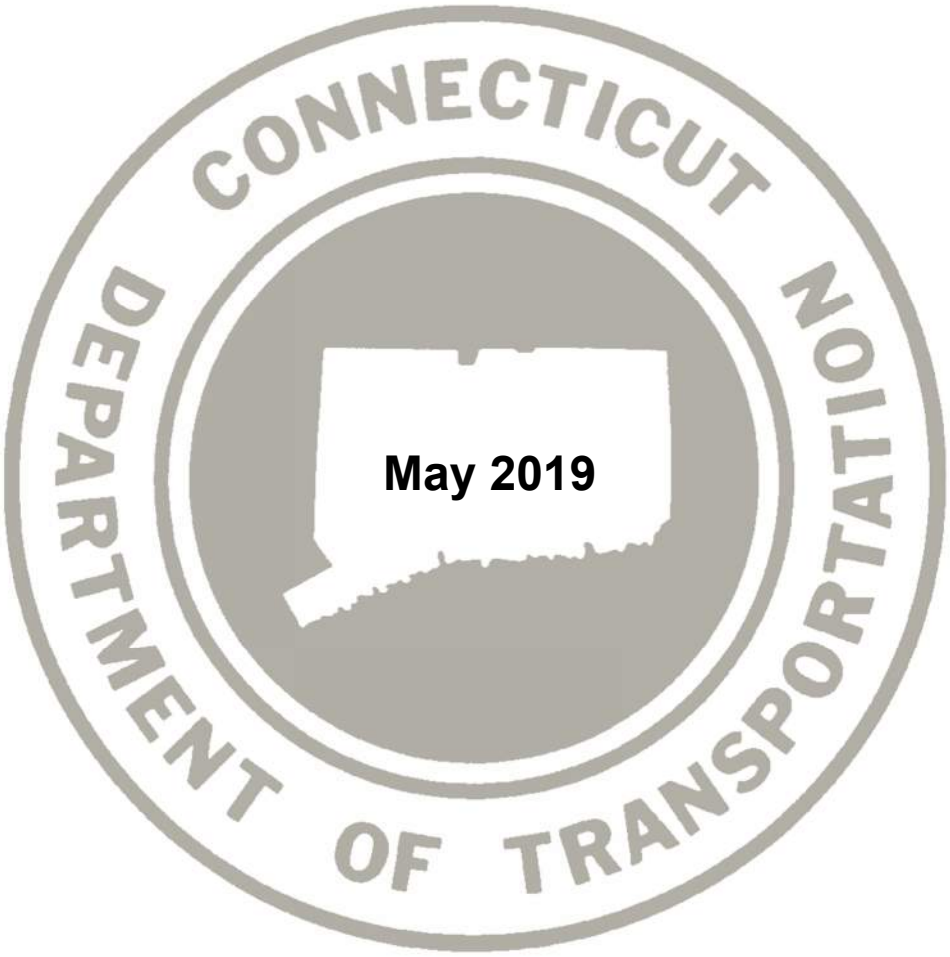
CONNECTICUT DEPARTMENT OF TRANSPORTATION

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

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
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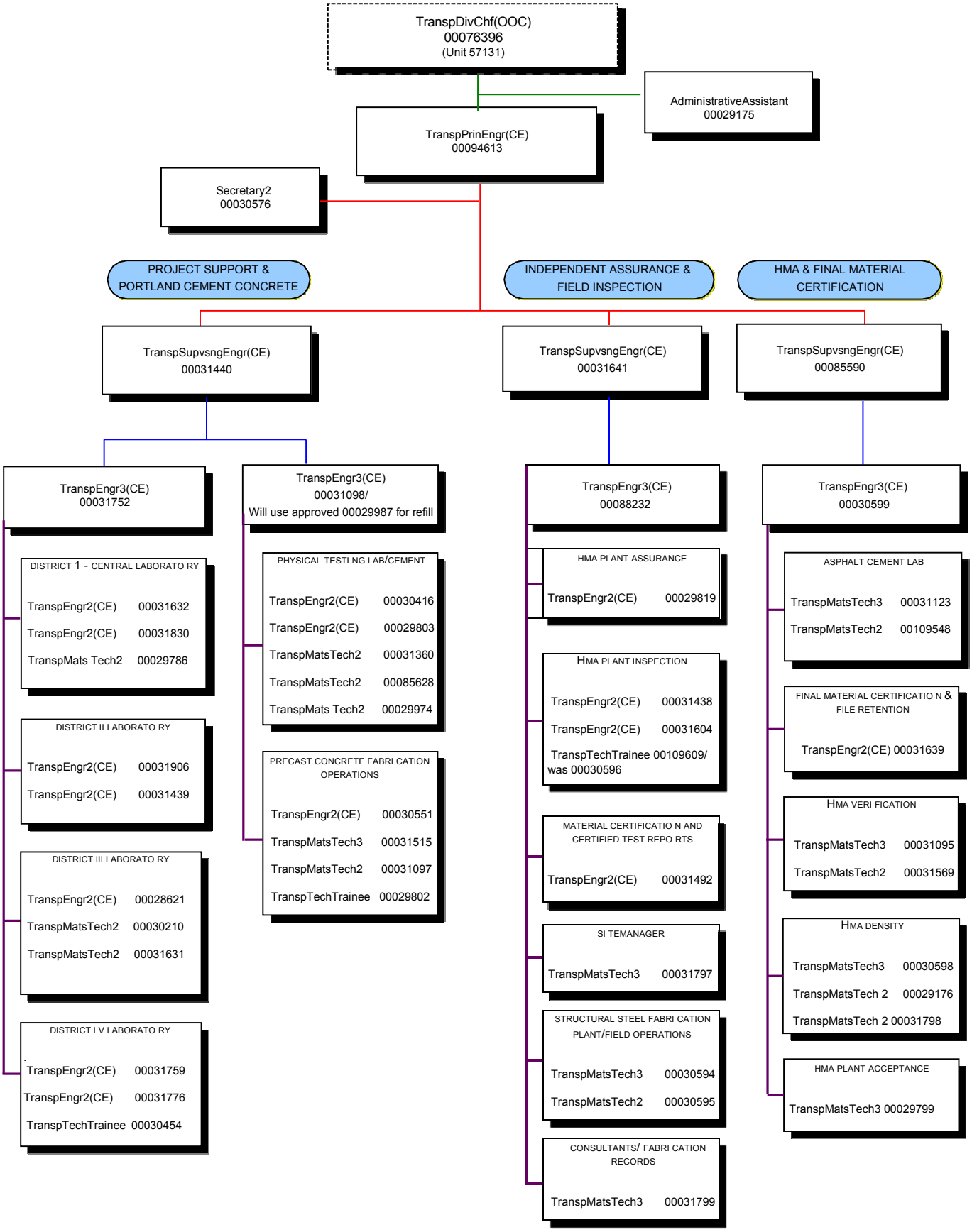

Division of Materials Testing Overview (cont.)

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:

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

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 to validate Contractor's QC tests used for acceptance. Samples will be randomly obtained by Department personnel from the quartered field samples obtained as indicated in Section M.04.

For non-PWL lots, the ratio of verification tests to the Contractor tests will be a minimum 1 to 10. 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 tested at the Central Laboratory. QC and verification test results for Gmm, Gmb, Pb, VA and VMA will be compared using the F-test and t-test at a 0.01 significance level for PWL lots and the absolute difference for Non-PWL lots.

Sampling: All verification samples are obtained and transported to the Central Laboratory by the Contractor within 2 business days of production.

The Contractor will follow AASHTO T 168 5.2.3 for sampling and AASHTO R 47 for the mechanical splitting of the sample. The following figures demonstrate the procedure to be used.

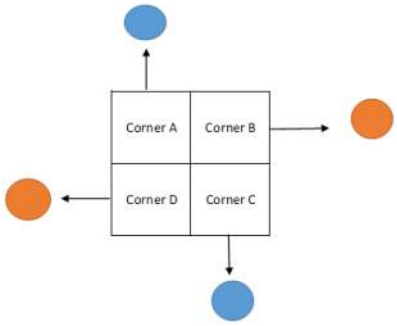

Figure 2- First Splitting Process

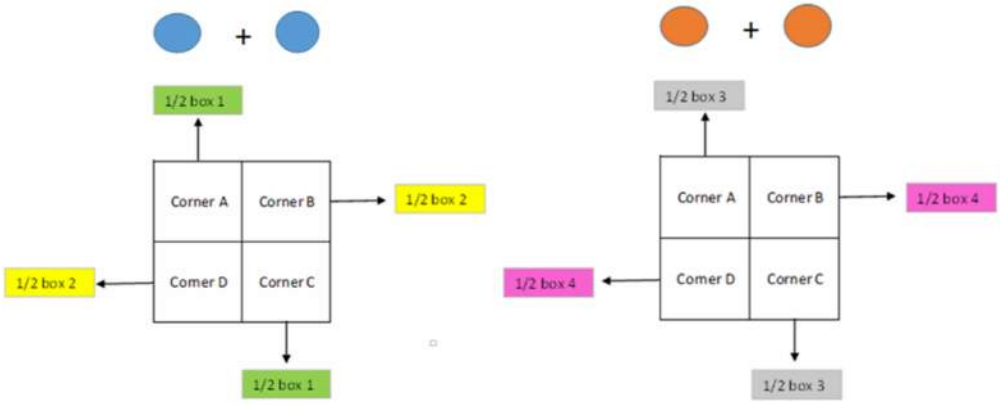

Figure 3- Second and Third Splitting Processes

Procedures:

1. AASHTO T 308: Method for Determining the Asphalt Content of HMA by the Ignition Method.
2. AASHTO T 209: Theoretical Maximum Specific Gravity and Density of HMA Mixtures.
3. AASHTO T 166: Bulk Specific Gravity of Compacted Asphalt Mixtures using Saturated Surface- Dry Specimens.
4. AASHTO T 168: Sampling of Paving Mixtures.
5. AASHTO T 312: Preparing and Determining the Density of Hot Mix Asphalt Specimens by Means of the Superpave Gyratory Compactor. The compaction temperature will match the sublot compaction temperature as tested at the Contractor Laboratory.
6. AASHTO T 329: Moisture Content of Hot-Mix Asphalt (HMA) by Oven Method. Should the field sample be re-heated for 1.5 hours or more, this test may be omitted.

For non-PWL lots, results will be considered validated when the the difference of te QC and verification results falls within the tolerances in Table 4.

For PWL lots, when the project estimated quantity is below 10,500 tons or when the remaining tonnage after a JMF change or after failing fata validation lot is below 10,500 tons, one data validation analysis will be performed for all the tonnage or remaining tonnage per mix design per project. The minimum number of verification tests per each data validation lot is three. Results will be considered validated when both the F- and t- tests pass.

For PWL lots with project estimated quantities over 10,500 tons, a data validation lot will include QC and verification results in three consecutive acceptance lots under the same mix design. The first data validation lot will be performed when the first three acceptance lots are completed and consecutive data validation lots will be performed each time a new acceptance lot is closed. QC and verification data from the last two acceptance lots will be rolled over to be used in consecutive data validation lots except when prior data validation lots failed. The minimum number of verification tests per each data validation lot is five. Results will be considered validated when both the F- and t- tests pass.

Should the Department be unable to validate the Contractor's acceptance test result(s) in any acceptance PWL lot, The Engineer will test the remaining verification samples in the lot and use the verification results to calculate the lot pay adjustment.

When any single result fails the F- or t- tests, 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.

If the Contractor request dispute resolution testing, all sublots in the disputed lot will be tested by the Independent Assurance Section and those test results will be used for the lot pay adjustment. The Department reserves the right to deny dispute resolution testing is there is a history of disputed lots that confirmed verification results or if the dispute resolution samples appear to be tampered.

Should the Department be unable to validate the Contractor's Non-PWL acceptance test result(s), The Engineer will use verification results for the pay adjustment calculation in the corresponding sublots.

Report Forms: MAT-408PWL and MAT-408NON_PWL

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:

<u>Aggregate Components Consensus Properties Verification:</u>

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.

Local Transportation Capital Improvement Program (LOTCIP) **4/2/2019**

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

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.
MAT 100: Indicates wether a Request for Test (MAT-100) is required to be submitted to the Division of Materials Testing (See Note 11. for ALT)
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. "Chem" requires
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	MAT 100	Sample Type	Test Method	Test Type	Test Responsibility	Frequency 1 per (E)	Frequency 1 per (M)	Sample Size lbs	Sample Size kg
01.01	Environmental Items		03166	Sheeting, Polyethylene	s.y.	NO	None	NA	Visual	Project Staff			See Note 8.	
			04XXX	Bit. Concrete (Various)	ton	NO	None	NA	Visual	Project Staff				
			04776	Hay, Baled	ea.	NO	None	NA	Visual	Project Staff				
			04901	Bedding Material	c.y.	NO	None	NA	Visual	Project Staff				
			08044	Retaining Wall - Precast Conc.	ea.	YES	Accept (Prod)	NA	PC1	Central Lab	1	1	NA	
02.01	Clearing & Grubbing	l.s.	00000	Labor only		NO								
02.02	Rdwy Ex, Formation of Embankment and Disposal of Surplus Material	c.y.	08037X	Reclaimed Waste (OFFSITE)	c.y.	YES	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										
02.03	Structure Excavation	c.y.	00000	Labor Only		NO								
02.04	Cofferdam	l.f.	00000	None		NO								
02.05	Trench Excav	c.y.	00000	None		NO								
02.06	Ditch Excav	c.y.	00000	None		NO								
02.07	Borrow	c.y.	04902	Borrow	c.y.	YES	Information	T180	LABT	District Lab	20k	15k	160	72
			08037X	Reclaimed Waste (OFFSITE)										
02.08	Free-Draining Material	c.y.	08037X	Reclaimed Waste (OFFSITE)	c.y.	YES	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
02.09	Subgrade, Form	s.y.	00000	Labor Only		NO								
02.10	A Water Pollution Control	est.	03166	Sheeting, Polyethylene	l.f.	NO	None	NA	Visual	Project Staff			See Note 8.	
			04XXX	Bit. Concrete (Various)	ton	NO	None	NA	Visual	Project Staff				
			03985	Geotextile	s.y.	NO	None	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.	YES								
			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.										
			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	MAT 100	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.	YES	Accept (Prod)	D 4832	FLABT	Central Lab	100	76	TBD	
02.19	Sedimentation Control Sys	l.f.	03985	Geotextile	s.y.	NO	None	NA	QPL/MC	Project Staff			NA	
			04776	Hay, Baled	ea.	NO	None	NA	Visual	Project Staff			See Note 8.	
03.02	X 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	X Concrete Base	c.y.	03015-03540	Concrete-PCC03540	c.y.	YES	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.	YES								
			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										
			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.	03015-0354X	Concrete-PCC354X	c.y.	YES	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 04056,7,8 04064,5,6 04076,7,8	Level 1,2,3 (6.25mm / 0.25 in) Level 1,2,3 (9.5 mm / 0.375 in) Level 1,2,3 (12.5 mm / 0.5 in) Level 1,2,3 (25.0 mm / 1.0 in)	ton	YES	**Material properties:** Accept (Prod) Table M.04.03-3 LABT Producer 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 Non-PWL. Multiple days of production, each under 150 tons, can be combined on a single MAT-100. Project personnel must submit one MAT-100 per lot for PWL.				Project quantities ≥ 3500 tons Use Percent Within Limits (PWL). 1 test per 500 tons			
											Project quantities <3500 tons Non-PWL See Table M.04.03-2 of Specification.			
							Material density in-place (cores): Accept (Prod) T331 LABT Central Lab				See Section 4.06.03-10 of Specification.			
											Project quantities ≥ 3500 tons Use Percent Within Limits (PWL). 1 mat core per 500 tons 1 joint core per 2000 ft. of joint			
											Project quantities <3500 tons Simple Average See Table 4.06-4 & 4.06-5 of Specification.			
04.06	Curb Mix	ton	04003	Curb Mix	ton	YES	One test per every 250 tons of cumulative production. See section M.04.03-2b.							

Chapter 8 - Minimum Schedule for Acceptance Testing

Item	X=Not Standard, A=Spec Pro / Title	Unit	Material #	Material Name	Material Unit	MAT 100	Sample Type	Test Method	Test Type	Test Responsibility	Frequency 1 per (E)	Frequency 1 per (M)	Sample Size lbs	Sample Size kg
04.06	Emulsified Asphalt	gal	04128	RS-1, RS-1H	gal		Accept (Prod)	M140 & M208	LABT	Central Lab	≤1000 gal		≤1000 gal	
			04133	SS-1, SS-1H		YES	Total project quantities up to 1000 gallons requires only a Materials Certificate and Certified Test Report from certified source.				None		None	
			04146	CSS-1, CSS-1H										
			04147	CRS-1		YES	Total project quantities >1000 gals also require sample(s) for testing, which must be submitted within 15 days of sampling.				>1000 gal 10k	38kl	>1000 gal 2 qts	2L
04.15	Press Rlf Joint	s.y.	See 04.06 for Bituminous Materials and 2.12 for unbound material.											
05.02	X Temp Crossings		00000	None										
5.03	Removal of Super Structure	l.s.	00000	None										
05.04	RR Protection	hr.	00000	None										
05.06	Retaining Walls, and Steps	c.y.	03015-X	Concrete-Class (Various)	c.y.	YES	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.												
05.07	Catch Basins,	ea.	00327	Water	gal	NO	None	NA	Visual	Project Staff			See Note 4.	
05.80	X Manholes & Drop Inlets		01422	Concrete Section, Precast	ea.	YES	Accept (Prod)	NA	PC1	Central Lab	1	1	NA	
			01440A	Catch Basin - Precast (Complete										
			01441A	Manhole - Precast (Complete)										
			03025	Mortar (prebagged)	bag	NO	None	NA	Visual	Project Staff			See Note 9.	
			03066	Cement - Portland Type I/II										
			06552	Lime - Hydrated										
			03200	Concrete Masonry Unit (CMU)	ea.	YES	Accept (Prod)	NA	LABT	Central Lab			See Note 13.	
			03201	Brick (Clay) - RED										
			03209	Manhole Covers / Frame	ea.	YES	Accept (Prod)	NA	MC	Central Lab	1	1	See Note 12.	
			03205	Catch Basin - Grate										
			06566	Lawn Drain Grate										
			04697	Sand (Masonry) - Grading A	c.y.	YES	Accept (Prod)	T27	LABT	District Lab	2.5k	1.9k	25	12
			04704	Sand (Masonry) - Grading B										
			04819	Gravel (Bank Run)	c.y.	YES	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	ea.	03542	Stud Shear Connector	ea.	YES	Accept (Prod)	AWS D1.5	MCCTR	Central Lab	quantity		1 per size	
05.09	Welded Studs	ea.	03543	Studs - Welded	ea.	YES	Accept (Prod)	AWS D1.5	MCCTR	Central Lab	quantity		1 per size	
05.13	PVC Pipe	l.f.	02649	Pipe - PVC & Fittings & Acc.	l.f.	NO	None	NA	Visual	Project Staff			See Note 8.	
05.14	Prestressd Conc Members	l.f.	03040,16	Grout	See requirements for material #03040 or #03016 under item 06.01									
			03050	Concrete Members, Prestressed	l.f.	YES	Accept (Prod)	NA	Visual	Lab & Project			See Note 2.	

Item	X=Not Standard, A=Spec Pro / Title	Unit	Material #	Material Name	Material Unit	MAT 100	Sample Type	Test Method	Test Type	Test Responsibility	Frequency 1 per (E)	Frequency 1 per (M)	Sample Size lbs	Sample Size kg
05.20	X Exp Jnt System	c.f.	07067	Exp. Joint System	l.f	NO	None	NA	MC	Project Staff				
	A Asph Plug Jnt		08010-SP	Exp. Jt. - Asphalt Plug-Spec Pro	c.f	YES	See Special Pro for Testing Requirements (MAT 100 for stone only)							
05.21	Elastomeric Bearing Pads	c.i.	03040,16	Grout	See requirements for material #03040 or #03016 under item 06.01									
			03505-L	Bearing Pads (Laminated)	ea.	YES	Accept (Prod)	NA	MCCTR	Central Lab	See Note 3.		See Note 3.	
			03505-P	Bearing Pads (Plain)	ea.									
05.22	Elastomeric Comp. Seal	l.f.	03432	Joint Seal, Elastomeric Comp	l.f.	None		NA	MC	Project Staff			NA	
			03040,16	Grout	See requirements for material #03040 or #03016 under item 06.01									
06.01	Concrete for Structures	c.y.	00804	Box Culvert, Precast Concrete	ea.	YES	Accept (Prod)	NA	Visual	Lab & Project			See Note 2.	
			01422	Concrete Section, Precast										
			03015-X	Concrete-PCCXXXXX	c.y.	YES	Accept (Prod)	T22	FLABT	Central Lab	75(60)/day		4 cyl	
			03014-SP_K	Concrete Special Provision										
			03040	Grout, Non-shrink	bag	NO	None	NA	Visual	Project Staff			See Note 9.	
			03016	Grout (Batched)	c.y.	YES	Accept (Prod)	T106	FLABT	Central Lab				
			04177	Joint Sealer, Concrete Structure	lb.	NO	None	NA	MC	Project Staff			NA	
			03158	Preformed Expansion Joint Filler	ea.									
			03444	Closed Cell Elastomer	l.f.	NO	None	NA	MC	Project Staff			NA	
			Note: All steel reinforcement under 06.01 will be tested as described in 06.02.											
06.02	Reinforcing	lb.	02995	Dowel Splice System, Epxy Ctd	ea.	YES	Accept (Prod)	T244	LMCT	Central Lab	quantity		1	
			02997	Dowel Splice System										
			02998	Deformed Steel Bars, Epxy Ctd	lb.	YES	Accept (Prod)	T244	LMCT	Central Lab	200t	180t	5ft	1.5m
			03040, 16	Grout	See requirements for material #03040 or #03016 under item 06.01									
			03100	Deformed Steel, Reinforcing	lb.	YES	Accept (Prod)	T244	LMCT	Central Lab	200t	180t	5ft	1.5m
			03105	Chemical Anchor	lb.	NO	None	NA	QPL/MC	Project Staff			NA	
			03138	Dowels, Steel	ea.	YES	Accept (Prod)	T244	LMCT	Central Lab	quantity		NA	
			03145	Fabric, Wire and Welded Steel	s.y.	YES	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 Struct. Stl	gal	NO	None	NEPCOAT www.nepcoat.org	MC	Project Staff	quantity		NA	
			00032	Paint - Interm. Coat for Struct Stl										
			00033	Paint - Top Coat for Struct Stl										
			03537	Steel, Structual	cwt.	YES	Accept (Prod)	NA	Visual	Lab & Project			See Note 2.	
			01839	Bolt/Nut/Washer	ea.	YES	Accept (Prod)	TBD	LMCT	Central Lab	quantity			
			08022	Bolt/Nut/Washer, High strength	ea.	YES	Accept (Prod)	TBD	LMCT	Central Lab	quantity			
			03542	Stud Shear Connectors	See item 5.08.									
			03040, 16	Grout	See requirements for material #03040 or #03016 under item 06.01									
06.05	Masonry Facing	s.y.	04771	Stone, Masonry	tons	NO	None	NA	Visual	Project Staff			NA	
			03138	Dowels, Steel	lb.	YES	Accept (Prod)	NA	LMCT	Central Lab	quantity		NA	
			Note: Mortar components to be tested as described in 05.07.											

Item	Title	Unit	Material #	Material Name	Material Unit	MAT 100	Sample Type	Test Method	Test Type	Test Responsibility	Frequency 1 per (E)	Frequency 1 per (M)	Sample Size lbs	Sample Size kg
06.06	Cement Rubble Masonry	c.y.	4771	Stone, Masonry	c.y.	NO	None	NA	Visual	Project Staff			NA	
			Note: Mortar components to be tested as described in 05.07.											
06.07	Dry Rubble Masonry	c.y.	4771	Stone, Masonry	c.y.	NO	None	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	None	ea.	NO	None	NA	Catalog Cut	Project Staff			See Note 8.	
06.51	Culverts/Pipe	l.f.	00327	Water	gal	NO	None	NA	Visual	Project Staff			See Note 4.	
			00699	Pipe - R.C. & Fittings & Acc.	l.f.	YES	Accept (Prod)	NA	PC1	Central Lab	size		See Note 7.	
			various	Pipe (Metal) All types	l.f.	YES	Accept (Prod)	NA	MC	District Lab	quantity		See Note 8.	
			01783	Pipe -Alum & Fitting & Acc.	l.f.	YES	None	NA	MC	Project Staff				
			03066	Cement - Portland Type I/II	bag	NO	None	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.	YES	Accept (Prod)	T106	FLABT	Central Lab				
			04704	Sand (Masonry) - Grading B	c.y.	YES	Accept (Prod)	T27	LABT	District Lab	2.5k	1.9k	25	12
			04901	Bedding Material	c.y.	NO	None	NA	Visual	Project Staff			Se Note 8.	
			04819	Gravel (Bank Run)	c.y.	YES	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)	c.y.	YES	Accept (Prod)	Chem(Offsite)	MCCTR	District Lab	2.5k	1.9k	160	72
06.52	Culvert Ends	ea.	00823	Culvert End - Reinforced Conc	ea.	YES	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	None		NO								
07.01	Drilled Shafts	l.f.	0306X	Cement (Type)		NO	None	NA	Visual	Project Staff			See Note 9.	
			03100	Deformed Steel, Reinforcing		YES	Accept (Prod)	T244	LMCT	Central Lab	200t	180t	5ft	1.5m
			03016	Grout (Batched)		YES	Accept (Prod)	T106	FLABT	Central Lab				
			03532	Pipe, Steel Shell		YES	Accept (Prod)	NA	MC	Central Lab	quantity		NA	
			02724	Pipe, Steel & Fit & Acc.		YES	Accept (Prod)	NA	MC	Central Lab	quantity		NA	
			02600	Pipe, Polyethylene & Fit & Acc.		NO	None	NA	Visual	Project Staff			See Note 8.	
07.02	Piles	lb.	03040	Grout, Non-shrink	See requirements for material #03040 under item 06.01									
			03549	H-Piles, Steel	ton	YES	Accept (Prod)	NA	MCCTR	Central Lab	See Note 1.		See Note 1.	
			3559	Pile Point, Steel	ea.	YES	Accept (Prod)	NA	MCCTR	Central Lab	quantity		NA	

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Item	Title	Unit	Material #	Material Name	Material Unit	MAT 100	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													
07.03	Riprap (all types)	c.y.	04819	Gravel (Bank Run)	c.y.	NO	None	NA	Visual	Project Staff			See Note 8.	
			08034	Stone (Broken/Crushed)										
			08035	Gravel (Crushed)										
07.04	Gabions	c.y.	03546	Gabions	ea.	YES	Accept (Prod)	NA	MC	Central Lab	quantity		NA	
07.05	Slope Paving	s.y.	08031	To Be Determined.										
07.06	Micropiles	ea.	See materials listed under 07.01											
07.07	Membrane Waterproofing (Woven Glass)	s.y.	04199	Membrane Waterproofing	s.y.	NO	None	NA	MC	Project Staff	quantity			
07.08	Dampproofing	s.y.	04207	Dampproofing Primer	gal	NO	None	NA	MC	Project Staff	quantity			
			04208	Dampproofing Sealer										
07.11	X Conc Crib Wall		08031	To Be Determined.										
07.13	Permanent Steel Sheet Piling	s.f.	03535	Piling, Steel Sheet	l.f.	YES	Accept (Prod)	NA	MCCTR	Central Lab	quantity		NA	
07.14	Temp Steel Sheet Piling													
07.15	Sht Piling Left													
07.17	Earth Ret Syst	s.f.	07627	Reinforced Earth Wall	ea.	YES	Accept(Prod)	NA	MC	Lab and Project	quantity		See Note 8.	
07.28	Crushed Stone for Slope Protection	ton	08034	Stone (Broken/Crushed) Gravel (Crushed)	c.y.	NO	None	NA	Visual	Project Staff			See Note 8.	
			08035											
07.32	Conc. Block Slope Prot.	s.y.	03200	Concrete Masonry Unit (CMU)	See requirements for material #03200 under item 05.07.									
		lb	03025	Mortar	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	None	NA	QPL/MC	Project Staff			NA	
			04901	Bedding Material	c.y.	NO	None	NA	Visual	Project Staff			NA	
			02649	Pipe - PVC & Fittings & Acc.	l.f.	NO	None	NA	Visual	Project Staff			See Note 8.	
07.55	Geotextile	s.y.	03985	Geotextile	s.y.	NO	None	NA	QPL/MC	Project Staff			NA	
08.03	Paved Ditches and Channels	s.y.	04003	Curb Mix	See requirements under 04.06.									
			04819	Gravel (Bank Run)	c.y.	YES	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.	YES	Accept (Prod)	NA	PC1	Central Lab	quantity		NA	
			03015-03X	Concrete PCC03XXX	c.y.	YES	Accept (Prod)	T22	FLABT	Central Lab	75	60	4 cyl	4 cyl
			03155	Expansion Joint filler	l.f.	NO	None	NA	MC	Project Staff			NA	
			03158	Preformed Expansion Joint Filler	s.f.									

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Item	X=Not Standard, A=Spec Pro / Title	Unit	Material #	Material Name	Material Unit	MAT 100	Sample Type	Test Method	Test Type	Test Responsibility	Frequency 1 per (E)	Frequency 1 per (M)	Sample Size lbs	Sample Size kg
08.13	Stone Curbing	l.f.	04909	Curbing, Granite Stone	l.f.	NO	None	NA	Visual	Project Staff			NA	
08.14	Reset Stone Curbing	l.f.	00000	None		NO	None							
08.15	Bit. Conc. Lip Curbing	l.f.	04003	Curb Mix	See requirements under 04.06.									
		gal	04128,47	RS-1 or RS-1H	See requirements under 04.06.									
08.16	X Granite Slope Curbing	l.f.	04910	Curbing, Granite Slope	l.f.	NO	None	NA	Visual	Project Staff			NA	
08.18	Prtctve Cmpnd for Bridges	s.y.	00328	Protective Coating	gal	NO	None	NA	QPL/MC	Project Staff			NA	
08.21	Precast Concrete Barrier Curb	l.f.	00895	Concrete Barrier, Precast	l.f.	YES	Accept(Prod)	NA	PC1	Central Lab	size		See Note 7.	
			03015-04X	Concrete-PCC04XXX	c.y.	YES	Accept (Prod)	T22	FLABT	Central Lab	75	60	4 cyl	4 cyl
08.22	Temp Precast Conc. Barrier	l.f.	00865	Concrete Barrier, Precast, Temp	l.f.	NO	None							
09.01	A Bollard	ea.	07351	Bollard, Steel	ea.	YES	Accept (Prod)	NA	MC	Central Lab	quantity		NA	
09.04	Metal Br Rail	l.f.	03429	Metal Bridge Rail System	l.f.	YES	Accept(Prod)	NA	MC	Lab and Project	quantity		See Note 2.	
09.05	Stone Wall Fence	l.f.	00000	None		NO	None							
09.06	Wire Fence	l.f.	03326	Fence - Wire, Posts & Hardware	l.f.	YES	Accept(Prod)	TBD	MC	Central Lab	quantity		NA	
09.10	Metal Beam Rail	l.f.	03406	Metal Beam Rail System	l.f.	YES	Accept (Prod)	NA	MC	Central Lab	quantity		NA	
09.11	Metal Beam Rail Anchorages	ea.	01435	Anchor, (Precast)	ea.	YES	Accept (Prod)	NA	PC1	Central Lab	quantity		NA	
			03405	Metal Beam Rail, Anchorages for	ea.	YES	Accept (Prod)	NA	Visual	Lab and Project	quantity		See Note 2.	
			03015-033X	Concrete PCC033XX	c.y.	YES	Accept (Prod)	T22	FLABT	Central Lab	75	60	4 cyl	4 cyl
			03100	Deformed Steel, Reinforcing	lb.	YES	Accept (Prod)	T244	LMCT	Central Lab	200t	180t	5ft	1.5m
09.12	Remove and Reset Posts, ...	l.f.	08031	To Be Determined.		TBD								
09.13	Chain Lnk Fence	l.f.	03309	Fence, Chain Link	l.f.	YES	Accept(Prod)	NA	MC	Central Lab	quantity		3 lf	1m
			03310	Fence, Chain Link, Post for	ea.				LABT				1	1
			03320	Fence, Hardware & Acc. (Chain Link)	ea.								1	1
09.14	Metal Handrail	l.f.	03414	Metal Handrail	l.f.	YES	Accept(Prod)	NA	MC	Lab and Project	quantity		See Note 2.	
09.16	Noise Bar Wall	s.f.	07822	Noise Barrier Wall	s.f.	YES	Accept (Prod)	NA	MC	Central Lab	quantity		NA	
09.18	Three-Cable Guide Railing (I_Beam Posts) & Anchorages	ea.	03015-033X	Concrete PCC033XX	c.y.	YES	Accept (Prod)	T22	FLABT	Central Lab	75	60	4 cyl	4 cyl
			03100	Deformed Steel, Reinforcing	lb.	YES	Accept (Prod)	T244	LMCT	Central Lab	200t	180t	5ft	1.5m
			03419	Cable Guide Rail	l.f.	YES	Accept (Prod)	NA	MC	Central Lab	quantity		NA	
			03421	Cable Guide Railing Anchorage	ea.									

Item	X=Not Standard, A=Spec Pro / Title	Unit	Material #	Material Name	Material Unit	MAT 100	Sample Type	Test Method	Test Type	Test Responsibility	Frequency 1 per (E)	Frequency 1 per (M)	Sample Size lbs	Sample Size kg
09.21	Concrete Sidewalks	s.f.	01467	Slab, Precast	ea.	YES	Accept (Prod)	NA	PC1	Central Lab	quantity		NA	
			02998	Deformed Steel Bars, Epxy Ctd	lb.	YES	Accept (Prod)	T244	LMCT	Central Lab	200t	180t	5ft	1.5m
			03015-044X	Concrete-PCC044XX	c.y.	YES	Accept (Prod)	T22	FLABT	Central Lab	75	60	See Note 14.	
			03100	Deformed Steel, Reinforcing	lb.	YES	Accept (Prod)	T244	LMCT	Central Lab	200t	180t	5ft	1.5m
			03145	Fabric, Wire & Welded Steel	s.y.	YES	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	None	NA	MC	Project Staff			See Note 1.	
			04819	Gravel (Bank Run)	c.y.	YES	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
			08060	Detectable Warning Strip	ea.	NO	None	NA	QPL/MC	Project Staff	quantity			
09.22	Bituminous Concrete Driveway	s.y.	0405X	HMA S 0.375	ton	YES	Accept(Prod)	TBD	FLDT	Project Staff	day	day	NA	
			04819	Gravel (Bank Run)	c.y.	YES	Accept (Prod)	T27	LABT	District Lab	5k	3.8k	160	72
			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
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.									
09.30	Object Marker	ea.	03943	Object Marker	ea.	NO	None	NA	QPL/MC	Project Staff	quantity			
		ea.	03952	Sign Post	ea.	YES	Accept(Prod)	TBD	MC	Central Lab	quantity		See Note 1.	
09.39	Sweeping for Dust Control	hr.	00000	None		NO	None							
09.41	X Service Bridges	ea.	08031	To Be Determined.										
09.42	Calc Chloride Dust Control	ton	00302	Calcium Chloride	gal	NO	None	NA	Visual	Project Staff			NA	
09.44	Topsoil	s.y.	00542X	Topsoil (from offsite)	c.y.	YES	Accept (Prod)	NA	MCCTR	Central Lab	1k	765	NA	
			00542	Topsoil (from project)	c.y.	NO	None	NA	Visual	Project Staff				
09.45	X Wildflowers	lb.	00000	None		ALT	None	Landscape Design Unit Approval					See Note 11.	
09.46	Liming	ton	00533	Lime	lb.	NO	None	NA	Visual	Project Staff			NA	

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Item	Title	Unit	Material #	Material Name	Material Unit	MAT 100	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														
09.47	Bus Shelter	ea.	08031	To Be Determined.		TBD								
09.49	Planting and Mulching Trees, Shrubs Vines and Groundcover Plants	ea.	00327P	Water (plantings)	gal	NO	None	NA	Visual	Project Staff			NA	
			00510	Peat	c.y.	NO	None	NA	Visual	Project Staff			NA	
			00533	Lime	ton	NO	None	NA	Visual	Project Staff			NA	
			00496	Fertilizer	lb.	NO	None	NA	MC	Project Staff			See Note 10.	
			00536	Plant Materials		ALT	None			Landscape Design Unit Approval			See Note 11.	
			00542P	Topsoil - plantings (no turf estab)	c.y.	YES	Accept (Prod)	NA	MCCTR	Central Lab	1k	765	NA	
			07547	Tree		ALT	None			Landscape Design Unit Approval			See Note 11.	
09.50	Turf Establishment Erosion Control	s.y.	00327P	Water (plantings)	gal	NO	None	NA	Visual	Project Staff			NA	
			00496	Fertilizer	lb.	NO	None	NA	MC	Project Staff			See Note 10.	
			00497	Seed	lb.	NO	None	NA	MC	Project Staff			See Note 10.	
			00533	Lime	lb.	NO	None	NA	Visual	Project Staff			NA	
			00534	Mulch - All Types	lb.	NO	None	NA	Visual	Project Staff			NA	
			00542	Topsoil (from project)	c.y.	NO	None	NA	Visual	Project Staff			NA	
			00542X	Topsoil (from offsite)	c.y.	YES	Accept (Prod)	NA	MCCTR	Central Lab	1k	765	NA	
			3985	Geotextiles	s.y.	NO	None	NA	QPL/MC	Project Staff			NA	
09.53	Sodding	s.y.	00518	Sod	s.y.	NO	None	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	None	NA	Visual	Project Staff			NA	
09.77	Traffic Cone	ea.	03934	Reflective Sheeting	s.f.	NO	None	NA	QPL/MC	Project Staff			NA	
			03948	Traffic Cones	ea.	NO	None	NA	Visual	Project Staff			NA	
09.78	Traffic Drum	ea.	03934	Reflective Sheeting	s.f.	NO	None	NA	QPL/MC	Project Staff			NA	
			03927	Traffic Drums	ea.	NO	None	NA	Visual	Project Staff			NA	
09.79	Construction Barricades	ea.	03934	Reflective Sheeting	s.f.	NO	None	NA	QPL/MC	Project Staff			NA	
			03974	Construction Barricade	ea.	NO	None	NA	MC	Project Staff				
09.81	42 in. Traffic Cone	ea.	03934	Reflective Sheeting	s.f.	NO	None	NA	QPL/MC	Project Staff			NA	
			03948	Traffic Cones	ea.	NO	None	NA	Visual	Project Staff				
10.01	Trenching and Backfilling	l.f.	04901	Bedding Material	c.y.	NO	None	NA	Visual	Project Staff			See Note 8.	
				Other materials as listed elsewhere.										
10.02	Light Standards and Traffic Control Foundations		01432	Foundation (Precast)	ea.	YES	Accept (Prod)	NA	PC1	Central Lab	size		See Note 7.	
			03015-033X	Concrete PCC033XX	c.y.	YES	Accept (Prod)	T22	FLABT	Central Lab	75	60	4 cyl	4 cyl
			03100	Deformed Steel, Reinforcing	lb.	YES	Accept (Prod)	T244	LMCT	Central Lab	200t	180t	5ft	1.5m
			03504	Anchor Bolts	ea.	YES	Accept (Prod)	TBD	LMCT	Central Lab	quantity		1 per size	
			03711	Ground Rod	ea.	NO	None	NA	Visual	Project Staff			NA	
10.03	Light Standards	ea.	03704	Light Standard	ea.	YES	Accept (Prod)	TBD	MC	Central Lab	quantity		See Note 6.	

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Item	X=Not Standard, A=Spec Pro / Title	Unit	Material #	Material Name	Material Unit	MAT 100	Sample Type	Test Method	Test Type	Test Responsibility	Frequency 1 per (E)	Frequency 1 per (M)	Sample Size lbs	Sample Size kg
10.04	Roadway Luminaire	ea.	07645	Luminaire	ea.	NO	Catalog Cut - Designer							
10.06	Underbridge Luminaire	ea.	07645	Luminaire	ea.	NO								
10.08	Elec. Conduit	l.f.	03693	Conduit & Fittings (all types)	l.f.	NO	No Request for Test - Catalog Cut - Designer							
10.09	Cast Iron Junction Box	ea.	03724	Junction Box & Cover	ea.	YES	Accept (Prod)	NA	MC	Central Lab	quantity		NA	
10.10	Conc Handhole	ea.	01462	Handhole & Cover, Precast	ea.	YES	Accept (Prod)	NA	PC1	Central Lab	size		See Note 7.	
10.11	4" Drain Pipe	l.f.	01708	Pipe - For Underdrain or Outlets	l.f.	NO	Catalog Cut - Designer							
10.12	Single Conductor	l.f.	08031	To Be Determined.		TBD								
10.14	Cable In Duct	l.f.	08031	To Be Determined.		TBD								
10.15	Grounding Conductor	l.f.	03709	Ground Wire	l.f.	NO	None	NA	Visual	Project Staff			NA	
			03711	Ground Rod	ea.	NO	None	NA	Visual	Project Staff			NA	
10.17	Service Entrance & Cabinet	ea.	00000	None		NO	Catalog Cut			Designer of Record				
10.18	Navigation Light	ea.	08031	To Be Determined.		TBD	Catalog Cut - Designer							
11.01	Pole Anchor	ea.	08031	To Be Determined.		TBD								
11.02	Pedestals	ea.	03801	Pedestals, Aluminum	ea.	NO	None	NA	Visual	Project Staff			NA	
11.03	Span Pole	ea.	03802	Span Pole - Steel	ea.	YES	Accept(Prod)	NA	MC	Central Lab	quantity		See Note 2 & 6.	
11.04	X Mast Arm		03806	Mast Arm Assembly	ea.	YES	Accept(Prod)	NA	MC	Central Lab	quantity		See Note 2 & 6.	
11.05	Traffic Signals	ea.	03766	Traffic Signal Equipment	ea.	NO	Catalog Cut - Designer							
			03807	Traffic Signal	ea.	NO								
11.06	Pedestrian Signal	ea.	00000	None		NO	Catalog Cut			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	PVC Conduit		00000	None		NO	Catalog Cut			Designer of Record				
11.16	Illum. Signs	ea.	00000											

Item	X=Not Standard, A=Spec Pro / Title	Unit	Material #	Material Name	Material Unit	MAT 100	Sample Type	Test Method	Test Type	Test Responsibility	Frequency 1 per (E)	Frequency 1 per (M)	Sample Size lbs	Sample Size kg
11.17	A Alt. Flsh Sig for Wrnng Sgns	ea.	00000	None		NO	Catalog Cut			Designer of Record				
11.18	Rmvl/ Relo Traff Sig. Equip	l.s.	08031	To Be Determined.		TBD								
11.30	High Mounted Inter Illum. Flashing Arrow	day	00000	None		NO	Catalog Cut			Designer of Record				
11.31	Changeable Message Sign / Remote Controlled Sign	day	03764	Sign (Variable Message)	ea.	NO	None	NA	MC	Project Staff			NA	
12.00	Gen. Clauses for Hwy Signing		00000	None		NO								
12.01	Ohead Sign Sup.	ea.	03928	Sign Support, Structural Steel	ea.	YES	Accept(Prod)	NA	MC	Central Lab	quantity		See Note 2 & 6.	
12.02	Overhead Sign Support Foundation	ea.	03015-X	Concrete PCC03XXX	c.y.	YES	Accept (Prod)	T22	FLABT	Central Lab	75	60	4 cyl	4 cyl
			03100	Deformed Steel, Reinforcing	lb.	YES	Accept (Prod)	T244	LMCT	Central Lab	200t	180t	5ft	1.5m
			03504	Anchor Bolts	ea.	YES	Accept (Prod)	TBD	LMCT	Central Lab	quantity		1 per size	
			03711	Ground Rod	ea.	NO	None	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	None		NO	None	NA	Visual	Project Staff			NA	
12.05	Delineators	ea.	03933	Delineator	ea.	NO	None	NA	QPL/MC	Project Staff			NA	
			03952	Sign Post	ea.	YES	Accept(Prod)	TBD	MC	Central Lab	quantity		See Note 1.	
12.07	Sign Face - Extrdd Alum.	s.f.	03938	Sign Face, Sheet Aluminum	s.f.	NO	None	NA	QPL/MC	Project Staff			NA	
12.08	Sign Face - Sheet Alum.	s.f.	03938	Sign Face, Sheet Aluminum	s.f.	NO	None	NA	QPL/MC	Project Staff			NA	
		ea.	03952	Sign Post	ea.	YES	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	None	NA	MC	Project Staff			See Note 5.	
		lb.	00306	Glass Spheres	lb.	NO	None	NA	MC	Project Staff				
12.10	Epoxy Pavmnt, Symb and Lgnds	l.f.	00091	Paint - Epoxy Pvmt Markings	gal	NO	None	NA	MC	Project Staff			See Note 5.	
		s.f.	00306	Glass Spheres	lb.	NO	None	NA	MC	Project Staff				
12.11	Removal of Pvmnt Markings	s.f.	00000	None		NO	None							
12.12	Temp Pvmnt Mrkng Tape	l.f.	00000	None		NO	None							

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Item	X=Not Standard, A=Spec Pro / Title	Unit	Material #	Material Name	Material Unit	MAT 100	Sample Type	Test Method	Test Type	Test Responsibility	Frequency 1 per (E)	Frequency 1 per (M)	Sample Size lbs	Sample Size kg
12.14	Black Mrkng Tape	l.f.	00206	Preformed Black Marking Tape	l.f.	NO	None	NA	MC	Project Staff			NA	
12.15	X Tublr Sign Sup.	ea.	See 06.03 Structural Steel requirements.											
12.16	X Black Epoxy Resin Pvmnt Mrkings Symbls and Lgnds	l.f.	00091	Paint - Epoxy Pvmt Markings	gal	NO	None	NA	MC	Project Staff			See Note 5.	
		s.f.	00091	Paint - Epoxy Pvmt Markings										
12.20	Constr. Signs - Encap. Lens Refl Sheeting	s.f.	03945	Construction Signing	s.f.	NO	None	NA	QPL/MC	Project Staff			NA	
13.00	X Utilities		Utilities Special Provisions			NO	None							
18.01	X Repair Impact Att Sys.		08031	To Be Determined.		TBD								
18.02	Sand Barrels	ea.	04915	Sand (Inertial Barriers)	lbs	NO	None	NA	Visual	Project Staff			See Note 8.	
18.03	Imp Att Sys.	ea.	03970	Impact Attenuator	ea.	NO	None	NA	QPL/MC	Project Staff	quantity		NA	
18.06	Truck Mntd Imp Att Sys.	hr.	03970	Impact Attenuator	ea.	NO	None	NA	MC	Project Staff	quantity		NA	
18.07	Temp Impact Atten Sys.	ea.	00298	Sodium Chloride, Interial Barriers	lb.	NO	None	NA	MC	Project Staff			NA	
			03970	Impact Attenuator	ea.	NO	None	NA	QPL/MC	Project Staff	quantity		NA	
			4700	Sand	c.y.	NO	None	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. Should neither provide direction, contact the Division of Materials Testing for assistance.

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 MC matches information on Project Wise. **CTDOT/Documents/04.1 – Construction Libraries\04.400 – Offices\04.406 - Materials Testing\Pavement Marking Materials**
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 If assistance is needed, 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 Delivery Ticket clearly listing the manufacturer of the bricks and blocks is required. Unfamilair sources should not be used, contact DMT for confirmation.
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	c.y.	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	c.y.	na
		08037X	Recl. Waste (OFFSITE)					
		08039	Embankment Material					
02.07	Borrow	04902	Borrow	Field	Central Lab	50000	c.y.	na
02.12	Subbase	04819	Gravel (Bank Run)	Laboratory	District Lab	50000	c.y.	80 lbs
		08034	Stone (Broken/Crushed)		Central Lab	30000	c.y.	na
		08035	Gravel (Crushed)					
		08036	Recl. Misc. Agg.					
		08036X	Recl. Misc. Agg. (OFFSITE)	Field Density	Central Lab	50000	c.y.	na
03.03	Concrete Base	03015-XXXXX	Concrete-Class PCCXXXYZ	Field	Project Personnel	2500	c.y.	na
03.04	Processed Aggregate Base	04819	Gravel (Bank Run)	Laboratory	District Lab	30000	c.y.	80 lbs
		08034	Stone (Broken/Crushed)		Central Lab	30000	c.y.	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	03015-XXXXX	Concrete Class PCCXXXYZ	Field	Project Personnel	2500	c.y.	4 cyl na
04.06	Bituminous Concrete	04003	Curb Mix	Laboratory	Central Lab	3500	tons	15 kg
		040XX	HMA, Level 1,2,3 (6.25 mm / 0.25 in), (9.5 mm / 0.375 in), (12.5 mm / 0.5 in), (25.0 mm / 1.0 in)					
		040XX	HMA, Level 1,2,3 (6.25 mm / 0.25 in), (9.5 mm / 0.375 in), (12.5 mm / 0.5 in), (25.0 mm / 1.0 in)			40	core	1 core
Structures								
05.06	Retaining Walls, Endwalls and Steps	03015-XXXXX	Concrete-Class PCCXXXYZ	Field	Project Personnel	2500	c.y.	na
06.01	Concrete for Structures	03015-XXXXX	Concrete Class PCCXXXYZ	Field	Project Personnel	2500	c.y.	na

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-212	Acceptance Criteria for Use of Reclaimed Material	
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.

Mat 106 Contact List REV 04/19

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,			
	John Giannini	John.Giannini@ct.gov	258 - 0324
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			
	John Giannini	John.Giannini@ct.gov	258 - 0324
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			
	John Giannini	John Giannini@ct.gov	258 - 0324
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

Contact List_2019.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
MAT111

WELDER'S CERTIFICATION PROGRAM

Rev. 4-19

Requirements for a State of Connecticut Department of Transportation (ConnDOT) Welder Certification Card:

1. New applicants must receive a Welder Qualification Test from an approved Contractor listed on page 2. The State 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 may be revoked.

4. The Welder Certification must be updated by emailing **DOT.WelderCertification@ct.gov** or calling 860-258-0327 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.

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

- Adherence to the requirements stated above
- Please complete contact information below with an attached **current photo** and do **one** of the following:
  a. Mail form and hard copy photo to: 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:

Christopher Carlo
280 West Street
Rocky Hill, CT 06067
Email:
Christpher.Carlo@ct.gov
(860) 258-0334
Fax: (860) 258-0399

Jonathan Boardman
280 West Street
Rocky Hill, CT 06067
Email:
Jonathan.Boardman@ct.gov
(860) 258-0327
Fax: (860) 258-0399

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

MAT112

WELDER'S CALL IN REPORT

Call Received Date: _____ 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 and home.
4. Email address if they have one.

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

MAT112

WELDER'S CALL IN REPORT

Call Received Date: _____ 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 and home (one that we can get a hold of welder)
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

KIND OF MATERIAL	**State of Connecticut** **Department of Transportation** **Bureau of Engineering & Construction** **Inspection Report of Structural Plate and Pipe Arches** **MAT-203**	**Date**	**Project #**
SOURCE OF SUPPLY		**Sample ID #**	
LOCATION OF SOURCE OF SUPPLY			
SAMPLE TAKEN FROM	**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) :** _____		
LOCATION OF			
SAMPLED BY			
DATE SAMPLED			
USING AGENCY			
QUANTITY PRESENTED			
PURPOSE FOR WHICH MATERIAL WILL BE USED			
SAMPLE RECEIVED			
DATE MATERIAL WILL BE USED	**Recommended For**	**Remarks**	
WHERE MATERIAL WILL BE USED			
Division of Materials Testing			

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			

This form is to be completed and signed by both the selected DPH-certified analytical Laboratory and the Contractor. The original laboratory test reports, including chain of custody, must be attached to this form.

Project Number _____ **Contractor** _____

Project Location_____ **Contractor Telephone**_____

_____ **Contractor Email**_____

Laboratory Name_____ **Laboratory Telephone**_____

Section 1

ANALYTICAL LABORATORY TO COMPLETE

Sample containers - Samples received at the laboratory in clean, laboratory-supplied containers, appropriately preserved, and transmitted to the lab under proper "chain-of-custody" protocols. **(check one)** ☐ **Yes** ☐ **No**

Other - Does the sample have an unusual appearance or odor? ☐ **Yes** ☐ **No**

If yes, please describe: _____

_____

Laboratory Certification: I certify that the analytical report provided for sample ID #(s) _____

_____

represents the laboratory analysis of a sample that was received in acceptable condition (clean, appropriate sample container, preservation chemicals per sample protocols, proper temperature, chain of custody maintained, etc.) on_____ (date).

_____

Signature Date

_____

Name (printed) Title

Project Number _____ **Contractor** _____

Project Location_____ **Contractor Telephone**_____

_____ **Contractor Email**_____

Material Source_____ **Source Telephone**_____

Source Address_____ **Source Email**_____

Represented Quantity _____ **Sample Collected by**_____
(name)

Section 2

CONTRACTOR TO COMPLETE

Leachable RCRA metals by SPLP method 1312

List of RCRA Metals	GA Pollutant Mobility Criteria (mg/l)	Result (mg/l)	≤ Specified Limits
Arsenic	0.05		☐ Yes ☐ No
Barium	1.00		☐ Yes ☐ No
Cadmium	0.005		☐ Yes ☐ No
Chromium	0.05		☐ Yes ☐ No
Lead	0.015		☐ Yes ☐ No
Mercury	0.002		☐ Yes ☐ No
Selenium	0.05		☐ Yes ☐ No
Silver	0.036		☐ Yes ☐ No

Total RCRA metals mass analysis by EPA Method 3050 & 6000 or equivalent

List of RCRA Metals	Residential Direct Exposure Criteria (mg/kg)	Result (mg/kg)	≤ Specified Limits
Arsenic	10		☐ Yes ☐ No
Barium	4700		☐ Yes ☐ No
Cadmium	34		☐ Yes ☐ No
Chromium	100		☐ Yes ☐ No
Lead	400		☐ Yes ☐ No
Mercury	20		☐ Yes ☐ No
Selenium	340		☐ Yes ☐ No
Silver	340		☐ Yes ☐ No

Volatile Organic Compounds (VOC) by EPA Method 8260B	**Class GA Pollutant Mobility Criteria (mg/kg)**	**Results (mg/kg)**	**≤ Specified Limits**
Acetone	14		☐ **Yes** ☐ **No**
Acrylonitrile	0.01		☐ **Yes** ☐ **No**
Benzene	0.02		☐ **Yes** ☐ **No**
Bromodichloromethane	0.011		☐ **Yes** ☐ **No**
Bromoform	0.08		☐ **Yes** ☐ **No**
Bromomethane	0.2		☐ **Yes** ☐ **No**
2-Butane (MEK)	8		☐ **Yes** ☐ **No**
n-Butylbenzene	1.4		☐ **Yes** ☐ **No**
sec-Butylbenzene	1.4		☐ **Yes** ☐ **No**
tert-Butylbenzene	1.4		☐ **Yes** ☐ **No**
Carbon Disulfide	14		☐ **Yes** ☐ **No**
Carbon Tertachloride	0.1		☐ **Yes** ☐ **No**
Chlorobenzene	2		☐ **Yes** ☐ **No**
Chloroform	0.12		☐ **Yes** ☐ **No**
Chloromethane	0.054		☐ **Yes** ☐ **No**
Dibromochloromethane	0.01		☐ **Yes** ☐ **No**
1,2-Dibromoethane (EDB)	0.01		☐ **Yes** ☐ **No**
1,2-Dichlorobenzene	3.1		☐ **Yes** ☐ **No**
1,3-Dichlorobenzene	12		☐ **Yes** ☐ **No**
1,4- Dichlorobenzene	1.5		☐ **Yes** ☐ **No**
1,1-Dichloroethane	1.4		☐ **Yes** ☐ **No**
1,2- Dichloroethane	0.02		☐ **Yes** ☐ **No**
1,1-Dichloroethylene	0.14		☐ **Yes** ☐ **No**
cis-1,2- Dichloroethylene	1.4		☐ **Yes** ☐ **No**
trans-1,2- Dichloroethylene	2		☐ **Yes** ☐ **No**
1,2- Dichloropropane	0.1		☐ **Yes** ☐ **No**
1,3- Dichloropropane	0.01		☐ **Yes** ☐ **No**
Ethylbenzene	10.1		☐ **Yes** ☐ **No**
Hexachlorobutadiene	1		☐ **Yes** ☐ **No**
Isopropylbenzene	0.6		☐ **Yes** ☐ **No**
p-Isopropyltoluene	1.4		☐ **Yes** ☐ **No**
MTBE	2		☐ **Yes** ☐ **No**
Methylene Chloride	0.1		☐ **Yes** ☐ **No**
Methyl Isobutyl Ketone (MIBK)	7		☐ **Yes** ☐ **No**
Naphthalene	5.6		☐ **Yes** ☐ **No**
n-Propylbenzene	1.4		☐ **Yes** ☐ **No**
Styrene	2		☐ **Yes** ☐ **No**
1,1,1,2-Tetrachloroethane	0.02		☐ **Yes** ☐ **No**
1,1,2,2-Tetrachloroethane	0.01		☐ **Yes** ☐ **No**
Tetrachloroethylene	0.1		☐ **Yes** ☐ **No**
Toluene	20		☐ **Yes** ☐ **No**
1,2,4,-Trichlorobenzene	1.4		☐ **Yes** ☐ **No**
1,1,1,-Trichloroethane	4		☐ **Yes** ☐ **No**
1,1,2- Trichloroethane	0.1		☐ **Yes** ☐ **No**
Trichloroethylene	0.1		☐ **Yes** ☐ **No**
Trichloroflouromethane	26		☐ **Yes** ☐ **No**
1,2,4-Trimethylbenzene	7		☐ **Yes** ☐ **No**
1,3,5- Trimethylbenzene	7		☐ **Yes** ☐ **No**
Vinyl Chloride	0.04		☐ **Yes** ☐ **No**
Total Xylenes	19.5		☐ **Yes** ☐ **No**

Note: Samples must be analyzed for all substances listed above. When a substance is not detected in the sample, enter **ND**. For substances reported under a different name on the lab report, see instructions below. DOT Environmental Compliance will review the acceptability of any substance detected but not listed above on a case-by-case basis.

For any VOC listed on the lab report as a different name than that above, verify that they are the same compound and the difference is in nomenclature only.

Name on List Above	Name on Lab Report	Same compound?
		☐ **Yes** ☐ **No**
		☐ **Yes** ☐ **No**
		☐ **Yes** ☐ **No**

Asbestos – analysis using California Air Research Board Method 435 Polarized Light Microscopy (CARB 435 PLM)

Result (%)	**< 1%**
	☐ **Yes** ☐ **No**

Polychlorinated Biphenyls (PCB's) - Mass analysis by EPA Method 8082 or equivalent

Residential Direct Exposure Criteria	**Result (mg/kg)**	**≤ 1 mg/kg**
1 mg/kg		☐ **Yes** ☐ **No**

Contractor Certification: I certify that the information provided on this form represents the laboratory analysis of a representative sample of reclaimed material that was collected at the location indicated above and placed in clean, laboratory-supplied sample containers, preserved (as appropriate), and transmitted to the lab under proper "chain-of-custody" protocols in a manner consistent with the prevailing standards and guidelines specified by the Connecticut Department of Energy & Environmental Compliance (CT DEEP) and Connecticut Department of Transportation (CT DOT).

Signature Name (printed) Title Date

Notary Required on this page

RECLAIMED MATERIAL GUIDELINE

ConnDOT Standard Specifications, Section 1.01.01, defines the three types of reclaimed construction materials and requires environmental testing of these materials prior to use or hauling to project sites.

Form MAT-212 (Acceptance Criteria for Use of Reclaimed Material) is to be completed by and signed by both the Contractor and its selected analytical laboratory. The Contractor proposing to utilize the reclaimed material must have material tested by a CT DPH approved analytical testing laboratory.

Section 1 of the Form MAT-212 must be completed and signed by the Contractor's analytical laboratory.

Section 2 of the Form MAT-212 is to be completed by the Contractor. The Contractor must check off (yes) if results exceed specified limits or (no) if results do not exceed specified limits. All analytes must have results included on the form. Incomplete forms will be returned to the contractor.

The contractor must sign and notarize the MAT-212 and submit with the full analytical report.

FOR CONNDOT PROJECTS ONLY:

If all forms are submitted correctly and materials meet the environmental criteria, project personnel can request source testing by forwarding these forms and the applicable Form Mat-100 (Request for Test) to the district laboratory for review.

The laboratory will review the documentation and the Request for Test. Project personnel will be notified if the source of the material has been recommended for acceptance or rejection.

The project personnel can then allow material recommended for acceptance to be brought on to the project site.

Production samples should then be submitted to the Division of Materials Testing for testing according to the minimum sampling frequency.

FOR MUNICIPAL PROJECTS ONLY:

The Form MAT 212 must be reviewed by a competent representative of the municipality to determine if the material is environmentally acceptable. If so, the material must be tested and used in accordance with the project specifications.

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) : _____

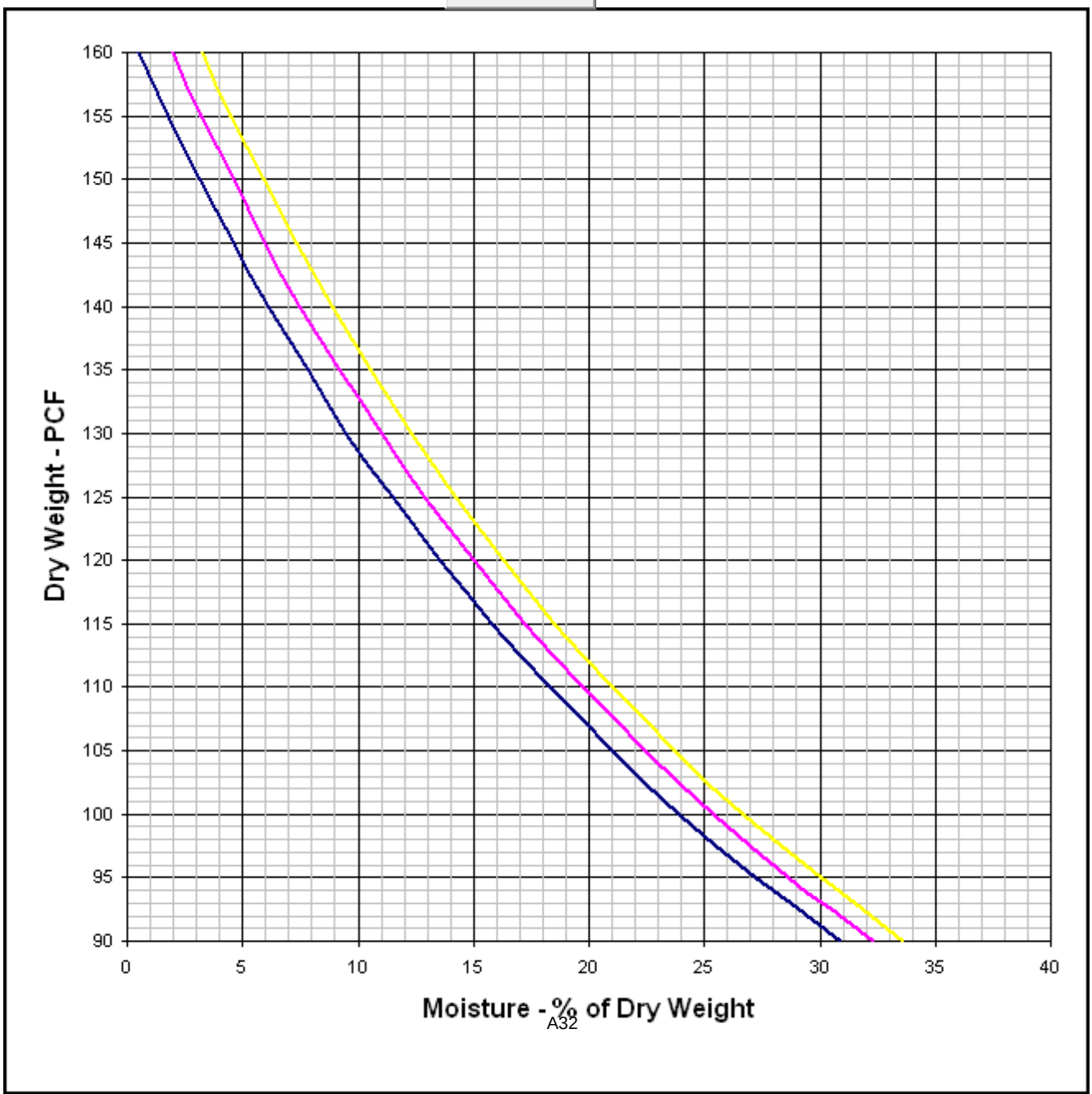
Recommended For	**Remarks**
Information	

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.				

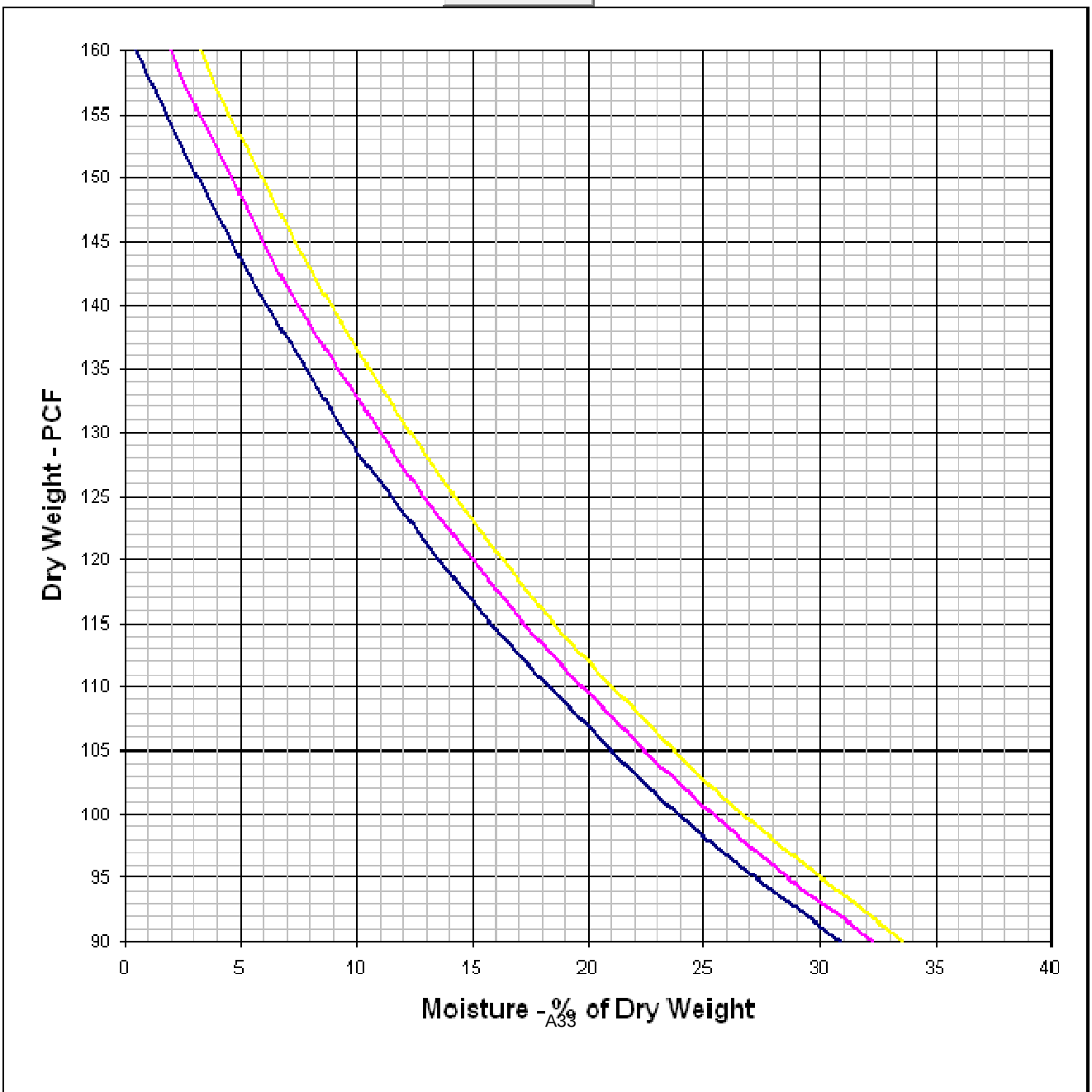
Clear Sheet



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)		RELATIVE YIELD
						27	

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) o	**NOTE: COMPLETED MAT 222 MUST BE ATTACHED TO THIS REPORT**

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) _____ Dry Time (-120 sec) _____ Flexibility (NO Flaws) _____ Color (visual) _____ Weight/Gal. (12.5 +) _____ Lead (-0.06%) _____ Dry Opacity (0.96 +) _____ Pigment (58-63) _____ Nonvolatile (76% +) _____ Scrub Resistance (500+) _____ Flash Point (145°F+) _____ 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

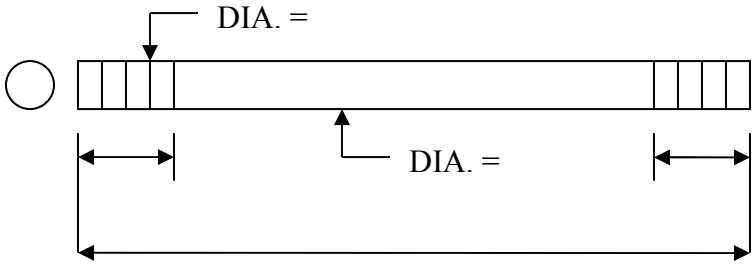
Remarks/Observations:

DMT Tracking Number:
DMT XXXXXXXX

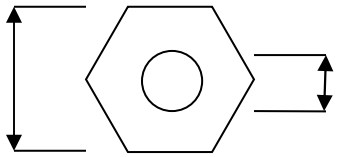
Form Completed By:

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)			



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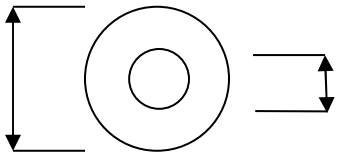


THK. =

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)				

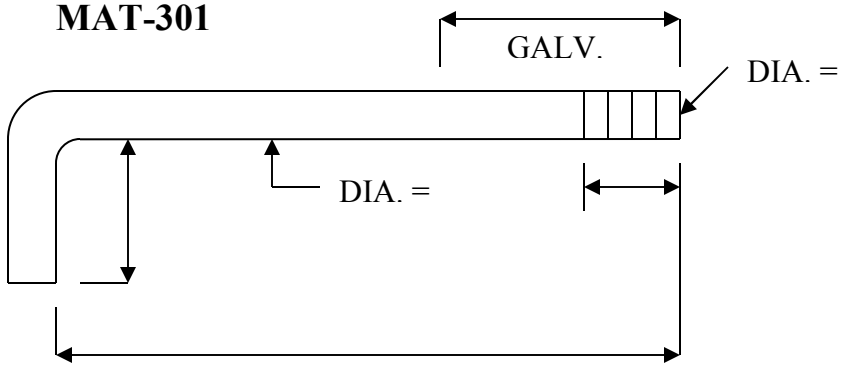
Begin Test	End Test	Tested By

Recommendations

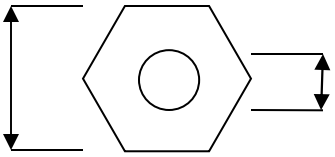
REMARKS

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)			



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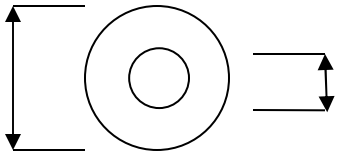


THK. =

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: _____

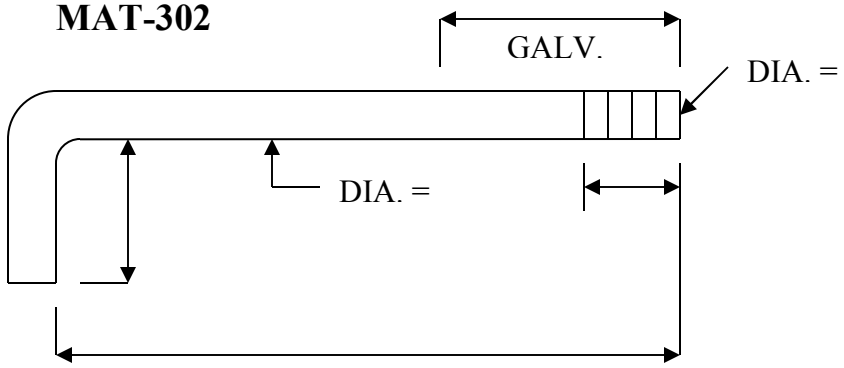
TITLE: _____

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		

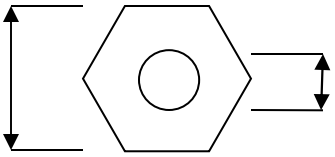
c:\jwh\forms\Anchor Bolt with Hook combo.doc

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)			



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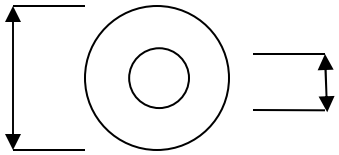


THK. =

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

MAT-308

State of Connecticut - Department of Transportation
Division of Materials Testing - 280 West Street, Rocky Hill, CT 06067
DOT.MATtesting@ct.gov (860)258-0371

REPORT OF TEST ON PORTLAND CEMENT CONCRETE CYLINDERS - MAT-308 Rev 2-14-19

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:**		Date Sampled:	
Material Quantity:***		Item Units:	
Brand of Cement:		Unit:	☐ C.Y. ☐ CU.M (Check one)
Required Strength:		Contractor:	

Field Test Results	Test 1	Test 2	(Required if material fails test 1.)
Air (ASTM C173/C231)			Field Sampling is performed in accordance with
Conc. Temp. (ASTM C1064)			
Slump (ASTM C143)			***ASTM C172***

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

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

Technical Responsibility: Name:_____ **Title:**_____

Signature_____

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 m³) for structures and 50 CY (40 m³) for pavement. It is never the number of cylinders submitted.

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

MAT-308A

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING AND CONSTRUCTION
DIVISION OF MATERIALS TESTING
DAILY CONCRETE CYLINDER DIAMETER LOG

MAT-308A

Year 20__ Month	Cylinder Diameters (inches)				Rev. 12-14-18 Measured
Day	**#1**	**#2**	**#3**	**AVERAGE**	By:
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)] x 62.4
Oven Dry Density (D), kg/m^3 = [W_d/(W_s-W_i)] x 1000
Absorption, lb/ft^3 = [(W_s-W_d)/(W_s-W_i)] x 62.4
Absorption, kg/m^3 = [(W_s-W_d)/(W_s-W_i)] x 1000
Net Volume (V_n), ft^3 or mm^3 = W_d/D
Average Net Area (A_n), in^2 = (V_n x 1728)/H
Average Net Area (A_n), mm^2 = V_n/H

PROJECT NUMBER:	**MAT-309** STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION DIVISION OF MATERIALS TESTING REPORT OF TEST: MASONRY CONCRETE UNITS/BRICK	PROCESSING DATE	MATERIAL CODE
SAMPLE NUMBER:		LABORATORY NO.	

	#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

	#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 (%)								

SPECIFICATION REFERENCE

___ STANDARD SPECIFICATION

___ SUPPLEMENTAL SPECIFICATION

___ PROJECT SPECIAL PROVISION

___ OTHER

PERSON ACCEPTING TECHNICAL RESPONSIBILITY

NAME: _____

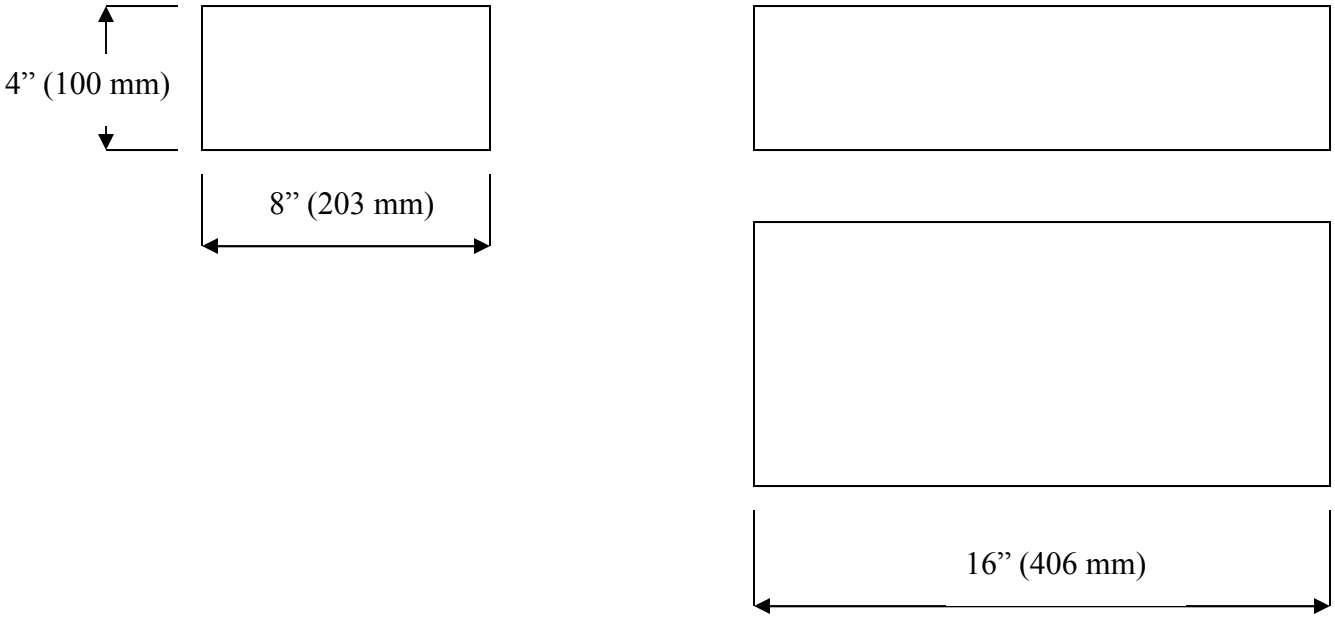
TITLE: _____

BEGIN DATE	END DATE	TESTED BY	REMARKS

RECOMMENDATION

DIVISION CHIEF – MATERIALS TESTING

MAT-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.	

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

PERSON ACCEPTING
TECHNICAL RESPONSIBILITY
NAME : _____
TITLE: _____

	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

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 _____

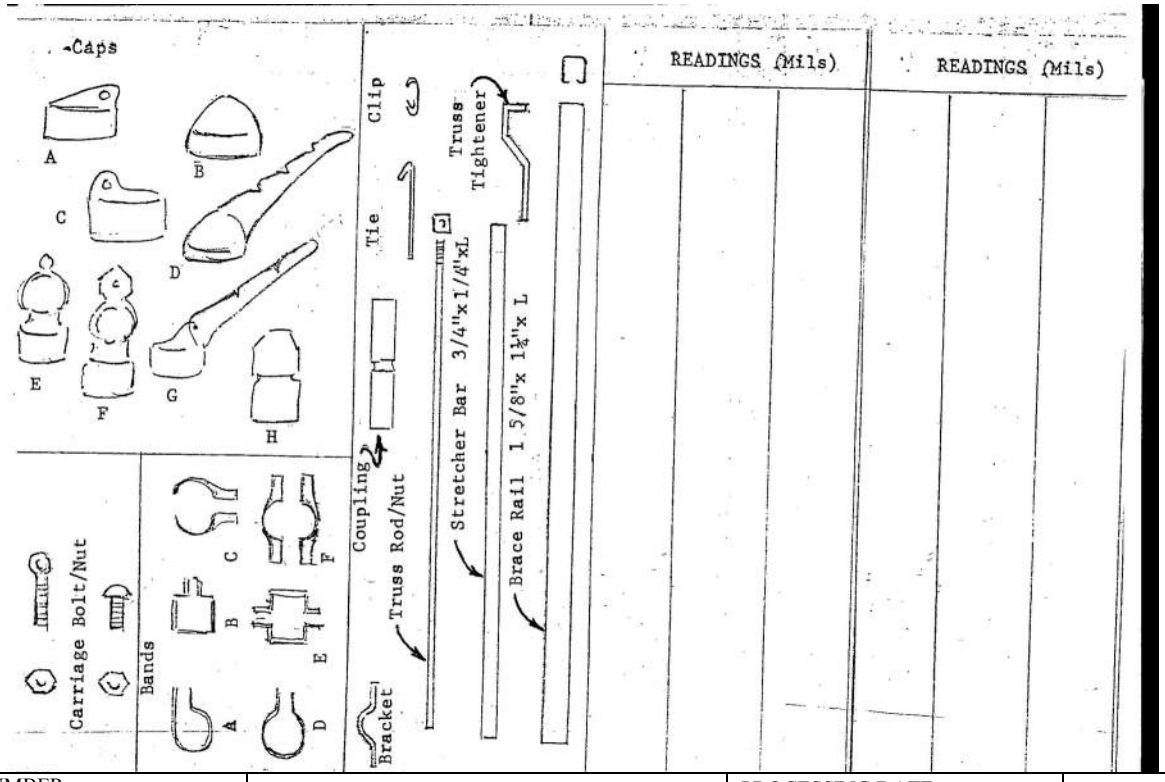
Foreign Steel Onsite _____

ADMIXTURES

Manufacturers of Admixtures

Name	Type

Q.C. PLAN DEFICIENCIES



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 : _____

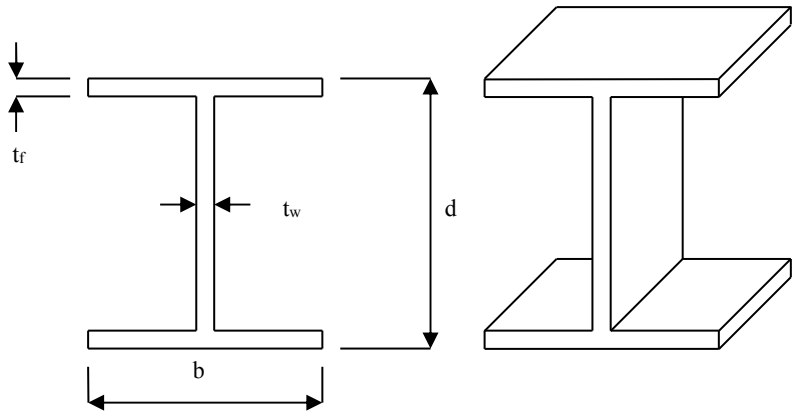
TITLE: _____

	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:

SAMPLE NUMBER:

MAT-328
STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING
REPORT OF TEST:
DEFORMED STEEL WIRE FOR CONCRETE REINFORCEMENT

PROCESSING DATE

LABORATORY NO.

MATERIAL CODE
3145

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				
Unit Wt. (lb/ft)				
Nom. Area (in^2)		—		—
Load (lbf)		—		—
T.S. (psi)				
Condition		—		—

BEGIN DATE	END DATE	TESTED BY	REMARKS

RECOMMENDATION

DIVISION CHIEF – MATERIALS TESTING

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:
Tank Number:
Sample Received:
Remarks:

Mass per Gallon

M_e, mass in measure at 77 °F g
D_e, density of the emulsififed asphalt, lb/gal at 77 °F
D_e, density of the emulsififed asphalt, lb/gal at 60 °F

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					
Emulsified Asphalt weight (49 - 51 g)					
M_{brr} Beaker + Rod + Screen (if used) + residue, g					
Residue, %					
Residue by Evaporation, %					*

* Requirement for residue by distillation: For grades 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*

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING

FORM 404 (REV 1-29-07) Check List for Bituminous Concrete Plants (Batch Type) Page 1 of 7

Plant: _____ **Location** _____

Inspected By: _____ **Date:** _____

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

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”	

TYPE	SOURCE OF SUPPLY	TYPE	SOURCE OF SUPPLY
☐ Natural Sand		☐ Stone Sand	
☐		☐	
☐		☐	
☐		☐	
☐		☐	
☐		☐	
☐		☐	

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING

FORM 404 (REV 1-29-07) Check List for Bituminous Concrete Plants (Batch Type) Page 2 of 7

TYPE	SOURCE OF SUPPLY	TYPE	SOURCE OF SUPPLY
☐ Screenings		☐ Other	
☐		☐	
☐		☐	
☐		☐	
☐		☐	
☐		☐	
☐		☐	

Cold Bins:

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

Dust Return:

Method of Introduction:

- ☐ **Pneumatic**
- ☐ **Screwed**
- ☐ **Separate Bin**

Bag House Options:

- ☐ **Reversible Screw**
- ☐ **Knockout Box**
- ☐ **Other**

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING

FORM 404 (REV 1-29-07) Check List for Bituminous Concrete Plants (Batch Type) Page 3 of 7

Hot Bins:

- ☐ **Number of compartments (minimum of 3 required)**
- ☐ **Overflow pipes**
- ☐ **Snug fitting gate**

Asphalt Delivery System:

- ☐ **Spray Bar Pressure System**
- ☐ **Spray Bar Gravity Fed System**
- ☐ **Measures accurately to within +/-0.1% of the total batch**
- ☐ **Delivers asphalt cement in thin, uniform sheet full width of the mixer**

Hot 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.**

Number of storage tanks on site _____

Tank Inventory:	Tank Number:	Tank Capacity:	Type of Asphalt:

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING

FORM 404 (REV 1-29-07) Check List for Bituminous Concrete Plants (Batch Type) Page 4 of 7

Tickets:

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

1) ☐ State of Connecticut printed on ticket
2) ☐ Name of producer, and identification of plant or specific storage bin, if used
3) ☐ Date and time of day
4) ☐ Individual bin high/target/low batch weights marked with an * asterisk
5) ☐ Type of material* (including RAP (dry weight) percentage and moisture content, if used)
6) ☐ Net weight of material
7) ☐ Gross weight or tare weight of truck
8) ☐ Project number, purchase order number, name of contractor (if contractor other than producer), whichever applies
9) ☐ Truck number for positive identification of truck

***NOTE: Class 3 mixture to be used for machine-placed curbing must be shown on the ticket as "curb Mix only."**

Items 1 to 9 must be printed on the ticked. The time of day may be printed by a separate time clock.

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING

The State reserves the right to have a weigh man at the scales to monitor the weighing of trucks.

Plant Scales:

In addition to complying with the above requirements, the weighing equipment shall be constructed with the necessary adjustable devices that will permit any part thereof that gets out of alignment or adjustment to be easily readjusted so that the weighing device will function properly. Scales will be checked and sealed by the Weights and Measures Division at least annually and more often if deemed necessary in to insure their accuracy.

Seal Dates:

Plant: _____

Truck: _____

Storage Bin(s): _____

☐ **Copy of Printout(s) (Plant and Truck)** _____

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

FORM 404 (REV 1-29-07) Check List for Bituminous Concrete Plants (Batch Type) Page 6 of 7

Automation and Recordation of Bituminous Concrete Plant:

The plant shall be equipped with an automated weighing, cycling, and monitoring system approved by the Division Chief, and installed as part of the batching equipment with displays located in full view of the operator.

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**

Tolerance controls shall be automatically or manually adjustable to provide for spans suitable for less than full size of batches.

Recording equipment shall monitor the batching sequence of each component of the mixture and produce a printed record of these operations on each truck ticket in accordance with Sub article 4.06.03-2 and as specified herein. For each day's production, each D.O.T. project shall be provided a clear, legible copy of the recording. Provision will be made so that scales may not be manually manipulated during the printing process. In addition, the system shall be interlocked to allow printing only when the scale has come to a complete rest.

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

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

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING

FORM 404 (REV 1-29-07) Check List for Bituminous Concrete Plants (Batch Type) Page 7 of 7

Hot Storage Silos:

Number of Silos: _____.

☐ **Heated**

Type of Heat:

☐ **Cone Hot Oil**
☐ **Cone Electric**

☐ **Unheated**

Silo Capacity:

Silo Number	Capacity	Silo Number	Capacity

Brand/Manufacture: _____

Brand/Manufacture: _____

Brand/Manufacture: _____

Brand/Manufacture: _____

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

Please note any variations in specifications below:

_____

_____

_____

_____

_____

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING

FORM 405 (REV 1-29-07) Check List for Bituminous Concrete Plants (Drum Type) Page 1 of 7

Plant: _____ **Location** _____

Inspected By: _____ **Date:** _____

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

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”	

TYPE	SOURCE OF SUPPLY	TYPE	SOURCE OF SUPPLY
☐ Natural Sand		☐ Stone Sand	
☐		☐	
☐		☐	
☐		☐	
☐		☐	
☐		☐	
☐		☐	

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING

FORM 405 (REV 1-29-07) Check List for Bituminous Concrete Plants (Drum Type) Page 2 of 7

TYPE	SOURCE OF SUPPLY	TYPE	SOURCE OF SUPPLY
☐ Screenings		☐ Other	
☐		☐	
☐		☐	
☐		☐	
☐		☐	
☐		☐	
☐		☐	

Mineral Filler

- ☐ Separate Bin
- ☐ Delivery System accurate to 0.1% of total weight of bituminous mixture
- ☐ 5-second interrupt interlock

Aggregate Weighing:

- ☐ Continuous weighing device
- ☐ Individual Feeders (belt type)
- ☐ 5-second interrupt device
- ☐ Moisture compensating device
- ☐ Means for diverting aggregate prior to entry into drum
- ☐ Belt scale accurate to +/-1/2 of 1% (verified by plant records)

Dust Return Type: ☐ Pneumatic ☐ Screw conveyer

Bitumen Delivery System:

- ☐ Accurate to 0.1% based on total weight of mixture
- ☐ Presetting actual Bitumen content directly as a percentage/per total mixture weight
- ☐ Interlock to halt production within 5 seconds if Bitumen flow is interrupted
- ☐ Temperature compensating device to correct quantity of asphalt to 60F (16C)
- ☐ Recordation of Proportions. The plant shall be quipped with an automatic digital recording device approved by the Division Chief, that simultaneously records the weight of each aggregate, mineral filler if added separately and bitumen a 5-minute intervals during production time and on demand. The recordation shall include the actual bitumen quantity as a percentage of the total weight. The maximum resolution shall be 0.1 tons for dry aggregate, 0.01 tons for mineral filler if added separately, 0.01 tons for bitumen and 0.1% for bitumen content.

FORM 405 (REV 1-29-07) Check List for Bituminous Concrete Plants (Drum Type)

All recording shall show the date, including day, month, and year, and time to the nearest minute for each print. For each day's production, each DOT project(s) shall be provided with a clear and legible copy of the recording.

Mixing Plant and Machinery:

- ☐ **A capacity of at least 125 tons (115 metric tons) per hour**
- ☐ **A minimum of four (4) cold-feed storage bins**
- ☐ **RAP capability, per specifications**
- ☐ **Scalping screens or other devices installed in the cold feed system to remove any debris or other foreign material in excess of 4 inches (100 mm). (Individual bins shall be labeled for the aggregate sizes being used.)**
- ☐ **Flights in drum checked and found in satisfactory condition.**
- ☐ **The plant shall have at hand the required number of 50-lb. (22.7 kg) test weights for frequent testing off all scales.**
- ☐ **Provisions shall be made at the drum outlet so that the pyrometer reading may be checked by means of an armored thermometer**

Bag House Options:

- ☐ **Reversible Screw**
- ☐ **Knockout Box**
- ☐ **Other**

FORM 405 (REV 1-29-07) Check List for Bituminous Concrete Plants (Drum Type)

Hot 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.**

Number of storage tanks on site _____

Tank Inventory:	Tank Number:	Tank Capacity:	Type of Asphalt:

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING

FORM 405 (REV 1-29-07) Check List for Bituminous Concrete Plants (Drum Type) Page 5 of 7

Tickets:

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

1) ☐ State of Connecticut printed on ticket
2) ☐ Name of producer, and identification of plant or specific storage bin, if used
3) ☐ Date and time of day
4) ☐ Individual bin high/target/low batch weights marked with an * asterisk
5) ☐ Type of material* (including RAP (dry weight) percentage and moisture content, if used)
6) ☐ Net weight of material
7) ☐ Gross weight or tare weight of truck
8) ☐ Project number, purchase order number, name of contractor (if contractor other than producer), whichever applies
9) ☐ Truck number for positive identification of truck

***NOTE: Class 3 mixture to be used for machine-placed curbing must be shown on the ticket as "curb Mix only."**

Items 1 to 9 must be printed on the ticked. The time of day may be printed by a separate time clock.

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING

FORM 405 (REV 1-29-07) Check List for Bituminous Concrete Plants (Drum Type) Page 6 of 7

The State reserves the right to have a weigh man at the scales to monitor the weighing of trucks.

Plant Scales:

In addition to complying with the above requirements, the weighing equipment shall be constructed with the necessary adjustable devices that will permit any part thereof that gets out of alignment or adjustment to be easily readjusted so that the weighing device will function properly. Scales will be checked and sealed by the Weights and Measures Division at least annually and more often if deemed necessary in to insure their accuracy.

Seal Dates: **Plant:** _____

Truck: _____

Storage Bin(s): _____

☐ **Copy of Printout(s) (Plant and Truck)** _____

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

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING

FORM 405 (REV 1-29-07) Check List for Bituminous Concrete Plants (Drum Type) Page 7 of 7

Hot Storage Silos:

Number of Silos: _____.

☐ **Heated**

Type of Heat:

☐ **Cone Hot Oil**
☐ **Cone Electric**

☐ **Unheated**

Silo Capacity:

Silo Number	Capacity	Silo Number	Capacity

Brand/Manufacture:

Brand/Manufacture: _____

Brand/Manufacture: _____

Brand/Manufacture: _____

_____

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

Please note any variations in specifications below:

_____

_____

_____

_____

_____

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING

Plant: _____ **Inspection Date:** _____

Site: _____ **Inspector(s):** _____

Contractor Representative:

FIELD LABORATORY REQUIREMENTS

At all points during the production season this lab will comply with all requirements.

GENERAL:

1. **A field laboratory that is equipped for performing required tests shall be provided at each mixing plant for the use of the State's inspectors at no expense to the State.**

2. **The Contractor shall ensure that the State's inspectors are given priority in the use of the field laboratory.**

3. **The field laboratory shall be approved by the Division Chief of Materials.**

4. **The field laboratory shall:**

   ☐ **a. be a separate building or a separate room and shall have a minimum floor space of 300 ft^2 minimum floor space and 20 ft^2 of counter space. for laboratories constructed after January 1, 1991] with the least dimension to be 6 ft (1.8 m)**

   ☐ **b. has windows installed that allow for sufficient light and ventilation**

   ☐ **c. has a source of fresh air from a door and/or from windows that open**

   ☐ **d. have an exhaust fan located directly behind and within 2 ft (0.6 m) of both extractor and drying source, and 12m. (304 mm) from top of workbench and shall not adversely effect the room temperature**

   ☐ **f. has a telephone available within the testing laboratory.**

   ☐ **g. be equipped with a suitable heating and air conditioning cooling system able to maintain the temperature between 65ºF and 80ºF(18ºC to 27ºC)**

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

EQUIPMENT:

The field laboratory shall be equipped with the following:

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

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

☐ **3. 1000 ml unbreakable wash bottle or flask.**

MIX PLANT FIELD LABORATORY – APPARATUS INSPECTION SHEET (continued)

☐ **4. Two, 6 in. (152 mm) spatulas, heavy enough to rod molds without bending**

☐ **5. Two Thermometer50ºF to 450ºF (10ºC to 230ºC)**

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

☐ **For Superpave laboratories, 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. *****

☐ **For Superpave laboratories, Water bath: Shall be capable of maintaining constant temperature and constant suitable water level.**

☐ **For Superpave laboratories, Manometer and Residual Pressure Manometer. Two (2) Meeting contract requirements and NIST traceable per ASSHTO T-209 (6.4-5). *** (Mercury Manometers not allowed for use).**

☐ **For Superpave laboratories, Superpave Gyratory Compactor: capable of providing a consolidation pressure of 600 ± 18 kPa, an angle of gyration of 1.25±0.02 degrees, and a speed of gyration of 30 ± 0.5 rpm. Gyratory shall be directly connected to printer.**

☐ **For Superpave laboratories, Three (3) cylindrical molds: large enough to accommodate the following specimen requirements: 150 mm diameter, 150 mm maximum heights, and 90 mm minimum height.**

☐ **For Superpave laboratories, Extrusion jack or arbor press: capable of extruding compacted specimens from molds without distortion or damage.**

EQUIPMENT: Continued

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

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

☐ **For Superpave laboratories, The field laboratory shall include a PC, printer and dedicated phone line and modem (phone is able to be used while modem is connected to server) suitable to run software and perform all necessary computations, as directed by the Division Chief. This equipment shall be maintained in good working order and be made available for use by State inspectors.**

☐ **For Superpave laboratories, The field laboratory shall have potable source (with documentation stating the sources potability) and drainage for use with testing equipment.**

☐ **6. Putty knife or scraper**

☐ **7. Trowel or similar tool to quarter samples**

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

☐ **9. Scoop: large enough to scoop a 1200 g sample**

☐ **10. Heavy (Kraft) wrapping paper: 36 in. (915 mm) minimum width**

☐ **11. Long-handled, pointed shovel**

☐ **12. Six metal pie plates: 10 in. (250 mm) minimum diameter**

☐ **13. Five, 3 gal (12L) sample buckets. Eight, 3 gal (12L) sample buckets for Superpave Labs only. *****

EQUIPMENT: Continued

☐ **14. Sample splitter suitable to split aggregate samples and sand, through and including No. 4 aggregate**

☐ **15. Fire extinguisher: for electrical or chemical fires, effective on all solvents used in the laboratory**
Date refilled or checked (within one year)_____

☐ **16. Hot plate and infrared lamp of suitable wattage, or a vented drying oven for drying samples**

- ☐ **a. Type (describe) _____**
- ☐ **b. Placed within 2 ft (0.6 m) of exhaust fan**
- ☐ **c. Vented to the outside (if oven)**

☐ **17. Oven**

- ☐ **a. Thermostatically controlled so as to maintain temperature within ± 5ºF (3ºC)**
- ☐ **b. Temperature range of 104ºF to 395º (40ºC to 200ºC)**
- ☐ **c. 12 Cu. ft forced draft oven capable of being controlled to ±3ºC as a minimum of 104ºC to 395ºC (40ºCto200ºC) for Superpave Labs and an inside dimension shall be at least 17 in W x 12 in. D x 17 in. H (432 mm/304 mm/432 mm) for Marshal Laboratories.**

MIX PLANT FIELD LABORATORY – APPARATUS INSPECTION SHEET

☐ **18. A suitable non-chlorinated solvent that has been approved by the Division Chief (Some non chlorinated solvents may require additional equipment or supplies, which shall be the responsibility of the Contractor. These may include a potable water source, a revised disposal method and other items deemed necessary for the particular solvent used.**

☐ **a. Brand**

☐ **a. Brand Name: _____**

☐ **b. Solvent to be located at a reasonable distance from the laboratory –not to exceed 75 ft (25m)**

☐ **c. Materials Safety Data Sheet to be posted in the field laboratory.***

***A statement from the Department of Environmental Protection, Water Compliance Unit, reads: Discharge of solvents into the surface or ground waters is not an acceptable method for disposal. This waste should be collected in a sealed, quality container free of leaks and held on site in a dry location for adequate disposal through a licensed waste hauler. Ground and surface water discharge require a permit under the provisions of the Connecticut General Statutes.)**

☐ **19. Centrifugal Extractor. (May be waved if ignition oven is used). *****

☐ **a. Sufficient amount of filter rings and filter paper on hand**

☐ **b. Rings and paper are at least the outside diameter of the extractor bowl**

☐ **c. Solvent disposal from the extractor is piped directly to the outside into a closed container contained in a larger containment area or container.**

MIX PLANT FIELD LABORATORY – APPARATUS INSPECTION SHEET (continued)

☐ **20. Ignition Oven:**

Date Scale last calibrated_____

Brand. _____

☐ **21. Truck Body Release Agent:**

☐ **Brand Name: _____**

☐ **22. Sieve Shaker**

☐ **a. Motorized shaker having a horizontal sieving motion and a tapping action (or one of equal performance as determined by the Division Chief)**

☐ **b. Equipped with an automatic 0 to 30 minute timer capable of turning off the shaker after a predetermined 0 to 30 minute time period**

☐ **c. Brand Name: _____**

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

☐ **e. Sieve retaining & Hold-down** ☐ **Good** ☐ **Fair** ☐ **Unacceptable**

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

☐ **g. Timer accuracy:** ☐ **Acceptable** ☐ **Unacceptable**

MIX PLANT FIELD LABORATORY – APPARATUS INSPECTION SHEET (continued

23. Sieves: Set of U.S. Standard ☐ 8 in. (200 mm) minimum for Marshal laboratories and ☐ 12 in. (300 mm) sieves minimum for Superpave Laboratories ; minimum of one each of the following:

- ☐ 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)
- ☐ 11/2" (37.5 mm)
- ☐ 2" (50mm)

☐ **24. Electronic Balances**

☐ **a. For Superpave laboratories, one 20kg. (42 lbs) capacity scale, with sufficient sensitivity to read to ± 0.1 grams. For the bowl determination method the balance 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.**

☐ **a. For Marshal laboratories, 1500g capacity; 1 g sensitivity**

☐ **b. Type: _____**

☐ **b. Type: _____**

☐ **c. Brand Name: _____**

☐ **c. Brand Name: _____**

MIX PLANT FIELD LABORATORY – APPARATUS INSPECTION SHEET (continued

☐ **25. Workbench: Adequate in Size**

☐ **26. Sampling table: Adequate size for quartering samples and cooling theoretical gravities 36 in. x 36 in. (914 mm x 914 mm)**

☐ **27. Marshall Mold Block**

- ☐ **a. Wood block dimensions: 8 in. x 8 in. x 18 in. (203 mm x 203 mm x 457 mm)**
- ☐ **b. Steel Plate dimension: 12 in. x 12 in. x 1 in. (304 mm x 304 mm x 25 mm)**
- ☐ **c. Steel plate to be plum and level**
- ☐ **d. Block to be firmly attached to a concrete slab or floor**

☐ **28. Mechanical Marshall Hammer**

- ☐ **a. Automatically compacts sample and shuts off motor after desired number of strokes**
- ☐ **b. Trip hammer falls the same distance for every stroke**
- ☐ **c. Spring-loaded clamp ring to hold molds in position for easy insertion and removal from compactor**

☐ **29. Marshall Molds**

- ☐ **a. Two-mold cylinders, one base plate, one extension collar, one mechanical mold extractor**
- ☐ **b. A sufficient amount of 4 in. (102 min) paper disks**
- ☐ **c. Molds, upper collar and base plate fit together freely**

MIX PLANT FIELD LABORATORY – APPARATUS INSPECTION SHEET (continued

☐ **30. Sampling Platform or Catwalk (FORM 415)***

☐ **a. Safe and adequate with step access and railing to accommodate the inspector. *If two mixing plants, one platform may be used for both plants, Platform must be as close to the laboratory as traffic patterns allow.**

☐ **b. Located a safe distance from plant and a maximum of 75 ft (25 m) from the laboratory entrance. , Platform must be as close to the laboratory as traffic patterns allow.**

☐ **c. Located so that plant traffic flow is not impeded.**

☐ **d. Height of platform adequate to sample any size truck**

☐ **e. Platform permanently anchored and wobble free**

☐ **f. Sampling Platform structure: no visible weak or rotted materials**

☐ **g. General Condition:** ☐ **Acceptable** ☐ **Unacceptable**

☐ **h. Sufficient lighting for night work – Describe:**

Plant: _____ **Location** _____

Inspected By: _____ **Date:** _____

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

Item	Deficiency
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Please make the necessary corrections as soon as possible.

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

_____

Inspector
Connecticut Department of Transportation
Division of Materials Testing

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

MAT-429s rev 12/16

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**	

Quality Control Plan for Fine Aggregates used in HMA
QCPFA

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 used in HMA
QCPFA

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 used in HMA
QCPFA

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 meet 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 used in HMA
QCPFA

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 used in HMA
QCPFA

4. Stockpiling	
A. Stockpiles	
1. Describe the height, 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 used in HMA
QCPFA

4. Stockpiling continued	
A. Stockpiles	
5. Describe how the stockpiles will be monitored for non-uniformity and contamination:	
a. 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 used in HMA
QCPFA

4. Stockpiling continued	
A. Stockpiles cont.	
8. 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	

Quality Control Plan for Fine Aggregates used in HMA
QCPFA

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

MAT429s USE PDF

MAT 429ut USE PDF

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING

FORM 433(REV 1-29-07) Ignition Oven Correction Factor Work Sheet Page 1 of 1

Plant: _____ **Location** _____

State Inspector: _____ **Date:** _____

Contractor's Rep: _____

All Aggregates Should Be Burned At 538° C For 45 Minutes Each (If Material or Equipment Is Unable To Comply With This Process Revert To AASHTO T 308-05)

Material	Minimum Sample Size	Maximum Sample Size	Source	Correction Factors
1 ¼" **	4000 grams	4500 grams		
1"	3000 grams	3500 grams		
3/4"	2000 grams	2500 grams		
1/2"	1500 grams	2000 grams		
3/8"	1200 grams	1700 grams		
1/4"	1200 grams	1700 grams		
Stone Sand	1200 grams	1700 grams		
Blended Sand	1200 grams	1700 grams		
Natural Sand "A"	1200 grams	1700 grams		
Natural Sand "B"	1200 grams	1700 grams		
Rap	1200 grams	1700 grams		
Other				

Specimen size shall not exceed 500 grams greater than the minimum sample size

**** For ovens with a max sample size of 4,000 grams use 3,500 grams for 1 ¼" ****

In Accordance With: AASHTO T 308-05(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:	Matt Garretson
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: Matt Garretson
Checked by:

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

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]
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.

Legend			
Material Code:	Coding used in SiteManager	**Unit (Eng):**	English unit of material that defines a quantity
Material - Full Name:	The full detail description of a material		
Status:	Type of Acceptance required A: A request for test (Mat100) B: An alternative method for Acceptance (see Minimum Schedule for Acceptance Testing)		
Section:	Section responsibility within the Divison of Materials Testing for material		
	1: District 1 Rocky Hill 2: District 2 Colchester 3: District 3 New Haven 4: District 4 Thomaston 5: Chemical 6: Hot Mix Asphalt		7: Asphalt Binder 9: Physical Testing 10: Precast Concrete 11: Certifications 15: Structural Steel 17: Road Salts

MATERIAL CODES	MATERIAL - FULL NAME	UNIT (ENG)	STATUS	SECTION
00000	NO REQUEST FOR TEST REQUIRED	NONE	B	11
00031	Paint - Prime Coat for Struct. Steel	gal	B	15
00032	Paint - Interm. Coat for Struct. Steel	gal	B	15
00033	Paint - Top Coat For Struct. Steel	gal	B	15
00039	Paint - For Field Touchup	gal	B	15
00054	Paint - Waterborne Pvmt Mark (15 Min)	gal	B	5
00060	Paint - Waterborne Pvmt. Mark (3 Min)	gal	B	5
00091	Paint - Epoxy Pavement Markings	gal	B	5
00097	Sand Blast Debris (Toxicity Test)	TEST	B	5
00206	Preformed Black Marking Tape	l.f.	B	5
00297	Calcium Chloride - Liquid	gal	B	17
00298	Sodium Chloride, Inertial Barriers	lb.	B	5
00302	Calcium Chloride	ton	B	5
00303	Sodium Chloride	ton	A	17
00306	Glass Spheres	lb.	B	5
00310	Pavement Marking, Plastic, Preformed.	l.f.	B	5
00327	Water	gal	B	5
00327P	Water - Plantings	gal	B	5
00328	Protective Coating	s.f.	B	11
00496	Fertilizer	lb.	B	5
00497	Seed	lb.	B	5
00510	Peat	c.y.	B	5
00518	Sod	s.y.	B	5
00533	Lime	lb.	B	5
00534	Mulch - All Types	lb.	B	5
00536	Plant Materials	ea.	B	5
00542	Topsoil (from project)	c.y.	B	5
00542X	Topsoil (OFFSITE)	c.y.	A	5
00542P	Topsoil - Plantings	c.y.	B	5
00699	Pipe - R.C. & Fittings & Acc.	l.f.	A	10

MATERIAL CODES	MATERIAL - FULL NAME	UNIT (ENG)	STATUS	SECTION
00800	Box Culvert, Precast Concrete, 3 sided	l.f.	A	10
00804	Box Culvert, Precast Concrete	l.f.	A	10
00823	Culvert End - Reinforced Concrete	ea.	A	10
00865	Concrete Barrier, Precast, Temporary	l.f.	B	10
00895	Concrete Barrier, Precast	l.f.	A	10
01422	Concrete Section, Precast	ea.	A	10
01432	Foundation (precast)	ea.	A	10
01435	Anchor, Precast	ea.	A	10
01440A	Catch Basin - Precast (Complete)	ea.	A	10
01441A	Manhole - Precast (Complete)	ea.	A	10
01444	Catch Basin Riser, Precast	ea.	A	10
01458	Catch Basin Sump, Precast	ea.	A	10
01462	Handhole & Cover, Precast	ea.	A	10
01467	Slab, Precast	ea.	A	10
01491	Manhole - Riser (precast)	ea.	A	10
01499	Manhole - Base (precast)	ea.	A	10
01511	Curb, Precast	l.f.	A	10
01649	Catch Basin Top, Frame & Grate	ea.	A	10
01708	Pipe - For Underdrain or Outlet	l.f.	A	11
01783	Pipe - Aluminum & Fittings & Acc.	l.f.	B	11
01807	Culvert End - Aluminum	ea.	B	11
01839	Bolt / Nut / Washer	ea.	A	9
01940	Pipe - CCM & Fittings & Acc.	l.f.	A	1
01977	Pipe - ACCM & Fittings & Acc.	l.f.	A	1
02018	Culvert End - Coated Metal	ea.	A	1
02110	Pipe - Cast Iron & Fittings & Acc.	l.f.	A	15
02449	Pipe - Copper & Fittings & Acc.	l.f.	B	11
02501	Pipe - Ductile Iron & Fittings & Acc.	l.f.	A	15
02600	Pipe - Polyethylene & Fittings & Acc.	l.f.	B	11
02649	Pipe - PVC & Fittings & Acc.	l.f.	B	11
02673	Culvert End - Polyethylene	ea.	B	11
02724	Pipe - Steel & Fittings & Acc.	l.f.	A	15
02731	Pipe - Fiberglass & Fittings & Acc.	l.f.	B	11
02995	Dowel Splice System, Epoxy Coated	ea.	A	9
02996	Dowel Splice System, Galvanized	ea.	A	9
02997	Dowel Splice System	ea.	A	9
02998	Deformed Steel Bars, Epoxy Coated	lb.	A	9
03014-A-3.3K	Concrete-Class A (3300psi/22.8MPa)	c.y.	A	9
03014-C-3.3K	Concrete-Class C (3300psi/22.8MPa)	c.y.	A	9
03014-F-4.4K	Concrete-Class F (4400psi/30.4MPa)	c.y.	A	9
03014-SP2500	Concrete-Spec. Prov. (2500psi/18MPa)	c.y.	A	9
03014-SP3.3K	Concrete-Spec. Prov. (3300psi/23MPa)	CY	A	9
03014-SP3K	Concrete-Spec. Prov. (3000psi/21MPa)	c.y.	A	9
03014-SP4.4K	Concrete-Spec. Prov. (4400psi/30MPa)	CY	A	9
03014-SP4500	Concrete-Spec. Prov. (4500psi/31MPa)	c.y.	A	9
03014-SP4K	Concrete-Spec. Prov. (4000psi/28MPa)	c.y.	A	9

MATERIAL CODES	MATERIAL - FULL NAME	UNIT (ENG)	STATUS	SECTION
03014-SP5.7K	Concrete-Spec. Prov. (5656psi/39MPa)	c.y.	A	9
03014-SP5K	Concrete-Spec. Prov. (5000psi/35MPa)	c.y.	A	9
03014-SP6.5K	Concrete-Spec. Prov. (6527psi/45MPa)	CY	A	9
03014-SP6K	Concrete-Spec. Prov. (6000psi/41MPa)	c.y.	A	9
03014-SP8K	Concrete-Spec. Prov. (8000psi/55MPa)	c.y.	A	9
03014-SP-CLSM	Concrete-Controlled Low Strngth Material	c.y.	A	9
03015-02230	PCC 2200 psi, No. 3, Exp. 0	c.y.	A	9
03015-03081	PCC 3000 psi, No. 8, Exp. 1	c.y.	A	9
03015-03340	PCC 3300 psi, No. 4, Exp. 0	c.y.	A	9
03015-03360	PCC 3300 psi, No. 6, Exp. 0	c.y.	A	9
03015-03540	PCC 3500 psi, No. 4, Exp. 0	c.y.	A	9
03015-04081	PCC 4000 psi, No. 8, Exp. 1	c.y.	A	9
03015-04460	PCC 4400 psi, No. 6, Exp. 0	c.y.	A	9
03015-04462	PCC 4400 psi, No. 6, Exp. 2	c.y.	A	9
03015-04481	PCC 4400 psi, No. 8, Exp. 1	c.y.	A	9
03015-05081	PCC 5000 psi, No. 8, Exp. 1	c.y.	A	9
03015-05560	PCC 5500 psi, No. 6, Exp. 0	c.y.	A	9
03015-05562	PCC 5500 psi, No. 6, Exp. 2	c.y.	A	9
03016	Grout - Non Shrink (Batched)	c.y.	A	10
03025	Mortar (prebagged)	bag	B	10
03040	Grout, Non-Shrink	bag	B	10
03050	Concrete Members, Prestressed	l.f.	A	10
03051	Concrete Piles - Prestressed	l.f.	A	10
03062	Cement - Portland Type III	bag	B	9
03066	Cement - Portland Type I/II	bag	B	10
03092	Bituminous Concrete Joint / Crack Sealer	gal	A	7
03093	Bituminous Concrete Joint / Crack Filler	lb.	A	7
03094	Joint Sealer (Hot-Applied Rubberized)	l.f.	A	7
03100	Deformed Steel, Reinforcing	lb.	A	9
03100-G	Deformed, Steel, Reinforcing Bars, Galva	lb.	A	9
03100-SS	Stainless Steel Rebar	lb.	A	9
03102-FRP	Reinforcing Bars - Fiber Reinf - Polymer	lb.	A	9
03105	Chemical Anchor	ea.	B	11
03138	Dowels, Steel	ea.	A	9
03145	Fabric, Wire & Welded Steel	s.y.	A	9
03155	Expansion Joint Filler	l.f.	B	5
03158	Preformed Expansion Joint Filler	s.f.	B	5
03166	Sheeting, Polyethylene	s.y.	B	11
03200	Concrete Masonry Unit (CMU)	ea.	B	9
03201	Brick (Clay) - RED	ea.	B	9
03205	Catch Basin - Grates	ea.	A	15
03209	Manhole Covers / Frames	ea.	A	15
03211	Handhole Covers / Frames	ea.	A	15
03243	Supper Grates and Frames	ea.	A	15
03251	Catch Basin - Adjustment Ring	ea.	A	15
03252	Manhole - Adjustment Ring	ea.	A	15

MATERIAL CODES	MATERIAL - FULL NAME	UNIT (ENG)	STATUS	SECTION
03307	Fence, Chain Link, Gate	ea.	A	9
03309	Fence, Chain Link	l.f.	A	9
03310	Fence, Chain Link, Post for	ea.	A	9
03320	Fence, Hardware & Access. (Chain Link)	ea.	A	9
03326	Fence - Wire, Posts & Hardware	l.f.	A	9
03327	Fence, Protective	l.f.	A	15
03405	Metal Beam Rail, Anchorages for	ea.	A	15
03406	Metal Beam Rail System	l.f.	A	15
03413	Box Beam Guide Railing	l.f.	A	15
03414	Metal Handrail	l.f.	A	15
03419	Cable Guide Rail	l.f.	A	9
03421	Cable Guide Railing, Anchorages for	ea.	A	9
03429	Metal Bridge Rail System	l.f.	A	15
03430	Metal Bridge Rail Components	l.f.	A	15
03432	Joint Seal, Elastomeric Compression	l.f.	B	11
03444	Closed Cell Elastomer	c.i.	B	11
03449	Timber Guide Rail	l.f.	A	15
03450	Timber Guide Rail - Anchorages	ea.	A	10
03504	Anchor Bolts	ea.	A	9
03505-L	Bearing Pads (Elastomeric Laminated)	ea.	A	9
03505-P	Bearing Pads (Elastomeric Plain)	ea.	A	9
03532	Pile, Steel Shell	l.f.	A	9
03535	Piling, Steel Sheet	l.f.	A	9
03537	Steel, Structural	cwt.	A	15
03539	Piles, Timber	l.f.	B	11
03540	Bearings, Pot or Spherical	ea.	A	15
03542	Stud Shear Connector	ea.	A	9
03543	Studs - Welded	ea.	A	9
03546	Gabions	ea.	A	11
03549	H-Piles, Steel	lb.	A	9
03559	Pile Point, Steel	ea.	A	15
03566	Steel Plates	ea.	A	15
03603	Warning Lights	ea.	B	11
03693	Conduit & Fittings (all types)	l.f.	B	11
03704	Light Standard	ea.	A	15
03709	Ground Wire	l.f.	B	15
03711	Ground Rod	ea.	B	11
03723	Rigid Metal Conduit	l.f.	B	11
03724	Junction Box & Cover	ea.	A	15
03764	Sign (Variable Message)	ea.	B	11
03766	Traffic Signal Equipment	ea.	B	11
03801	Pedestals, Aluminum or Steel	ea.	B	11
03802	Span Pole - Steel	ea.	A	15
03806	Mast Arm Assembly	ea.	A	15
03807	Traffic Signal	ea.	B	11
03927	Traffic Drum	ea.	B	11

MATERIAL CODES	MATERIAL - FULL NAME	UNIT (ENG)	STATUS	SECTION
03928	Sign Support (Overhead), Structural Steel	ea.	A	15
03933	Delineator	ea.	B	11
03934	Reflective Sheeting	s.f.	B	11
03938	Sign Face - Sheet Aluminum	s.f.	B	11
03943	Object Marker	ea.	B	11
03945	Construction Signing	s.f.	B	11
03948	Traffic Cones	ea.	B	11
03952	Sign Post	ea.	A	9
03956	Traffic Drums	ea.	B	11
03970	Impact Attenuator	ea.	B	11
03974	Construction Barricade	ea.	B	11
03985	Geotextile	s.y.	B	11
04003	Bituminous Concrete - Curb Mix	ton	A	6
04029	Ultra-Thin Bonded HMA Pavement (Type B)	ton	A	6
04050	Asphalt Binder 64-22	gal	A	7
04052	HMA- Level 1 (9.5 mm / 0.375 in)	ton	A	6
04053	HMA, Level 2 (9.5 mm / 0.375 in)	ton	A	6
04054	HMA, Level 3 (9.5 mm / 0.375 in)	ton	A	6
04056	HMA, Level 1 (12.5 mm / 0.5 in)	ton	A	6
04057	HMA, Level 2 (12.5 mm / 0.5 in)	ton	A	6
04058	HMA, Level 3 (12.5 mm / 0.5 in)	ton	A	6
04064	HMA, Level 1 (25.0 mm / 1.0 in)	ton	A	6
04065	HMA, Level 2 (25.0 mm / 1.0 in)	ton	A	6
04066	HMA, Level 3 (25.0 mm / 1.0 in)	ton	A	6
04076	HMA, Level 1 (6.25 mm / 0.25 in)	ton	A	6
04077	HMA, Level 2 (6.25 mm / 0.25 in)	ton	A	6
04078	HMA, Level 3 (6.25 mm / 0.25 in)	ton	A	6
04092	PMA, Level 1 (6.25 mm / 0.25 in)	ton	A	6
04093	PMA, Level 2 (6.25 mm / 0.25 in)	ton	A	6
04094	PMA, Level 3 (6.25 mm / 0.25 in)	ton	A	6
04095	PMA, Level 1 (9.5 mm / 0.375 in)	ton	A	6
04096	PMA, Level 2 (9.5 mm / 0.375 in)	ton	A	6
04097	PMA, Level 3 (9.5 mm / 0.375 in)	ton	A	6
04098	PMA, Level 1 (12.5 mm / 0.5 in)	ton	A	6
04099	PMA, Level 2 (12.5 mm / 0.5 in)	ton	A	6
04100	PMA, Level 3 (12.5 mm / 0.5 in)	ton	A	6
04101	PMA, Level 1 (25.0 mm / 1.0 in)	ton	A	6
04102	PMA, Level 2 (25.0 mm / 1.0 in)	ton	A	6
04103	PMA, Level 3 (25.0 mm / 1.0 in)	ton	A	6
04108-SP	HMA- POROUS PAVEMENT	ton	A	6
04128	RS-1	gal	A	7
04133	SS-1- Slow Setting Asphalt Emulsion	gal	A	7
04134	SS-1H - Slow Setting Asphalt Emulsion -	GAL	A	7
04138	CRS-1 (Cationic Rapid Setting Asphalt)	gal	A	7
04139	CRS-2 (Cationic Rapid Setting)	gal	A	7
04142	Cationic Emulsion (CMS-2)	gal	A	7

MATERIAL CODES	MATERIAL - FULL NAME	UNIT (ENG)	STATUS	SECTION
04145	CSS-1H - Slow Setting Ashalt Emulsion	gal	A	7
04146	CSS-1- Cationic Emulsion	gal	A	7
04147	RS-1H	gal	A	7
04148	CRS-1P - Polymer Modified	GAL	A	7
04177	Joint Sealer, Concrete Structure	lb.	B	5
04199	Membrane Waterproofing	s.y.	B	7
04207	Dampproofing, Primer for	gal	B	7
04208	Dampproofing, Sealer for	gal	B	7
04697	Sand (Masonry) - Grading A	c.y.	A	1
04700	Sand	c.y.	A	1
04704	Sand (Masonry) - Grading B	c.y.	A	1
04749	Aggregate (Lightweight)	c.y.	A	1
04771	Stone, Masonry	ton	B	1
04776	Hay, Baled	ea.	B	11
04817	Stone Dust/Screenings	ton	A	1
04819	Gravel (Bank Run)	c.y.	A	1
04901	Bedding Material	c.y.	B	1
04902	Borrow	c.y.	A	1
04909	Curbing, Granite Stone	l.f.	B	1
04910	Curbing, Granite Slope	l.f.	B	1
04959	Railroad Ballast Mat	s.f.	A	15
06566	Lawn Drain	ea.	A	15
06659	Expansion Joint Sealer	l.f.	B	5
06923	Stay In Place Forms	l.f.	A	15
07067	Expansion Joint System	l.f.	B	5
07351	Bollard, Steel	ea.	A	15
07392	Bolt / Nut / Washer, Stainless Steel	ea.	A	9
07403	Rod, Threaded	ea.	A	15
07547	Tree	ea.	B	5
07627	Reinforced Earth Wall	ea.	B	10
07645	Luminaire	ea.	B	11
07799	Impact Attenuator Parts/Devices	ea.	B	11
07822	Noise Barrier Wall	s.f.	B	11
08010 - SP	Exp. Jt.- Asphaltic Plug - SPECIAL PROV.	c.f.	B	5
08022	Bolt / Nut / Washer, High Strength	ea.	A	9
08032	Sand (Washed)	c.y.	A	1
08033	Sand (Natural)	c.y.	A	1
08034	Stone (Broken/Crushed)	c.y.	A	1
08035	Gravel (Crushed)	c.y.	A	1
08036	Reclaimed Misc. Aggregate (ON-SITE)	c.y.	A	1
08036X	Reclaimed Misc. Aggregate (OFFSITE)	c.y.	A	1
08037	Reclaimed Waste	c.y.	A	1
08037X	Reclaimed Waste (OFFSITE)	c.y.	A	1
08039	Embankment Material	c.y.	A	1
08042	Pull Box - Precast Concrete	ea.	A	10
08044	Retaining Wall - Precast Concrete	ea.	A	10

MATERIAL CODES	MATERIAL - FULL NAME	UNIT (ENG)	STATUS	SECTION
08060	Detectable Warning Strip - (ADA)	s.f.	B	11
08069	Prefabricated Bridge Units	EACH	A	10

Appendix E

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.

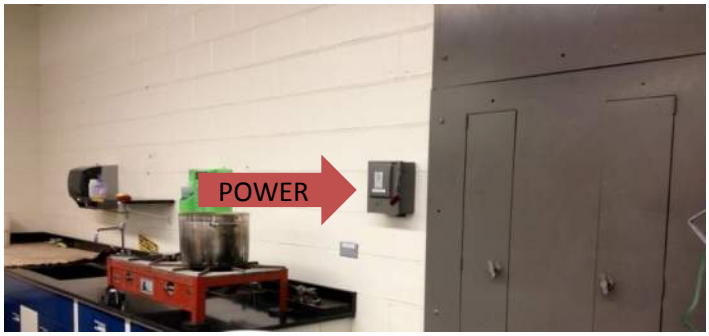


Figure 1. Power Switch Location for Tinius-Olsen Compression Machine

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**.

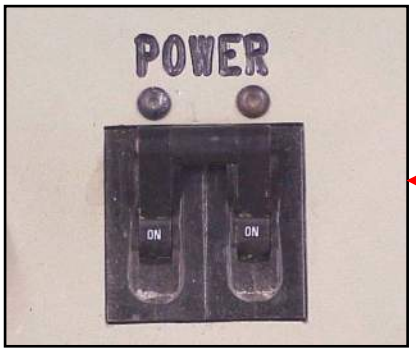
See attached sheets pages 1-5

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

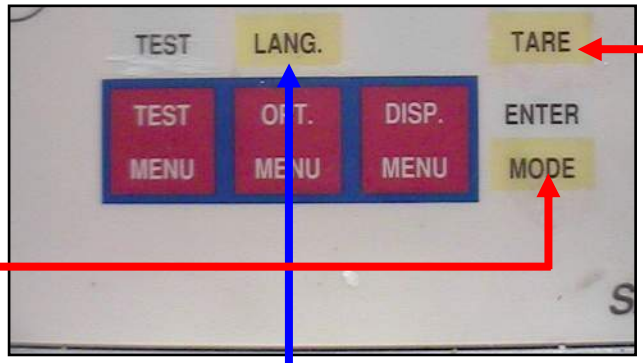


Step 1
Flip switch for power.

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

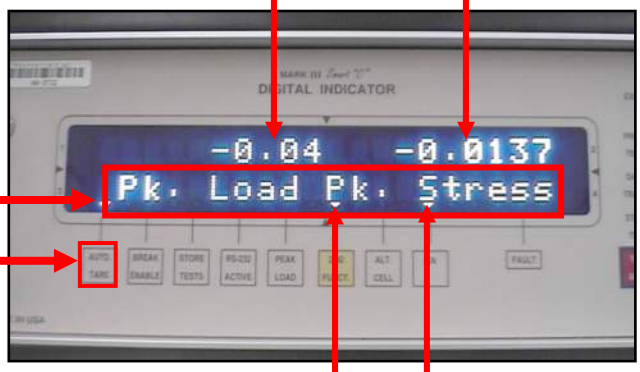


Step 4
Press the **MODE** button once to switch what's on the display.

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.



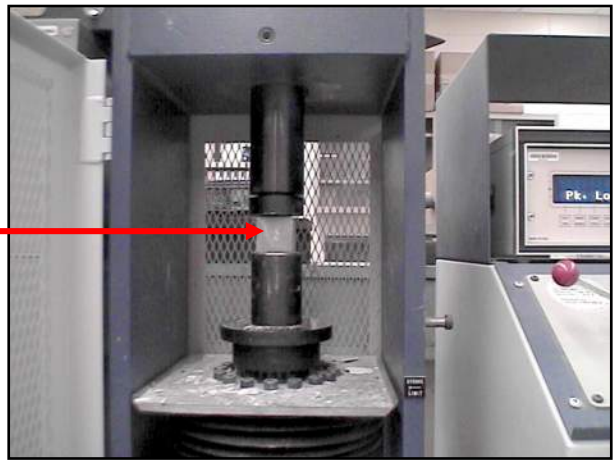
Step 7
Make sure the arrow shows up each time you break a cube in the **AUTO TARE** box.

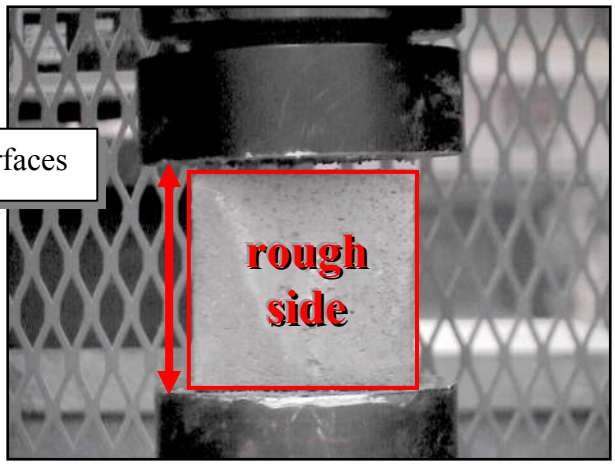
Total Load

PSI

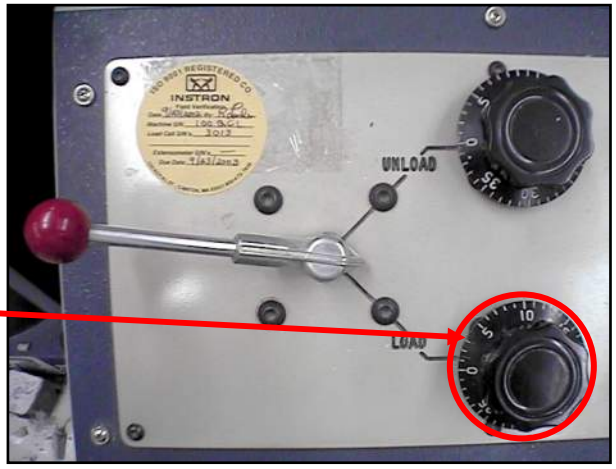
SATEC COMPRESSION MACHINE
Standard Operating Procedure

Step 8
Place cube between cylinders with the **rough sides** facing away from the plane surfaces.





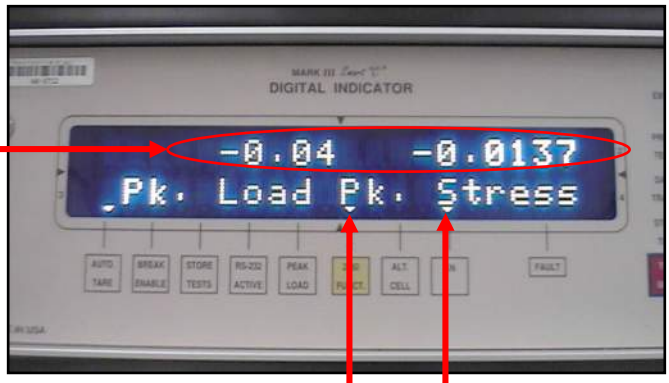
Step 9
Start placing a load on the specimen gradually. You will see the digital display numbers go up. Set the dial at around 4 and 5.



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)

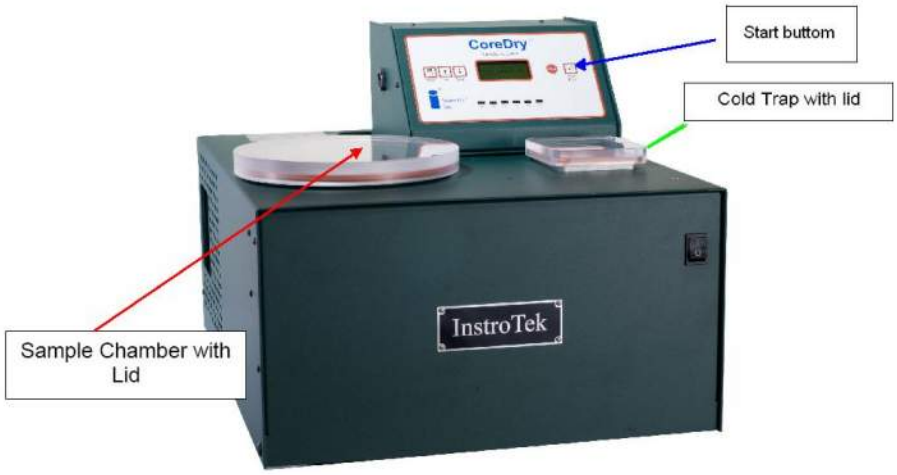


Figure 2. CoreDry Components

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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