

6. Construction and capacity of casting beds.

7. Dimensions, condition, and construction of forms.

8. Method and equipment for applying prestressing or post-tensioning forces.

9. Method and equipment for measuring prestressing or post-tensioning forces and the procedure for measuring elongation of strands or tendons.

10. Accuracy and calibration data of pressure gauges. (Gauges shall be calibrated at intervals not to exceed 6 months)

Inspection of Casting Bed

1. Check cleanliness, level, and alignment of form liner.

2. Check position of bulkheads for proper length of units and skewed or sloped ends, when applicable.

3. Inspect stringing of prestressing strands to ensure correct number and position of strands and location of "hold-downs."

4. For a sample of strands: inspect tension, measure elongation, and check gauge reading for proper force application. Force measurement of elongation and gauge reading shall check each other and the theoretical value shall be within 5 percent.

5. Witness retensioning at the non-jacking end of deflected strands and straight strands to verify application of the required prestressing force in accordance with the Standard Specifications, Article 5.14.03.

6. Inspect installation of a sample of post-tensioning tendons and anchorages, when applicable.

7. Check size, type, and location of a sample of reinforcing steel, hardware, and miscellaneous steel when placed in forms.

8. Inspect condition and alignment of a sample of side forms.

9. Check proper bracing and anchorage of casting bed and end anchorages.

Inspection of Concrete Operations

1. Inspect a sample of concrete delivered to forms for homogeneity and uniformity of successive batches.

2. Spot-check batching and mixing of concrete to assure that approved mix design and procedures are being used.

3. Witness/monitor sampling of concrete for quality control testing.

4. Witness slump, air tests, concrete temperature, and unit weight for conformance to specifications and accept or deem unacceptable on the basis of results.

5. Inspect placement, consolidation and finishing of concrete for conformance to specifications and accepted concrete practices.

6. For deck units, inspect internal void forms for material, size, and proper installation.

7. Check identification marker for required data and placement in unit.

8. Ensure that approved curing method is used and applied at proper time. If steam or radiant heat is used, ensure that required preset period is observed.

Inspection of Fabricated Units

1. Inspect a sample of units to determine if they were cured uniformly. Review the time/temperature record of curing cycle for specification compliance.

2. Witness testing of cylinders for required concrete strength prior to detensioning or removal of forms.

3. Verify dimensions, details, surface finish, and freedom from defects of a sample of finished units.

4. Verify proper marking and identification of units.

5. Witness application of protective compound to surfaces of precast catch basin and drop inlet tops, which will be exposed when in service.

6. Catch basin, drop inlets, manhole riser sections, bases, and appurtenances that exhibit the following may be recommended for rejection:

    6.1 Fractures or cracks passing through the wall, except for a single end crack that does not exceed the depth of the joint.

    6.2 Defects that indicate imperfect proportioning, mixing, or molding.

    6.3 Surface defects indicating honeycombed or open texture.

    6.4 Any continuous crack having a surface width of 0.01 in. (0.3mm) or more and extending for a length of 1.0 ft. (300mm) or more, regardless of position in the section wall.

    6.5 Damaged or cracked ends where such damage would prevent making a satisfactory joint.

Reporting – As directed by a Department representative, the inspector will document test results on forms provided by the Department.

SCOPE OF WORK
MATERIAL TESTING INSPECTION
For Consultant third-party Testing Agency (Testing Agency)

As determined by the Connecticut Department of Transportation's (Department) Division Chief of Construction Services and Materials Testing (Division Chief), the Testing Agency shall provide qualified inspection and testing personnel to perform inspections, sampling, and testing of materials in the following areas:

- General Requirements
- Precast, Prestressed and Post-Tensioned Concrete Inspection
- HMA Plant Inspection
- Sampling Materials (i.e., Hot Mix Asphalt [HMA], aggregates) on Project Sites or Sources
- Testing In-Place Materials (HMA, aggregates) on Project Sites
- Testing Material Samples at Department Material Testing Facilities
- Inputting Test Results, Processing Request for Test (MAT-100) Forms, and Filing Documentation

All inspections, sampling, and testing are to be done in accordance with applicable standards including, but not limited to, those described by the American Welding Society (AWS), National Association of Corrosion Engineers (NACE), American Association of State Highway Transportation Officials (AASHTO), and the American Society of Testing Materials (ASTM).

Personnel performing the inspection, sampling, or testing of specific materials shall require certification that is administered by agencies such as the New England Transportation Technician Certification Program (NETTCP), American Concrete Institute (ACI), and others.

The purpose of this inspection, sampling, or testing is to assure conformance of the material to project specifications. The primary function of the Quality Assurance (QA) Inspector is to assure the Engineer that the fabricator/producer is exercising adequate quality control during the entire fabrication/production process. The Engineer is defined as the Division Chief or his duly authorized representative. As such, the QA Inspector shall visually inspect, witness, sample, or test material during all phases of manufacture/fabrication/production.

General Requirements

The Testing Agency shall:

1. Assume responsibility for the assigned inspection, sampling, or testing of materials as of the date stipulated by the Department in the formal notice to the Testing Agency to proceed with the work. This includes any partially completed work performed by the Department's former Testing Agency under the "Task Order Fabrication/Materials Inspection Services" contract that concluded February 14, 2016.

2. Make no decisions and offer no advice or opinion to a proposed action by the manufacturer/fabricator/producer/contractor without first consulting with the Engineer.

3. Provide all equipment required for the safe and comprehensive execution of the work including personal safety equipment such as clothing, hard hats, safety glasses, shoes, and gloves. This will also include appropriate means of transportation for some job classifications. All such equipment is subject to the approval of the Engineer.

4. Adhere to the Travel Expense Guidelines dated April 19, 2016 for the purpose of determining travel expenses and work locations.

The QA Inspector shall:

1. Be certified in the applicable field and have a thorough knowledge of the State of Connecticut - Department of Transportation - Standard Specifications for Roads, Bridges and Incidental Construction (Form 816 as supplemented), and project specifications, including approved shop drawings.

Specific information on scope of work, personnel, and reporting requirements for each area are provided in the following pages.

Precast, Prestressed and Post-Tensioned Concrete Inspection

Due to their critical function as load-bearing units of bridges and structures, precast, prestressed, and post-tensioned concrete members must be constructed in strict conformance with the specifications. To assure this conformance, the DMT assigns a QA Inspector to the manufacturing/fabrication plant to inspect, in detail, all phases of manufacture/fabrication. The primary function of the QA Inspector is to assure the Engineer that the fabricator is exercising adequate quality control during the entire fabrication process. Should the QA Inspector discover deficiencies or witness a lack of quality control, it is imperative that the Engineer be notified immediately so that corrective action can be initiated.

The QA Inspector shall perform the following:

Sampling

The following component materials shall be sampled for testing in accordance with standard Department procedures and frequencies listed below:

1. *Portland cement:* Shall be from a qualified source. Each load shall be accepted by certification. Samples shall be taken as directed by the Engineer.

2. *Aggregate:* Samples from bins or stockpiles each month for each source of supply, or as directed by the Engineer.

3. *Admixtures:* Only qualified admixtures are to be used. Samples are to be taken as directed by the Engineer.

4. *Prestressing steel strand:* Sample each reel or coil in accordance with Standard Specifications, Article M.14.01-2.

5. *Post-tensioning tendons and anchorages:* Sample as per Special Provisions.

6. *Reinforcing steel:* From each source, a 5-foot (1.5 m) sample of each size for every 200 tons (181.4 metric tons), with a minimum of one sample of each size from each source per project.

Inspection of Plant Facilities and Manufacturing Procedures

The plant facilities shall be inspected annually or as directed by the Engineer. A form provided by the Department shall be utilized as a guide to plant facilities inspection. As a minimum, the following shall be inspected:

1. Storage and handling of materials.

2. Batching, mixing, transportation and placement of concrete.

3. Curing method and apparatus (i.e., steam, radiant heat or other approved method) including provision for recording time and temperature data during the curing cycle.

4. Concrete testing equipment (i.e., compression-testing machine - should be calibrated every 12 months, pressure-type air meters, cylinder molds, slump cones, and unit weight apparatus) and facilities for moist-curing test cylinders in accordance with ASTM C 192.

5. Equipment and procedure for consolidation of concrete.

6. Construction and capacity of casting beds.

7. Dimensions, condition, and construction of forms.

8. Method and equipment for applying prestressing or post-tensioning forces.

9. Method and equipment for measuring prestressing or post-tensioning forces and the procedure for measuring elongation of strands or tendons.

10. Accuracy and calibration data of pressure gauges. (Gauges shall be calibrated at intervals not to exceed 6 months)

Inspection of Casting Bed

1. Check cleanliness, level, and alignment of form liner.

2. Check position of bulkheads for proper length of units and skewed or sloped ends, when applicable.

3. Inspect stringing of prestressing strands to ensure correct number and position of strands and location of “hold-downs.”

4. For a sample of strands: inspect tension, measure elongation, and check gauge reading for proper force application. Force measurement of elongation and gauge reading shall check each other and the theoretical value shall be within 5 percent.

5. Witness retensioning at the non-jacking end of deflected strands and straight strands to verify application of the required prestressing force in accordance with the Standard Specifications, Article 5.14.03.

6. Inspect installation of a sample of post-tensioning tendons and anchorages, when applicable.

7. Check size, type, and location of a sample of reinforcing steel, hardware, and miscellaneous steel when placed in forms.

8. Inspect condition and alignment of a sample of side forms.

9. Check proper bracing and anchorage of casting bed and end anchorages.

Inspection of Concrete Operations

1. Inspect a sample of concrete delivered to forms for homogeneity and uniformity of successive batches.

2. Spot-check batching and mixing of concrete to assure that approved mix design and procedures are being used.

3. Witness/monitor sampling of concrete for quality control testing.

4. Witness slump, air tests, concrete temperature, and unit weight for conformance to specifications and accept or deem unacceptable on the basis of results.

5. Inspect placement, consolidation and finishing of concrete for conformance to specifications and accepted concrete practices.

6. For deck units, inspect internal void forms for material, size, and proper installation.

7. Check identification marker for required data and placement in unit.

8. Ensure that approved curing method is used and applied at proper time. If steam or radiant heat is used, ensure that required preset period is observed.

Inspection of Fabricated Units

1. Inspect a sample of units to determine if they were cured uniformly. Review the time/temperature record of curing cycle for specification compliance.

2. Witness testing of cylinders for required concrete strength prior to detensioning or removal of forms.

3. Verify dimensions, details, surface finish, and freedom from defects of a sample of finished units.

4. Verify proper marking and identification of units.

5. Witness application of protective compound to surfaces of precast catch basin and drop inlet tops, which will be exposed when in service.

6. Catch basin, drop inlets, manhole riser sections, bases, and appurtenances that exhibit the following shall be recommended for rejection:

    6.1 Fractures or cracks passing through the wall, except for a single end crack that does not exceed the depth of the joint.

    6.2 Defects that indicate imperfect proportioning, mixing, or molding.

    6.3 Surface defects indicating honeycombed or open texture.

    6.4 Any continuous crack having a surface width of 0.01 in. (0.3mm) or more and extending for a length of 1.0 ft. (300mm) or more, regardless of position in the section wall.

    6.5 Damaged or cracked ends where such damage would prevent making a satisfactory joint.

Reporting – As directed by the Engineer, the QA Inspector will document test results on forms provided by the Department.

HMA PLANT INSPECTION

The duties listed here are minimum requirements to be performed by HMA Inspectors. The daily responsibilities of an HMA Inspector shall be for elements and frequency, as specified in the contract, and will typically include, but are not limited to, the following items.

AASHTO Test Witnessed (at a Minimum)

T 168 – Sampling Bituminous Mixtures
R 47 – Sample Reduction
T 312 – Preparation of Gyratory Sample
T 308 – Asphalt Content – Ignition Sample
T 209 – Theoretical Maximum Gravity (GMM)
T 30 – Sieve Analysis
T 166 – Bulk Specific Gravity (GMB)
T 255 – Moisture Content

1. Confirm assignment, correct specification year, and mix status (A/PT) with plant technician.

2. Review test data charts, past technician notes, and copies of past testing reports.

3. Inspect aggregates for consistency, quality, and cleanliness, and verify it was obtained from an approved source of supply.

4. Visually inspect stockpiles and cold-feed bins for segregation and/or contamination.

5. Verify that the latest JMF and HMA laboratory correction factors are available and accurate.

6. Verify the appropriate PG binder grade is being used for the day's production.

7. Inspect haul units for proper canvas covers and approved truck body release agents (no fuel oil).

8. Check the temperature of the mix.

9. Inspect the process of the batch/drum plant operations.

10. Check truck tickets for mix proportion, class, RAP content, moisture, and target weights.

11. Verify and note the status of the HMA plant. It should be running only on full automatic (not auto-manual or manual).

12. Retrieve all QC documentation.

13. Obtain random verification sample(s).

14. Obtain a liquid bituminous sample.

15. Obtain an Independent Assurance split sample.

Sampling Materials on Project Sites or Sources

The technician shall perform the following at the direction of a Department employee:

Sampling – Sample materials at a project site or source and transport such material all in accordance with applicable standards. The technician shall transport the sample to a location designated by the Department. The technician must be aware of the hazards of the project site or material sources and perform sampling in a safe manner.

Reporting – As directed by a Department representative, the inspector will document test results on forms provided by the Department. For example, HMA Inspectors shall report results on Forms MAT 412, MAT 413, and Daily Inspector Report/Form MAT 431. Pavement density and subbase density testing are reported on Forms CON 133 and CON 125.

Testing In-Place Materials on Project Sites

The technician shall perform the following at the direction of a Department employee:

Sampling – Test in-place material in accordance with applicable standards. The technician must be capable of following directions to various project and supplier sites throughout the state to independently test materials. The technician must be qualified to use the testing equipment safely and effectively. The technician must be aware of the hazards of the project site and perform testing in a safe manner.

Reporting – As directed by a Department representative, the inspector will document test results on forms provided by the Department within 24 hours. For example, HMA Inspectors shall report results on Forms MAT 412, MAT 413, and Daily Inspector Report/Form MAT 431. Pavement density and subbase density testing are reported on Forms CON 133 and CON 125.

Testing Material Samples at Department Material Testing Facilities

The technician shall perform the following at the direction of a Department employee:

Sampling – In accordance with applicable standards, assist or independently test material samples including, but not limited to, concrete cylinders, steel reinforcing bars, chains, fasteners, sand, and Portland cement in a laboratory setting. The technician shall also document the test results, input the test results into the Department's reporting system, and file the documentation as needed. Assist in the cleaning and maintenance of testing equipment and surrounding areas.

Reporting – As directed by a Department representative, the inspector will document test results on forms provided by the Department.

Inputting Test Results, Processing Request for Test (MAT-100) Forms, & Filing Documentation

The technician shall perform the following at the direction of a Department employee:

Request for Test (Form MAT-100) Processing – Through the Department's computerized construction management system (Site Manager), record test results and status of MAT-100 forms. File hardcopy versions of the MAT-100 forms in the Department's files.

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
00000	NO REQUEST FOR TEST REQUIRED	A	NONE	NONE
00031	Paint - Prime Coat for Struct. Steel	A	gal	L
00032	Paint - Interm. Coat for Struct. Steel	A	gal	L
00033	Paint - Top Coat For Struct. Steel	A	gal	L
00039	Paint - For Field Touchup	A	gal	L
00046	Paint - Finish Coat Aluminum	A	gal	L
~~00050~~	~~Paint - Zinc Rich ZRC Fed.~~	~~A~~	~~gal~~	~~L~~
00051	Paint - Traffic Alkyd (3 Min Dry)	A	gal	L
~~00052~~	~~Paint - Traffic Alkyd (15 Min Dry)~~	~~A~~	~~gal~~	~~L~~
~~00054~~	~~Paint - Waterborne Pvmt Mark (15 Min)~~	~~A~~	~~gal~~	~~L~~
~~00058~~	~~Paint - Waterborne Pvmt Mark (15 Minute)~~	~~A~~	~~s.f.~~	~~sq.m~~
00060	Paint - Waterborne Pvmt. Mark (3 Min)	A	gal	L
00064	Paint - Epoxy	A	gal	L
00070	Epoxy Cement	A	gal	L
00071	Epoxy Powder Coating	A	lb.	kg
00072	Epoxy Injection Resin	A	l.f.	m
00076	Paint - Primer	A	gal	L
00078	Paint, Finish	A	gal	L
00079	Paint, Finish	A	s.f.	sq.m
00082	Paint - Traffic (3 Minute Dry)	A	s.f.	sq.m
00091	Paint - Epoxy Pavement Markings	A	gal	L
00093	Epoxy Mastic Aluminum	A	gal	L
00095	Paint Thinner	A	gal	L
00097	Sand Blast Debris (Toxicity Test)	A	TEST	TEST
00102	Primer, Zinc Rich	A	gal	L
00105	Metallizing, Wire for	A	lb.	kg
00200	Painted Pavement Markings, Temporary	A	l.f.	m
00201	Painted Pavement Markings (Temporary)	A	s.f.	sq.m
00202	Paint-Pavement Marking-Temporary	A	gal	L
00203	Plastic Pavement Marking Tape (Temp.)	A	l.f.	m
~~00205~~	~~Cement - Contact~~	~~A~~	~~gal~~	~~L~~
00206	Preformed Black Marking Tape	A	l.f.	m
00207	Plastic Pavement Marking Tape (Temp.)	A	s.f.	sq.m
00208	Thermoplastic Pavement Markings	A	l.f.	m
00210	Thermoplastic Pavement Markings	A	s.f.	sq.m
~~00296~~	~~Magnesium Chloride Liquid~~	~~A~~	~~gal~~	~~L~~
~~00297~~	~~Calcium Chloride - Liquid~~	~~A~~	~~gal~~	~~L~~
00298	Sodium Chloride, Inertial Barriers	A	lb.	kg
00302	Calcium Chloride	A	ton	t
00303	Sodium Chloride	A	ton	t
00306	Glass Spheres	A	lb.	kg
00310	Pavement Marking, Plastic, Preformed.	A	l.f.	m
00311	Pavement Marking, Plastic, Preformed	A	s.f.	sq.m
~~00312~~	~~Pavement Markings, Reflective~~	~~A~~	~~ea.~~	~~ea.~~
00314	Tape (Reflective)	A	l.f.	m
~~00315~~	~~Pavement Markers~~	~~A~~	~~ea.~~	~~ea.~~

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
~~00316~~	~~Marking Tape~~	~~A~~	~~l.f.~~	~~m~~
00320	Linseed Oil	A	gal	L
00323	Compound, Protective	A	s.f.	sq.m
00324	Concrete Curing Compound	A	gal	L
00325	Sealer, Protective Compound	A	gal	L
00327	Water	A	gal	L
00328	Protective Coating	A	s.f.	sq.m
00496	Fertilizer	A	lb.	kg
00497	Seed	A	lb.	kg
00506	Flagging	A	ea.	ea.
~~00507~~	~~Twine~~	~~A~~	~~l.f.~~	~~m~~
~~00508~~	~~Wire 10 Ga.~~	~~A~~	~~l.f.~~	~~m~~
~~00509~~	~~Wire 12 Ga.~~	~~A~~	~~l.f.~~	~~m~~
00510	Peat	A	c.y.	cu.m
~~00511~~	~~Limestone~~	~~A~~	~~ton~~	~~t~~
00512	Fertilizer	A	s.y.	sq.m
00513	Mulch, Wood Cellulose Fiber	A	lb.	kg
00514	Mulch, Hay	A	s.y.	sq.m
00515	Mulch, Wood Chip	A	s.y.	sq.m
00518	Sod	A	s.y.	sq.m
00521	Herbicide	A	s.y.	sq.m
00526	Topsoil, (1.00 ton) Lime Per Acre	A	s.y.	sq.m
00531	Mulch - Stone	A	s.y.	sq.m
00532	Lime Determination, Soils for	A	TEST	TEST
~~00533~~	~~Lime~~	~~A~~	~~lb.~~	~~kg~~
00534	Mulch - Wood Fiber	A	lb.	kg
00536	Plant Materials	A	ea.	ea.
~~00537~~	~~Mulch - Tackifier~~	~~A~~	~~lb.~~	~~kg~~
00541	Environmental Control Netting	A	s.y.	sq.m
00542	Topsoil (from project)	A	c.y.	cu.m
00542X	Topsoil (OFFSITE)	A	c.y.	cu.m
00543	Compost	A	c.y.	cu.m
00699	Pipe - R.C. & Fittings & Acc.	A	l.f.	m
00790	Concrete Gross Particle Separator	A	ea.	ea.
00800	Box Culvert, Precast Concrete, 3 sided	A	l.f.	m
00804	Box Culvert, Precast Concrete	A	l.f.	m
00823	Culvert End - Reinforced Concrete	A	ea.	ea.
00865	Concrete Barrier, Precast, Temporary	A	l.f.	m
00895	Concrete Barrier, Precast	A	l.f.	m
00926	Concrete Barrier, Precast, Connect Hdwe.	A	ea.	ea.
01422	Section, Precast	A	ea.	ea.
01425	Double Wall Section	A	ea.	ea.
01430	Manhole - Reducer (precast)	A	ea.	ea.
01432	Foundation (precast)	A	ea.	ea.
01435	Anchor, Precast	A	ea.	ea.
01436	Boundary Markers (Precast)	A	ea.	ea.

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
01440	Catch Basin Sections, Precast	A	ea.	ea.
01440A	Catch Basin - Precast (Complete)	A	ea.	ea.
01441	Manhole - Sections (Precast)	A	ea.	ea.
01441A	Manhole - Precast (Complete)	A	ea.	ea.
01444	Catch Basin Riser, Precast	A	ea.	ea.
01448	Handhole & Cover (Precast)	A	ea.	ea.
01458	Catch Basin Sump, Precast	A	ea.	ea.
01462	Handhole & Cover, Precast	A	ea.	ea.
01467	Slab, Precast	A	ea.	ea.
01470	Pedestal Base, Precast	A	ea.	ea.
01481	Manhole Slab (Precast)	A	ea.	ea.
01491	Manhole - Riser (precast)	A	ea.	ea.
01499	Manhole - Base (precast)	A	ea.	ea.
01500	Panels (Precast)	A	ea.	ea.
01505	Precast Transition	A	ea.	ea.
01506	Catch Basin Adaptor (precast)	A	ea.	ea.
01510	Curb, Park, Precast	A	ea.	ea.
01511	Curb, Precast	A	l.f.	m
01522	Manhole - Sump (Precast)	A	ea.	ea.
01600	Concrete Products - Precast	A	ea.	ea.
01630	Manhole Base & Top, Precast	A	ea.	ea.
01633	Manhole Top, Precast	A	ea.	ea.
01634	Manhole - Cone (precast)	A	ea.	ea.
01649	Catch Basin Top, Frame & Grate	A	ea.	ea.
01661	Catch Basin Top & Sump	A	ea.	ea.
01700	Pipe - Drain	A	l.f.	m
01708	Pipe - For Underdrain or Outlet	A	l.f.	m
01750	Box Culvert - Aluminum	A	l.f.	m
01783	Pipe - Aluminum & Fittings & Acc.	A	l.f.	m
~~01785~~	~~Pipe - Corr.Struc.Plate & Fittings & Acc~~	~~A~~	~~l.f.~~	~~m~~
~~01790~~	~~Pipe Arch - Aluminum~~	~~A~~	~~l.f.~~	~~m~~
~~01807~~	~~Culvert End - Aluminum~~	~~A~~	~~ea.~~	~~ea.~~
01839	Bolts, Nuts & Washers	A	ea.	ea.
01940	Pipe - CCM & Fittings & Acc.	A	l.f.	m
01977	Pipe - ACCM & Fittings & Acc.	A	l.f.	m
02000	Reference Mat - 100	A	MAT1	MAT1
02018	Culvert End - Coated Metal	A	ea.	ea.
02110	Pipe - Cast Iron & Fittings & Acc.	A	l.f.	m
02402	Pipe - Clay & Fittings & Acc.	A	l.f.	m
02449	Pipe - Copper & Fittings & Acc.	A	l.f.	m
02501	Pipe - Ductile Iron & Fittings & Acc.	A	l.f.	m
02520	Water Main & Accessories	A	l.f.	m
~~02522~~	~~Water Main Fittings & Appurtenances~~	~~A~~	~~ea.~~	~~ea.~~
~~02523~~	~~Water Main Air Release Assembly~~	~~A~~	~~ea.~~	~~ea.~~
02600	Pipe - Polyethylene & Fittings & Acc.	A	l.f.	m
02649	Pipe - PVC & Fittings & Acc.	A	l.f.	m

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
02673	Culvert End - Polyethylene	A	ea.	ea.
02724	Pipe - Steel & Fittings & Acc.	A	l.f.	m
02731	Pipe - Fiberglass & Fittings & Acc.	A	l.f.	m
02739	Curb Stop & Box	A	ea.	ea.
02995	Dowel Splice System, Epoxy Coated	A	ea.	ea.
02997	Dowel Splice System	A	ea.	ea.
02998	Deformed Steel Bars, Epoxy Coated	A	lb.	kg
03014- LHC-3.3K	Concrete-Low Heat Conc (3300 psi/22MPa)	A	CY	cu.m
03014-A	Concrete-Class A (3000psi/21MPa)	A	c.y.	cu.m
03014-A-3.3K	Concrete-Class A (3300psi/22.8MPa)	A	c.y.	cu.m
03014-C	Concrete-Class C (3000psi/21MPa)	A	c.y.	cu.m
03014-C-3.3K	Concrete-Class C (3300psi/22.8MPa)	A	c.y.	cu.m
03014-Elast-CRT	Concrete-Elastomeric (Cert Only)	A	CF	cu.m
03014-Elast-CYL	Concrete-Elastomeric (Cylinders)	A	c.y.	cu.m
03014-F	Concrete-Class F (4000psi/28MPa)	A	c.y.	cu.m
03014-F-4.4K	Concrete-Class F (4400psi/30.4MPa)	A	c.y.	cu.m
03014-HE	Concrete-High Early Strength (All Mixes)	A	c.y.	cu.m
03014-Latex	Concrete-Latex Modified	A	c.y.	cu.m
03014-LH -3.3K	Concrete Low Heat Conc (3300 psi/23MPa)	A	c.y.	cu.m
03014-LHC-4K	Concrete-Low Heat Conc (4000 psi/28MPa)	A	c.y.	cu.m
03014-Light Wt	Concrete-Light Weight (All)	A	c.y.	cu.m
03014-PAV	Concrete-Pavement (3500psi/25MPa)	A	c.y.	cu.m
03014-SP2500	Concrete-Spec. Prov. (2500psi/18MPa)	A	c.y.	cu.m
03014-SP3K	Concrete-Spec. Prov. (3000psi/21MPa)	A	c.y.	cu.m
03014-SP4.4K	Concrete-Spec. Prov. (4400psi/30MPa)	A	CY	cu.m
03014-SP4500	Concrete-Spec. Prov. (4500psi/31MPa)	A	c.y.	cu.m
03014-SP4K	Concrete-Spec. Prov. (4000psi/28MPa)	A	c.y.	cu.m
03014-SP5.7K	Concrete-Spec. Prov. (5656psi/39MPa)	A	c.y.	cu.m
03014-SP5K	Concrete-Spec. Prov. (5000psi/35MPa)	A	c.y.	cu.m
03014-SP6K	Concrete-Spec. Prov. (6000psi/41MPa)	A	c.y.	cu.m
03014-SP8K	Concrete-Spec. Prov. (8000psi/55MPa)	A	c.y.	cu.m
03014-SP-CLSM	Concrete-Controlled Low Strngth Material	A	c.y.	cu.m
03016	Grout - Non Shrink (Batched)	A	c.y.	cu.m
03017	Cement, High-Early	A	bag	bag
~~03023~~	~~Cylinder Concrete Curing Box~~	~~A~~	~~ea.~~	~~ea.~~
03025	Mortar	A	bag	bag
03026	Mortar Topping	A	s.f.	sq.m
~~03029~~	~~Shotcrete~~	~~A~~	~~gal~~	~~L~~
03040	Grout, Non-Shrink	A	bag	bag
~~03041~~	~~Grout~~	~~A~~	~~lb.~~	~~kg~~
~~03042~~	~~Grout~~	~~A~~	~~TEST~~	~~TEST~~
03043	Grout, Expansive Mix	A	gal	L
03047	Curing Mats - Burlap	A	s.y.	sq.m
03050	Concrete Members, Prestressed	A	l.f.	m
03051	Concrete Piles - Prestressed	A	l.f.	m
~~03052~~	~~Curing Coumpound-Liquid Membrane~~	~~A~~	~~c.y.~~	~~cu.m~~

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
03054	Curing Material-Polyethylene	A	s.y.	sq.m
03056	Grout Test Cube	A	bag	bag
03057	Sand Blast Abrasive	A	lb.	kg
03060	Cement - Portland Type I	A	bag	bag
03061	Cement - Portland Type II	A	bag	bag
~~03062~~	~~Cement - Portland Type III~~	~~A~~	~~bag~~	~~bag~~
03066	Cement - Portland Type I/II	A	bag	bag
~~03072~~	~~Cement - Copolymer Mortar Patch~~	~~A~~	~~gal~~	~~L~~
03075	Epoxy Bonding Compound	A	gal	L
03076	Epoxy Mortar	A	gal	L
~~03078~~	~~Adhesive~~	~~A~~	~~gal~~	~~L~~
03079	Epoxy Protective Coating	A	s.f.	sq.m
~~03084~~	~~Admixture~~	~~A~~	~~c.f.~~	~~cu.m~~
03092	Joint Sealer	A	gal	L
03093	Joint Sealer	A	lb.	kg
03094	Joint Sealer	A	l.f.	m
03100	Deformed Steel, Reinforcing	A	lb.	kg
03100-G	Deformed, Steel, Reinforcing Bars, Galva	A	lb.	kg
03100-SS	Stainless Steel Rebar	A	lb.	kg
03102-FRP	Reinforcing Bars - Fiber Reinf - Polymer	A	lb.	kg
03103	Anchors for Curbing	A	l.f.	m
03104	Anchors - Chemical	A	ea.	ea.
03105	Chemical Anchor	A	ea.	ea.
03112	Post Tension Components	A	ea.	ea.
~~03114~~	~~Post Tensioning Devices~~	~~A~~	~~l.f.~~	~~m~~
~~03116~~	~~Anchorages, Prestressing~~	~~A~~	~~ea.~~	~~ea.~~
03138	Dowels, Steel	A	ea.	ea.
03145	Fabric, Wire & Welded Steel	A	s.y.	sq.m
03146	Bar Mat Reinforcement	A	s.y.	sq.m
03148	Prestressing Cable (Strand)	A	REEL	REEL
03155	Expansion Joint Filler	A	l.f.	m
03156	Transverse Contraction Joint	A	l.f.	m
03157	Transverse Expansion Joint	A	l.f.	m
03158	Preformed Expansion Joint Filler	A	s.f.	sq.m
03159	Elastomeric Expansion Device	A	l.f.	sq.m
~~03162~~	~~Premolded Expansion Joint Filler~~	~~A~~	~~l.f.~~	~~m~~
03164	Prefabricated Expansion Joint	A	l.f.	sq.m
03166	Sheeting, Polyethylene	A	s.y.	sq.m
~~03168~~	~~Noise Barrier, Timber~~	~~A~~	~~ea.~~	~~ea.~~
03171	Wire Cable	A	l.f.	m
03188	Catch Basin/Manhole-Plastic Steps	A	ea.	ea.
03197	Concrete Blocks	A	ea.	ea.
03198	Mesh, Reinforcing for Walls	A	lb.	kg
03199	Masonry Brick & Block (Hollow)	A	ea.	ea.
03200	Masonry Brick & Block (Solid)	A	ea.	ea.
03201	Brick (Clay) - RED	A	ea.	ea.

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
03202	Manhole Blocks, Concrete	A	ea.	ea.
03203	Catch Basin Blocks, Concrete	A	ea.	ea.
03205	Catch Basin - Grates	A	ea.	ea.
03206	Manhole Cover	A	ea.	ea.
03207	Manhole Frame	A	ea.	ea.
03209	Manhole Covers & Frames	A	ea.	ea.
03210	Handhole - Plastic	A	ea.	ea.
03211	Handhole Cover	A	ea.	ea.
03212	Catch Basin Frame & Grate	A	ea.	ea.
03214	Handhole Covers & Frames	A	ea.	ea.
~~03215~~	~~Catch Basin / Manhole - Steps~~	~~A~~	~~ea.~~	~~ea.~~
~~03216~~	~~Catch Basin/Manhole Cast Iron Steps~~	~~A~~	~~ea.~~	~~ea.~~
03218	Stain Protection	A	l.s.	l.s.
03223	Scupper Components	A	ea.	ea.
03227	Scupper	A	ea.	ea.
03228	Manhole -Top & Cover (Cast Iron)	A	ea.	ea.
03229	Drains	A	ea.	ea.
~~03230~~	~~Concrete Pipe Reinforcement~~	~~A~~	~~ton~~	~~MTON~~
03237	Catch Basin Trap Hood	A	ea.	ea.
03243	Scupper Grates & Frames	A	ea.	ea.
03247	Manhole Rings, Cast Iron	A	ea.	ea.
03251	Catch Basin - Adjustment Ring	A	ea.	ea.
03252	Manhole - Adjustment Ring	A	ea.	ea.
~~03253~~	~~Castings, Metal -Use for most Structural~~	~~A~~	~~ea.~~	~~ea.~~
03300	Fence, Chain Link, Fabric	A	l.f.	m
03307	Fence, Chain Link, Gate	A	ea.	ea.
03308	Fence, Chain Link, Gate Hardware	A	ea.	ea.
03309	Fence, Chain Link	A	l.f.	m
03310	Fence, Chain Link, Post for	A	ea.	ea.
~~03312~~	~~Fence, Chain Link, Anchor for~~	~~A~~	~~ea.~~	~~ea.~~
03319	Fence - Barbed Wire	A	l.f.	m
03320	Fence, Chain Link, Hrdwe. & Access.	A	ea.	ea.
03321	Fence - Steel	A	l.f.	m
03322	Fence - Aluminum	A	l.f.	m
03323	Fence - Wood	A	l.f.	m
~~03325~~	~~Fence, Wire~~	~~A~~	~~l.f.~~	~~m~~
03326	Fence - Wire, Posts & Hardware	A	l.f.	m
03327	Fence, Protective	A	l.f.	m
03329	Fence - Stone	A	l.f.	m
03333	Post	A	ea.	ea.
03334	Fence, 3 Cable, Vinyl	A	l.f.	m
03335	Hook Bolts	A	ea.	ea.
03336	Fence (Rail)	A	l.f.	m
03397	Terminal Sections	A	ea.	ea.
03398	Rail Element Systems	A	l.f.	m
03405	Metal Beam Rail, Anchorages for	A	ea.	ea.

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
03406	Metal Beam Rail	A	l.f.	m
03407	Metal Beam Rail Element	A	l.f.	m
03408	Rub Rail Element	A	l.f.	m
03409	Metal Bridge Rail, Posts for	A	ea.	ea.
03410	Metal Beam Rail Hardware & Accessories	A	ea.	ea.
03411	Metal Beam Rail, Post for	A	ea.	ea.
03413	Box Beam Guide Railing	A	l.f.	m
03414	Metal Handrail	A	l.f.	m
~~03415~~	~~Transition Sections~~	~~A~~	~~ea.~~	~~ea.~~
03419	Cable Guide Rail	A	l.f.	m
03421	Cable Guide Railing, Anchorages for	A	ea.	ea.
~~03422~~	~~Swedge Bolt~~	~~A~~	~~ea.~~	~~ea.~~
03423	Cable Guide, Fittings for	A	ea.	ea.
03424	Cable Anchorage Components	A	ea.	ea.
~~03425~~	~~Cable Guide Railing, 3, Components for~~	~~A~~	~~ea.~~	~~ea.~~
~~03428~~	~~Wood Post - Treated~~	~~A~~	~~ea.~~	~~ea.~~
03429	Metal Bridge Rail	A	l.f.	m
03430	Metal Bridge Railing Components	A	ea.	ea.
03432	Joint Seal, Elastomeric Compression	A	l.f.	m
03433	Lubricant Adhesive	A	l.f.	m
03434	Bridge Rail Protective Fence	A	l.f.	m
03435	Anchorages, Preset	A	ea.	ea.
~~03439~~	~~Cable - Guide~~	~~A~~	~~l.f.~~	~~m~~
03441	Barricades	A	ea.	ea.
03442	Wood Planks	A	ea.	ea.
03443	Wood Posts	A	ea.	ea.
03444	Closed Cell Elastomer	A	c.i.	cu.m
03446	Timber Deck Planking	A	l.f.	m
03449	Timber Guide Rail	A	l.f.	m
03450	Timber Guide Rail - Anchorages	A	ea.	ea.
03451	Timber Guide Rail - Hardware & Access.	A	ea.	ea.
03496	Sheeting, Reinforced Plastic	A	l.f.	m
03500	Grout - Anchor Bolt	A	gal	L
03504	Anchor Bolts	A	ea.	ea.
03505	Bearing Pad, Elastomeric	A	ea.	ea.
03505-L	Bearing Pads (Elastomeric Laminated)	A	ea.	ea.
03505-P	Bearing Pads (Elastomeric Plain)	A	ea.	ea.
03506	Bearing Pads, Bonding, Adhesive for	A	gal	L
03508	Blades - Snow Plow	A	ea.	ea.
03509	Blades - Grader	A	ea.	ea.
03510	Blades - Payloader	A	ea.	ea.
~~03511~~	~~Chain~~	~~A~~	~~l.f.~~	~~m~~
03517	Steel Grid Decking	A	s.f.	sq.m
03518	Timber Face	A	s.f.	sq.m
03521	Transverse Terminal Joint	A	l.f.	m
03522	Bolts	A	ea.	ea.

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
03523	Bolts & Washers	A	ea.	ea.
03524	Bolts & Nuts	A	ea.	ea.
03526	Rope - Polyester	A	l.f.	m
03529	Weld Equipment Qualification (Test)	A	TEST	TEST
03531	Bearing Pads, Prefabricated	A	ea.	ea.
03532	Steel Pile Shell	A	l.f.	m
03535	Piles, Sheet Steel for (ASTM-A328)	A	l.f.	m
03537	Steel, Structural	A	cwt.	kg
~~03538~~	~~Structural Timber~~	~~A~~	~~l.f.~~	~~m~~
03539	Piles, Timber	A	l.f.	m
03540	Bearings, Pot or Spherical	A	ea.	ea.
03541	Welding Electrode	A	lb.	kg
03542	Stud Shear Connector	A	ea.	ea.
03543	Studs - Welded	A	ea.	ea.
03545	Fender System & Hardware	A	ea.	ea.
03546	Gabions	A	ea.	ea.
03549	H-Piles, Steel	A	lb.	kg
03557	Pile	A	ea.	ea.
~~03559~~	~~Pile Point, Steel~~	~~A~~	~~ea.~~	~~ea.~~
03564	Structural Steel Supports	A	ea.	ea.
03565	Structural Steel Items	A	ea.	ea.
03566	Steel Plates	A	ea.	ea.
03569	Structural Steel, Low Alloy	A	cwt.	kg
03571	Structural Steel	A	l.s.	l.s.
~~03576~~	~~Structural Steel Bracket~~	~~A~~	~~ea.~~	~~ea.~~
03578	Pile Splice, Preformed	A	ea.	ea.
~~03580~~	~~Weld Test Sample~~	~~A~~	~~ea.~~	~~ea.~~
03595	Temporary Illumination	A	ea.	ea.
~~03598~~	~~Luminaire With Ballast & Lamp~~	~~A~~	~~ea.~~	~~ea.~~
03600	Fire Alarm System	A	ea.	ea.
~~03601~~	~~Ground Rod Sleeves~~	~~A~~	~~ea.~~	~~ea.~~
03603	Warning Lights	A	ea.	ea.
03607	Generator	A	ea.	ea.
03609	Meter Socket	A	ea.	ea.
~~03610~~	~~Conduit, Fiberglass~~	~~A~~	~~l.f.~~	~~m~~
03612	Cable in Duct	A	l.f.	m
~~03617~~	~~Pole, Base~~	~~A~~	~~ea.~~	~~ea.~~
03619	Anchor - Light Standard	A	ea.	ea.
~~03625~~	~~Pole, Anchor~~	~~A~~	~~ea.~~	~~ea.~~
~~03629~~	~~Poles Transmission & Support~~	~~A~~	~~ea.~~	~~ea.~~
~~03630~~	~~Wire Shield~~	~~A~~	~~ea.~~	~~ea.~~
03631	Pole - Span Combination	A	ea.	ea.
~~03636~~	~~Electrical Hardware - Misc.~~	~~A~~	~~ea.~~	~~ea.~~
03639	Flasher Cabinet	A	ea.	ea.
03645	Pole, Light & Fixtures	A	ea.	ea.
03651	Auxiliary Equipment Cabinet	A	ea.	ea.

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
03688	Light Standard & Bracket	A	ea.	ea.
03690	Anchor, Miscellaneous Hardware for	A	ea.	ea.
03691	Nuts and/or Washers	A	ea.	ea.
03693	Conduit & Fittings (all types)	A	l.f.	m
03696	Cable - Aerial	A	l.f.	m
~~03697~~	~~Bracket - (Illumination) For Wood Pole~~	~~A~~	~~ea.~~	~~ea.~~
03698	Wood Pole For Illumination	A	ea.	ea.
03704	Light Standard	A	ea.	ea.
03705	Tape	A	l.f.	m
03707	Bolts, High Strength	A	ea.	ea.
~~03708~~	~~Rock Anchor~~	~~A~~	~~ea.~~	~~ea.~~
~~03709~~	~~Ground Wire~~	~~A~~	~~l.f.~~	~~m~~
~~03710~~	~~Ground Rod & Clamp~~	~~A~~	~~ea.~~	~~ea.~~
~~03711~~	~~Ground Rod~~	~~A~~	~~ea.~~	~~ea.~~
03715	Lamp Ballast, Mercury Vapor	A	ea.	ea.
03723	Rigid Metal Conduit	A	l.f.	m
03724	Junction Box & Cover	A	ea.	ea.
03725	Single Conductor In Conduit	A	l.f.	m
03728	Service Entrance & Cabinet	A	ea.	ea.
03729	Navigation Lights	A	ea.	ea.
03730	Single Conductor	A	l.f.	m
~~03731~~	~~Aviation Lights~~	~~A~~	~~ea.~~	~~ea.~~
03734	Metal Conduit & Fittings	A	l.f.	m
03735	Signs - Internally Illuminated	A	ea.	ea.
~~03743~~	~~Conduit & Appurtenances~~	~~A~~	~~l.f.~~	~~m~~
~~03745~~	~~Amplifier~~	~~A~~	~~ea.~~	~~ea.~~
~~03748~~	~~Signal Accessories~~	~~A~~	~~ea.~~	~~ea.~~
03753	Bushings	A	ea.	ea.
~~03754~~	~~Clamp~~	~~A~~	~~ea.~~	~~ea.~~
03756	Straps	A	ea.	ea.
03758	Circuit Breakers	A	ea.	ea.
03760	Flasher E/M	A	ea.	ea.
~~03762~~	~~170 Controller & Cabinet~~	~~A~~	~~ea.~~	~~ea.~~
03764	Sign (Variable Message)	A	ea.	ea.
03765	Pedestrian Push Button & Sign	A	ea.	ea.
03766	Traffic Signal Equipment	A	ea.	ea.
03774	Service Cabinet & Components	A	ea.	ea.
03775	Service Components	A	ea.	ea.
~~03777~~	~~Service Electrical~~	~~A~~	~~ea.~~	~~ea.~~
03778	Lighting Fixtures	A	ea.	ea.
~~03779~~	~~Grounding Connectors~~	~~A~~	~~ea.~~	~~ea.~~
03786	Arrow Signal	A	ea.	ea.
03793	Optical Detector	A	ea.	ea.
03794	Vehicle Emitter	A	ea.	ea.
03795	Phase Selector	A	ea.	ea.
03797	Detectors	A	ea.	ea.

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
03798	Temporary Signalization	A	ea.	ea.
03799	Bracket	A	ea.	ea.
03800	Traffic Signal Foundation	A	ea.	ea.
03801	Pedestals, Aluminum or Steel	A	ea.	ea.
03802	Span Pole - Steel	A	ea.	ea.
03803	Flashing Arrow	A	ea.	ea.
03804	Span Pole - Wood	A	ea.	ea.
~~03805~~	~~Wood Pole Anchor~~	~~A~~	~~ea.~~	~~ea.~~
03806	Mast Arm Assembly	A	ea.	ea.
03807	Traffic Signal	A	ea.	ea.
03808	Pedestrian Signal	A	ea.	ea.
~~03809~~	~~Pedestrian Push Buttons~~	~~A~~	~~ea.~~	~~ea.~~
03810	Controller	A	ea.	ea.
03812	Loop Vehicle Detector	A	ea.	ea.
03813	Loop Detector Saw Cut Materials	A	ea.	ea.
03814	Loop Detector, Wire for	A	l.f.	m
03815	Loop Detector, Plastic Compound for	A	gal	L
03817	Vehicle Detector	A	ea.	ea.
03843	Control Cable, Multi Conductor	A	l.f.	m
03844	Control Cable	A	l.f.	m
03848	Span Wire	A	l.f.	m
03849	Conduit, Polyvinyl Chloride	A	l.f.	m
03854	Span Wire Assembly	A	ea.	ea.
03855	Wire, Electrical	A	l.f.	m
~~03856~~	~~Wire And Duct~~	~~A~~	~~l.f.~~	~~m~~
03858	Duct Bank - PVC	A	l.f.	m
03861	Traffic Control Cabinet	A	ea.	ea.
03862	Pole	A	ea.	ea.
03864	Traffic Signal Lamp	A	ea.	ea.
03865	Vehicle Detector and Amplifier	A	ea.	ea.
03867	Communication Equipment	A	ea.	ea.
03869	Test Equipment	A	ea.	ea.
~~03874~~	~~Cable Clamp~~	~~A~~	~~ea.~~	~~ea.~~
03875	Cable Closures	A	ea.	ea.
~~03878~~	~~Conduit (Metal) Liquid Tight~~	~~A~~	~~l.f.~~	~~m~~
03881	Messenger Cable and Hardware	A	l.f.	m
03882	Guy Wire	A	l.f.	m
~~03883~~	~~Guy Wire Shield~~	~~A~~	~~ea.~~	~~ea.~~
03893	Tubular Sign Support	A	ea.	ea.
03895	Post - Sign	A	ea.	ea.
03898	Support Bracket	A	ea.	ea.
03899	Sign Support (Cantilever)	A	ea.	ea.
03900	Sign Supports, Structural Steel	A	cwt.	kg
03927	Traffic Drum	A	ea.	ea.
03928	Sign Support (Overhead)	A	ea.	ea.
03929	Sign Support, Structure Mounted	A	ea.	ea.

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
~~03932~~	~~Delineator Posts~~	~~A~~	~~ea.~~	~~ea.~~
03933	Delineator	A	ea.	ea.
03934	Reflective Sheeting	A	s.f.	sq.m
~~03936~~	~~Sign Panels, Extruded Aluminum~~	~~A~~	~~s.f.~~	~~sq.m~~
03937	Panel Bolt & Post Clip Assemblies	A	ea.	ea.
03938	Sign Face - Sheet Aluminum	A	s.f.	sq.m
03939	Signs	A	ea.	ea.
03940	Sign Support (Side Mounted)	A	ea.	ea.
03942	Sign Support (foundation for side mount)	A	ea.	ea.
03943	Object Marker	A	ea.	ea.
~~03944~~	~~Signs - (Safety) and Accessories~~	~~A~~	~~ea.~~	~~ea.~~
03945	Construction Signing	A	s.f.	sq.m
~~03946~~	~~Sign Face Illuminated~~	~~A~~	~~s.f.~~	~~sq.m~~
03948	Traffic Cones	A	ea.	ea.
03949	Delineator and Post	A	ea.	ea.
03952	Sign Post	A	ea.	ea.
03953	Sign Hardware	A	ea.	ea.
03956	Traffic Drums	A	ea.	ea.
03960	Sign Face - Extruded Aluminum	A	s.f.	sq.m
03964	Delineator Brackets	A	ea.	ea.
03965	Inertial Barrier Module	A	ea.	ea.
03967	Sheet Aluminum	A	s.f.	sq.m
03970	Impact Attenuator	A	ea.	ea.
03972	Signs (Reflective)	A	ea.	ea.
03973	Sign Support	A	ea.	ea.
03974	Construction Barricade	A	ea.	ea.
03978	Runway Signs	A	ea.	ea.
03984	Cable - Fiber Optics	A	l.f.	m
03985	Geotextile	A	s.y.	sq.m
04001	Bituminous Concrete, Class 1	A	ton	t
04002	Bituminous Concrete, Class 2	A	ton	t
04003	Bituminous Concrete, Class 3 - Curb Mix	A	ton	t
04004	Bituminous Concrete, Class 4	A	ton	t
04015	Bituminous Concrete, Surface Course-FAA	A	ton	t
04016	Bituminous Concrete Base Course - FAA	A	ton	t
04018	Bit. Concrete, PMA Suface Course - FAA	A	ton	t
04023	Bit Conc - Class 5A/Polypropylene Fiber	A	ton	MTON
04024	Bit Conc - Class 5B/Polyester Fibers	A	ton	MTON
04029	Ultra-Thin Bonded HMA Pavement (Type B)	A	ton	t
04030	Rubberized Coal-Tar Pitch Slurry Seal	A	s.y.	sq.m
~~04047~~	~~Asphalt Binder PG 58-28~~	~~A~~	~~gal~~	~~L~~
~~04050~~	~~Asphalt Binder PG 64-22~~	~~A~~	~~gal~~	~~L~~
~~04051~~	~~Asphalt Binder PG 64-28~~	~~A~~	~~gal~~	~~L~~
04052	HMA, Level 1 (9.5 mm / 0.375 in)	A	ton	t
04052- W	HMA, Level 1 (9.5 mm / 0.375 in) - Warm	A	ton	t
04053	HMA, Level 2 (9.5 mm / 0.375 in)	A	ton	t

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
04053- W	HMA, Level 2 (9.5 mm / 0.375 in) - Warm	A	ton	t
04054	HMA, Level 3 (9.5 mm / 0.375 in)	A	ton	t
04054- W	HMA, Level 3 (9.5 mm / 0.375 in) - Warm	A	ton	t
04055	HMA, Level 4 (9.5 mm / 0.375 in)	A	ton	t
04056	HMA, Level 1 (12.5 mm / 0.5 in)	A	ton	t
04056-W	HMA, Level 1 (12.5 mm / 0.5 in) - Warm	A	ton	t
04057	HMA, Level 2 (12.5 mm / 0.5 in)	A	ton	t
04057- W	HMA, Level 2 (12.5 mm / 0.5 in) -Warm	A	ton	t
04058	HMA, Level 3 (12.5 mm / 0.5 in)	A	ton	t
04058- W	HMA, Level 3 (12.5 mm / 0.5 in) - Warm	A	ton	t
~~04059~~	~~HMA, Level 4 (12.5 mm / 0.5 in)~~	~~A~~	~~ton~~	~~t~~
04064	HMA, Level 1 (25.0 mm / 1.0 in)	A	ton	t
04064- W	HMA, Level 1 (25.0 mm / 1.0 in) - Warm	A	ton	t
04065	HMA, Level 2 (25.0 mm / 1.0 in)	A	ton	t
04065- W	HMA, Level 2 (25.0 mm / 1.0 in) - Warm	A	ton	t
04066	HMA, Level 3 (25.0 mm / 1.0 in)	A	ton	t
04066- W	HMA, Level 3 (25.0 mm / 1.0 in) -Warm	A	ton	t
~~04067~~	~~HMA, Level 4 (25.0 mm / 1.0 in)~~	~~A~~	~~ton~~	~~t~~
04068	HMA, Level 1 (37.5 mm / 1.5 in)	A	ton	t
04068- W	HMA, Level 1 (37.5 mm / 1.5 in) - Warm	A	ton	t
04069	HMA, Level 2 (37.5 mm / 1.5 in)	A	ton	t
04069- W	HMA, Level 2 (37.5 mm / 1.5 in) - Warm	A	ton	t
04070- W	HMA, Level 3 (37.5 mm / 1.5 in) - Warm	A	ton	t
~~04072~~	~~#4 Superpave - Level 1~~	~~A~~	~~ton~~	~~t~~
~~04073~~	~~#4 Superpave - Level 2~~	~~A~~	~~ton~~	~~t~~
~~04074~~	~~#4 Superpave - Level 3~~	~~A~~	~~ton~~	~~t~~
~~04075~~	~~#4 Superpave - Level 4~~	~~A~~	~~ton~~	~~t~~
04076	HMA, Level 1 (6.25 mm / 0.25 in)	A	ton	t
04076- W	HMA, Level 1 (6.25 mm / 0.25 in) - Warm	A	ton	t
04077	HMA, Level 2 (6.25 mm / 0.25 in)	A	ton	t
04077- W	HMA, Level 2 (6.25 mm / 0.25 in) - Warm	A	ton	t
04078	HMA, Level 3 (6.25 mm / 0.25 in)	A	ton	t
04078- W	HMA, Level 3 (6.25 mm / 0.25 in) - Warm	A	ton	t
~~04079~~	~~HMA, Level 4 (6.25 mm / 0.25 in)~~	~~A~~	~~ton~~	~~t~~
04080	HMA, Asphalt Rubber Gap-Graded	A	ton	MTON
04092	PMA, Level 1 (6.25 mm / 0.25 in)	A	ton	t
04093	PMA, Level 2 (6.25 mm / 0.25 in)	A	ton	t
04094	PMA, Level 3 (6.25 mm / 0.25 in)	A	ton	t
04095	PMA, Level 1 (9.5 mm / 0.375 in)	A	ton	t
04096	PMA, Level 2 (9.5 mm / 0.375 in)	A	ton	t
04097	PMA, Level 3 (9.5 mm / 0.375 in)	A	ton	t
04098	PMA, Level 1 (12.5 mm / 0.5 in)	A	ton	t
04099	PMA, Level 2 (12.5 mm / 0.5 in)	A	ton	t
04100	PMA, Level 3 (12.5 mm / 0.5 in)	A	ton	t
04101	PMA, Level 1 (25.0 mm / 1.0 in)	A	ton	t
04102	PMA, Level 2 (25.0 mm / 1.0 in)	A	ton	t

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
04103	PMA, Level 3 (25.0 mm / 1.0 in)	A	ton	t
04108-SP	HMA- POROUS PAVEMENT	A	ton	t
~~04109~~	~~MC - 250~~	~~A~~	~~gal~~	~~L~~
04128	RS-1	A	gal	L
04133	SS-1- Slow Setting Asphalt Emulsion	A	gal	L
04134	SS-1H - Slow Setting Asphalt Emulsion -	A	GAL	L
04138	CRS-1 (Cationic Rapid Setting Asphalt)	A	gal	L
04139	CRS-2 (Cationic Rapid Setting)	A	gal	L
04142	Cationic Emulsion (CMS-2)	A	gal	L
04145	CSS-1H - Slow Setting Ashalt Emulsion	A	gal	L
04146	CSS-1- Cationic Emulsion	A	gal	L
04147	RS-1H	A	gal	L
04148	CRS-1P - Polymer Modified	A	GAL	L
~~04168~~	~~Gasket~~	~~A~~	~~ea.~~	~~ea.~~
~~04173~~	~~Asphalt Flashing Cement~~	~~A~~	~~gal~~	~~L~~
04174	Coating Material For Corr. Struct Plates	A	gal	L
04175	Asphalt Coating - Culvert	A	gal	L
04177	Concrete Joint Sealer	A	lb.	kg
04178	Pipe Joint Compound	A	gal	L
04181	Asphalt Saturated Roofing Felt	A	s.y.	sq.m
04199	Membrane Waterproofing	A	s.y.	sq.m
04203	Woven Glass Fabric	A	s.y.	sq.m
04204	Waterproofing Asphalt	A	gal	L
04207	Dampproofing, Primer for	A	gal	L
04208	Dampproofing, Sealer for	A	gal	L
04210	Elastomer Expansion Joint Binder	A	lb.	kg
04697	Sand (Masonry) - Grading A	A	c.y.	cu.m
04700	Sand	A	c.y.	cu.m
04703	Sand Filler	A	c.y.	cu.m
04704	Sand (Masonry) - Grading B	A	c.y.	cu.m
04705	Sand (Ottawa)	A	c.y.	cu.m
04709	Sand (for trenching and backfilling)	A	c.y.	cu.m
04749	Aggregate (Lightweight)	A	c.y.	cu.m
04757	Tree Root Protection, Stone for	A	c.y.	cu.m
~~04766~~	~~Impervious Fill~~	~~A~~	~~c.y.~~	~~cu.m~~
~~04768~~	~~Burlap Bags~~	~~A~~	~~ea.~~	~~ea.~~
04769	Stone (Bagged)	A	c.y.	cu.m
04771	Stone, Masonry	A	ton	t
04776	Hay, Baled	A	ea.	ea.
04793	Fill, Lightweight	A	c.y.	cu.m
04817	Stone Dust	A	ton	t
04819	Gravel (Bank Run)	A	c.y.	cu.m
04898	Screenings	A	ton	t
04901	Bedding Material	A	c.y.	cu.m
04902	Borrow	A	c.y.	cu.m
04905	Free Draining Material	A	c.y.	cu.m

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
04909	Curbing, Granite Stone	A	l.f.	m
~~04910~~	~~Curbing, Granite Slope~~	~~A~~	~~l.f.~~	~~m~~
04913	Stone for Slope Paving	A	s.y.	sq.m
04914	Sand - Graded	A	c.y.	cu.m
~~04959~~	~~Railroad Ballast Mat~~	~~A~~	~~s.f.~~	~~sq.m~~
04984	Granite Pavers	A	ea.	ea.
06505	Roofing Felt	A	s.y.	sq.m
~~06540~~	~~Door Frame~~	~~A~~	~~ea.~~	~~ea.~~
~~06541~~	~~Door~~	~~A~~	~~ea.~~	~~ea.~~
06552	Lime - Hydrated	A	bag	bag
~~06558~~	~~Insulation~~	~~A~~	~~s.f.~~	~~sq.m~~
~~06563~~	~~Coal Tar Epoxy for Piling~~	~~A~~	~~l.f.~~	~~m~~
06566	Lawn Drain	A	ea.	ea.
~~06567~~	~~Asphalt Shingles~~	~~A~~	~~s.f.~~	~~sq.m~~
06569	Exhaust Fans	A	ea.	ea.
~~06571~~	~~Caulk & Sealant~~	~~A~~	~~gal~~	~~L~~
~~06574~~	~~Electrical Panel~~	~~A~~	~~ea.~~	~~ea.~~
~~06600~~	~~Timber For Piles~~	~~A~~	~~l.f.~~	~~m~~
~~06604~~	~~Cable Connections~~	~~A~~	~~l.f.~~	~~m~~
06605	Post, Galvanized Steel	A	ea.	ea.
06613	Flashing	A	l.f.	m
06622	Anchor Studs	A	ea.	ea.
06623	Netting	A	s.f.	sq.m
06624	Sealant	A	l.f.	m
~~06645~~	~~Wood Roof Shakes~~	~~A~~	~~s.f.~~	~~sq.m~~
~~06647~~	~~Picnic Table~~	~~A~~	~~ea.~~	~~ea.~~
~~06651~~	~~Wire Rope (1/2"/13mm)~~	~~A~~	~~l.f.~~	~~m~~
~~06659~~	~~Expansion Joint Sealer~~	~~A~~	~~l.f.~~	~~m~~
~~06660~~	~~Expansion Joint Sealer~~	~~A~~	~~s.f.~~	~~sq.m~~
06667	Fiberglass Hopper	A	ea.	ea.
~~06704~~	~~Signs Supports (Breakaway)~~	~~A~~	~~ea.~~	~~ea.~~
~~06710~~	~~Cleanouts~~	~~A~~	~~ea.~~	~~ea.~~
06713	Drywell - Precast (Complete)	A	ea.	ea.
~~06724~~	~~Duct Components~~	~~A~~	~~ea.~~	~~ea.~~
06725	Cabinet	A	ea.	ea.
06727	Lamp	A	ea.	ea.
~~06728~~	~~Time Clock~~	~~A~~	~~ea.~~	~~ea.~~
06747	Wood Sign Posts	A	ea.	ea.
~~06768~~	~~Weather Information System~~	~~A~~	~~ea.~~	~~ea.~~
~~06779~~	~~Ground Bushings W/Lugs~~	~~A~~	~~ea.~~	~~ea.~~
06780	Locknuts, Steel	A	ea.	ea.
~~06781~~	~~Lighting Switches~~	~~A~~	~~ea.~~	~~ea.~~
~~06784~~	~~Electrical Tape~~	~~A~~	~~ea.~~	~~ea.~~
06795	Gate, Slide	A	ea.	ea.
~~06801~~	~~Hangers~~	~~A~~	~~ea.~~	~~ea.~~
06802	Geogrids	A	s.y.	sq.m

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
06836	Lumber (Southern Yellow Pine)	A	l.f.	m
06841	Elastomeric Joint Sealer	A	s.f.	sq.m
06843	Timber (Treated)	A	l.f.	m
06851	Arch Units - Precast	A	l.f.	m
06854	House Service Connection	A	l.f.	m
~~06855~~	~~Tie Rod~~	~~A~~	~~l.f.~~	~~m~~
~~06865~~	~~Lubricant~~	~~A~~	~~TUBE~~	~~TUBE~~
06868	Gate Valve	A	ea.	ea.
~~06879~~	~~Waterstop~~	~~A~~	~~l.f.~~	~~m~~
06885	Pumping Station & Misc. Materials	A	ea.	ea.
06903	Connectors	A	ea.	ea.
06907	Stainless Steel Strapping	A	l.f.	m
06908	Box Railing (Post)	A	ea.	ea.
06909	Box Railing (Hardware)	A	ea.	ea.
06920	Drain, Flexible Down	A	l.f.	m
06921	Railroad Track & Accessories	A	l.f.	m
06923	Stay In Place Forms	A	l.f.	m
~~06954~~	~~Railroad Crossing - Rubber~~	~~A~~	~~ea.~~	~~ea.~~
06956	Electrical Equipment	A	ea.	ea.
06960	Signs	A	s.f.	sq.m
06963	Plywood	A	s.f.	sq.m
~~06990~~	~~Galvanizing (Test)~~	~~A~~	~~TEST~~	~~TEST~~
06994	Cabinet Flasher	A	ea.	ea.
~~06996~~	~~Wire, No. 10~~	~~A~~	~~l.f.~~	~~m~~
~~07000~~	~~Washers~~	~~A~~	~~ea.~~	~~ea.~~
~~07008~~	~~U-Bolt~~	~~A~~	~~ea.~~	~~ea.~~
07013	Butterfly Valve	A	ea.	ea.
07055	Foam, Polyethylene	A	l.f.	m
07061	Call Box	A	ea.	ea.
07067	Expansion Joint System	A	l.f.	m
07078	Steel Casing	A	l.f.	m
~~07085~~	~~Prefab Building~~	~~A~~	~~ea.~~	~~ea.~~
~~07087~~	~~Anchor - Guy~~	~~A~~	~~ea.~~	~~ea.~~
~~07125~~	~~Tapping Sleeve & Valve~~	~~A~~	~~ea.~~	~~ea.~~
07132	Elastomer	A	c.i.	cu.m
~~07133~~	~~Studs~~	~~A~~	~~ea.~~	~~ea.~~
07140	Lumber	A	ea.	ea.
07143	Pipe Insulation	A	l.f.	m
07145	Catenary (Temp.) Hold Down Support	A	ea.	ea.
07148	Threaded Reinforcement Bar	A	l.f.	m
07152	Pump	A	ea.	ea.
07156	Valves	A	ea.	ea.
~~07164~~	~~Floodlights~~	~~A~~	~~ea.~~	~~ea.~~
~~07172~~	~~Water Main Support~~	~~A~~	~~ea.~~	~~ea.~~
~~07182~~	~~Drainage Composites - Prefabricated~~	~~A~~	~~s.y.~~	~~sq.m~~
~~07199~~	~~Traffic Guides~~	~~A~~	~~ea.~~	~~ea.~~

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
07201	Transformer Base	A	ea.	ea.
07209	Fence - Plastic	A	l.f.	m
07210	Heaters	A	ea.	ea.
~~07229~~	~~Water Main Plug~~	~~A~~	~~ea.~~	~~ea.~~
07230	Valve Box	A	ea.	ea.
~~07231~~	~~Tapping Sleeve~~	~~A~~	~~ea.~~	~~ea.~~
~~07241~~	~~Railroad Ties~~	~~A~~	~~ea.~~	~~ea.~~
07244	Bonding Compound	A	gal	L
07250	Insertion Valve & Sleeve	A	ea.	ea.
07260	Corporation Stops	A	ea.	ea.
07265	Curb Stops	A	ea.	ea.
07272	Barrier Supports, Steel	A	ton	t
07277	Turf Reinforcement Mats	A	s.y.	sq.m
07284	Block Wall Reinforcement	A	l.f.	m
07285	Timber Lagging	A	s.f.	sq.m
~~07291~~	~~Wood Rail~~	~~A~~	~~l.f.~~	~~m~~
07294	Handrail	A	ea.	ea.
~~07298~~	~~Door & Frame~~	~~A~~	~~ea.~~	~~ea.~~
07309	Tubing & Pipe (Copper)	A	l.f.	m
~~07317~~	~~Steel Rod~~	~~A~~	~~ea.~~	~~ea.~~
07331	Louvers & Accessories	A	ea.	ea.
07351	Bollard	A	ea.	ea.
~~07355~~	~~Tubing - Plastic~~	~~A~~	~~ea.~~	~~ea.~~
07357	Lumber - Treated	A	bd.f	cu.m
07366	Hydrant	A	ea.	ea.
07369	Pile Point Reinforcement	A	ea.	ea.
07370	Post (For Protective Fence)	A	ea.	ea.
~~07373~~	~~Aluminum Panel~~	~~A~~	~~ea.~~	~~ea.~~
07387	Expansion Joint - Modular	A	ea.	ea.
07392	Bolts, Stainless Steel	A	ea.	ea.
~~07393~~	~~Concrete Bonding Compound (Test)~~	~~A~~	~~TEST~~	~~TEST~~
07401	Hydrant Assembly	A	ea.	ea.
07403	Rod, Threaded	A	ea.	ea.
07412	Metered Service	A	ea.	ea.
~~07422~~	~~Bolts - Lag~~	~~A~~	~~ea.~~	~~ea.~~
~~07429~~	~~Walkway Lumber~~	~~A~~	~~s.f.~~	~~sq.m~~
07430	Misc. Hardware	A	ea.	ea.
07434	Joint Filler, Polyethylene	A	l.f.	m
07435	Expansion Joint Strip	A	l.f.	m
07437	Bench & Pedestal	A	ea.	ea.
~~07447~~	~~Sealant, Pourable~~	~~A~~	~~gal~~	~~L~~
07450	Wood Poles	A	l.f.	m
07459	Glare Screen, Temporary	A	ea.	ea.
~~07460~~	~~Sweeps & Fittings~~	~~A~~	~~ea.~~	~~ea.~~
07461	Rail	A	l.f.	m
07462	Rail Anchors	A	ea.	ea.

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
07466	Sheet Pile, Temporary	A	l.f.	m
07481	Seals	A	ea.	ea.
07483	Stairs	A	ea.	ea.
07507	Elastomeric Seal & Adhesive	A	l.f.	m
07514	Rod Restraint	A	ea.	ea.
07520	Fire Suppression Standpipe System	A	ea.	ea.
07523	Reducer & Fittings	A	ea.	ea.
07530	Box Beam Guide Rail End Assembly	A	ea.	ea.
07536	Base Assembly	A	ea.	ea.
07547	Tree	A	ea.	ea.
07558	Manhole Accessories	A	ea.	ea.
~~07572~~	~~Runway Lights~~	~~A~~	~~ea.~~	~~ea.~~
~~07578~~	~~Lowering Assembly~~	~~A~~	~~ea.~~	~~ea.~~
07581	Inserts, Threaded	A	ea.	ea.
07601	Connectors & Hardware	A	ea.	ea.
07610	Insulators	A	ea.	ea.
07627	Reinforced Earth Wall	A	ea.	ea.
07640	Plywood	A	ea.	ea.
07641	Screws, Drywall	A	lb.	kg
07642	Post Support	A	l.f.	m
07645	Luminaire	A	ea.	ea.
07654	Anchorage Assemblies	A	ea.	ea.
07658	Jute Mesh, Staples for	A	ea.	ea.
07679	Concrete Pavers	A	ea.	ea.
07684	Light Base	A	ea.	ea.
~~07686~~	~~Anchor Bolts, Steel Plate for~~	~~A~~	~~ea.~~	~~ea.~~
07687	Communication Cable & Hardware	A	l.f.	m
07695	Anchors - Masonary	A	ea.	ea.
07722	Pipe Sleeve	A	l.f.	m
~~07737~~	~~Wood Pole, Anchor Rod with Nut for~~	~~A~~	~~ea.~~	~~ea.~~
07748	Plastic Covers	A	l.f.	m
07762	Sheet Piling	A	l.f.	m
~~07768~~	~~Splicing Kit~~	~~A~~	~~ea.~~	~~ea.~~
~~07778~~	~~Regulator~~	~~A~~	~~ea.~~	~~ea.~~
07797	Tie Wire	A	l.f.	m
07798	Breakaway Sign Base	A	ea.	ea.
07799	Impact Attenuator Parts/Devices	A	ea.	ea.
07800	Barrier, Temporary	A	l.f.	m
07801	Roof Decking	A	s.f.	sq.m
07804	Steel, Reinforcing	A	ea.	ea.
~~07807~~	~~Saw Blades~~	~~A~~	~~ea.~~	~~ea.~~
~~07810~~	~~Wrought Iron Railing~~	~~A~~	~~l.f.~~	~~m~~
07816	Neoprene	A	ea.	ea.
07821	Noise Barrier Wall, Structure	A	l.f.	m
07822	Noise Barrier Wall	A	s.f.	sq.m
07832	Silicone Sealant	A	TUBE	TUBE

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
07850	Catchment, Fiberglass	A	ea.	ea.
07855	Nut, Anchor	A	ea.	ea.
07856	Anchor Plate	A	ea.	ea.
07858	Mesh, Galvanized	A	s.f.	sq.m
07880	Stairway Hardware	A	ea.	ea.
07887	Nails	A	lb.	kg
~~07935~~	~~Cathodic Protection System~~	~~A~~	~~ea.~~	~~ea.~~
07936	Glare Screen	A	l.f.	m
07946	Joint Filler, Polyethylene Foam	A	l.f.	m
~~07967~~	~~Steel Band~~	~~A~~	~~l.f.~~	~~m~~
07974	Barricades, Hardware for	A	ea.	ea.
~~07982~~	~~Steel Plate, Galvanized~~	~~A~~	~~ea.~~	~~ea.~~
~~07983~~	~~Anchor (Barrier)~~	~~A~~	~~ea.~~	~~ea.~~
~~07984~~	~~Apron Tiedown~~	~~A~~	~~ea.~~	~~ea.~~
07986	Anchors - Steel For Sign	A	ton	t
07991	Molded Pad	A	ea.	ea.
~~07995~~	~~Steel Grating~~	~~A~~	~~s.f.~~	~~sq.m~~
~~07998~~	~~Steel Shell~~	~~A~~	~~ton~~	~~t~~
07999	Wire Mesh	A	s.f.	sq.m
08003	Washer, Stainless Steel	A	ea.	ea.
08004	Pin	A	ea.	ea.
08009	Wire - Loop Vehicle Detector	A	l.f.	m
08010	Expansion Joint - Asphaltic Plug	A	l.f.	m
08010 - SP	Exp. Jt.- Asphaltic Plug - SPECIAL PROV.	A	c.f.	cu.m
08018	Stainless Steel Anchor Studs & Nuts	A	ea.	ea.
08022	Bolt (High Strength), Nut & Washer	A	ea.	ea.
08031	To Be Determined	A	NONE	NONE
08032	Sand (Washed)	A	c.y.	cu.m
08033	Sand (Natural)	A	c.y.	cu.m
08034	Stone (Broken/Crushed)	A	c.y.	cu.m
08035	Gravel (Crushed)	A	c.y.	cu.m
08036	Reclaimed Misc. Aggregate (ON-SITE)	A	c.y.	cu.m
08036X	Reclaimed Misc. Aggregate (OFFSITE)	A	c.y.	cu.m
08037	Reclaimed Waste	A	c.y.	cu.m
08037X	Reclaimed Waste (OFFSITE)	A	c.y.	cu.m
08038	Subgrade	A	s.y.	sq.m
08039	Embankment Material	A	c.y.	cu.m
08042	Pull Box - Precast Concrete	A	ea.	ea.
08043	Traffic Control Equipment	A	ea.	ea.
08044	Retaining Wall - Precast Concrete	A	ea.	ea.
08045	Pipe - Liner	A	l.f.	m
08046	Camera Video Detection System	A	ea.	ea.
08047	Camera Cable	A	l.f.	m
08050	Monument	A	ea.	ea.
08051	Lawn Sprinkler System	A	ea.	ea.
~~08052~~	~~Helix Pier~~	~~A~~	~~ea.~~	~~ea.~~

MATERIAL CODES	MATERIAL - FULL NAME	ACTIVE	ENG_UNIT	MET_UNIT
08053	Wood Log	A	ea.	ea.
08054	Wetland Soil	A	c.y.	cu.m
08055	Low Density Cellular Concrete Fill	A	c.y.	cu.m
08056	Oil Absorbent Boom	A	l.f.	m
08058	Containment Boom	A	l.f.	m
08059	Turbidity Control Curtains	A	l.f.	m
08060	Detectable Warning Strip - (ADA)	A	s.f.	sq.m
~~08062~~	~~Bridge Plate~~	~~A~~	~~ea.~~	~~ea.~~
08063	Video Equipment	A	ea.	ea.
08064	Warning Paver	A	ea.	ea.
~~08065~~	~~Counterweight Blocks~~	~~A~~	~~ea.~~	~~ea.~~
~~08066~~	~~Vehicle Arresting System~~	~~A~~	~~ea.~~	~~ea.~~
08067	SILTSACK	A	ea.	ea.

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING AND CONSTRUCTION
DIVISION OF MATERIALS TESTING

CRITERIA FOR ACCEPTANCE OF PORTLAND CEMENT BY CERTIFICATION

Before a cement producer is qualified to provide cement for use on Connecticut Department of Transportation (Department) projects, an authorized representative of the cement producer must agree to and comply with the following:

A. QUALIFICATION

1. The cement producer shall demonstrate that the production of cement at each mill providing material to the Department is regulated by an effective program of quality control. The cement producer shall submit a quality control plan to the Division of Materials Testing (DMT) that includes a detailed account of the quality control methods employed, the sampling and testing frequency, and testing procedures for review. Furthermore, the cement producer shall provide upon request, any documentation produced during any quality control related sampling and testing.

2. The testing laboratory of the cement producer shall be certified by the Cement and Concrete Reference Laboratory. Copies of the two (2) latest inspection reports shall be submitted to the DMT for review. The laboratory must be CCRL certified during any period that the mill provides material to the Department.

3. The cement producer shall certify the quality of the cement supplied as conforming to the requirements of the applicable specifications.

B. OPERATIONAL PROCEDURE

1. One (1) certified summary laboratory test report for all cement being produced shall be furnished on a monthly basis by the cement producer to the Division of Materials Testing, 280 West Street, Rocky Hill, Connecticut 06067.

2. Each bulk shipment to a ready mix producer, precast fabricator, or distributor shall be accompanied by a Bill of Lading that includes the following information:

    a. Cement Producer's Name
    b. Mill Location
    c. Cement Carrier Number
    d. Date Loaded
    e. Weight of Material Contained in Carrier

f. Silo, Bin or Lot Number of Cement, Terminals
g. Consignee
h. Destination
i. Cement Type

Original BOL's must be provided to the purchaser for retention and review by the Department.

3. Random samples of the cement supplied may be selected and tested by the Department. Results of tests on these samples may be compared with the certified test values provided by the cement producer.

4. Results from bulk cement testing may also apply to bagged material from the same source.

Failure of the cement producer to comply with the requirements of the operational procedure may be considered grounds for suspending the qualification of the cement producer to provide cement on the basis of certification.

The procedure outlined above is intended to establish general guidelines for the acceptance of cement on the basis of producer qualification. However, the ConnDOT reserves the right to modify the above requirements if the best interest of the Department is served.

Appendix F – Connecticut Reference File (CRF) Specifications*

*** used for Bureau of Highway Operations purchasing contracts ONLY.**
The following CRF's are active.

File #	Title/Description
25	Black Enamel Paint
104	Burnt Orange Enamel Paint For Trucks
139	Sodium Chloride (Rock salt)
161	Non-reflective Plastic Sheeting
163	Processed Aggregate
191	Grits
194	Premixed Sodium Chloride (Salt) And Calcium Chloride
199	Epoxy Resin Pavement Markings, Symbols and Legends
200	White and Yellow Fast-Drying Waterborne Pavement Marking Paint
207	White and Yellow Regular-Drying Waterborne Pavement Marking Paint
2007-03	Liquid Calcium Chloride Anti-icing Agent

BLACK ENAMEL PAINT

REFERENCE FILE NO. 25—G

Issued March 10, 1953
Revised November 2, 1981

GENERAL — This material shall be shipped in regulation 1—gallon metal pails. Each container shall be marked with the following: name and type of paint, net weight, batch number, date of manufacture and State of Connecticut reference file and purchase order numbers, together with name and address of the manufacturer. When so requested, samples and analyses of all pigments, oils, resins, thinners and driers used for the enamel furnished shall be supplied by the manufacturer within ten days after request is made therefore.

A certified test report containing the physical and chemical properties of the material shall be submitted with each batch shipment.

The enamel shall consist of pigments and composition ground in the required vehicle by a suitable grinding machine to the required fineness. All pigments, oils, resins, thinners and driers used shall be of the best quality, free from adulterants of any kind and shall comply with the specific requirements given below. The enamel shall not contain any lead or lead by products.

The material desired under this specification is an extremely durable, highest quality black enamel for use on highway signs, and shall be resistant to air, sun and water.

COLOR — The color shall be jet black, conforming to Federal Standard No. 595, Color No. 17038.

ENAMEL COMPOSITION

	MIN.	MAX.
Carbon Black, %	3	4
Total solids, % by weight	42	-
Coarse particles retained on #325 screen based on paint, %	-	0.5
Weight per gallon, lb.	7.5	--
Viscosity, Krebs units at 77˚F.	67	77
Fitneness of grind (North Standard)	7	--

PIGMENT COMPOSITION — The pigment shall be carbon black only.

VEHICLE - The vehicle shall consist of a phthalic alkyd resin conforming to the requirements of Federal Specification TT—R-266, Type 3, of latest issue, with the following exceptions: Viscosity - Z maximum; Compatibility — delete raw linseed oil and mineral spirits dilution tests. The necessary quantities of suitable aliphatic, aromatic or terpene thinners and driers shall be added to yield a product conforming to all the requirements of this specification.

SPECULAR GLOSS - The enamel shall be flowed on a tin panel and allowed to dry for 24 hours before measuring. The specular gloss at 60º angle of incident, ASTM designation D523 of latest issue, shall be not less than 85.

SETTING AND DRYING TIME — This enamel shall air dry dust free within 2 hours, dry hard within 8 hours and reach full hardness within 48 hours.

DRY OPACITY — This enamel shall have a contrast ratio of at least 0.99 when spread at the rate of 630 sq. ft. per gallon (0.0025—inch wet film thickness).

WATER RESISTANCE — A film of enamel 0.002 inch thick shall be allowed to air dry for 96 hours, and then immersed in distilled water for 16 hours. It shall show no blistering or wrinkling immediately upon removal and no more than slight dulling or whitening after 2 hours recovery. After 24 hours, the gloss of the immersed portion shall be at least 90 percent of a comparison panel, which was not immersed.

FLEXIBILITY - A film of enamel 0.002 inch thick shall be allowed to dry for 18 hours, then baked for 72 hours at 105± 2°C, allowed to cool for 1/2 hour at 25°c (77°F), then bent over an 1/8—inch mandrel. There shall be no visible cracks when examined in a strong light at a 7—diameter magnification.

SKINNING — The enamel shall not skin within 48 hours in a three—quarter filled, closed container. Small amounts of anti—skinning agents, wetting agents, suspension agents and anti—drier agents may be added at the discretion of the manufacturer.

WORKING PROPERTIES — The enamel shall be well ground and shall show no more settling or caking than may be easily redispursed with a paddle to a homogeneous state. It shall be of good brushing consistency and shall dry to a smooth, glossy, uniform film, free from running, sagging or streaking.

BURNT ORANGE ENAMEL PAINT FOR TRUCKS (LEAD FREE)

REFERENCE FILE NO. 104-P

Issued May 17, 1945
Revised January 25, 1999

INTENDED USE – This specification covers a lead-free high-grade, synthetic-type high gloss enamel intended for use on trucks and other metallic motorized mechanical equipment. It is highly weather-resistant and is characterized by excellent color and gloss-retention, good drying, flexibility and freedom from aftertack. This enamel may be applied by brush or spray. It fails by mild chalking rather than by checking or cracking. The application of wax at periodic intervals will retard chalking and improve the appearance of the finish.

GENERAL – This material shall consist of pigments of the required fineness and composition, ground in the specified vehicle by a suitable grinding machine to the required fineness. All pigments, oils, resins, thinners and driers shall comply with the requirements below.

This enamel shall be shipped in regulation one-or five-gallon metal pails, as specified by the Purchasing Department. Each container shall be marked with the following: name and type of paint, net weight, batch number, date of manufacture and State of Connecticut Reference File and Purchase Order Numbers, together with the name and address of the manufacturer. When so requested, samples and, analyses of all pigments, oils, resins, thinners, and driers used shall be supplied by the manufacture within ten (10) days after request is made.

COLOR – Standard color chips may be viewed at the Connecticut Department of Transportation, Research and Materials Testing Laboratory, 280 West Street, Rocky Hill, Connecticut 06067. The color shall essentially match that of color Omaha Orange, DuPont #082.

VEHICLE - The vehicle for this air-drying enamel shall consist of a phthalic alkyd resin.

Necessary quantities of suitable aliphatic, aromatic or tarpene thinners and driers, or mixture thereof, shall be added to yield a product conforming to all the requirements of this specification. Small amounts of antiskinning agents, wetting agents, suspension agents and antidrier absorption agents may be added at the discretion of the manufacturer.

QUANTITITIVE REQUIREMENTS	Min.	Max.
Pigment, % by weight	16	
Vehicle, % by weight	--	84
Volatile matter in vehicle, % by weight	--	55
Coarse particles and skins retained on #325 sieve, % by weight of pigment	--	0.5
Viscosity, Krebs units at 77˚F.	75	85
Specular gloss (without correction for diffuse reflectance)	85	
Fineness of grind (North Standard)	6	
Dry opacity (540 sq. ft. per gallon)	0.52	
Weight per gallon, lbs.	8.0	
Drying time: Dust-free setting time, hours	--	1
Dry hard, hours	--	8
Full hardness, hours	--	48

BRUSHING PROPERTIES – As received, this enamel shall be ready-mixed for use. It shall be of good brushing consistency in the packaged condition. When tested as described below, laps

shall be picked up without pulling under the brush; and the enamel shall dry to a smooth, glossy, uniform film, free from running, sagging or streaking.

Brush the evenly mixed enamel on a thoroughly cleaned, rust-free, smooth, cold-rolled steel or aluminum panel (2 ft. square) with a 2-1/2 inch paint brush, applying the enamel uniformly at an approximately spreading rate of 500 square feet per gallon. Place the panel in a nearly vertical position, allow to air dry for 24 hours and examine for defects described above.

DRYING TIME – A wet film, 0.0015-inch thick, shall set to a dust-free condition within one hour, dry hard and tack-free within 8-hours and reach full hardness within 48 hours.

FILM FOR FLEXIBILITY, WATER-RESISTANCE AND GASOLINE-RESISTANCE – Tin panels, measuring 4 by 6 inches and weighing 19 to 25 grams per square centimeter, will be used for this test. They will be thoroughly cleaned with a suitable solvent and lightly buffed with steel wool immediately before using. Apply the film with a 0.002-inch (approximately 0.004-inch gap clearance). Bird Film Applicator or any other doctor blade which produces a film of the same thickness as that produced by the Bird blade.

FLEXIBILLITY – Films prepared as above shall be allowed to air dry in a horizontal position for 18 hours, then baked for 168 hours at 105 $\pm$ 2˚C (221 $\pm$ 4˚F). After baking, condition the panel for one-half hour at 23 $\pm$ 1˚C (73.4 $\pm$ 2˚F) and relative humidity 50% - 4%. Bend over a 1/8 inch mandrel. Examine the coating for cracks over the area of the bend in a strong light at a 7-diameter magnification. The film of the enamel shall show no cracking.

APPEARANCE OF FILM AFTER BAKING – After drying and baking the panel for flexibility, the enamel film shall retain at least 75 percent of the original secular gloss value.

ADHESION – In testing for adhesion, use the flat portion of the panel from the flexibility test. Cut a narrow ribbon of the film from the panel by use of the sharp knife blade held at about 30 degrees from the panel. The film should cut loose in the form of a ribbon without flaking or cracking.

COLOR WATER RESISTANCE – After drying for 96 hours, place one of the test panels in a beaker containing approximately 2-1/2 inches of distilled water at room temperature (21 to 32˚C), and allow to remain for 16 hours. Remove and allow to dry. The film shall show no blistering or wrinkling immediately upon removal from the water. There shall be no more than a slight dulling or whitening when examined 2 hours after removal of the panels and after 24 hours of air drying, the gloss of the immersed portion shall be at least 90 percent of the gloss of a comparison panel which was not immersed. The immersed and comparison panel shall be indistinguishable with regard to film hardness after the 24 hours of air drying.

GASOLINE RESISTENCE – After drying for 96 hours, place one of the panels in a beaker containing approximately 2-1/2 inches of gasoline conforming to Federal Specification VVG-1690, cover with a watch glass and allow to remain at room temperature (21 to 32˚C), for 16 hours. Remove and allow to dry. The film shall show no blistering or wrinkling immediately upon removal of the panel, and any softening or whitening effect that may remain two hours after removal shall have completely disappeared after air drying for 24 hours. The immersed portion shall retain at least 50 percent of the gloss of a comparison panel which was not immersed.

DRY OPACITY – At a spreading rate of 540 square feet pr gallon, this enamel shall have a minimum dry-film contrast ratio of not less than 0.98.

MISCIBILITY WITH MINERAL SPIRITS – Mix thoroughly one part of mineral spirits conforming to Grade I of Federal Specification AA-2904 with eight parts of enamel by slowly adding the mineral spirits to the enamel with constant stirring. The enamel shall be completely missible with mineral

spirits. After standing 24 hours there shall be no curdling or precipitation of the vehicle. Any settling of the pigment shall be disregarded.

SKINNING – The enamel shall not skin within 48 hours in a three-quarters filled, closed container.

RESIN – Resin and resin derivatives shall be absent.

RECOATING – Recoating after 24 hours air drying shall produce no film irregularity.

ODOR – The odor of the wet enamel and of the dry film shall not be obnoxious.

TOXICITY – The enamel shall contain no benzol or chlorinated solvents.

PARTIALLY FILLED CONTAINER – After standing 30 days at a temperature between 21 and 32˚C, a three-quarters filled, closed 8-ounce glass jar of the enamel shall show no livering, curdling, hard settlement or caking. Any skin formed shall be continuously and easily removed, and the enamel shall mix readily to a smooth, homogeneous state.

FULL CONTAINER - Upon being opened after six months of storage under warehouse storage conditions, a full, closed container shall show no livering or curding of the enamel and no more settling than can be redispersed with a paddle to a homogeneous state. There shall be no hard settlement or caking and no skinning. The viscosity shall not have increased more than an equivalent of 10 K.U. during the storage period. The enamel shall have retained its drying properties and shall dry to a full gloss finish, free from grit and seediness.

APPLICABLE FEDERAL SPECIFICATIONS AND STANDARDS –

A-A2504	Thinners; Paint, Volatile Mineral Spirits
VV-3-1690	Gasoline, Automotive
141	Paint, Varnish, Lacquer and Related Materials; Methods of Inspection, Sampling and Testing

SODIUM CHLORIDE (ROCK SALT)

REFERENCE FILE NO. 139R

Issued July 7, 1955

Revised June 1, 2002

Scope: This specification prescribes the composition, storage, inspection, acceptance and delivery of road salt obtained from (natural deposits/artificially produced) which is to be used for snow & ice control on highways and bridges.

Requirements: All road salt shall conform to AASHTO M 143 (ASTM D—632) Type 1, with the exceptions and additions stated herein. When material is not in conformance as stated herein, and the state formally agrees to accept such material, payment reduction shall apply and will be the sum of the individual reductions based on the bid price.

Inspection & Testing: At the vendor's location the stockpile shall be covered as required and the road salt shall be tested by Division of Materials Testing. The Bureau of Finance and Administration shall accept the material prior to any shipment to the State. Road salt from different origins (natural deposits/artificially produced) shall be stockpiled separately. If at any time, the purity of road salt is less than 95 percent sodium chloride, the vendor shall maintain this material in a physically separated stockpile. Once the stockpile has been accepted, material shall not be added to the stockpile without prior notification to and additional testing by the State. Failure to properly control these stockpiles may result in revocation of the award.

Material acceptance:

PURITY: The road salt requirements for material acceptance shall be as stated in AASHTO M—143 (ASTM D—632) Type 1, except sections 9.1.2 and 11.2 will not apply. It is intended that only products meeting the specified sodium chloride content (95.0 percent or greater) will be accepted; however, at the sole discretion of the Department of Transportation, road salt having a purity of less than 95.0 percent sodium chloride content may be accepted with an adjustment in payment in accordance with Table 1.

TABLE 1: Adjustment in Payment for Purity of Sodium Chloride

Percent of Sodium Chloride	Percent Payment of Unit Bid Price
95.0% to 100%	100
93.0% to 94.9%	95
91.0% to 92.9%	90
90.9% & below	73

Grading: The gradation requirements for material acceptance shall be as stated below. Failure to conform to these requirements may result in rejection of the stockpile. If non-conforming material is accepted, a reduction in payment of 2 percent per screen shall be assessed for deviations in the gradation.

Sieve Size	Percent Passing by Weight
12.5 mm (1/2in.)	100
9.5 mm (3/8in.)	95 to 100
4.75 mm (No.4)	20 to 90
2.36 mm (No.8)	10 to 60
600 µm (No.30)	0 to 15

Moisture: Full payment will apply to the road salt when its moisture content does not exceed two (2.0) percent. Road salt with a moisture content greater than (2.0) percent may be accepted at the discretion of the Department, with an adjustment in weight for moisture content over 2.0 percent.

Anticaking Agent: Road salt furnished under this contract shall be free flowing and granular. All bulk road salt shall be treated with an approved conditioner, such as sodium ferrocyanide, to prevent caking while in storage. This treatment shall be prior to shipping product from the origin (natural deposits/artificially produced). This conditioner shall be visible and introduced uniformly throughout the road salt at a maximum rate of 50 parts per million or 0.0050 percent.

NON-REFLECTIVE PLASTIC SHEETING

REFERENCE FILE NO. 161-D

Issued October 19, 1962
Revised June 10, 1983

Description: The material shall consist of a flexible, pigmented plastic film, completely pre-coated with a solvent or heat-activated tack-free adhesive. The adhesive shall be protected by a paper liner, which shall be removable without soaking in water or other solvents.

Property Requirements:

A. Thickness: The thickness of the plastic film with adhesive shall be a minimum of 0.003 inches and a maximum of 0.0045 inches.

B. Film: The unapplied and/or applied film shall be readily processed with, and ensure adequate adhesion of, process inks recommended by the manufacturer.

1. Flexibility: The material shall be sufficiently flexible to permit application over and conform to moderately contoured surfaces.

2. Gloss: The film shall have an initial 60-degree gloss value of 35 (minimum), when tested in accordance with ASTM Method D 523, measuring at least three portions of the film to obtain uniformity.

C. Adhesive: The pre-coated adhesive shall form a durable bond to smooth, clean, corrosion- and weather-resistant surfaces, shall be of uniform thickness, non-corrosive to applied surfaces and shall have no staining effect on the film.

Adhesion: The material, applied according to Paragraph I “Preparation of Test Panels” shall have sufficient bond to prevent removal from the panel in one piece without the aid of a physical tool.

D. Exterior Exposure: The material shall withstand three years’ vertical, south-facing exterior exposure in Texas, showing no appreciable discoloration, cracking, crazing, blistering, delamination or loss of adhesion. A slight amount of caulking is permissible.

E. Dimensional Stability: The material shall show no more than 1/64” shrinkage in any direction from edge of the panel when prepared in accordance with Paragraph I after being subjected to a temperature of 150° F for 48 hours.

F. Heat Resistance: The material applied according to Paragraph I, shall be heat-resistant enough to retain adhesion after one week at 150° F.

G. Solvent and Chemical Resistance: The material, when prepared in accordance with Paragraph I, shall withstand immersion in the following liquids at 70°-90° F, showing no appreciable decrease in adhesion, color or general appearance.

Liquids	Time, Hours
Reference Fuel (MIL-F-8799A) (15 parts xylol – 85 parts mineral spirits by weight)	1
Distilled Water	24
SAE #20 Motor Oil	24

H. Opacity: when applied, the material shall be sufficiently opaque to hide a contrasting black printed legend and white surface.

I. Preparation of Test Panels: Test panel shall be prepared using a 6 ½" × 6 ½" piece of the plastic film, applied to a clean 6" × 6" aluminum panel, pre-masked or as recommended by the manufacturer, trimmed evenly at the edge of the panel, and aged for 48 hours at 70-90°F.

J. Shelf Life Storage: The material shall withstand one year's shelf life when stored in a clean area free from exposure to excessive heat, moisture, and direct sunlight.

K. General Characteristics and Packaging: The plastic film shall be furnished in rolls, cut sheets or characters as may be specified. The film, as supplied, shall be free from ragged edges, streaks, blisters, foreign matter, or other
surface imperfections which would make it unsuitable for the intended usage, and shall be readily cut with scissors, knife, blade, shears, or other production tools. Complete and detailed instructions for mounting the plastic film shall be supplied with each package of material.

Rolls, sheets or letters shall be individually packaged in suitable containers and in such a manner that no damage or defacement may occur to the plastic film during transport to destination.

Quality Assurance: The vendor shall furnish a Certified Test Report conforming to the requirements stated herein below for all materials supplied under this specification.

1. A Certified Test Report is a document containing a list of the dimensional, chemical, and physical results obtained by an approved testing organization from an actual test of the material involved. It shall also certify that the materials meet the requirements of the specifications and shall include the following information:

a. Description of material
b. Connecticut Department of Transportation purchase order number.
c. Date of manufacture.
d. Date of testing.
e. Name of organization to which the material is consigned.
f. Quantity of material represented.
g. Means of identifying consignment such as label, marking, lot number, etc.
h. Date and method of shipment.
i. Name of organization performing the tests.

EACH SHIPMENT SHALL BE ACCOMPANIED BY A CERTIFIED TEST REPORT. THIS REPORT SHALL STATE THAT MATERIAL FURNISHED WILL CONFORM TO THE SPECIFICATIONS IN EVERY DETAIL. The Certified Test Report shall be signed by an authorized and responsible agent for the organization supplying the material. The certificate MUST be notarized.

PROCESSED AGGREGATE
REFERENCE FILE NO. 163-K

Issued: March 4, 1963
Revised: January 28, 2015

Description: Generally used by the Office of Maintenance as a base material for incidental work such as bike paths or ancillary paved surfaces.

Processed Aggregate shall conform to the following:

All Processed Aggregate shall conform to ConnDOT Standard Specifications, Article M.05.01, except that reclaimed material is prohibited and Medium processed aggregate shall conform to the following gradation:

Medium Processed Aggregate	
Square Mesh Sieves	Percent Passing by Weight (Mass)
2 ½ in. (63 mm)	100
2 in. (50 mm)	100
1 ½ in. (37.5 mm.)	100
1 in. (25.4 mm)	90-100
¾ in. (19 mm)	75-100
¼ in. (6.3 mm)	30-60
#40 (425 um)	5-25
#100 (150 um)	3-12

GRITS

REFERENCE FILE NO. 191-E
Issued January 14, 1980
Revised June 29, 2001

REFERENCE FILE 191-E
CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING AND HIGHWAY OPERATIONS
SPECIFICATION FOR GRITS

DESCRIPTION: Grits shall consist of sound, tough, durable particles of crushed or uncrushed screened stone or gravel, and shall be free from lumps of clay, soil, loam or organic matter.

MATERIAL REQUIREMENTS:

1) Soundness: When tested for soundness with a magnesium sulfate solution using AASHTO Method T 104, the plus No. 4 fraction shall show a loss of not more than 10 percent at the end of five cycles.

2) Loss on Abrasion: When tested by means of the Los Angeles Machine using AASHTO Method T 96, the plus No. 8 fraction shall show a loss on abrasion of not more than 40 percent.

3) Flat and Elongated: All plus No. 8 material shall not contain more than 15 percent of flat or elongated pieces, the longest dimensions of which exceed three times the maximum thickness.

4) Grading: The grit material shall conform to one of the gradations shown in Table 1 below. The grading will be specified on the Purchase Order.

Table 1. Percent Passing per Grading

Sieve Size	Grading "A"	Grading "B"
3/8	100	100
#4	40-90	85-100
#8	0-30	10-40
#16	---	0-10
#50	0-10	0-5
#100	0-3	---

PREMIXED SODIUM CHLORIDE (Salt) AND CALCIUM CHLORIDE
REFERENCE FILE NUMBER 194-E
Issued March 12, 1976
Revised June 1, 1998

SCOPE:
This specification covers a premixed blend of sodium chloride (rock salt) and calcium chloride to be used for ice control on highways and bridges.

DESCRIPTION:
Sodium Chloride: The sodium chloride shall conform to the requirements of Reference File 139, latest revision.

Calcium Chloride: The calcium chloride shall conform to the requirements of AASHTO M 144, Type I.

MIXTURE:
The premix for the CONTNDOT shall be a completely uniform and free-flowing mixture of three parts sodium chloride by weight to one part flake calcium chloride by weight.

SAMPLES FOR TEST:
Before a purchase order is issued, vendor(s) awarded the contract must forward, UNBLENDED, a thirty-pound bag of sodium chloride and a ten-pound bag of calcium chloride to be used for test to the Director of Research and Materials, 280 West St., Rocky Hill, CT 06067.

GENERAL:
The State reserves the right to inspect or sample material at the place of manufacture or stockpile, or to test materials before accepting delivery.

EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS

REFERENCE FILE NO. 199-C

Issued: November 1, 1985

Revised: October 30, 1995

DESCRIPTION: This specification covers reflectorized white and yellow two component epoxy resin to be used for pavement marking on both asphaltic and Portland cement concrete pavement surfaces. It is to be used in conjunction with a surface application of glass beads and in accordance with these requirements. Upon curing, it produces an adherent reflectorized stripe of specified thickness and width capable of resisting wear from traffic.

CLASSIFICATION: This specification provides for the classification of epoxy resin pavement marking system by type.

Type I	A fast—cure material suitable for centerline, skipline and edgeline use under traffic conditions
Type II	A slow—cure material suitable for centerline, skipline and edgeline use under minimal traffic conditions; e.g., unopened roadways
Type III	A medium—cure material suitable for pavement marking message and transverse line work

MATERIALS -GENERAL REQUIREMENTS:

Standards - All standards herein are minimum standards.

Identification: Each container must bear a label with the following information thereon: Name and address of manufacturer, shipping point, grade production batch number, date of manufacture, shipping point, grade name and/or identification number, type of material, number of gallons, contract number, use intended, directions for application, and formula. Improperly labeled samples and deliveries will be rejected.

Qualification of Manufacturer: No material will be considered unless the firm submitting the material can meet the following conditions (these qualifications must be provided to approve a subcontractor for this work):

a: that it has in operation a factory adequate for and devoted to manufacturer of the pavement marking material that it proposes to furnish;

b. that it is capable of predicting batch sizes consistent with the quantities to be delivered;

c. that it maintains a laboratory to scientifically control the product bid on to ensure accuracy and quality of formulation; and

d. that it has produced pavement marking material over the past two (2) years with a successful application record.

Certification: The manufacturer shall furnish a certified test report by an independent testing laboratory prior to the start of work indicating that the material as specified has been tested in accordance with ASTM or ACI testing procedures noted in this specification. The certified test report shall indicate the results of testing for the following criteria:

Composition, Color, Adhesion Capabilities, Abrasion Resistance, Hardness, Tensile Strength, and Compressive Strength.

Additionally, infrared spectrophotometer plots for both components of the test material shall be included by the independent laboratory in the certified test report.

The manufacturer shall furnish certified test reports for each batch delivered for application at the project site. Certified test reports shall be in accordance with the State of Connecticut, Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction, Section 1.06.07 of the latest edition,

MATERIALS - DETAILED REQUIREMENTS:

Epoxy Resin Material: The material shall be composed of epoxy resins and pigments only. No solvents to be given off to the environment upon application to the pavement surface, nor fillers, will be allowed.

Composition:	WHITE (percent by weight) 20 ± 2 Titanium Dioxide (ASTM D 476 Type III) 80 ± 2 Epoxy Resins	YELLOW (percent by weight) 20 ± 2 Chrome Yellow (ASTM D211 Type III) 75 ± 2 Epoxy Resins

Color: The color of the WHITE material shall be no darker or yellower than color chip 17778 of Federal Standard No. 595a of the latest issue, when the material is placed in a Type EH weatherometer for a period of 500 hours and weathered according to ASTM F 42. The color of the YELLOW shall be reasonably close to color chip 13538 of the Federal Standard No. 595a of the latest issue.

Adhesion Capabilities: When the adhesion of the material to Portland cement concrete (the concrete shall have a minimum of 300 psi tensile strength) is tested according to American Concrete Institute Committee 503R testing procedure, the failure of the system must take place in the concrete. The concrete shall be 32 °C when the material is applied, after which the material shall be allowed to cure for 72 hours at 23 ± 2 °C.

Abrasion Resistance: When the abrasion resistance of the material is tested according to ASTM C 501 with a CS-17 wheel under a load of 1000 grams for 1000 cycles, the wear index shall be no greater than 82. (The index is the weight in milligrams that is abraded from the sample under the test conditions)

Hardness: The Type D durometer hardness of the material shall be not less than 75 or more than 90 when tested according to ASTM D 2240 after the material has cured for 72 hours at 23 ± 2 °C.

Compressive Strength: The compressive strength of the material, when tested according to ASTM D 695, shall not be less than 12,000 psi after 72 hours cured at 23 ± 2 °C.

Shelf Life: The individual components shall not require mixing prior to use when stored for a period of 12 months.

Glass Beads: The moisture resistant glass beads shall meet the requirements of AASHTO M 246, except that glass spheres shall meet the gradation requirements as follows:

Grading "A"		Grading "B"	
Sieve Size	Percent	Sieve Size	Percent
% Passing #20	100	% Retained #10	0
% Passing #30	80—95	% Retained #12	0—5
% Passing #50	9—42	% Retained #14	5—20
% Passing #80	0—10	% Retained #16	40—80
		% Retained #18	10—40
		% Retained #20	0—5
		% Retained Pan	0—2

Glass beads conforming to the requirements of Grading "A" shall be applied at a rate of 25 pounds per gallon of epoxy pavement marking material.

If specified, glass beads conforming to the requirements of Grading “B” shall be applied at a rate of 12 pounds per gallon of epoxy pavement marking material, immediately followed by a scanned drop of glass beads conforming to the requirements of Grading “A” applied at a rate of 12 pounds per gallon of epoxy pavement marking material.

Traffic cones or any other acceptable method shall be used to protect the pavement marking until cured.

Time To No—Track: The Type I material shall be in “no—tracking” condition in 60 seconds or less.

The no-tracking condition shall be determined by actual application on the pavement of the pigmented binder at 20 mils wet, covered with glass spheres at a rate of 25 pounds per gallon. The lines for this test shall be applied with the specialized striping equipment operated so as to have the material at the manufacturer’s recommended application temperature. This maximum no—tracking time shall not be exceeded when the pavement temperature varies from 50 °F to 120 °F, and under all humidity conditions, provided the pavement is surface dry.

The no-tracking time shall be determined by passing over the line with a passenger car or pickup truck in the simulated passing maneuver. A line showing no visual deposition of the material to the pavement surface when viewed from a distance of 50 feet shall be considered as showing “no— tracking” and conforming to this requirement for time to no-track.

WHITE AND YELLOW FAST-DRYING WATERBORNE PAVEMENT MARKING PAINT

REFERENCE FILE NUMBER 200-I

Revised: May 29, 2008

Scope: White and yellow fast-drying waterborne pavement marking paint to be applied to bituminous concrete and Portland cement concrete pavements. This paint shall be capable of being applied with paint striping equipment at an application temperature of 130° F to 145° F (54° C to 63° C).

General: Specifications and publications that apply are as follows:

FS: TT-P-1952 Paint, Traffic and Air Field Marking, Water Emulsion Base; Federal Test-Method Standard #141 Paint, Varnish, Lacquer and Related Materials, Methods of Inspection, Sampling and Testing; FS No. 595 Colors; and HH-R-59 Roofing Felt (Asbestos, Asphalt-saturated).

ASTM Standards: D 211-Specifications for Chrome Yellow and Chrome Orange; D 476-Specifications for Titanium Dioxide Pigments; D 562 Test for Consistency of Paints Using the Stormer Viscometer; D 869-Test for 45-deg, 0-deg Directional Reflectance Factor of Opaque Specimens by Broad Band Filter Reflectometry.

Detailed Requirements, Formulation and Manufacture: The paint shall be formulated and manufactured from first-grade raw materials and shall be free from defects and imperfections that might adversely affect the serviceability of the finished product. The materials shall not exhibit settling or jellying after storage in the sealed containers as received that will affect the performance of the products. The paint shall provide the proper anchorage, refraction and reflection for the finished glass spheres when applied as specified.

Composition: The composition of the paint shall be at the discretion of the manufacturer, provided that the finished product meets the requirements of any applicable Federal, State or Local regulations for products of this type and the requirements as follows:

1. Paint shall not contain more than 0.06% lead;

2 Total nonvolatile shall not be less than 76% by weight (mass);

3. Pigment shall be 58-63% by weight (mass);

4. Resin solids shall be composed of 100% acrylic emulsion polymer;

5. Volatile organic compounds shall not exceed 150 grams/liter, excluding water;

6. Closed-cup flash point shall not be less than 145° F (38° C);

7. Weight per gallon (mass per liter) shall not be less than 12.5 pounds/gallon (1.50 kilograms/liter) when tested in accordance with ASTM D 1475.

8. Drying time to no pick up shall be3 minutes or less when tested in accordance with ASTM D 711

Scrub Resistance: The paint shall pass test for scrub resistance when tested in accordance with ASTM D2486, Method B.

Viscosity: The consistency of the paint shall not be less than 80, nor more than 90 Kreb units when tested in accordance with ASTM D562.

Flexibility: The paint shall not show cracking or flaking when subjected to the TT-P-1952 flexibility test in which the panels used shall be tin plates that are 3 inches x 5 inches (76 millimeters x 127 millimeters) in area and 35 - 31 U.S. Gauge in thickness. The tin panels shall be lightly buffed with steel wool and thoroughly cleaned with solvent before being used for tests.

Dry Opacity: Both white and yellow paints shall have a minimum contrast ratio of 0.96. Contract ratio shall be determined by applying a wet film thickness of 0.005 inches (127 microns) to a standard hiding power chart. After drying, the black and white reflectance values shall be determined using a suitable reflectometer and the contrast ratio determined.

Bleeding: The paints shall have a minimum bleeding ratio of 0.97 when tested in accordance with FS TT-P-1952. The asphalt-saturated felt shall conform to FS HH-R-59.

Abrasion Resistance: No less than 210 liters of sand shall be required to remove paint film when tested in accordance with TT-P-1952.

Color: The paint shall not discolor in sunlight and shall maintain colorfastness throughout its life, approximately two years. Color determination shall be made without beads, after a minimum of 24 hours. Color for yellow paint shall be a visual match for 595-13538. If not a visual match, the diffuse day color of the paint shall conform to the CIE Chromaticity coordinate limits as follows:

	x y		**x y**		**x y**		**x y**		**Brightness**
	(x)	**(y)**	**(x)**	**(y)**	**(x)**	**(y)**	**(x)**	**(y)**	84.0
White:	0.305	0.295	0.360	0.360	0.388	0.377	0.280	0.310	
	(x)	**(y)**	**(x)**	**(y)**	**(x)**	**(y)**	**(x)**	**(y)**	
Yellow:	0.485	0.455	0.506	0.452	0.484	0.428	0.477	0.438	50.0

WHITE AND YELLOW REGULAR-DRYING WATERBORNE PAVEMENT MARKING PAINT

REFERENCE FILE NUMBER 207- D

Revised: May 29, 2008

Scope: White and yellow regular-drying waterborne pavement marking paint that is to be applied to bituminous concrete and Portland cement concrete pavements. This paint shall be capable of being applied with paint striping equipment that does not require heating above ambient temperatures.

General: Specifications and publications that apply are as follows:

FS: TT-P-1952 Paint, Traffic and Air Field Marking, Water Emulsion Base; Federal Test-Method Standard #141 Paint, Varnish, Lacquer and Related Materials, Methods of Inspection, Sampling and Testing; FS No. 595 Colors; and HH-R-59 Roofing Felt (Asbestos, Asphalt-saturated).

ASTM Standards: D 211-Specifications for Chrome Yellow and Chrome Orange; D 476-Specifications for Titanium Dioxide Pigments; D 562 Test for Consistency of Paints Using the Stormer Viscometer; D 869-Test for 45-deg, 0-deg Directional Reflectance Factor of Opaque Specimens by Broad Band Filter Reflectometry.

Detailed Requirements, Formulation and Manufacture: The paint shall be formulated and manufactured from first-grade raw materials and shall be free from defects and imperfections that might adversely affect the serviceability of the finished product. The materials shall not exhibit settling or jellying after storage in the sealed containers as received that will affect the performance of the products. The paint shall provide the proper anchorage, refraction and reflection for the finished glass spheres when applied as specified.

Composition: The composition of the paint shall be at the discretion of the manufacturer, provided that the finished product meets the requirements of any applicable Federal, State or Local regulations for products of this type and the requirements as follows:

1. Paint shall not contain more than 0.06% lead;

2 Total nonvolatile shall not be less than 70% by weight (mass);

3. Pigment shall be 50-60% by weight (mass);

4. Resin solids shall be composed of 100% acrylic emulsion polymer;

5. Volatile organic compounds shall not exceed 150 grams/liter, excluding water;

6. Closed-cup flash point shall not be less than 145° F (38° C), and weight per gallon (mass per liter) shall not be less than 12.5 pounds/gallon (1.50 kilograms/liter) when tested in accordance with ASTM D 1475.

7. Weight per gallon (Mass per liter) shall not be less than 12.5 pounds/gallon (1.50 kilograms/liter) when tested in accordance with ASTM D 1475;

8. Drying time to no pick up shall be 15 minutes or less when tested in accordance with ASTM D 711

Scrub Resistance: The paint shall pass test for scrub resistance when tested in accordance with ASTM D2486, Method B.

Viscosity: The consistency of the paint shall not be less than 75, nor more than 85 Kreb units when tested in accordance with ASTM D562.

Flexibility: The paint shall not show cracking or flaking when subjected to the TT-P-1952 flexibility test in which the panels used shall be tin plates that are 3 inches x 5 inches (76 millimeters x 127 millimeters) in area and 35 - 31 U.S. Gauge in thickness. The tin panels shall be lightly buffed with steel wool and thoroughly cleaned with solvent before being used for tests.

Dry Opacity: Both white and yellow paints shall have a minimum contrast ratio of 0.96. Contract ratio shall be determined by applying a wet film thickness of 0.005 inches (127 microns) to a standard hiding power chart. After drying, the black and white reflectance values shall be determined using a suitable reflectometer and the contrast ratio determined.

Freeze-Thaw Resistance: After five freeze thaw cycles in accordance with ASTM D2243: 1) Evidence of settling, gelation, or coagulation in the can shall have a rating of no less than 8 (very slight). 2) The paint shall not have a change in viscosity (ASTM D562) of more than 10 Kreb units. 3) Test panel changes in hiding, gloss, speckiness, agglomeration, coagulation, or color change shall have a rating of no less than 8 (very slight).

Bleeding: The paints shall have a minimum bleeding ratio of 0.97 when tested in accordance with FS TT-P-1952. The asphalt-saturated felt shall conform to FS HH-R-59.

Abrasion Resistance: No less than 210 liters of sand shall be required to remove paint film when tested in accordance with TT-P-1952.

Color: The paint shall not discolor in sunlight and shall maintain colorfastness throughout its life, approximately two years. Color determination shall be made without beads, after a minimum of 24 hours. Color for yellow paint shall be a visual match for 595-13538. If not a visual match, the diffuse day color of the paint shall conform to the CIE Chromaticity coordinate limits as follows:

	x y		x y		x y		x y		Brightness
	(x)	**(y)**	**(x)**	**(y)**	**(x)**	**(y)**	**(x)**	**(y)**	84.0
White:	0.305	0.295	0.360	0.360	0.388	0.377	0.280	0.310	
	(x)	**(y)**	**(x)**	**(y)**	**(x)**	**(y)**	**(x)**	**(y)**	
Yellow:	0.485	0.455	0.506	0.452	0.484	0.428	0.477	0.438	50.0

Liquid Calcium Chloride Anti-icing Agent

REFERENCE FILE Number 2007-3

Issued August 1, 2007

Scope: This reference file consists of the specification for Liquid Calcium Chloride Anti-icing Agent, which is to be used with Sodium Chloride for snow and ice control by the Connecticut Department of Transportation (Department).

The supplier shall furnish a Certified Test Report and Materials Certificate as detailed below for each batch delivered to the Department.

The Certified Test Report is a document containing a list of the dimensional, chemical, metallurgical, electrical and physical results obtained from a physical test of the materials involved, and shall certify that the materials being supplied meet the requirements of this specification. Such Report shall also include the following information:

(1) Description of materials

(2) Date of manufacture

(3) Date of testing

(4) Name of organization to which the material has been consigned, if applicable

(5) Quantity of material represented, such as batch, lot, group, etc.

(6) Means of identifying the consignment, such as label, marking, lot number, etc.

(7) Date and method of shipment

(8) Name of organization performing tests

The Certified Test Report shall be signed by a duly-authorized and responsible agent for the organization manufacturing the materials, and the signature must be notarized.

A Materials Certificate is a document certifying that the materials, components and equipment furnished conform to all requirements of this specification. Such Certificate shall also include the following information:

(1) Quantity of material represented, such as batch, lot, group, etc., and certified test report identification number representing materials being delivered

(2) Quantity of material represented by the certificate

(3) Means of identifying the consignment, such as labels, lot numbers, etc.

(4) Date and method of shipment

The Materials Certificate shall be signed by a duly-authorized and responsible agent for the organization supplying the material, and the signature must be notarized.

The supplier shall be responsible for all testing and materials certificates.

Samples: The ConnDOT representative may take one gallon sample at start, and one gallon prior to the end of delivery, Samples must be taken directly from the truck.

References to the web site of the Pacific Northwest Snowfighters Association (PNSA) of British Columbia, Idaho, Montana, Oregon and Washington (http://www.wsdot.wa.gov/partners/pns/default.htm) **are exclusively to the 2007 testing method(s) that the Department's Division of Materials Testing will use to determine if the product meets this specification. PNSA specifications listed on the PNSA Web site are for information only and do not necessarily reflect requirements of this REFERENCE FILE (Number 2007_3)**.

ConnDOT Test Methods and Specification Limits:

ConnDOT Test #1 - Percent Concentration of Active Ingredient in the Liquid

The Product shall be 32% Calcium Chloride by weight; tolerance: ±1%, per PNSA Test Method Number 1 on page 24 of the PNSA Web site or by ASTM methods D345 and E449. It is intended that only products meeting the specified Liquid Calcium Chloride content of 31% to 33% will be accepted; however, at the sole discretion of the Department of Transportation, Liquid Calcium Chloride content lower or greater than this percent may be accepted with an adjustment in payment in accordance with table 1.

Percent of Liquid Calcium	Percent Payment of Unit Bid Price
29% to 30%	90
34% to 35%	90

At the sole discretion of the Department, Liquid Calcium Chloride content lower than 29% or greater than 35% is subject to rejection and nonpayment.

All test data shall be rounded in accordance with the latest version of **AASHTO R11**.

ConnDOT Test #2 - Weight per Gallon

Specific Gravity by ASTM D 1429 Test Method A - Pycnometer at 20°C +/- 1°C per PNSA Test Method Number 2 on page 24 of the PNSA Web site.

ConnDOT Test #3 - PH

The PH shall be between 6.0 -10.0 per PNSA Test Method Number 4 on page 24 of the PNSA Web site.

ConnDOT Test #4 - Sampling Liquid Calcium Chloride

Sampling Liquid Calcium Chloride shall be done in accordance with ASTM D345. Product shall be tested using generally accepted industry standard analytical procedures as appropriate.

ConnDOT Test #5 - Visual Inspection and Field Observations

A ConnDOT representative may perform a visual inspection `to assure that the material remains clean and free of extraneous matter, remains free from hard caking, does not segregate, and remains suitable for the intended purpose and as otherwise outlined in Section IV. NOTE: Purchaser may use any laboratory test method necessary to verify conclusions from visual inspections. Per PNSA Test Method Number 14 on page 25 of the PNSA Web site.

ConnDOT Test #6 - Total Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Zinc, Phosphorus, and Cyanide

Atomic Absorption Spectrophotometry or Plasma Emission Spectroscopy as described in "Standard Methods for the Examination of Water and Waste Water," APHA-AWWA-WPCF per PNSA Test Method Number 9 on page 25 of the PNSA Web site.

A submitted product that contains any constituent in excess of the following established total concentration limits as tested in accordance with the above test shall not be acceptable. Results are stated as parts per million (ppm).

Arsenic	1.0 ppm
Barium	100.0 ppm
Cadmium	0.20 ppm
Chromium	1.0 ppm
Copper	1.0 ppm
Lead	1.0 ppm
Mercury	0.05 ppm
Selenium	5.0 ppm
Zinc	10.00 ppm
Phosphorus	250.00 ppm
Cyanide	0.20 ppm

Note: Liquid products shall be tested as received.

All laboratory results must be below the maximum concentrations listed above.

Appendix G – Standard Operating Procedures

	Version	Date	Pages
Portland Cement Concrete			
Compression Testing	V1.1	Dec 2014	G2-G6
Grout			
Compression Testing	V1.0		G7-G12
Bituminous Concrete			
In-place density using Cores	V1.1	Dec 2014	G13-G18
Steel Reinforcement			
Tensile Testing			Pending
Bend Testing			Pending
Hardness Testing			Pending
Snow and Ice Control			
Testing for Moisture of Roadway Salt	V1.0		G19

TINIUS-OLSEN COMPRESSION MACHINE

Version 1.1

Standard Operating Procedure

John Giannini	**Mechanical & Electrical**
Supervisor of Laboratory/Workshop	Type of hazards (mechanical, electrical, chemical, biological or radiation)
Tinius-Olsen Hydraulic Compression Tester Equip. #68-3695	**Room 150**
Name and Function of Lab/Project	Location
Tinius-Olsen	**400,000 Lbf Super "L"**
Make	Model

A. Introduction/Features

- 400,000 Lbf Capacity
- Heavy-duty, ultra-stiff frame design permits testing of 6" X 12" and 4" X 8" concrete cylinders
- Side and rear safety guards ensure operator safety
- High-accuracy pressure transducer load weighing system
- HP Compaq MXL31707H6 Controller
- Wire safety cage to prevent debris from falling outside testing area.

B. Health and Safety Considerations

I. Safety devices required (e.g. machine guards, personal protective equipment, etc.)

- ***SAFETY GOGGLES/GLASSES*** must be worn **at all times in the lab**. Prescription glasses can be worn under the safety goggles.
- ***HARD TOE BOOTS/SHOES*** must be worn **at all times while handling cylinders**.

II. General Safety

- **FOOD AND DRINK** are not allowed in any laboratory.
- Be aware of the specific hazards associated with each lab procedure.
- Wear appropriate clothing and foot wear (**NO OPEN-TOED SHOES**).
- Familiarize yourself with all emergency safety equipment (eyewash, fire alarm, fire extinguishers, telephone).
- Do not leave in-progress tests unattended.
- **Keep work areas Clean**.

FIRE: Immediately **report it to a supervisor** and then exit the laboratory and building quickly via proper exit route. (Make sure you know where the exits are located.)

ACCIDENTS AND INJURIES must be reported to a supervisor. There are emergency first aid supplies available, and emergency responders are trained in basic first-aid.

THE BEST SAFETY PRECAUTIONS *include* ***ADVANCED PREPARATION*** *for each laboratory and a* ***CLEAN ORGANIZED WORK SPACE****.*

C. Operation Procedures:

The following guidelines are for persons who are authorized to use the Tinius-Olsen compression machine for ASTM C-39 & ASTM-1231. If a person is operating equipment for the first time, a competent operator of that equipment must also be present.

Power On equipment

1. Turn on the testing machine by using the power switch (LPLH-LF-CIR.9) located on the wall near the service panel to the right of the testing machine as shown in Figure 1.

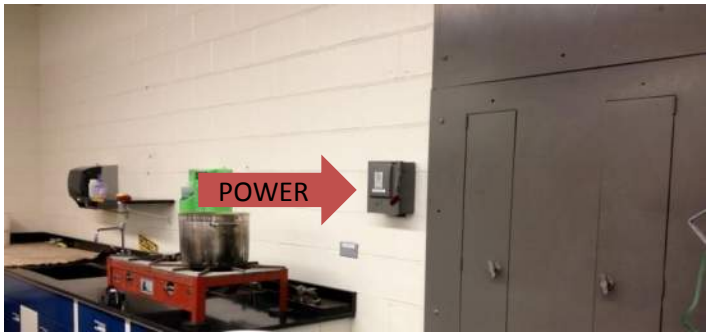


Figure 1. Power Switch Location for Tinius-Olsen Compression Machine

2. Turn on computer and computer monitor using switches shown in Figure 2.

Figure 2. Computer and Monitor Power Switches

Turn on hydraulic pump by pressing "Pump" button on handheld controller as shown in Figure 3. When leaving the area of the machine for an extended period of time (10 minutes or more) shut off pump.

1) **PUMP** will appear on the display (let pump warm up for about 20 seconds)

2) Press "Return" button on handheld controller (the bottom compression plate will raise to specific height)

Figure 3. Handheld Controller and Compression Plates

a. Using the computer mouse, Click on "Navigator" icon on the computer monitor
b. Using the steps below, check that the software is configured for the proper size cylinder.

1) go to file

2) load test setting

3) #8 for 6x12 or #9 for 4x8

Test Preparation

c. Review MAT-308 and enter project number and sample ID on "NEXT" tab
d. Check cylinder markings for concurrence with MAT-308
e. Type in or check appropriate cylinder size (typically 6 or 4 inches) is displayed
f. Place test caps on bottom and top of cylinder. Caps are shown in Figure 4.
g. Properly place specimen (centered on bottom compression plate)
h. Place wire safety cage centered around specimen, close cage. Cage is shown in Figure 4.

Figure 4. Wire Safety Cage and Test Caps

3. Test Procedure

4”x8” cylinders

a. Double click on ⬆ in top menu bar to raise base plate until the cylinder is located ⅛” from top plate then click on the red STOP sign.
b. Click on the “LOAD ZERO” icon in top menu bar (handheld controller should show zero load)
c. Click on TEST NOW button
d. Monitor the testing (Click on ABORT button if needed)

6”x12” cylinders

a. Click on the “LOAD ZERO” icon in top menu bar (handheld controller should show zero load)
b. Click on TEST NOW button
c. Monitor the testing (Click on ABORT button if needed)

4. Documentation of Results
   a. Observe how specimen broke and that no contact with wire safety cage was made.
   b. Double check project number and sample ID, edit on “RESULTS” tab if needed.
   c. Click on “ACCEPT” if no issues were observed. Click “DISCARD” if needed.
   d. Record Total load and Load (PSI/Mpa) on Mat-308 from yellow highlighted information at the bottom the window.

5. Remove crushed specimen
   a. Open and remove wire safety cage
   b. Discard crushed specimen in yellow rolling metal bin.
   c. Clean bottom plate of any debris.

6. To test another specimen;
    e. Press the "**NEXT**" tab;
    f. Return to step 2

7. Clean and shutdown
    g. Properly close "Navigator" window by clicking on [X] in top right corner.
    h. Click on "Start" icon in lower left corner and select "SHUTDOWN" from menu.
    i. Turn pump off using handheld controller shown in Figure 3.
    j. Switch test equipment off by using switch shown in Figure 1.
    k. Clean floor, pan, and plates of any debris.
    l. Record number of cylinders tested on Pad Usage Sheet in three ring binder located on test console.

If you ever have any doubts or questions, ASK!

Emergency Contacts:

John Giannini, Supervising Engineer, 860-258-0324

Daniel Guzzo, Transportation Engineer III, 860-258-0339

Mark Brothwell, Transportation Engineer II, 860-258-0378

FIRE/AMBULANCE/SAFETY -Emergency Response, 9-911

SATEC COMPRESSION MACHINE
Standard Operating Procedure

Version 1.1

John Giannini Supervisor of Laboratory/Workshop	**Mechanical & Electrical** Type of hazards (mechanical, electrical, chemical, biological or radiation)
SATEC SYSTEMS **Hydraulic Compression Tester** **Equip. #68-3712** Name and Function of Lab/Project	**Room 155** Location
SATEC-QC PRISM Make	**Mark III *Smart* "C" 100QC** Model

A. Introduction/Features

- 100,000 Lbs. Capacity
- Heavy-duty, ultra-stiff frame design permits testing of 2" X 2" grout cube
- Side and rear safety guards ensure operator safety
- High-accuracy pressure transducer load weighing system
- Mark III *Smart* "C" Indicator display Controller
- Wire safety cage to prevent debris from falling outside testing area.

B. Health and Safety Considerations

I. Safety devices required (e.g. machine guards, personal protective equipment, etc.)

- ***SAFETY GOGGLES/GLASSES*** must be worn **at all times in the lab**. Prescription glasses can be worn under the safety goggles.
- ***HARD TOE BOOTS/SHOES*** must be worn **at all times while handling cubes**.

II. General Safety

- **FOOD AND DRINK** are not allowed in any laboratory.
- Be aware of the specific hazards associated with each lab procedure.
- Wear appropriate clothing and foot wear (**NO OPEN-TOED SHOES**).
- Familiarize yourself with all emergency safety equipment (eyewash, fire alarm, fire extinguishers, telephone).
- Do not leave in-progress tests unattended.
- **Keep work areas Clean**.

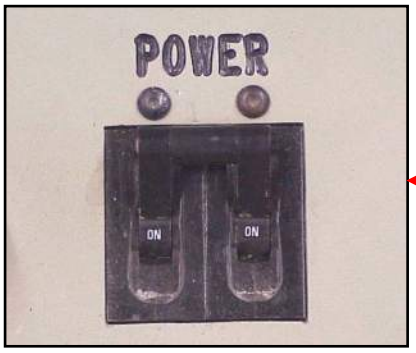
See attached sheets pages 1-5

SATEC COMPRESSION MACHINE
Standard Operating Procedure

COMPRESSION MACHINE PROCEDURES

These buttons will all be explained on the next few pages.

SATEC COMPRESSION MACHINE
Standard Operating Procedure

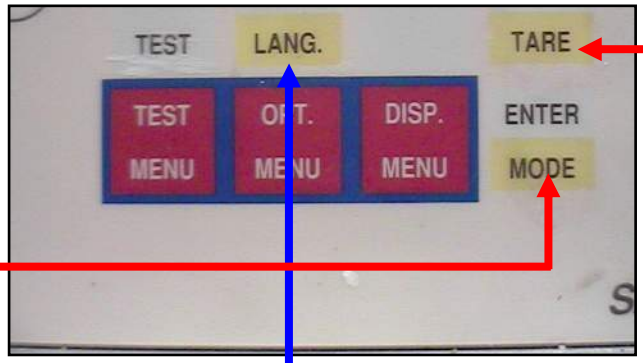


Step 1
Flip switch for power.

Step 2
Turn knob clockwise till it pops up.

Step 3
Press the button to turn on the pumps.

SATEC COMPRESSION MACHINE
Standard Operating Procedure

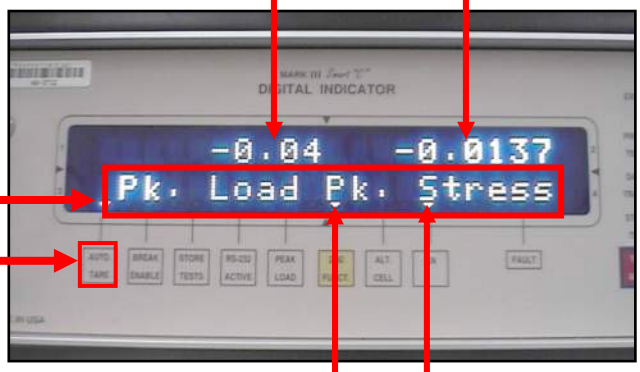


Step 4
Press the **MODE** button once to switch what's on the display.

Step 5
Press the **LANG** button to switch between metric and english.

Step 6
Press the **TARE** button to switch modes.

These units are reading in metric.



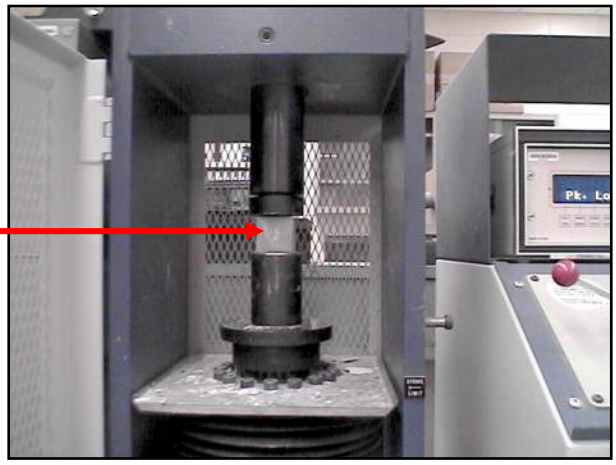
Step 7
Make sure the arrow shows up each time you break a cube in the **AUTO TARE** box.

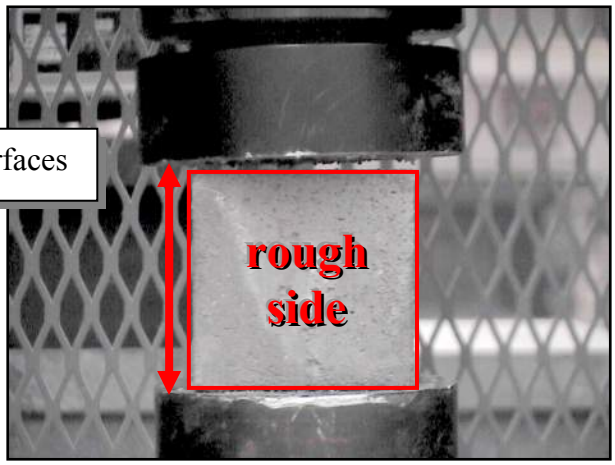
Total Load

PSI

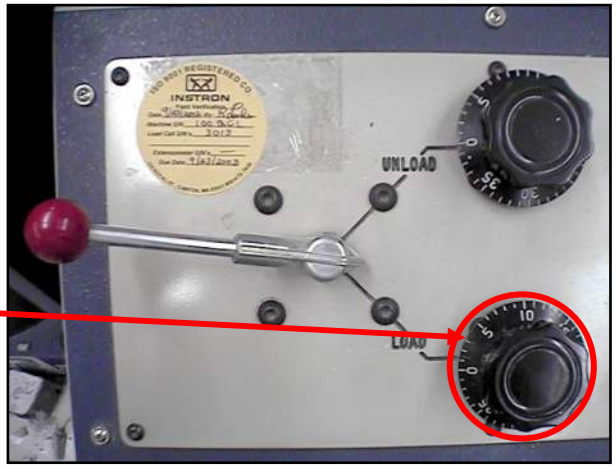
SATEC COMPRESSION MACHINE
Standard Operating Procedure

Step 8
Place cube between cylinders with the **rough sides** facing away from the plane surfaces.





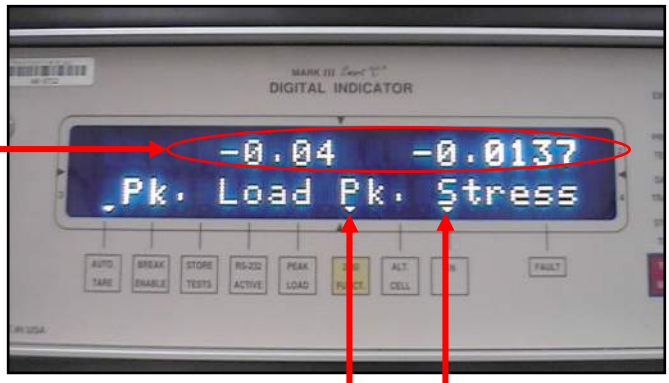
Step 9
Start placing a load on the specimen gradually. You will see the digital display numbers go up. Set the dial at around 4 and 5.



SATEC COMPRESSION MACHINE
Standard Operating Procedure

Step 10
Push the servo button. It will then start placing a load on the specimen gradually. You will see the digital display numbers go up.

Step 11
When you notice the numbers slowing down or stress cracks on the cube itself that means it's reached its breaking point.



Total Load

PSI

These are procedures that will ensure the proper methods of testing cement cubes per ASTM C109.

HANDLING AND TESTING BITUMINOUS CONCRETE CORE SAMPLES FOR IN-PLACE DENSITY DETERMINATION

Version 1.1

Standard Operating Procedure

Eliana Carlson	**Mechanical & Electrical**
Supervisor of Laboratory/Workshop	Type of hazards (mechanical, electrical, chemical, biological or radiation)
Handling and Testing Hot Mix Cores for Density Determination	**Rooms 162 and 159**
Name and Function of Lab/Project	Location
Various	**Various**
Make	Model

A. Introduction/Features

- Procedures to be followed for the in-place density of bituminous concrete mixtures by testing cores samples
- Handling of the bituminous concrete core samples include:
    - Receiving core samples (chain of custody)
    - Organization
- Testing of the bituminous concrete core samples include:
    - Saw cutting core samples
    - Drying core samples
    - Testing for bulk specific gravity
    - Reporting
    - Core sample retention and disposal
- Equipment:
    - 5 Vacuum drying apparatus located in room 162:
        - Make: Instrotek
        - Model: CoreDry
    - 1 Automatic vacuum sealing apparatus located in Room 162
        - Make: Instrotek
        - Model: CoreLok
    - 2 Radial cutting table saws located in Room 159
        - Make: Nuova Mondial Mec
        - Model: Manta ED 120

HANDLING AND TESTING BITUMINOUS CONCRETE CORE SAMPLES FOR IN-PLACE DENSITY DETERMINATION

Version 1.1

Standard Operating Procedure

B. Health and Safety Considerations

I. Safety devices required (e.g. machine guards, personal protective equipment, etc.)

- ***SAFETY GOGGLES/GLASSES*** must be worn when operating the table saw. Prescription glasses can be worn under the safety goggles.
- ***SAFETY EAR PROTECTION*** must be worn when operating the table saw.
- The operator shall keep all body parts outside the ***MACHINE GUARDS*** when operating the table saw
- ***HARD TOE BOOTS/SHOES*** must be worn **at all times in the laboratory**.

II. General Safety

- **FOOD AND DRINK** are not allowed in any laboratory.
- Be aware of the specific hazards associated with each laboratory procedure.
- Wear appropriate clothing and foot wear (**NO OPEN-TOED SHOES**).
- Familiarize yourself with all emergency safety equipment (eyewash, fire alarm, fire extinguishers, telephone).
- Do not leave in-progress tests unattended.
- **Keep work areas Clean**.

FIRE: Immediately **report it to a supervisor** and then exit the laboratory and building quickly via proper exit route. (Make sure you know where the exits are located.)

ACCIDENTS AND INJURIES must be reported to a supervisor. There are emergency first aid supplies available, and emergency responders are trained in basic first-aid.

THE BEST SAFETY PRECAUTIONS *include* ***ADVANCED PREPARATION*** *for each laboratory and a* ***CLEAN ORGANIZED WORK SPACE***.

C. Equipment Maintenance

All maintenance operations shall follow the corresponding operator's manual.

CoreDry Maintenance:

- Change the vacuum pump oil (InstroTek part number 1520137) after 80 hours of use. A software indicator will prompt you to do so. Keep the maintenance records updated in the corresponding calibration and maintenance book.
- Change your Tank Filters (InstroTek part number 1009012) every 1 to 2 months. Keep the maintenance records updated in the corresponding calibration and maintenance book.

- Change your exhaust filter (InstroTek part number 1520084) on the vacuum pump once a year. Keep the maintenance records updated in the corresponding calibration and maintenance book.

CoreLok Maintenance:

- Weekly, check oil level, the condition of the silicon pad in lid, the condition of the silicon gasket in lid, the condition of the seal bar Teflon tape and seal element, the condition of the CoreLok lid and glass viewing window. Keep records of the oil refills in corresponding calibration and maintenance book.
- Yearly, replace vacuum oil using 10-weight synthetic oil, exhaust filter, seal element and Teflon tape of the seal bar. Keep records of these replacements in the corresponding calibration and maintenance book.

D. Operation Procedures – Handling Bituminous Concrete Core Samples:

Receipt of Cores (Chain of Custody):
The Contractor is responsible to obtain, label and transport core samples to the DMT. The Engineer will select the core locations, witness the extraction and labeling of the core samples and will complete Form MAT 109. The cores and corresponding MAT 109 will be delivered to the DMT in a secured container approved by the Engineer. Upon delivery DMT staff will:

1. Inspect the container and cut the security seal(s).
2. Verify the security seal numbers match numbers documented on MAT 109.
3. Check in and take possession of each core sample by comparing the labeling on the core to the sample identifications listed on the MAT 109 and inspecting each core sample for visible damage. Document discrepancies or damaged core(s) on the MAT 109. The DMT inspector will initial and date the MAT 109.
4. If no discrepancies exist, place cores and MAT 109 on a rack for testing.
5. If discrepancies or damaged samples are found, notify the room lead who will send an e-mail to the project inspector or other designated district staff detailing the observation(s).
6. Damaged cores shall not be tested.
7. If a Mat 109 or security seal(s) are not present, the room lead will send an e-mail to the project inspector or other designated district staff. The cores will be retained until such time a decision is made to test or not.
8. Once the observation(s) is cleared the sample(s), or replacement sample(s), will be placed on a rack for subsequent testing.

Organization:
Log in all the core samples received (including damage cores and note this in the corresponding column) in the "Tracking Cores" file located in the year folder in: S:\Verification & Cores\HMA Core Density Testing. The room lead will input an entry in the tracking file for any correspondence with project personnel.

HANDLING AND TESTING BITUMINOUS CONCRETE CORE SAMPLES FOR IN-PLACE DENSITY DETERMINATION

Version 1.1

Standard Operating Procedure

E. Operation Procedures – Testing Bituminous Concrete Core Samples:

The following guidelines are for persons who are authorized to use the CoreDry, CoreLok and Table Saws for ASTM D 7227/D 7227M & AASHTO T 331. If a person is operating any of this equipment for the first time, a competent operator of said equipment must also be present.

Sample Preparation - Saw Cutting Core Samples:

When applicable, the core will be separated into individual lifts. This will be accomplished by slight strokes with a chisel or the use of a table saw. Care shall be taken to ensure the lift to be tested is not damaged. In general, any sample that cannot be readily separated into individual lifts by the use of a chisel or if the testing bag does not conform to the specimen in a uniform manner will be saw cut. Any remaining material that is not used for testing will be discarded. The lift will be cleaned to remove any deleterious material from the coring or sawing process.

Before operating the table saw, refer to the corresponding job hazard analysis document in Appendix A of this manual.

Sample Preparation - Drying Core Samples:

1. CoreDry Daily Test: Everyday, before starting operation, test the CoreDry equipment according to the equipment manual. If the test fails, notify the room lead.
2. Towel-dry the surface of the core and place it on its side on the wire mesh sample support (Figure 1).
3. Place the lid on sample chamber (Figure 2 – red arrow) and press start (Figure 2 - blue arrow).
4. When sample is dry, the unit will automatically stop and the lids can be removed.
5. If the sample is not dry after 45 cycles, remove the sample and place at room temperature for 15 minutes and continue drying the sample.
6. Between samples, remove the cold trap lid (Figure 2 – green arrow) and the divider plate and wipe out the cumulate moisture using a lint free cloth. Always replace the divider before drying the next sample.

HANDLING AND TESTING BITUMINOUS CONCRETE CORE SAMPLES FOR IN-PLACE DENSITY DETERMINATION

Version 1.1

Standard Operating Procedure

Figure 1. Placing a Core Sample in the CoreDry Sample Chamber (Instrotek CoreDry Manual)

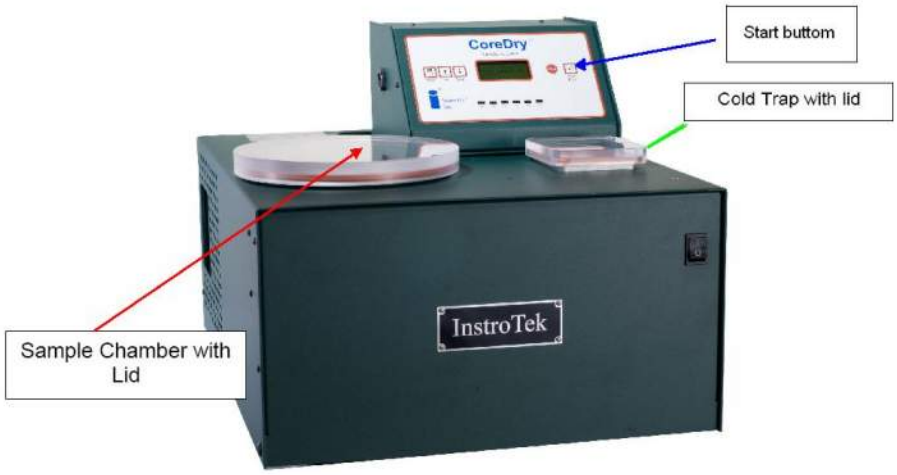


Figure 2. CoreDry Components

Testing for Bulk Specific Gravity:

1. Select and inspect the bag for holes or stress points. Do not use the bag if you find holes or stress points.
2. Record the thickness of the core in column L in the "input" sheet in of Form MAT 438.
3. Weight the bag and enter this weight in column F in the "input" sheet in of Form MAT 438.
4. Weigh the dry sample and record the sample weight in column G in the "input" sheet in of Form MAT 438.
5. Check CoreLok oil level as indicated in the equipment operator manual.
6. Place the bag in the CoreLok Chamber and carefully place the sample inside the bag. The bag opening shall be over the seal bar (Figures 3 and 4) with approximately 1" overlap.
7. Close the CoreLok door and the equipment will seal the bag,
8. Record the weight of the sample sealed inside the bag under water in column I in the "input" sheet in of Form MAT 438. Make sure that the bag is not touching the sides or bottom of the water tank and that all entrapped air has been remove (this may be accomplished by gently shaking the bag under water).
9. Remove the bag and sample from the water bath, cut the bag and record the dry weight of the core in column J in the "input" sheet in of Form MAT 438. If the dry weight of the core before and after test in column J and G differ by more than 1gr, repeat the process from 1 thought 9.
10. All weights of shall be entered into the electronic MAT 438 between two days of testing and all the data shall be reviewed.
11. Notify your chain of command and obtain a quote when the stock of bags is reduced to ten boxes (1000 bags).

HANDLING AND TESTING BITUMINOUS CONCRETE CORE SAMPLES FOR IN-PLACE DENSITY DETERMINATION

Version 1.1

Standard Operating Procedure

Figures 3 and 4. CoreDry Seal bar and Sample Placement (Instrotek CoreLok Manual)

Reporting:

The percentage compaction shall be reported as the percent of the average day's production acceptance maximum theoretical gravity (Gmm) results performed in accordance with AASHTO T 209. Gmm test results determined to be invalid will not be included in the daily's average Gmm determination. The Engineer may replace the contractor's Gmm result(s) with the verification result(s). If Gmm test results are not available from acceptance testing, the Gmm shall be tested from a sample obtained by breaking down the core after the core has been tested or shall be determined from historical data.

The percent compaction of each core (sub-lot) will be determined using the following formula:

Percent compaction = 100[Gmb of core / Gmm of day's production (avg.) or Gmm core sample or historical Gmm]

All percent compaction results will be reported to the nearest 0.1 percent. The density report will automatically mark in red all individual density results that are outside the 87-95% range and that are outside +/-3.5% of the average. The cores that provide results on red will be re-tested.

The handling, testing and reporting of core samples will be monitored and reviewed by DMT supervisory staff (E3 and above) on an ongoing basis. Any change to the standard procedure, shall be approved by the SE or above prior to implementation.

Once a lot is completed the results shall be emailed by the DMT's core testing room lead to project inspection staff or other designated district staff. At no time will the DMT forward results directly to the Contractor. In general, the following shall be included in the email list:

HANDLING AND TESTING BITUMINOUS CONCRETE CORE SAMPLES FOR IN-PLACE DENSITY DETERMINATION

Version 1.1 Standard Operating Procedure

- Construction projects; Project Engineer, Project Inspector, District email, DMT chain of command.
- VIP and other Maintenance Projects; District Planners and/or other designated staff, DMT chain of command.
- Municipal Projects; Muni Team leader, Muni team inspector (if known), muni MAT 100 email, DMT chain of command.

Report Form: Form MAT 438 or other form approved by the DMT.

Core Sample Retention and Disposal:
After the specific gravity testing has been completed and reviewed by the room lead, store the tested core in the back hall rack for a two-week period. After two weeks, dispose the cores in the HMA recycling bin located in the back dock. In general cores that are below the minimum acceptable density (negative adjustment range) should be retained for a slightly longer period to allow for inspection by others. Any lot that is remove and replace will be retained until such time it is determined they are no longer needed.

If you ever have any doubts or questions, ASK!

Emergency Contacts:

Eliana Carlson, Supervising Engineer, 860-258-0325

David Howley, Transportation Engineer III, 860-258-0350

Shane St. Lauren, Transportation Technician III, 860-258-03??

FIRE/AMBULANCE/SAFETY -Emergency Response, 9-911

Connecticut Department of Transportation

STANDARD OPERATING PROCEDURE

Testing For Moisture of Roadway Salt

Division of Materials Testing

Why is roadway salt tested for moisture content?

- Roadway salt is paid for based on gross weight.
- Specifications allow 3% moisture content for full payment.
- Weight of water in excess of 3% is deducted from payment by contract administrator (Purchasing).
- Salt with excess moisture may clump and freeze, making handling difficult.

Scale Inspection/Check

- Scales must be labeled with current calibration date.
- Scale must show same reading (within 0.1 gram) when weighing the same reference weight.
- These steps must be performed before each test or if a scale has been moved.

Sample, and chain of custody, must be maintained at all times.

- Sample must be representative of the pile being tested.
- Sample must not be taken from surface of a pile.
- **Do not** pick out large or discolored particles.
- Take samples from no less than 3 areas of the pile.
- All equipment used in the testing process must be maintained at all times.

Equipment Needed:

- *Oven*

- *Calibrated Digital Scale*

- *Sampling Containers/Sampling Bag*

- *Shovel / Scoop / Sample Thief*

Reference: Standard Testing Specification
For (Sodium Chloride ASTM D632)

This procedure must be consistently and thoroughly followed.

Sampling:

1. Scrape aside the top layer of salt to a depth of no less than 1 inch.

Figure 1 - Preparing field sampling location

2. Take approximately 500 g of material to a depth of six inches.
   - Repeat steps 1 and 2 at two locations, no less than five feet from each other.

Figure 2 - Sampling

3. Place the three samples in a sample bag.

Figure 3 - Filling field sample bag

4. Sample bag must be closed tightly while transporting field sample.

Figure 4 – Securing sample bag

5. The field sample must be reduced to a minimum of 300 grams test sample using sample splitter.

Figure 5 - Sample splitter

6. Determine the mass of the test sample and a metal container of stable shape and weight, using a scale.

Figure 6 - Scale

7. Place the test sample, within the container into the drying oven at a temperature of 230° ± 9°F.

Figure 7 – Drying oven

8. Cool sample on the counter until cool to the touch, then determine the mass weight of the test sample and container.

9. Repeat steps 7 and 8 until test sample weight changes less than 0.1 %.

10. Use the following formula to determine the moisture content of the test sample.

$$\text{moisture content (\%)} = \frac{(\text{wet mass} - \text{dry mass})}{(\text{dry mass})} \text{ X } 100$$

References

Photos:

1. Oven – "Clarkson Laboratory",
   - http://store.clarksonlab.com/O4325-B.aspx

2. Digital Scale – "Scale Palace",
   - https://scalepalace.com/index.php?main_page=index&manufacturers_id=6&sort=20a&page=3

3. Scoop – "Cole-Palmer",
   - http://www.coleparmer.com/Product/Stainless_Steel_Scoop_201_Grade_5_oz_1_each/EW-07205-01

4. Sample Thief – Wilkey Industries, Inc",
   - http://www.wilkeyindustries.com/sample-probe.php

5. CTDOT Salt Shed – "Ctpost",
   - http://www.ctpost.com/local/article/Storms-draining-road-salt-supplies-straining-5222298.php

❖ All other photos are property of CTDOT

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