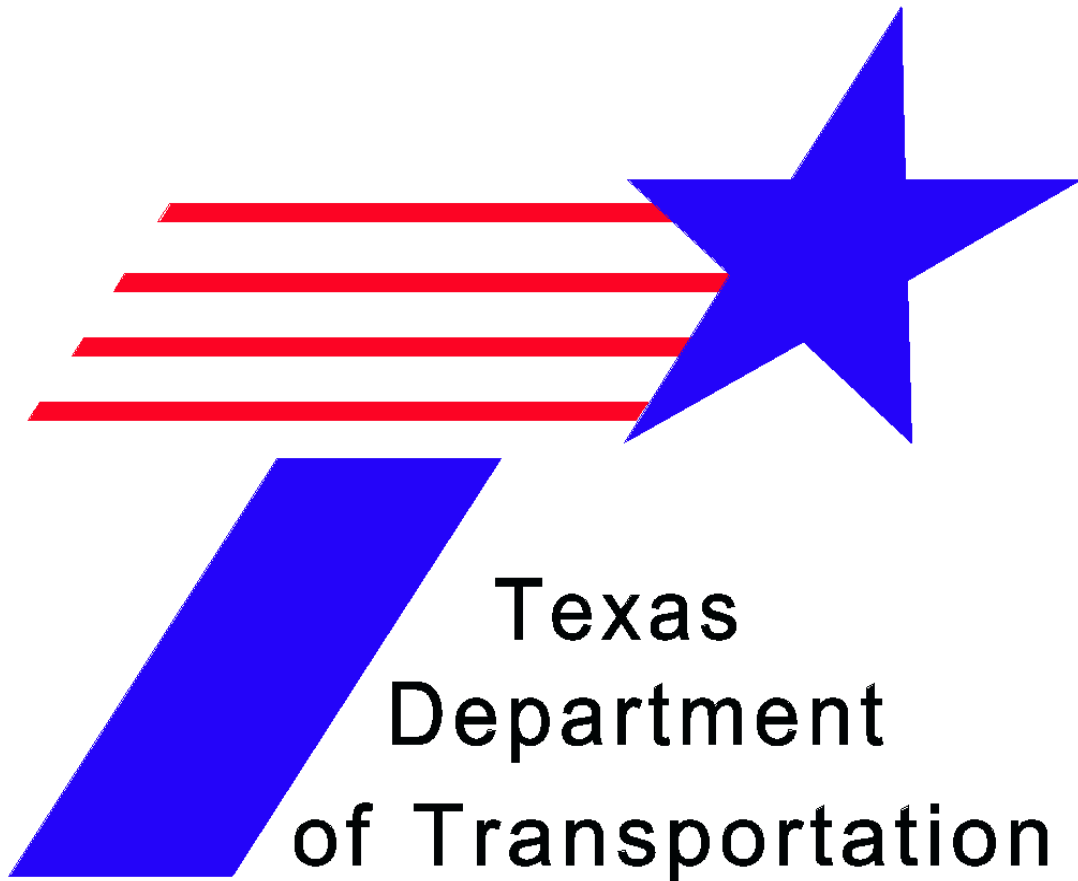


MATERIAL INSPECTION GUIDE



MAY 2012

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SECTION 1 - OVERVIEW

1.1 A Look Ahead

This manual outlines sampling, testing, and inspecting procedures and instructions for specific roadway materials. These procedures and instructions aid the project engineer as well as the Construction Division, Materials and Pavements Section (CST/M&P) personnel in performing sampling, testing, inspecting, and related functions. Sections are further divided into the following subsections:

- Functions of the Project Engineer
- Functions of CST/M&P
- Sampling and Testing
- Remarks.

Other subsections appear as the subject warrants.

SECTION 2 - AGGREGATE FOR ASPHALT STABILIZED BASE

2.1 Functions of the Project Engineer

The project engineer performs the following functions:

- sampling for job control tests in accordance with procedures outlined in [Tex-400-A, "Sampling Stone, Gravel, Sand, and Mineral Aggregates,"](#) at a frequency required by the [Guide Schedule of Sampling and Testing](#) or as specified by the plans.
- job control testing as required by the standard specifications, special specifications, special provisions, the [Guide Schedule of Sampling and Testing](#), and plan notes.

2.2 Functions of CST/M&P

CST/M&P performs the following functions:

- Los Angeles Abrasion testing on asphalt stabilized base aggregate when required by the standard specifications, special specifications, special provisions, or plan notes.
- testing for quality, such as Los Angeles Abrasion, gradation, plasticity index, or coarse aggregate angularity, as requested by the districts.

2.3 Sampling and Testing

Project Tests

Sample in accordance with [Tex-400-A, "Sampling Stone, Gravel, Sand, and Mineral Aggregates."](#)

2.4 Remarks

When shipping samples to CST/M&P for quality tests, the project engineer completes [Form 202, "Identification of Material Samples."](#)

Three working days are required to test the Los Angeles Abrasion samples after being received.

SECTION 3 - AGGREGATE FOR BITUMINOUS MIXES

3.1 Functions of the Project Engineer

The project engineer performs the following functions:

- samples aggregate in accordance with procedures outlined in [Tex-221-F, "Sampling Aggregate for Bituminous Mixtures, Surface Treatments, and Limestone Rock Asphalt,"](#) or [Tex-400-A, "Sampling Stone, Gravel, Sand, and Mineral Aggregates,"](#) at a frequency required by the [Guide Schedule of Sampling and Testing](#) or as specified by the plans.
- submits samples of aggregates not in the Aggregate Quality Monitoring Program (AQMP) to CST/M&P for quality testing.
- performs job control testing as required by the standard specifications, special specifications, special provisions, the [Guide Schedule of Sampling and Testing](#), or plan notes and when CST/M&P does not maintain resident inspectors at the producer's plant.

3.2 Functions of CST/M&P

CST/M&P performs the following functions:

- quality testing (Los Angeles Abrasion, Five-Cycle Magnesium Sulfate Soundness, Surface Aggregate Classification) for aggregate on bituminous mixes when required by the standard specifications, special specifications, special provisions, or plan notes.
- administers AQMP as stated in [Tex-499-A, "Aggregate Quality Monitoring Program."](#)
- quality testing on all samples submitted by the districts.
- job control testing at commercial producers of aggregate for bituminous mixes where CST/M&P maintains resident inspectors and when production of the bituminous mixture is completed by the same producer. In this case, CST/M&P Plant Inspection test reports are forwarded directly to the project engineer, indicating that the individual aggregates as well as the bituminous mixture have been tested and are acceptable for use.

3.3 Sampling and Testing

Quality Tests

- QM Sources
 - District laboratory samples aggregate sources that are under the AQMP when notified by CST/M&P.
 - Sample in accordance with [Tex-400-A, "Sampling Stone, Gravel, Sand, and Mineral Aggregates,"](#) or [Tex-221-F, "Sampling Aggregate for Bituminous Mixtures, Surface Treatments, and Limestone Rock Asphalt."](#)

- Non-QM Sources
 - For aggregate sources not under the AQMP, the district samples each stockpile of material designated for a project in accordance with [Tex-400-A, "Sampling Stone, Gravel, Sand, and Mineral Aggregates,"](#) and [Tex-499-A, "Aggregate Quality Monitoring Program."](#)

3.4 Remarks

When shipping samples to CST/M&P for quality tests, the project engineer completes [Form 202, "Identification of Material Samples."](#)

Allow 3 weeks for testing.

SECTION 4 - AGGREGATE FOR FLEXIBLE BASE

4.1 Functions of the Project Engineer

The project engineer performs the following functions:

- sample for job control tests in accordance with [Tex-400-A, "Sampling Stone, Gravel, Sand, and Mineral Aggregates,"](#) or [Tex-100-E, "Surveying and Sampling Soils for Highways,"](#) at a frequency required by the [Guide Schedule of Sampling and Testing](#) or as specified by the plans.
- job control testing as required by the standard specifications, special specifications, special provisions, the [Guide Schedule of Sampling and Testing](#), and plan notes.

4.2 Function of CST/M&P

CST/M&P tests samples as requested by the project engineer.

4.3 Sampling and Testing

Sample in accordance with [Tex-400-A, "Sampling Stone, Gravel, Sand, and Mineral Aggregates,"](#) or [Tex-100-E, "Surveying and Sampling Soils for Highways,"](#) and the [Guide Schedule of Sampling and Testing](#).

4.4 Remarks

When shipping samples to CST/M&P for tests, the project engineer completes [Form 202, "Identification of Material Samples."](#)

SECTION 5 - AGGREGATE FOR HYDRAULIC CEMENT CONCRETE

5.1 Functions of the Project Engineer

The project engineer performs the following functions:

- samples for project tests in accordance with procedures outlined in [Tex-400-A, "Sampling Stone, Gravel, Sand, and Mineral Aggregates,"](#) at a frequency required by the [Guide Schedule of Sampling and Testing](#) or as specified by the plans.
- submits samples of aggregates not in the Aggregate Quality Monitoring Program (AQMP) to CST/M&P for quality testing.
- job control testing as required by the standard specifications, special specifications, special provisions, the [Guide Schedule of Sampling and Testing](#), or plan notes.

5.2 Functions of CST/M&P

CST/M&P performs the following functions:

- quality testing for hydraulic cement concrete aggregate when required by the standard specifications, special specifications, special provisions, or plan notes.
- administers the AQMP in accordance with [Tex-499-A, "Aggregate Quality Monitoring Program."](#)
- quality testing on all samples submitted by the districts.

5.3 Sampling and Testing

Quality Tests

- QM Sources
 - District laboratory samples aggregate sources that are under the AQMP when notified by CST/M&P.
 - Sample in accordance with [Tex-400-A, "Sampling Stone, Gravel, Sand, and Mineral Aggregates."](#)
- Non-QM Sources
 - For aggregate sources not under the AQMP, the district samples each stockpile of material designated for a project in accordance with [Tex-400-A, "Sampling Stone, Gravel, Sand, and Mineral Aggregates,"](#) and [Tex-499-A, "Aggregate Quality Monitoring Program."](#)

Job Control Tests

- Sample in accordance with [Tex-400-A, "Sampling Stone, Gravel, Sand, and Mineral Aggregates,"](#) and the [Guide Schedule of Sampling and Testing](#).

5.4 Remarks

When shipping samples to CST/M&P for quality tests, the project engineer completes and submits [Form 202, "Identification of Material Samples."](#)

Allow 3 weeks for testing.

SECTION 6 - AGGREGATE FOR SURFACE TREATMENT

6.1 Functions of the Project Engineer

The project engineer performs the following functions:

- samples for job control tests from bins, belts, stockpiles, railroad cars, or trucks in accordance with [Tex-221-F, "Sampling Aggregate for Bituminous Mixtures, Surface Treatments, and Limestone Rock Asphalt."](#)
- submits samples of aggregates not in the Aggregate Quality Monitoring Program (AQMP) to CST/M&P for quality testing.
- job control testing as required by the standard specifications, special specifications, special provisions, or plan notes when CST/M&P does not maintain resident inspectors at the producer's plant.

6.2 Functions of CST/M&P

CST/M&P performs the following functions:

- quality testing for surface treatment aggregates when required by the standard specifications, special specifications, special provisions, or plan notes.
- administers the AQMP in accordance with [Tex-499-A, "Aggregate Quality Monitoring Program."](#)
- quality testing on all samples submitted by the districts.
- job control testing at commercial plants where CST/M&P maintains resident inspectors. In this case, CST/M&P Plant Inspection test reports are forwarded directly to the project engineer, indicating that the aggregate has been tested and is acceptable for use.

6.3 Sampling and Testing

Sampling and testing for quality tests are not required when the published value of the source, as listed in the current Material Producer List for the [Bituminous Rated Source Quality Catalog](#), meets the project specifications.

Quality Tests

- QM Sources
 - District laboratory samples aggregate sources that are under the AQMP when notified by CST/M&P.
 - Sample in accordance with [Tex-400-A, "Sampling Stone, Gravel, Sand, and Mineral Aggregates,"](#) and [Tex-499-A, "Aggregate Quality Monitoring Program."](#)
- Non-QM Sources
 - For aggregate sources not under the AQMP, the district samples each stockpile of material designated for a project in accordance with [Tex-400-A, "Sampling Stone, Gravel, Sand, and Mineral Aggregates."](#)

6.4 Remarks

When shipping samples to CST/M&P for quality tests, the project engineer completes and submits [Form 202, "Identification of Material Samples."](#)

Include the following information on each Form 202:

- month, day, and year the sample was taken
- name of area engineer
- name of Department employee who obtained the sample, or industry representative for informational samples.
- name of prime contractor
- project district
- project county
- project control, section, and job number
- federal project number
- type of material (e.g., crushed stone)
- company name of material producer
- location — pit or quarry name or source number
- sampled from (e.g., stockpile on project)
- quantity — estimated quantity of stockpile sampled
- units — cubic yards or tons (C.Y. preferred)
- specification item relating to this sample
- identification marks or district number of this sample.

Allow 3 weeks for testing.

SECTION 7 - ANCHOR BOLTS

7.1 Reference

Refer to the [Standard Specifications](#) for information on Item 449, "Anchor Bolts."

7.2 Functions of the Project Engineer

The project engineer performs the following functions:

- checks for the Department monogram on anchor bolts inspected by CST/M&P that are designated for traffic signal poles, roadway illumination poles, high mast illumination poles, camera poles, and overhead sign support structures.
- inspects anchor bolts for full threading, dimensions, fit of the nuts, and length of galvanizing/zinc coating.
- contacts CST/M&P when:
 - fit of bolts and nuts appears to be improper, such as too loose or too tight
 - material, threads, or coating appear questionable.
- verifies that the anchor bolts for traffic signal poles, roadway illumination poles (shoe base and CTB mounted), high mast illumination poles, and overhead sign support structures are lubricated and tightened per Item 449 when the structure is erected.

7.3 Functions of CST/M&P

CST/M&P performs the following functions:

- obtains a completed [Form 1818 \(D-9-USA-1\), "Material Statement,"](#) with mill test reports (MTRs) and certifications for all inspected anchor bolts.
- inspects and stamps with the Department monogram anchor bolts fabricated at locations where CST/M&P performs inspection.
- issues Structural Test Reports for all material inspected or tested by CST/M&P.
- assists the project engineer when requested.

7.4 Sampling and Testing

Sampling at the project site for testing is not required but may be performed if material is of questionable quality. If sampling is desired, contact CST/M&P for instructions.

SECTION 8 - ANTI-ICER/DE-ICER MATERIALS

8.1 Overview

CST/M&P pre-qualifies anti-icer/de-icer materials per [DMS-6400, "De-Icer/Anti-Icer."](#)

Anti-icers/de-icers on the Material Producer List (MPL), entitled "[De-Icer/Anti-Icer](#)," will not require sampling for testing unless deemed necessary by the engineer.

8.2 Functions of the Project Engineer

If material is questionable, the project engineer may sample each shipment of salt or anti-icer/de-icer at the destination.

8.3 Functions of CST/M&P

CST/M&P performs the following functions:

- tests samples of salt and any other chemical de-icer submitted by the project engineer.
- issues test reports to the project engineer.
- maintains the approved MPL.

8.4 Sampling and Testing

Sampling at the destination for testing is not required but may be performed if material is of questionable quality. Sample material, where desired, as follows:

- Submit a 1/2 gal. sample of salt or any other chemical de-icer for each shipment.
- take sample at random from the shipment with a sampling thief or other means that will assure a representative cross-section of the material.
- Place a solid sample in a plastic bag, sealed in a 1 gal. friction lid bucket for shipment.
- Place a liquid sample in a sealed plastic container.

Allow ten working days for testing.

SECTION 9 - ARMOR JOINTS — STEEL

See SECTION 15 - BRIDGE EXPANSION JOINTS.

SECTION 10 - ASPHALT, OILS, AND EMULSIONS

10.1 Overview

This Section describes general sampling and approval requirements for asphalt, oils, and emulsions.

These materials are typically pre-approved at the point of origin and should arrive at the job site with a shipping ticket showing, at a minimum, the supplier, grade, and TxDOT lab number.

In cases where the material is blended or modified after delivery, the material is approved at the point of consumption. Sampling and testing must be performed according to a schedule established by the plans and specifications for that project.

10.2 Functions of the Project Engineer

The project engineer performs the following functions:

- For asphalts approved at the point of origin:
 - verifies that the CST/M&P lab number shown on the producer's invoice is a valid, passing lab number for the appropriate material and supplier.
 - samples any asphalt, oil, or emulsion that is not properly identified by the producer's invoice as being the material specified.
 - samples any asphalt, oil, or emulsion suspected of being contaminated or not conforming to specification requirements.
- For asphalts approved at the point of consumption:
 - collects or witnesses the collection of samples.
 - performs required field testing on the samples.
 - submits samples to CST/M&P for laboratory testing.

Note: The Department pre-approves asphalt cements and performance graded (PG) binders for a period up to 60 days and approves cutbacks and emulsions for a maximum period of 30 days. Treat materials exceeding these time limits as unapproved product requiring testing by the producer, re-sampling, and re-testing by the Department for approval.

10.3 Functions of CST/M&P

CST/M&P performs the following functions:

- samples, tests and approves asphalt, oils, and emulsions at the source prior to shipment to Department projects.
- tests and reports any samples submitted by the project engineer.

10.4 Sampling and Testing

Sample in accordance with [Tex-500-C, "Sampling Bituminous Materials, Pre-Molded Joint Fillers, and Joint Sealers."](#)

Use the following sample sizes:

- Asphalt — take one sample in a 1 qt. (1 liter) double friction top can.
- Oils and Emulsions — take two samples in 1 qt. (1 liter) screw-top cans.

10.5 Remarks

Care must be taken to obtain representative samples of asphalt, oils, and emulsion using methods described in the sampling procedure. Samples that are not collected in accordance with the test procedure may not be considered suitable for acceptance decisions.

Address any questions regarding asphalt sampling and inspection to the Asphalt Laboratory at 512-506-5818 or 512-506-5821, or in writing to the Texas Department of Transportation, CST/M&P, Asphalt Laboratory (CP51), 125 East 11th Street, Austin, Texas 78701-2483.

The Department reserves the right to randomly sample and test materials.

SECTION 11 - BITUMINOUS MATERIALS

11.1 Overview

Bituminous mixtures include hot mix asphaltic concrete, hot mix-cold laid asphaltic concrete, cold mix limestone rock asphalt, pre-coated aggregate, and patching mixes.

11.2 Function of the Project Engineer

The project engineer performs plant inspection and sampling except at commercial producers of bituminous mixtures where CST/M&P maintains authorized inspectors.

11.3 Functions of CST/M&P

CST/M&P performs the following functions:

- tests samples submitted by the project engineer.
- samples and inspects bituminous mixtures where CST/M&P maintains field office inspectors.
- issues Plant Inspection test reports indicating that the material has been inspected and tested and can be unloaded upon arrival at destination.

11.4 Sampling and Testing

When it is necessary for the project engineer to sample at destination, sample in accordance with [Tex-400-A, "Sampling Stone, Gravel, Sand and Mineral Aggregates,"](#) or [Tex-222-F, "Sampling Bituminous Mixtures,"](#) and the [Guide Schedule of Sampling and Testing](#), Table VI, Table VII, and Table VIII "Asphalt Concrete Pavement."

SECTION 12 - BITUMINOUS SPECIALTIES

12.1 Overview

This section describes sampling and testing of miscellaneous materials, including some pre-molded joint and waterproofing materials.

12.2 Manufacturer's Certification

The project engineer accepts the following bituminous specialties based on Manufacturer's Certification:

- sewer joint compound
- plastic cement
- cold applied preformed plastic gaskets
- primers for concrete pipe
- asphalt mat
- asphalt plank
- asphaltic panels
- asphalt backer board
- asphaltic primer for waterproofing
- butyl rubber membrane
- ethylene-propylene-diene terpolymer (EPDM) sheets
- adhesive and splicing cement for butyl rubber and EPDM
- pre-molded expansion joint filler.

The Department reserves the right to randomly sample and test certified materials.

12.3 Quality Monitoring (QM) Materials

The project engineer accepts the following materials if CST/M&P has qualified the manufacturer to supply the material:

- rubber asphalt crack sealer
- bituminous marker adhesive.

Indicate a pre-qualified status by a valid QM test report.

CST/M&P samples these materials every 6 months to determine compliance with appropriate specifications and will make the QM test reports available as described in [Tex-538-C, "Quality Monitoring for Joint Sealers and Related Materials."](#)

12.4 Sampled at Destination

Sample in accordance with [Tex-500-C, "Sampling Bituminous Materials, Pre-Molded Joint Fillers, and Joint Sealers."](#)

The project engineer or other responsible district personnel samples the following materials at the destination, unless other arrangements have been made with CST/M&P before use:

- waterproofing fabric
- waterproofing membrane for pavement joints and cracks
- self-adhering polyethylene
- rubberized asphalt with plastic film membrane
- mopping asphalt, above and below ground types
- cold asphalt base emulsion
- asphaltic polymer and coal tar modified urethane coating.

SECTION 13 - BOX CULVERTS (PRECAST MACHINE-MADE)

13.1 Overview

Box culverts are precast by one of the following fabrication methods:

- precast machine-made (a dry cast method)
- precast formed (a wet cast method).

This section addresses precast machine-made boxes. (See SECTION 53 - PRECAST NONSTRESSED CONCRETE for precast formed box culverts.)

13.2 Reference

Refer to the [Standard Specifications](#) for information on Item 462, "Concrete Box Culverts and Storm Drains"

13.3 Functions of the Project Engineer

The project engineer performs the following functions:

- inspects precast machine-made box culvert for:
 - Department monogram for box culverts inspected by CST/M&P
 - excessive cracking and other damage
 - proper fill height (fill height is marked on box culverts)
 - proper installation.
- indicates the source in the Contract Information Segment (CIS) for CIS projects or attaches QM samples for SiteManager projects.
- advises CST/M&P of questionable material received at the job site.

13.4 Functions of CST/M&P

CST/M&P performs the following functions:

- inspects and stamps, with the Department monogram, precast machine-made box culverts at locations where CST/M&P performs inspection.
- maintains a list of approved sources in the Contract Information Segment (CIS) for CIS projects or maintains QM samples for SiteManager projects.
- assists the project engineer when requested.

SECTION 14 - BRIDGE BEARINGS AND ASSEMBLIES

14.1 References

Refer to Department special specifications and to the [Standard Specifications](#) for information on the following:

- Item 434, "Elastomeric Bridge Bearings"
- Item 441, "Steel Structures."

14.2 Functions of the Project Engineer

The project engineer performs the following functions:

- accepts plain or laminated elastomeric bearings, sliding elastomeric bearings, pot bearings (high load multi-rotational), pedestals, and shoes on the basis of the following:
 - Plain or Laminated Elastomeric Bearings – Checks each plain or laminated bearing for the Department monogram, checks for shipping damage, and verifies proper field installation of pads (i.e., direction of pad slope, location, etc.)
 - Sliding Elastomeric Bearings – Checks each sliding bearing for the Department monogram and checks for shipping damage.
 - Pot Bearings, Pedestals, and Shoes – Checks each pot bearing, pedestal, and shoe for the Department monogram and checks for shipping damage; checks for galvanizing damage on pedestals. (See SECTION 34 - GALVANIZED COATINGS.)
- advises CST/M&P of questionable materials received at the job site.

14.3 Functions of CST/M&P

CST/M&P performs the following functions:

- obtains a completed [Form 1818 \(D-9-USA-1\)](#), "[Material Statement](#)," with mill test reports (MTRs) and certifications for all inspected steel components of bridge bearings.
- samples, tests, inspects and stamps, with the Department monogram, bridge bearings fabricated at locations where CST/M&P performs inspection.
- issues Structural Test Reports for all material inspected or tested by CST/M&P.
- assists the project engineer when requested.

14.4 Sampling and Testing

Sampling and testing are not required at the project site.

SECTION 15 - BRIDGE EXPANSION JOINTS

15.1 Reference

Refer to the [Standard Specifications](#) for information on Item 454, "Bridge Expansion Joints."

15.2 Functions of the Project Engineer

The project engineer performs the following functions:

- obtains a completed [Form 1818 \(D-9-USA-1\), "Material Statement"](#), with mill test reports (MTRs), and certifications for:
 - sealed expansion joint steel shapes with welded studs and
 - armor joint steel plates with welded studs.

NOTE: See SECTION 16 – BUY AMERICA DOCUMENTATION PROGRAM.
- checks for damage or distortions to the seals and studded steel shapes or plates.
- verifies that sealed expansion joint system furnished is pre-approved as shown on the plans.
- verifies that materials furnished for header type expansion joints are from a Department-approved source on the Material Producer List (MPL) entitled "[Elastomeric Concrete](#)" and that the lab number has not expired.
- verifies that joint sealer material furnished is from a Department-approved source on the MPL entitled "[Joint Sealers](#)" and that the lab number has not expired.

15.3 Functions of CST/M&P

CST/M&P performs the following functions:

- performs tests for pre-approval of sealed expansion joint systems.
- assists the project engineer when requested.
- maintains the relevant MPLs.

15.4 Sampling and Testing

Sampling and testing are not required.

SECTION 16 - BUY AMERICA DOCUMENTATION PROGRAM

16.1 Overview

Item 6, "Control of Materials," Section 6.1.A, "Buy America," requires steel and iron materials (permanently installed) to be manufactured in the United States. Manufacturing begins with initial melting and mixing and continues through fabrication (cutting, drilling, welding, bending, etc.) and coating (epoxy coating, galvanizing, painting, etc.). Section 6.1.A also requires a furnished original of [Form 1818 \(D-9-USA-1\), "Material Statement,"](#) notarized and with proper attachments, for verification of Buy America compliance. This specification, however, allows a minimal use of foreign materials.

CST/M&P developed this Buy America documentation program for the verification of this domestic origin requirement for steel and iron materials.

16.2 Reference

Refer to the [Standard Specifications](#) for information on Item 6, "Control of Materials."

16.3 Definitions

- Certification — A certification is a document furnished by the manufacturer containing the following information: name and address of the manufacturer and the location where the manufacturing process occurred (if different from the address); manufacturing steps performed by the manufacturer; heat numbers, lot numbers, or any other identification used to identify the material; and a notarized statement from the manufacturer, attesting to the domestic origin of the material and signed by a person who can legally represent the manufacturer.
- Domestic origin — Domestic origin means having all manufacturing processes occurring in the United States of America.
- Mill test report (MTR) — A mill test report for steel **or iron** is a report from the producing mill of the base metal listing the chemical analysis, physical analysis, heat or lot number, specification used to manufacture the material, and "Domestic Clause" stating that the steel or iron was melted and manufactured in the United States of America **or that all manufacturing processes for the steel or iron occurred in the United States of America**. Reporting of the chemical and physical analysis must be as required by the applicable ASTM, AASHTO, ANSI, etc., specification.
- Supplier — A supplier is one who offers a material or finished product to the Department or contractors of the Department. A supplier may be a prime contractor, sub-contractor, producer, fabricator, manufacturer, approved warehouse, etc.

16.4 Responsibilities

The responsibilities of the project engineer and CST/M&P are as follows:

Steel and Iron Items Inspected and Tested by CST/M&P

- The project engineer receives CST/M&P Structural Test Reports as proof of compliance with the requirements of the specifications.
- CST/M&P obtains from the supplier a completed [Form 1818 \(D-9-USA-1\), "Material Statement"](#) (Section 16.5, "Documentation,") with attached MTRs, certifications, galvanizing reports, etc.

Steel and Iron Items Received and Sampled by the Project Engineer for Testing by CST/M&P

- The project engineer:
 - submits samples with the required documentation obtained from the supplier (completed [Form 1818 \(D-9-USA-1\)](#) with attached MTRs, certifications, galvanizing reports, etc.) to CST/M&P for testing.
 - receives CST/M&P General Test Report for all passing material (proof of compliance with the requirements of the specifications).

Steel and Iron Items Received, Inspected, and Accepted by the Project Engineer

- The project engineer obtains from the supplier the completed [Form 1818 \(D-9-USA-1\)](#) (Section 16.5, "Documentation"), with attached MTRs, certifications, galvanizing reports, etc.
- CST/M&P assists the project engineer when requested.

Steel and Iron Items Received from Regional or District Warehouse (Pretested) Stock

- The project engineer:
 - obtains documentation verifying the material was obtained from a regional or district warehouse.
 - when requested to inspect and test, obtains from the supplier the completed [Form 1818 \(D-9-USA-1\)](#) (Section 16.5, "Documentation"), with attached MTRs, **certifications, galvanizing reports**, etc.

16.5 Documentation

The supplier must furnish the following forms for verifying Buy America requirements (domestic origin) of steel and iron materials:

- [Form 1818 \(D-9-USA-1\), "Material Statement"](#) — This form is available from the Department and is to be completed and furnished per Item 6, "Control of Materials," by the supplier. This form, when completed, should contain the requested information with attached MTRs, certifications, galvanizing reports, etc.
- Form D-9-PS-1, "Domestic Certification" — All Department-approved seven-wire strand (stress-relieved and low relaxation) manufacturers generate their own version of this form and furnish it per Item 426, "Prestressing," with all shipments of seven-wire strand to the project. The minimum required information on this form is:
 - the project information
 - the type, size, and quantity of steel strand

- heat numbers of all rod used to make the strand
- heat numbers and coil/reel numbers for the furnished strand
- notarized statement attesting to the domestic origin of the furnished steel strand.

WARNING: In the event a supplier is possibly providing improper or falsified documentation, the Department entity responsible for acceptance of the material (division or district warehouse, project engineer, or CST/M&P) must notify the supplier in writing regarding the problem and take appropriate action. The Texas Attorney General's Office will be notified of major violations.

SECTION 17 - CAMERA POLES

17.1 Reference

Refer to Department Special Specifications.

17.2 Functions of the Project Engineer

The project engineer performs the following functions:

- inspects camera poles for:
 - the Department monogram for poles and anchor bolts inspected by CST/M&P.
 - proper dimensions and general fabrication.
 - damage or defects in the galvanized coatings such as bare spots, peeling, flaking, etc. (See SECTION 34 - GALVANIZED COATINGS.)
- advises CST/M&P of questionable material received at the job site.

17.3 Functions of CST/M&P

CST/M&P performs the following functions:

- obtains a completed [Form 1818 \(D-9-USA-1\), "Material Statement,"](#) with mill test reports (MTRs) and certifications for all inspected camera poles and anchor bolts.
- inspects and stamps, with the Department monogram, camera poles and anchor bolts fabricated at locations where CST/M&P performs inspection.
- issues Structural Test Reports for all material inspected or tested by CST/M&P.
- assists the project engineer when requested.

17.4 Sampling and Testing

Sampling and testing are not required.

SECTION 18 - CHAIN LINK FENCE

18.1 References

Refer to the [Standard Specifications](#) for information on Item 550, "Chain Link Fence."

18.2 Functions of the Project Engineer

The project engineer performs the following functions:

- accepts chain link fence on the basis of a certification from the manufacturer stating that all fencing materials comply with the requirements of Item 550.
- obtains a completed [Form 1818 \(D-9-USA-1\), "Material Statement,"](#) with MTRs, certifications, and galvanizing reports. (See SECTION 16 - BUY AMERICA DOCUMENTATION PROGRAM.)
- visually inspects for the following:
 - damage or defects in the galvanized coating. (See SECTION 34 - GALVANIZED COATINGS.)
 - zinc daggers or icicles — Long, sharp projections of zinc, if minor, are acceptable if removed by filing. Watch for brittle coating.
- advises CST/M&P of questionable material received at the job site.

18.3 Functions of CST/M&P

CST/M&P assists the project engineer when requested.

18.4 Sampling and Testing

If the material is of questionable quality, the project engineer may obtain samples in accordance with [Tex-708-I, "Sampling Galvanized Metal Products for Coating Weight,"](#) for galvanized coating testing.

SECTION 19 - CONCRETE ADMIXTURES

19.1 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that furnished concrete admixtures are from a Department-approved source on the Material Producer List (MPL), entitled "[Chemical Admixtures for Concrete.](#)"
 - Contractors furnish copies of the invoice to the project engineer showing the admixture or admixtures to be used on the project.
 - When changing brands of admixtures, make pilot tests using the materials that will be used on the project.
- samples any admixture of questionable quality and submits to CST/M&P for testing.

19.2 Functions of CST/M&P

CST/M&P performs the following functions:

- samples, pre-tests, and approves concrete admixtures in the laboratory.
- maintains the approved MPL.
- tests concrete admixture samples submitted by the project engineer.

19.3 Sampling and Testing

The following guidelines are for sampling concrete admixtures:

- Sampling frequency — Sample if questionable quality.
- Sample size — 1 gal. plastic bottle.

19.4 Remarks

Follow the manufacturer's storage instructions and agitate any admixture stored for an extended period prior to use.

Do not mix different brands or types of admixtures together prior to use or introduce into the mix at the same time.

Any admixture proposed for use that is not on the MPL will require a minimum of 12 months to test.

SECTION 20 - CONCRETE MEMBRANE CURING COMPOUND

20.1 Overview

Concrete membrane curing compound is sampled at the point of manufacture and submitted to CST/M&P for testing.

Curing compound will be delivered to the project only in the manufacturer's original containers, which shall be clearly labeled with the brand name of the compound, the type of compound, and a producer's batch number with which test samples may be correlated.

All approved containers will be stamped with the Department monogram, the laboratory number, and the date when retesting will be required.

20.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that concrete membrane curing compound used at the jobsite is from a Department-approved source listed on the Material Producer List (MPL), entitled ["Concrete Curing Compounds \(Liquid Membrane-Forming\)."](#)
- samples one batch per project from application equipment to verify the percent solids (percent solids information obtained from the MPL).
- samples containers that do not bear the Department monogram.
- samples material of questionable quality received at the job site.
- ensures that curing compounds are thoroughly agitated prior to use or sampling.
- ensures that product is not diluted prior to or during application.

20.3 Functions of CST/M&P

CST/M&P performs the following functions:

- maintains the approved MPL.
- stamps containers with the Department monogram.
- tests samples submitted by the project engineer.

20.4 Sampling and Testing

The following are sampling and testing requirements.

- Sample Size
 - Take one 1 pt. sample per project.
 - Use only lined friction top cans.

- Refer to [Tex-718-I, "Sampling Liquid Membrane-Forming Compounds for Curing Concrete."](#)

20.5 Remarks

CAUTION: Curing compounds must be thoroughly agitated prior to sampling, and samples must be shipped in friction top buckets or cans.

SECTION 21 - CONCRETE REPAIR MATERIAL — INORGANIC CEMENTING MATERIALS

21.1 Overview

This material is an inorganic cementing material with specifications as outlined in [DMS-4655, "Concrete Repair Materials."](#) The container or package must be moisture-resistant and clearly marked with the product name, manufacturer and brand names, date of manufacture, lot number, and mixing/placing instructions.

21.2 Functions of Project Engineer

The project engineer performs the following functions:

- ensures that furnished materials are from Department-approved sources on the Material Producer List (MPL), entitled "[Concrete Repair Materials.](#)"
- receives manufacturer's certificate for each lot number and shipment sent to the job site.
- may sample material of questionable quality.

21.3 Function of CST/M&P

CST/M&P maintains the approved MPL.

21.4 Sampling and Testing

Sampling at the jobsite for testing is not required but may be performed if material is of questionable quality. When sampling is desired, submit approximately 100 pounds of concrete repair material.

21.5 Remarks

Show complete information on [Form 202, "Identification of Material Samples."](#)

SECTION 22 - CONCRETE REPAIR MATERIAL — POLYMERIC MATERIALS

22.1 Overview

This material is for patching spalls in concrete pavement with specifications as outlined in [DMS-6170, "Polymeric Materials for Patching Spalls in Concrete Pavement."](#) It includes polymeric flexible material (Type I) and polymeric semi-rigid material (Type II). The container or package must be moisture-resistant and clearly marked with the product name, manufacturer name, and other information as set forth in the applicable specifications. (See [DMS-6170.](#))

22.2 Functions of the Project Engineer

The project engineer performs the following functions:

- ensures that furnished materials are from Department-approved sources on the Material Producer List (MPL), entitled "[Polymeric Materials for Patching Spalls in Concrete Pavement.](#)"
- may sample material of questionable quality from approved sources.
- takes job samples of material from non-approved sources.

22.3 Functions of CST/M&P

CST/M&P performs the following functions:

- tests samples of polymeric concrete repair material submitted by the project engineer.
- maintains the approved MPL.

22.4 Sampling and Testing

When sampling for testing is required or desired, sample polymeric concrete repair material in accordance with [Tex-734-I, "Sampling Epoxy."](#)

SECTION 23 - CONCRETE REPAIR MATERIAL — PNEUMATICALLY APPLIED MATERIALS

23.1 Overview

This material consists of pneumatically applied concrete or mortar as outlined in Item 431, "Pneumatically Placed Concrete." If using pre-bagged materials, the container or package should be clearly marked with the product and manufacturer name.

23.2 Functions of Project Engineer

The project engineer performs the following functions:

- samples pre-bagged materials, if desired, for testing.
- performs the following for mix design approval:
 - observes measuring and mixing of component materials.
 - observes application of concrete for installation test panels.
- verifies curing, sampling, and testing of test panels.

23.3 Function of CST/M&P

CST/M&P tests samples submitted by the project engineer.

23.4 Sampling and Testing

- Sample and test installation test panels per Item 431.
- When sampling of pre-bagged materials for testing is desired, obtain instructions from CST/M&P.

23.5 Remarks

Show complete information on [Form 202, "Identification of Material Samples."](#)

SECTION 24 - CONCRETE SURFACE FINISHES

24.1 Overview

These materials are for coating concrete surfaces in accordance with Item 427, "Surface Finishes for Concrete." They include adhesive grout, concrete paint, opaque sealer, 742 appearance coating, and Type X epoxy paint.

Refer to Departmental Material Specifications for information on the following:

- Adhesive grout, concrete paint and opaque sealer — [DMS-8110, "Coatings for Concrete."](#)
- 742 appearance coating — [DMS-8100, "Structural Steel Paints – Formula."](#)
- Type X Epoxy paint — [DMS-6100, "Epoxies and Adhesives."](#)

24.2 Functions of Project Engineer

The project engineer performs the following functions:

- for adhesive grout, verifies that the furnished adhesive grout is from a Department-approved source on the Material Producer List (MPL) entitled "[Surface Finishes for Concrete.](#)"
- for concrete paint:
 - verifies that the furnished concrete paint is from a Department-approved source on the MPL entitled "[Surface Finishes for Concrete.](#)"
 - samples containers that do not bear the Department monogram.
- for opaque sealer:
 - verifies that the furnished opaque sealer is from a Department-approved source on the MPL entitled "Surface Finishes for Concrete."
 - samples sealer, one sample per project, and submits to CST/M&P for testing.
- for 742 appearance coating, samples containers that do not bear the Department monogram.
- for Type X epoxy paint, verifies that the furnished epoxy paint is on the approved MPL entitled "[Epoxies and Adhesives](#)" and that the lab number has not expired.
- if desired, samples material of questionable quality received at the job site.

24.3 Functions of CST/M&P

CST/M&P performs the following functions:

- for adhesive grout and opaque sealers, maintains the approved MPL entitled "[Surface Finishes for Concrete.](#)"
- for concrete paint:
 - samples and tests for quality assurance at the origin, warehouse, or jobsite.
 - maintains the approved MPL entitled "[Surface Finishes for Concrete.](#)"
 - stamps containers with the Department monogram.

- for 742 appearance coating:
 - samples and tests for quality assurance at the origin, warehouse, or jobsite.
 - stamps containers with the Department monogram.
- for Type X epoxy paint, maintains the approved MPL entitled ["Epoxies and Adhesives."](#)
- tests samples submitted by the project engineer.

24.4 Sampling and Testing

Sample material for testing, if desired, in accordance with [Tex-736-I, "Sampling Structural Coatings."](#)

24.5 Remarks

CAUTION: Concrete paint must be thoroughly agitated prior to sampling or use. Samples must be shipped in clean friction top buckets/cans.

Inquiries should include the type of concrete surface finish, quantity, name of manufacturer, product destination, and batch number.

SECTION 25 - CONCRETE SURFACE TREATMENT — LINSEED OIL

25.1 Overview

Boiled linseed oil is specified in Item 428, "Concrete Surface Treatment," as a mixture with mineral spirits or kerosene and is designated as Surface Treatment Class I.

25.2 Functions of the Project Engineer

The project engineer performs the following functions:

- samples containers that do not bear the Department monogram.
- if desired, samples material of questionable quality received at the job site.

NOTE: Containers of approved linseed oil that have been sampled at origin or at approved warehouses will bear the Department monogram.

25.3 Functions of CST/M&P

CST/M&P performs the following functions:

- samples linseed oil and tests it for quality assurance at the origin or warehouse.
- stamps approved material with the Department monogram.
- tests samples submitted by the project engineer.

25.4 Sampling and Testing

Sample questionable material for testing, if desired, in accordance with [Tex-736-I, "Sampling Structural Coatings."](#)

25.5 Remarks

The project engineer completes [Form 202, "Identification of Material Samples,"](#) for all samples submitted to CST/M&P.

For Surface Treatment Class II, see Section 52 - PENETRATING CONCRETE SURFACE TREATMENTS — SILANES/SILOXANES.

SECTION 26 - CONCRETE TRAFFIC BARRIER (PRECAST)

26.1 References

Refer to the [Standard Specifications](#) for information on the following:

- Item 512, "Portable Concrete Traffic Barrier."
- Item 514, "Permanent Concrete Traffic Barrier."

26.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that precast concrete traffic barrier, fabricated at a multi-project fabrication plant, is furnished from a Department-approved fabricator on the MPL entitled "[Concrete Traffic Barrier Fabrication Plants \(Multi-Project\)](#)."
NOTE: Item 424 defines multi-project fabrication plants. When temporary barrier is to be furnished and retained by the Contractor, barrier from non-approved sources or previously used barrier may be provided if the Contractor submits written certification of specification compliance. (See Item 512.)
- for precast concrete traffic barrier furnished by Department approved multi-project plants, indicates the source in the Contract Information Segment (CIS) for CIS projects or attaches QM samples for SiteManager projects.
- advises CST/M&P when items of questionable quality are received on the job-site.

26.3 Functions of CST/M&P

CST/M&P performs the following functions:

- maintains the approved MPL entitled "[Concrete Traffic Barrier Fabrication Plants \(Multi-Project\)](#)."
- for precast concrete traffic barrier furnished from Department approved multi-project fabricators, maintains a list of approved sources in the CIS for CIS projects or maintains QM samples for SiteManager projects.
- assists the project engineer when requested.

SECTION 27 - CORRUGATED METAL PIPE

27.1 References

Refer to the [Standard Specifications](#) for information on the following:

- Item 460, "Corrugated Metal Pipe"
- Item 467, "Safety End Treatment."

27.2 Functions of the Project Engineer

The project engineer performs the following functions:

- obtains a completed [Form 1818 \(D-9-USA-1\), "Material Statement,"](#) with mill test reports (MTRs), certifications, and galvanizing reports for the steel components. (See SECTION 16 - BUY AMERICA DOCUMENTATION PROGRAM.)
- inspects corrugated metal pipe or corrugated metal end sections for compliance with the specifications (dimensions, type, gauge, etc.), damage, and for workmanship.
- rejects pipe or end sections that have been damaged during fabrication or in shipping, unless satisfactory repairs are made. Defects constituting poor workmanship are:
 - variation from a straight centerline
 - elliptical shape in pipe intended to be round
 - dents or bends in the metal
 - damaged galvanized, bituminous, or polymer coating (See SECTION 34 - GALVANIZED COATINGS.)
 - lack of rigidity
 - illegible or omitted brand markings (brand must show name of manufacturer, heat number, and AASHTO specification)
 - ragged or diagonal sheared edges
 - uneven laps in riveted or spot welded pipe
 - loose, unevenly lined, or unevenly spaced rivets
 - defective spot welds or continuous welds
 - loosely formed lockseams.
- advises CST/M&P if questionable material is received on the job site.

27.3 Function of CST/M&P

CST/M&P performs the following function:

- assists the project engineer when requested.

27.4 Sampling and Testing

Sampling at the project site for testing is not required but may be performed if material is of questionable quality. Perform sampling, if desired, in accordance with [Tex-708-I, "Sampling Galvanized Metal Products for Coating Weight."](#)

SECTION 28 - DELINEATORS AND OBJECT MARKERS

28.1 Functions of the Project Engineer

The project engineer performs the following functions:

- for **barrier reflector** delineator units, verifies that material at the job site is from a Department-approved source on the Material Producer List (MPL), entitled "[Barrier Reflector Units,](#)" and indicates the source in the Contract Information Segment (CIS) for CIS projects or attaches QM samples for SiteManager projects.
- **Visually inspects Type 1, 3, and 4 object marker panels for the following:**
 - **Dents, warps, and other conditions of the aluminum substrate that may affect the panel functionality.**
 - **Proper size.**
 - **Face damage that affects the panel functionality and durability such as scratches in the reflective sheeting wider than 1/16 in. or greater than 6 in. in length; damage in the reflective sheeting that penetrates the sheeting backing; or reflective sheeting with ragged edges, cracks, blisters, or streaks.**
- if desired, samples material of questionable quality received at the job site.

28.2 Functions of CST/M&P

CST/M&P performs the following functions:

- tests samples submitted by the project engineer.
- maintains the approved MPL.
- maintains a list of approved **barrier reflector** delineator unit sources in the CIS for CIS projects or maintains QM samples for SiteManager projects.

28.3 Sampling and Testing

Sampling at the project site for testing is not required but may be performed if material is of questionable quality. Sample delineator and object marker reflector units, when desired, in accordance with [Tex-725-I, "Sampling Delineator and Object Marker Reflector Units."](#)

28.4 Remarks

See SECTION 29 - DELINEATOR AND OBJECT MARKER POSTS for the reflector unit supports.

SECTION 29 - DELINEATOR AND OBJECT MARKER POSTS

29.1 Functions of Project Engineer

The project engineer performs the following functions:

- for flexible posts (including recycled rubber posts), verifies that material used at the job site is from a Department-approved source on the Material Producer List (MPL), entitled "[Flexible Delineator and Object Marker Posts.](#)" and indicates the source in the Contract Information Segment (CIS) for CIS projects or attaches QM samples for Site Manager Projects.
- samples material of questionable quality received at the job site.
- for thin-walled tubing post wedge anchor systems, verifies that the mount is from a source approved by the Traffic Operations Division.
- for wing channel posts, obtains a completed [Form 1818 \(D-9-USA-1\), "Material Statement,"](#) with mill test reports (MTRs,) certifications, and galvanizing reports. (See SECTION 16 - BUY AMERICA DOCUMENTATION PROGRAM.)
- visually inspects steel posts for damage or defects in the galvanizing coating. (See SECTION 34 - GALVANIZED COATINGS.)

29.2 Functions of CST/M&P

CST/M&P performs the following functions:

- tests samples submitted by the project engineer.
- maintains the approved MPL.
- maintains a list of approved sources in the CIS for CIS projects or maintains QM samples for SiteManager projects.

29.3 Sampling and Testing

Sampling at the project site for testing is not required but may be performed if material is of questionable quality. Sample flexible posts, when desired, in accordance with [Tex-737-I, "Sampling Flexible Delineator and Object Marker Posts."](#)

29.4 Remarks

When established in the proposal and specifications, certain items in this Section may be purchased by the contractor from stock at a Department regional supply center.

SECTION 30 - ELASTOMERIC MATERIALS

30.1 Reference

Refer to [DMS-6160, "Waterstops, Nylon Reinforced Neoprene Sheet, and Elastomeric Pads."](#)

30.2 Function of the Project Engineer

The project engineer performs the following functions:

- accepts elastomeric materials (waterstops, nylon reinforced neoprene sheet, and elastomeric pads) by:
 - obtaining and verifying the Manufacturer's Certification according to the specification.
 - visually inspecting for cuts, damage, and proper dimensions.
- advises CST/M&P of questionable materials received on the job site.

30.3 Function of CST/M&P

CST/M&P assists the project engineer when requested.

30.4 Sampling and Testing

Sampling and testing are not required.

SECTION 31 - EPOXIES (OTHER THAN PAINT)

31.1 Overview

Epoxies on the Material Producer List (MPL), entitled "[Epoxies and Adhesives](#)," do not require sampling for testing unless deemed necessary by the project engineer. Epoxies do not require a stamp indicating Department approval.

31.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that furnished epoxy is from a Department-approved source on the MPL.
- samples and sends epoxy to CST/M&P if the material is not from an approved source.
- samples epoxy purchased by the contractor on the open market unless prior arrangements have been made to sample at origin.

31.3 Functions of CST/M&P

CST/M&P performs the following functions:

- tests samples submitted by the project engineer.
- maintains the MPL.

NOTE: Tested material will not bear the Department monogram and test reports will not be issued unless material tested is not on the MPL.

31.4 Sampling and Testing

Epoxy and adhesives not on the MPL will be sampled in accordance with [Tex-734-I, "Sampling Epoxy."](#) Sampling frequency is one sample per shipment.

31.5 Remarks

Allow 30 days for testing.

CAUTION: Epoxy materials may cause skin irritation; avoid contact with skin, eyes, or clothing. Wash material on skin or clothing immediately and thoroughly with soap and water. Flush material in eyes with plenty of water. Seek medical attention.

SECTION 32 - FINGER JOINTS

32.1 Reference

Refer to the [Standard Specifications](#) for information on Item 442, "Metal for Structures."

32.2 Functions of the Project Engineer

The project engineer performs the following functions:

- inspects steel finger joints for the following:
 - Department monogram for finger joints inspected by CST/M&P.
 - damage or distortion.
- advises CST/M&P of questionable materials received at the job site.

32.3 Functions of CST/M&P

CST/M&P performs the following functions:

- obtains a completed [Form 1818 \(D-9-USA-1\), "Material Statement,"](#) with mill test reports (MTRs) and certifications for all inspected finger joints.
- inspects and stamps with the Department monogram finger joints fabricated at locations where CST/M&P performs inspection.
- issues Structural Test Reports for all material inspected by CST/M&P.
- assists the project engineer when requested.

32.4 Sampling and Testing

Sampling and testing are not required.

SECTION 33 - FRAMES, GRATES, RINGS, AND COVERS

33.1 Reference

Refer to the [Standard Specifications](#) for information on Item 471, "Frames, Grates, Rings, and Covers."

33.2 Functions of the Project Engineer

The project engineer performs the following functions:

- visually inspects the galvanized coating of welded steel frames and grates and the overall workmanship of these items. (See SECTION 34 - GALVANIZED COATINGS.)
- visually inspects frame, grate, ring, and cover castings to ensure smooth surfaces that are free from cracks, blow holes, or other defects.
- obtains a completed [Form 1818 \(D-9-USA-1\), "Material Statement,"](#) with mill test reports (MTRs) and certifications representing frames, grates, rings, and covers for:
 - cast in place manholes and inlets and
 - jobsite-fabricated precast manholes and inlets.
(See SECTION 16 – BUY AMERICA DOCUMENTATION PROGRAM.)

NOTE: For frames, grates, rings, and covers furnished with precast manholes and inlets that are fabricated by plants on the Material Producer List (MPL), entitled "[Manhole and Inlet Fabrication Plants \(Multi-Project\),](#)" this documentation is not required at the jobsite, since these approved precast plants maintain it on file as specified in [DMS-7340, "Qualification Procedure for Multi-Project Fabrication Plants of Precast Concrete Manholes and Inlets."](#)

33.3 Functions of CST/M&P

CST/M&P assists the project engineer when requested.

33.4 Sampling and Testing

Sampling and testing are not required.

SECTION 34 - GALVANIZED COATINGS

34.1 Reference

Refer to the [Standard Specifications](#) for information on Item 445, "Galvanizing."

34.2 Functions of the Project Engineer

The project engineer performs the following functions:

- performs visual inspection of galvanized items received at the project.
- inspects galvanizing in accordance with Section 34.5, "Galvanized Coating Thickness and Defects," for items not previously inspected by CST/M&P.
- advises CST/M&P of questionable material received at the job site.

34.3 Functions of CST/M&P

CST/M&P performs the following functions:

- inspects galvanized coatings on items normally inspected by CST/M&P, prior to shipment to the job site. Approved items bear the Department monogram.
- issues Structural Test Reports for all material inspected or tested by CST/M&P.
- assists the project engineer when requested.

34.4 Sampling and Testing

If the material is of questionable quality, the project engineer may submit samples in accordance with [Tex-708-I, "Sampling Galvanized Metal Products for Coating Weight,"](#) or may request CST/M&P to inspect the galvanized coating in the field.

34.5 Galvanized Coating Thickness and Defects

Coating thickness measurements are not required if CST/M&P inspected the material. When questionable material is found, contact CST/M&P for instructions.

Visually inspect coating finish prior to installation. Use good judgment to determine acceptable coating. Different steels (i.e., chemical composition, thickness, shape, cold working, etc.) will galvanize differently. Uniform coating, therefore, is not always possible. This does not, however, excuse poor galvanizing procedures or handling damage. The following are some common galvanized coating defects, with the causes and corrective actions listed for each condition:

- Alligator Cracking
 - Appearance — apparent dark lines resembling alligator skin on coating
 - Potential Cause — base metal chemical composition
 - Action — acceptable if coating adhesion is good (See Item 445.)



Figure 34-1—Alligator Cracking.

- Bare (Ungalvanized) Area
 - Appearance — voids in the zinc coating that expose base metal
 - Potential cause — insufficient pre-treatment, weld slag, deposits, articles in contact during galvanizing
 - Action — bare spots not greater than 1/8 in. are acceptable, unless numerous; larger bare spots may be repaired (See Item 445.)



Figure 34-2—Bare (Ungalvanized) Area.

- Heavy Runs/Drips
 - Appearance — lumps or globules
 - Potential cause — uneven drainage, bath temperature too low, articles in contact with each other
 - Action — acceptable unless it interferes with intended use of product; if desired, remove plainly visible excessive zinc accumulations by hand-filing or other means (See Item 445.)



Figure 34-3—Heavy Runs/Drips.

- Red Rust
 - Appearance — red, rusty stains
 - Potential cause — coated items in contact with rusty steel items, weeping of pickling acid from unsealed seams and joints, presence of uncoated areas
 - Action—remove by cleaning (power brush or grind to bare metal for small areas, then repair); unacceptable if large or numerous (See Item 445.)



Figure 34-4—Red Rust.

- Surface Roughness
 - Appearance — sandpaper surface appearance
 - Potential cause — base metal chemical composition, excessive pickling, sand/shot blasting
 - Action — acceptable if the chemistry of the steel meets specifications; check coating for proper thickness and adhesion

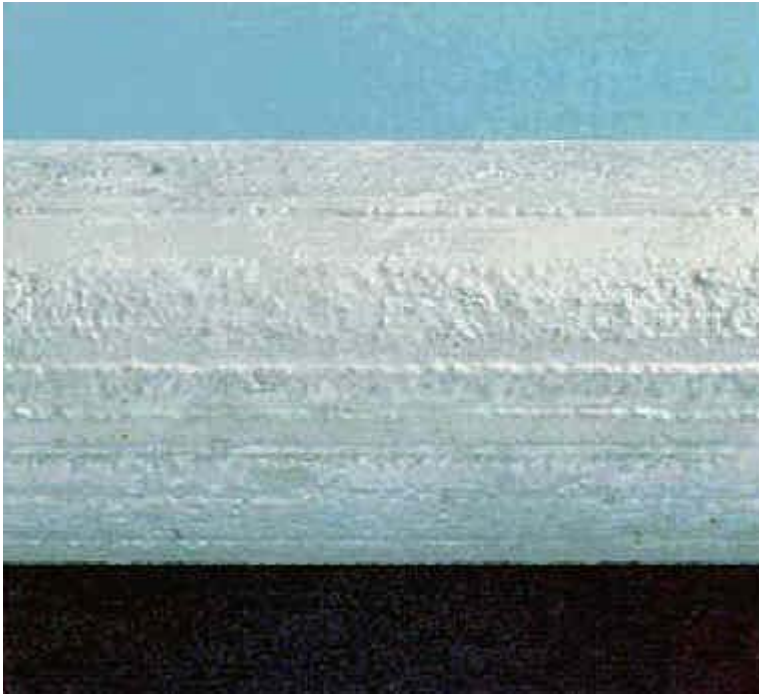


Figure 34-5—Surface Roughness.

- White Rust
 - Appearance — white, powdery deposit
 - Potential cause — moisture presence in closely packed articles, from standing water, etc.
 - Action — remove heavy layers that cause coating to pit; light coatings may remain; remove any white rust from articles to be in direct contact with soil (See Item 445.)

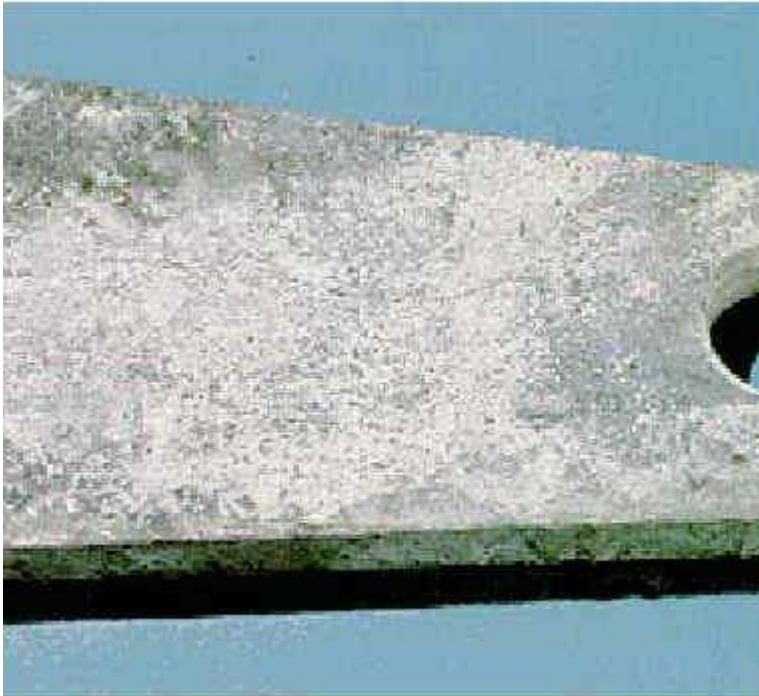


Figure 34-63—White Rust.

34.6 Remarks

The *Manual of Inspection for Galvanizing* is available from CST/M&P (512/506-5923).

SECTION 35 - GEOSYNTHETICS

35.1 Overview

This Section addresses geosynthetics, which include but are not limited to filter fabric, silt fence, fabric underseal, and geogrid.

Several commonly used geosynthetics appear on material producer lists (MPL) maintained by CST/M&P. These materials include filter fabric, silt fence, and fabric underseal, which appear on the MPL entitled "[Silt Fence, Filter Fabric, and Fabric Underseal.](#)" and fabric joint underseal, which appears on the MPL entitled "[Reinforced Fabric Joint Underseal.](#)" Geosynthetics appearing on an MPL will not require sampling for testing unless deemed necessary by the engineer.

35.2 Functions of the Project Engineer

The project engineer performs the following functions:

- checks whether furnished material is from a Department source on the MPL. Samples and sends geosynthetics to CST/M&P if the material is not on the approved list.
- ensures all rolls have lot or roll numbers.

35.3 Functions of CST/M&P

CST/M&P performs the following functions:

- randomly tests samples to ensure quality of material.
- maintains the approved MPLs for the various geosynthetics.
- tests samples submitted by the project engineer.

35.4 Sampling and Testing

For materials not appearing on an MPL, submit one sample per project in accordance with [Tex-735-I, "Sampling Geosynthetics."](#)

Allow 10 working days for testing.

SECTION 36 - GLASS TRAFFIC BEADS

36.1 Overview

The specifications for this material are outlined in [DMS-8290, "Glass Traffic Beads,"](#) which includes Type II and III glass beads. This material is furnished as drop-on glass beads for Type I and II Marking Materials as stated in Item 666, "Reflectorized Pavement Markings."

36.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that furnished traffic beads are from a Department-approved source on the Material Producer List (MPL), entitled ["Glass Traffic Beads."](#)
- if desired, samples material of questionable quality received at the job site.
- verifies that each glass traffic bead container is clearly labeled with the following:
 - manufacturer's name
 - traffic bead type
 - purchase order number
 - identification, such as lot or load number (traffic beads may be identified with quantities not exceeding 48,000 lb.)
 - net weight.

36.3 Functions of CST/M&P

CST/M&P performs the following functions:

- tests samples submitted by the project engineer.
- maintains the approved MPL.
- assists the project engineer when requested.

36.4 Sampling

Sample questionable material for testing, if desired, as follows:

- One bag of beads selected at random in accordance with [Tex-830-B, "Sampling Traffic Beads."](#)

36.5 Remarks

The project engineer completes [Form 202, "Identification of Material Samples,"](#) for all samples submitted to CST/M&P.

SECTION 37 - GROUND BOXES

37.1 Reference

Refer to the [Standard Specifications](#) for information on Item 624, "Ground Boxes."

37.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that precast polymer concrete ground boxes are furnished from manufacturers listed on the Material Producer List (MPL), entitled "[Roadway Illumination and Electrical Supplies,](#)" maintained by the Traffic Operations Division (TRF).
- advises CST/M&P or TRF when questionable material is received at the job site.

37.3 Functions of CST/M&P

CST/M&P performs testing on ground boxes received from TRF or the job site.

37.4 Sampling and Testing

Sampling at the project site for testing is not required but may be performed if the quality of the material is questionable. If sampling is desired, contact CST/M&P for instructions.

SECTION 38 - HEADWALLS AND WINGWALLS (PRECAST)

38.1 Reference

Refer to the [Standard Specifications](#) for information on Item 466, "Headwalls and Wingwalls."

NOTE: Item 466 defines headwalls and wingwalls in Section 466.2.B.1, "General."

38.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies the following:
 - proper marking information (manufacturer's name or trademark, type and size designation, and casting date).
 - correct diameter or design (headwalls).
 - correct type/wall height (wingwalls).
 - concrete design strength requirements achieved prior to shipment.
- may reject precast headwall and wingwall units for the following:
 - fractures or cracks passing through the wall.
 - surface defects indicating honeycombed or open texture surfaces.
 - improper/inadequate repairs.

38.3 Function of CST/M&P

CST/M&P assists the project engineer when requested.

38.4 Sampling and Testing

Sampling and testing are not required.

SECTION 39 - HIGH MAST ILLUMINATION POLES AND RINGS

39.1 References

Refer to the [Standard Specifications](#) for information on the following:

- Item 613, "High Mast Illumination Poles"
- Item 614, "High Mast Illumination Assemblies"

39.2 Functions of the Project Engineer

The project engineer performs the following functions:

- inspects high mast illumination poles and rings for:
 - the Department monogram for poles, anchor bolts, and rings inspected by CST/M&P.
 - proper dimensions and general fabrication. (Also see SECTION 7 - ANCHOR BOLTS.)
 - damage or defects in the galvanized coatings such as bare spots, peeling, flaking, etc. (See SECTION 34 - GALVANIZED COATINGS.)
 - proper fit, especially of items such as motors, cables, etc. that cannot be checked in fabrication.
- samples light fixtures, wire rope, and terminals for testing in accordance with Section 39.4, "Sampling and Testing."
- verifies that high mast assembly kits and light fixtures are furnished from manufacturers listed on the Material Producer List (MPL), entitled "[Roadway Illumination and Electrical Supplies](#)," maintained by the Traffic Operations Division (TRF).
- advises CST/M&P of any questionable material received at the job site.
- verifies that anchor bolts are lubricated and tightened, when erecting the pole, in accordance with Item 449, "Anchor Bolts."

39.3 Functions of CST/M&P

CST/M&P performs the following functions:

- obtains a completed [Form 1818 \(D-9-USA-1\)](#), "[Material Statement](#)," with mill test reports (MTRs) and certifications for all inspected high mast illumination poles, anchor bolts, and rings.
- inspects and stamps with the Department monogram high mast illumination poles, anchor bolts, and rings fabricated at locations where CST/M&P performs inspection.
- tests material sampled and received for testing.
- issues Structural Test Reports to the project engineer for all material inspected or tested by CST/M&P.
- assists the project engineer when requested.

39.4 Sampling and Testing

Sampling and testing are required for the following:

- light fixtures — See [Tex-1110-T, "Sampling Lighting Assemblies,"](#) and contact TRF for any special instructions.
- wire rope and terminals — See HMID plan sheets.

SECTION 40 - HYDRAULIC CEMENT AND SUPPLEMENTARY CEMENTITIOUS MATERIALS

40.1 Overview

This Section covers the functions of the project engineer and CST/M&P for sampling and testing of certified sources [those appearing on the Department-approved Material Producer Lists (MPLs) and non-certified sources of hydraulic cement, fly ash, ground granulated blast furnace slag (GGBFS), silica fume, and metakaolin.]

40.2 Functions of the Project Engineer

The project engineer performs the following functions:

- takes job samples of hydraulic cement, GGBFS, silica fume, and metakaolin at the frequency shown in the [Guide Schedule of Sampling and Testing](#) when non-certified materials are used on the project.
- takes job samples of hydraulic cement, fly ash, GGBFS, silica fume, and metakaolin when material is of questionable quality.
- samples hydraulic cement from certified and non-certified sources when requested by CST/M&P.

40.3 Functions of CST/M&P

CST/M&P performs the following functions:

- samples hydraulic cement from certified and non-certified sources.
- tests quality monitoring samples and job samples of hydraulic cement for compliance with [DMS-4600, "Hydraulic Cement."](#)
- tests quality monitoring samples and job samples of fly ash for compliance with [DMS-4610, "Fly Ash,"](#) or [DMS 4615, "Fly Ash for Soil Treatment."](#)
- tests silica fume and metakaolin job samples for compliance with [DMS-4630, "Silica Fume,"](#) and [DMS-4635, "Metakaolin."](#)
- maintains a list of sources in the approved MPLs, entitled ["Hydraulic Cement,"](#) ["Ground Granulated Blast-Furnace Slag,"](#) and ["Fly Ash."](#)

40.4 Sampling

- QM Sampling Frequency (for Certified Sources): Obtain QM samples once a month for all certified hydraulic cement, fly ash, and GGBFS sources. Take additional samples if results are questionable.
- Procedure
 - Sample hydraulic cement and GGBFS in accordance with [Tex-300-D, "Sampling Hydraulic Cement."](#)
 - Sample fly ash, silica fume, and metakaolin in accordance with [Tex-733-I, "Sampling Fly Ash."](#)

SECTION 41 - INLETS (PRECAST)

See SECTION 44 – MANHOLES & INLETS (PRECAST).

SECTION 42 - JOINT SEALANTS AND FILLERS

42.1 Overview

This Section addresses joint sealants and joint fillers for use in concrete pavements and bridge decks. These materials are addressed in [DMS-6310, "Joint Sealants and Fillers."](#)

42.2 Functions of the Project Engineer

The project engineer performs the following functions:

- for Class 1, 2, 3, 4, 5, 7, and 8 joint sealants, verifies that furnished material is from a Department-approved source on the Material Producer List (MPL), entitled "[Joint Sealers,](#)" and that the lab number has not expired.
- for Class 6 joint sealants (preformed seals):
 - with nominal widths less than 1.625 in., obtains manufacturer's certification of compliance to the pertinent specifications for material acceptance.
 - with nominal widths 1.625 in. and greater, verifies that furnished material is from a Department-approved source on the MPL.
 - for all preformed seals, visually inspects to verify size and configuration and to identify possible defects.
 - for lubricant adhesives used with all preformed seals, obtains manufacturer's certification of compliance to the pertinent specifications for material acceptance.
- for Class 9 and 10 joint sealants:
 - verifies that the CST/M&P lab number shown on the producer's invoice is a valid, passing lab number for the appropriate material and supplier. Verify the lab number either by accessing the Asphalt LIMS program or by contacting the Asphalt/Chemical branch of CST/M&P.
 - samples material that does not have a valid lab number.
- for all joint filler materials, accepts based on manufacturer's certification of compliance to the pertinent specifications. (See DMS-6310.)
- for joint sealants Class 1, 2, 3, 4, 5, 7, 8, and 6 (1.625 in. nominal width and greater) not appearing on the MPL, samples and submits to CST/M&P for testing.

42.3 Functions of CST/M&P

CST/M&P performs the following functions:

- tests samples submitted by the project engineer.
- maintains the approved MPL.

42.4 Sampling and Testing

- When sampling for testing is required or desired:
 - Sample joint sealants (Class 1, 2, 3, 4, 5, 7, 8, 9, and 10) and joint fillers in accordance with [Tex-500-C, "Test Procedure for Sampling Bituminous Materials, Pre-Molded Joint Filers, and Joint Sealers."](#)
 - For Class 6 joint sealants (preformed seals), take at least one sample from each size of preformed seal. Take the sample from the seals provided with a minimum of 3 ft. extra length. Remove the extra lengths and forward to CST/M&P for testing.

SECTION 43 - LIME

43.1 Overview

This Section describes the sampling procedures for all types of lime: hydrated lime, commercial lime slurry, quicklime, and carbide lime slurry.

Lime producers are pre-qualified and monitored by CST/M&P. Only producers listed in the Material Producer List (MPL), entitled "[Lime](#)," will be allowed to supply lime to Department projects.

NOTE: Shipments from non-prequalified sources must be tested and pre-qualified prior to use.

43.2 Functions of the Project Engineer

The project engineer performs the following functions:

- ensures the lime is supplied by a pre-qualified producer.
- samples lime at the job site in accordance with [Tex-600-J, "Sampling and Testing Lime,"](#) at the frequency shown in the [Guide Schedule of Sampling and Testing](#), and submits to CST/M&P for testing.

43.3 Functions of CST/M&P

CST/M&P performs the following functions:

- samples lime at origin when deemed necessary.
- maintains the approved MPL.
- tests samples submitted by the project engineer in accordance with Tex-600-J.
- issues test reports for samples submitted by the project engineer.

43.4 Sampling and Testing

- Sampling Frequency (shown in the [Guide Schedule of Sampling and Testing](#)).
 - hydrated lime and quicklime — one sample for each producer per type of lime per project.
 - commercial lime slurry — one sample per 200 tons or fraction thereof. (When using 50 tons or less of commercial lime slurry, sampling is not required if lime supplied is from a pre-qualified source).
 - carbide lime slurry — one sample per 100 tons of lime or fraction thereof.
- Sample Size
 - hydrated lime — 1/2 to 3/4 gal. in a 1 gal. double friction top bucket.
 - quicklime — 1/2 to 3/4 gal. in a plastic bag closed by a rubber band and placed in a 1 gal. double friction top bucket labeled "Caustic Quicklime."

- commercial lime slurry and carbide lime slurry — 1/4 gal. sample in a 1/2 gal. wide-mouthed polyethylene bottle.

43.5 Remarks

For commercial lime slurry, indicate on [Form 202, "Identification of Material Samples,"](#) the solids content specified for that project and the seal number assigned to the load.

Allow 5 working days for testing.

NOTE: Lime sample chemical contents may be altered by exposure to air and/or moisture. Use dry buckets for sampling, keep tightly closed, and submit for test without delay.

CAUTION: Quicklime is a strong irritant and evolves heat on exposure to moisture. Use caution when handling.

SECTION 44 - MANHOLES AND INLETS (PRECAST)

44.1 Reference

Refer to the [Standard Specifications](#) for information on Item 465, "Manholes and Inlets."

44.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that precast concrete manholes and inlets, fabricated at a multi-project fabrication plant, are furnished from a Department-approved fabricator on the MPL entitled "[Manhole and Inlet Fabrication Plants \(Multi-Project\)](#)."
NOTE: Item 424 defines multi-project fabrication plants.
- for precast concrete manholes and inlets furnished by Department approved multi-project plants, indicates the source in the Contract Information Segment (CIS) for CIS projects or attaches QM samples for SiteManager projects.
- advises CST/M&P when items of questionable quality are received on the job site.

NOTE: For precast manhole and inlet steel and iron appurtenances, see SECTION 33 – FRAMES, GRATES, RINGS, AND COVERS.

44.3 Functions of CST/M&P

CST/M&P performs the following functions:

- maintains the approved MPL entitled "[Manhole and Inlet Fabrication Plants \(Multi-Project\)](#)."
- for precast concrete manholes and inlets furnished from Department approved multi-project fabricators, maintains a list of approved sources in the CIS for CIS projects or maintains QM samples for SiteManager projects.
- assists the project engineer when requested.

SECTION 45 - METAL BEAM GUARD FENCE

45.1 Reference

Refer to the [Standard Specifications](#) for information on Item 540, "Metal Beam Guard Fence."

45.2 Functions of the Project Engineer

The project engineer performs the following functions:

- checks for the Department monogram on steel line posts, low fill culvert steel posts, and terminal anchor posts inspected by CST/M&P.
- verifies that the following materials are furnished from an approved source listed on the Department's approved Material Producer List (MPL):
 - timber blocks and posts. (See MPL entitled "[Timber Treating Plants and Suppliers](#)".)
 - composite material blocks and posts. (See MPL entitled "[Composite Material Blocks and Posts for Metal Beam Guard Fence](#)".)
 - rail elements. (See MPL entitled "[Metal Beam Guard Fence Rail Element Manufacturers](#)".)
NOTE: Each approved manufacturer's rail element brand description is shown on this list.
- visually inspects timber posts and blocks. (See SECTION 76 - TREATED TIMBER PRODUCTS.)
- receives [Form 2148, "Certification of Compliance \(Treated Timber Products\),"](#) for each shipment of timber blocks and posts. (See Item 492 documentation requirement.)
- visually inspects galvanized coating on steel items for bare spots, peeling, flaking, or handling damage. (See SECTION 34 - GALVANIZED COATINGS.)
- indicates the source in the Contract Information Segment (CIS) for CIS projects or attaches QM samples for SiteManager projects for the following materials:
 - timber blocks and posts
 - composite material blocks and posts
 - rail elements
 - steel line posts and low fill culvert steel posts
 - terminal anchor posts.
- obtains a completed [Form 1818 \(D-9-USA-1\), "Material Statement,"](#) with mill test reports (MTRs), certifications, and galvanizing reports for all rail elements, anchor bolts (for low fill culvert steel posts), and hardware. (See SECTION 16 - BUY AMERICA DOCUMENTATION PROGRAM.)
- advises CST/M&P of any questionable quality material received at the job site.

45.3 Functions of CST/M&P

CST/M&P performs the following functions:

- obtains a completed [Form 1818 \(D-9-USA-1\)](#) with MTRs and certifications for all inspected steel line posts, low fill culvert steel posts, and terminal anchor posts.

- inspects and stamps, with the Department monogram, steel line posts, low fill culvert steel posts, and terminal anchor posts fabricated at locations where CST/M&P performs inspection.
- administers the inspection and testing of timber blocks and posts performed by a contract commercial agency.
- maintains lists of sources in the Department's approved MPL for the following materials:
 - timber blocks and posts
 - composite material blocks and posts
 - rail elements.
- maintains a list of approved sources in the CIS for CIS projects or maintains QM samples for SiteManager projects for the following materials:
 - timber blocks and posts
 - composite material blocks and posts
 - rail elements
 - steel line posts and low fill culvert steel posts
 - terminal anchor posts.
- assists the project engineer when requested.

45.4 Sampling and Testing

Sampling and testing are not required but may be performed if the galvanized coating on steel material is of questionable quality. Sample, if desired, in accordance with:

- [Tex-708-I, "Sampling Galvanized Metal Products for Coating Weight,"](#) for bolts and nuts
- [Tex-713-I, "Sampling Metal Beam Guard Fence Rail Element,"](#) for rail element

SECTION 46 - MISCELLANEOUS PIPE

46.1 Overview

Miscellaneous pipes are of the following types:

- PVC pipe for bridge drains
- Perforated and corrugated steel, aluminum, ABS, polyethylene plastic, or PVC pipe; perforated and smooth PVC pipe; and non-perforated pipe.

46.2 References

Refer to the [Standard Specifications](#) for information on the following:

- Item 481, "PVC Pipe for Drains"
- Item 556, "Pipe Underdrains."

46.3 Functions of the Project Engineer

The project engineer performs the following functions:

- visually inspects for damage, cracks, and proper diameter.
- visually inspects galvanized coating on steel pipe for damage or defects. (See SECTION 34 - GALVANIZED COATINGS.)
- obtains a completed [Form 1818 \(D-9-USA-1\)](#), "[Material Statement](#)", mill test reports (MTRs), certifications, and galvanizing reports for all steel pipe. (See SECTION 16 - BUY AMERICA DOCUMENTATION PROGRAM.)
- obtains test reports and certifications for all other non-steel pipe.
NOTE: Test reports and certifications shall certify that the material was manufactured, tested, inspected, and meets the requirements of the appropriate Department specification.

46.4 Function of CST/M&P

CST/M&P assists the project engineer when requested.

46.5 Sampling and Testing

Sampling at the project site for testing is not required but may be performed if material is of questionable quality. If sampling is desired, contact CST/M&P for instructions

SECTION 47 - MULTIPLE-PIECE TIE BARS

47.1 Reference

Refer to the [Standard Specifications](#) for information on Item 360, "Concrete Pavement."

47.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that furnished material is from a Department-approved source on the Material Producer List (MPL), entitled ["Multiple-Piece Tie Bar Producers."](#)
- samples the material when multiple-piece tie bars are not furnished by a Department-approved source.
- if desired, samples material of questionable quality received at the job site from a Department-approved source.
- receives a completed [Form 1818 \(D-9-USA-1\), "Material Statement"](#) with mill test reports (MTRs) and certifications. (See SECTION 16 - BUY AMERICA DOCUMENTATION PROGRAM.)
- visually inspects a random sampling of the multiple-piece tie bars and verifies that they can easily be fully threaded and properly tightened.
- verifies proper installation, fit, and tightening of the tie bars as they are used on the project.
 - Ping the installed tie bar; a continuous ring from the tie bar indicates a proper fit, and a thud indicates a poor fit and the need for further investigation.
 - Look at the thread area; if more than a few of the external threads are not engaged with the internal threads, perform further investigation.
 - Grip the tie bar; if the tie bar is loose, perform further investigation.
- for multiple-piece tie bars not used because of lack of performance, verifies that replacement tie bars are drilled and epoxied into place.

NOTE: For epoxy-coated multiple-piece tie bars, verify that material is from a Department-approved source on the MPL entitled ["Epoxy Applicators for Reinforcing Steel."](#) (See SECTION 61 - REINFORCING STEEL.)

47.3 Functions of CST/M&P

CST/M&P performs the following functions:

- tests material sampled by the project engineer.
- maintains the approved MPL.
- provides tie bar pull-out testing equipment when requested.
- assists the project engineer when requested.

47.4 Sampling and Testing

Sample multiple-piece tie bars, when required or desired, in accordance with [Tex-711-I, "Sampling Multiple Piece Tie Bars."](#)

SECTION 48 - MULTIPOLYMER PAVEMENT MARKINGS

48.1 Overview

The specifications for this material are outlined in [Special Specification Item 6473, "Multipolymer Pavement Markings."](#)

48.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that furnished multipolymer pavement markings are from a Department approved source on the Material Producer List (MPL), entitled "[Multipolymer Pavement Markings.](#)"
- obtains a certification from the manufacturer for multipolymer pavement markings stating that the material conforms with Department specifications.
- if desired, samples material of questionable quality received at the job site.

48.3 Functions of CST/M&P

CST/M&P performs the following functions:

- tests samples of questionable material when submitted by the project engineer.
- samples and tests pavement marking material for quality assurance at origin, warehouse, or job site and maintains the approved MPL.
- assists the project engineer when requested.

48.4 Sampling and Testing

Sample questionable materials for testing, if desired, in accordance with [Tex-736-I, "Sampling Structural Coatings."](#)

48.5 Remarks

The project engineer completes [Form 202, "Identification of Material Samples,"](#) for all samples submitted to CST/M&P.

SECTION 49 - OVERHEAD SIGN SUPPORTS

49.1 Overview

Overhead sign supports include truss type balanced tee, bridge, cantilever, and combined bridge and cantilever structures; and monotube type bridge and cantilever structures.

49.2 Reference

Refer to the [Standard Specifications](#) for information on Item 650, "Overhead Sign Supports."

49.3 Functions of the Project Engineer

The project engineer performs the following functions:

- inspects overhead sign supports for:
 - Department monogram for overhead sign supports and anchor bolts inspected by CST/M&P.
 - proper dimensions and general fabrication. (See SECTION 7 - ANCHOR BOLTS.)
 - damage to members or galvanized coating. (See SECTION 34 - GALVANIZED COATINGS.)
- verifies that anchor bolts are properly lubricated and tightened, when erecting the structure, per Item 449, "Anchor Bolts."
- verifies that fasteners for field bolted connections are properly installed per Item 447, "Structural Bolting."
- verifies proper camber of overhead sign support spans.
- advises CST/M&P of unacceptable material received at the job site.

49.4 Functions of CST/M&P

CST/M&P performs the following functions:

- obtains [Form 1818 \(D-9-USA-1\), "Material Statement,"](#) with mill test reports (MTRs) and certifications on all inspected overhead sign supports and anchor bolts.
- inspects and stamps with the Department monogram overhead sign supports and anchor bolts fabricated at locations where CST/M&P performs inspection.
- issues Structural Test Reports for all material inspected or tested by CST/M&P.
- assists the project engineer when requested.

49.5 Sampling and Testing

Perform in the field an installation verification test on fasteners for field bolted connections per Section 447.4.A, "Equipment Preparation," of the [Standard Specifications](#).

If desired, perform jobsite Rotational Capacity (RC) testing on fasteners for field bolted connections per [Tex-452-A, "Rotational Capacity Testing of Fasteners Using a Tension Measuring Device."](#)

If desired, sample bolts, nuts, and washers (i.e., fasteners) for field bolted connections, per [Tex-719-I, "Sampling High Strength Bolts, Nuts, and Washers."](#)

SECTION 50 - PAINT FOR STRUCTURAL STEEL (FORMULA AND PERFORMANCE)

50.1 Overview

The specifications for this material are outlined in [DMS-8100, "Structural Steel Paints — Formula"](#) and [DMS-8101, "Structural Steel Paints — Performance."](#) Refer to the [Standard Specifications](#) for information on Item 446, "Cleaning and Painting Steel."

50.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that all paint furnished in accordance with DMS-8100 has a Department monogram indicating that it was inspected, tested, and approved at the plant.
- verifies that all paint furnished in accordance with DMS-8101 is from a Department-approved source on the Material Producer List (MPL), entitled "[Structural Steel Paints — Performance."](#)
- samples paint, one sample per project, and submits to CST/M&P for testing. Additional samples may be submitted for testing, if desired, when questionable material is received at the job site.
- samples in accordance with [Tex-736-I, "Sampling Structural Coatings."](#)
- ensures all painting is performed in accordance with specifications.

50.3 Functions of CST/M&P

CST/M&P performs the following functions:

- For Structural Steel Paints — Formula:
 - samples and tests for quality assurance at the origin, warehouse, or jobsite to ensure conformance to Department specifications.
 - performs in-plant inspection and stamps material with the Department monogram.
- For Structural Steel Paints — Performance:
 - maintains the approved MPL.
 - tests samples submitted by the project engineer.
- provides technical assistance for resolving field problems.
- assists in the inspection of coatings application.
- assists in training inspectors in new techniques and materials.

50.4 Remarks

CAUTION: Structural paints must be thoroughly agitated prior to sampling or use. Samples must be shipped in clean friction top buckets/cans.

The project engineer completes [Form 202, "Identification of Material Samples,"](#) for all samples submitted to CST/M&P. Inquiries should include the type of structural coating, quantity, name of manufacturer, product destination, and batch number.

SECTION 51 - PEDESTAL POLE ASSEMBLIES

51.1 Reference

Refer to the [Standard Specifications](#) for information on Item 687, "Pedestal Pole Assemblies."

51.2 Function of the Project Engineer

The project engineer performs the following functions:

- accepts pedestal pole assemblies on the basis of a certification from the manufacturer stating that all materials comply with the requirements of Item 687.
- verifies that pedestal pole bases are furnished from manufacturers pre-qualified by the Department. The Traffic Operations Division (TRF) maintains a list of these pre-qualified manufacturers.
- obtains a completed [Form 1818 \(D-9-USA-1\), "Material Statement,"](#) with mill test reports (MTRs,) certifications, and galvanizing reports for the steel components. (See SECTION 16 - BUY AMERICA DOCUMENTATION PROGRAM.)
- visually inspects for the following:
 - damage or defects in the galvanized coating. (See SECTION 34 - GALVANIZED COATINGS.)
 - proper dimensions and assembly.
- advises CST/M&P or TRF if questionable material is received on the job site.

51.3 Function of CST/M&P

CST/M&P or TRF assists the project engineer when requested.

51.4 Sampling and Testing

Sampling and testing are not required.

SECTION 52 - PENETRATING CONCRETE SURFACE TREATMENTS — SILANES/SILOXANES

52.1 Overview

The specifications for this material are outlined in [DMS-8140, "Concrete Surface Treatment \(Penetrating\)."](#) The material is used for Surface Treatment Class II as stated in Item 428, "Concrete Surface Treatment."

52.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that the furnished material is from a Department-approved source on the Material Producer List (MPL), entitled "[Penetrating Concrete Surface Treatments.](#)"
- samples penetrating concrete surface treatment, one sample per project, and submits to CST/M&P for verification testing.
- if desired, samples material of questionable quality received at the job site.

52.3 Functions of CST/M&P

CST/M&P performs the following functions:

- tests products submitted by manufacturers for pre-approval.
- maintains the approved MPL.
- tests samples submitted by the project engineer.
- assists the project engineer when requested.

52.4 Sampling and Testing

Sample in accordance with [Tex-736-I, "Sampling Structural Coatings."](#)

52.5 Remarks

The project engineer completes [Form 202, "Identification of Material Samples,"](#) with each material sample. Inquiries should include the type of concrete surface treatment, quantity, name of manufacturer, product destination, and batch number.

For Surface Treatment Class I, see SECTION 25 - CONCRETE SURFACE TREATMENT — LINSEED OIL.

SECTION 53 - PRECAST NONSTRESSED CONCRETE

53.1 Overview

This Section addresses precast nonstressed concrete items requiring fabrication per Item 424, "Precast Concrete Structures (Fabrication)." These items are to be fabricated by multi-project and project-specific fabrication plants as specified in Item 424 and [DMS-7300, "Precast Concrete Fabrication Plants."](#) The following [Standard Specifications](#) reference Item 424 for precast nonstressed concrete fabrication:

- Item 423, "Retaining Walls," for formed precast items (panels and coping).
- Item 462, "Concrete Box Culverts and Storm Drains," for formed precast boxes.
NOTE: See SECTION 13 – BOX CULVERTS (PRECAST MACHINE-MADE) for machine-made precast boxes.
- Item 450, "Railing"

Other precast nonstressed concrete items may also require Item 424 fabrication per Special Specifications, plan notes, etc. This may include precast items such as sound/noise wall panels, C-span culverts, bridge bent caps and columns, etc.

53.2 Functions of the Project Engineer

The project engineer performs the following functions:

- checks for the Fabricator's designated approval monogram stamp on precast nonstressed items produced at Department-approved multi-project fabrication plants.
NOTE: Item 424 defines multi-project fabrication plants. See the Material Producer List (MPL) entitled "[Nonstressed Member Fabrication Plants \(Multi-Project\)](#)" for approved fabricators and their designated approval monogram stamps.
- for precast railing and retaining wall items produced at Department approved multi-project fabrication plants, indicate the source in the Contract Information Segment (CIS) for CIS projects or attaches QM samples for SiteManager projects.
- checks for excessive cracking or other damage.
- ensures proper fit and aesthetics
- inspects precast items at project-specific nonstressed member fabrication plants.
NOTE: Item 424 defines project-specific fabrication plants.
- advises CST/M&P when items of questionable quality are received on the job-site.

53.3 Functions of CST/M&P

CST/M&P performs the following functions:

- provides quality assurance (QA) inspection of precast items fabricated at Department-approved multi-project nonstressed member fabrication plants.

- except for precast railing and retaining wall items, issues Structural Test Reports for all other precast nonstressed items fabricated at Department-approved multi-project nonstressed member fabrication plants.
- maintains the approved MPL entitled "Nonstressed Member Fabrication Plants (Multi-Project)."
- assists the project engineer when requested.

SECTION 54 - PREFABRICATED PAVEMENT MARKINGS (PERMANENT)

54.1 Overview

The specifications for this material are outlined in [DMS-8240, "Permanent Prefabricated Pavement Markings,"](#) which includes Types A, B, and C pavement markings. Refer to the [Standard Specifications](#) for information on Item 668, "Prefabricated Pavement Markings."

54.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that furnished prefabricated pavement markings are from a Department-approved source on the Material Producer List (MPL), entitled "[Permanent Prefabricated Pavement Markings.](#)"
- if desired, samples prefabricated pavement markings of questionable quality at the job-site.

54.3 Functions of CST/M&P

CST/M&P performs the following functions:

- tests samples submitted by the project engineer.
- maintains the approved MPL.
- assists the project engineer when requested.

54.4 Sampling and Testing

Sample questionable material for testing, if desired, per [Tex-732-I, "Sampling Prefabricated Pavement Marking Materials."](#)

SECTION 55 - PREFABRICATED PAVEMENT MARKINGS (REMOVABLE)

55.1 Overview

The specifications for this material are outlined in [DMS-8241, "Temporary \(Removable\) Prefabricated Pavement Markings."](#) Refer to the [Standard Specifications](#) for information on Item 662, "Work Zone Pavement Markings."

55.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that furnished temporary (removable) prefabricated pavement markings are from a Department-approved source on the Material Producer List (MPL), entitled ["Temporary \(Removable\) Prefabricated Pavement Markings."](#)
- if desired, samples temporary (removable) prefabricated pavement markings of questionable quality at the job-site.

55.3 Functions of CST/M&P

CST/M&P performs the following functions:

- tests samples submitted by the project engineer.
- maintains the approved MPL.
- assists the project engineer when requested.

55.4 Sampling and Testing

Sample questionable material for testing, if desired, in accordance with [Tex-732-I, "Sampling Prefabricated Pavement Marking Materials."](#)

SECTION 56 - PRESTRESSED CONCRETE

56.1 Overview

This Section addresses precast prestressed concrete items requiring fabrication per Item 424, "Precast Concrete Structures (Fabrication)." These items are to be fabricated by multi-project and project-specific fabrication plants as specified in Item 424 and [DMS-7300, "Precast Concrete Fabrication Plants."](#) The following [Standard Specifications](#) reference Item 424 for precast prestressed concrete fabrication:

- Item 409, "Prestressed Concrete Piling"
- Item 422, "Reinforced Concrete Slab" for bridge deck panels
- Item 425, "Precast Prestressed Concrete Structural Members" for beams/girders

Other precast prestressed concrete items may also require item 424 fabrication per Special Specifications, plan notes, etc. This may include prestressed items such as sound/noise wall panels, C-span culverts, bridge bent caps and columns, etc.

56.2 Functions of the Project Engineer

The project engineer performs the following functions:

- checks for the Fabricator's designated approval monogram stamp on prestressed concrete items produced at Department-approved multi-project fabrication plants.
NOTE: Item 424 defines multi-project fabrication plants. See Material Producer List (MPL) entitled "[Prestressed Member Fabrication Plants \(Multi-Project\)](#)" for approved fabricators and their designated approval monogram stamp.
- for prestressed concrete piling and bridge deck panels produced at Department approved multi-project fabrication plants, indicates the source in the Contract Information Segment (CIS) for CIS projects or attaches QM samples for SiteManager projects.
- checks for damage such as cracking that exceeds the specification tolerance or spalled concrete.
- ensures proper fit and location of diaphragms, dowel holes, and appurtenances.
- Inspects prestressed concrete items fabricated at project-specific prestressed member fabrication plants.
NOTE: Item 424 defines project-specific fabrication plants.
- advises CST/M&P when items of questionable quality are received on the job site.

56.3 Functions of CST/M&P

CST/M&P performs the following functions:

- provides quality assurance (QA) inspection of prestressed concrete items fabricated at Department-approved multi-project prestressed member fabrication plants. This includes the following prestressed concrete items:
 - I-beams
 - I-girders
 - U-beams
 - box beams
 - slab beams
 - deck slab beams
 - tee beams
 - bridge deck panels
 - piling
 - any other prestressed concrete items to be fabricated per Item 424.
- except for prestressed concrete piling and bridge deck panels, issues Structural Test Reports for all other prestressed concrete items fabricated at Department-approved multi-project prestressed member fabrication plants.
- maintains the approved MPL entitled ["Prestressed Member Fabrication Plants \(Multi-Project\)"](#).
- assists the project engineer when requested.

SECTION 57 - RAILING (METAL)

57.1 Reference

Refer to the [Standard Specifications](#) for information on Item 450, "Railing."

57.2 Functions of the Project Engineer

The project engineer performs the following functions:

- checks metal railing inspected by CST/M&P for Department monogram.
- inspects metal railing for the following:
 - proper dimensions, hole sizes and location, and general fabrication.
 - bare spots, peeling, flaking, or handling damage to the steel galvanized coating or paint coating. (See SECTION 34 - GALVANIZED COATINGS.)
- obtains a completed [Form 1818 \(D-9-USA-1\), "Material Statement,"](#) with mill test reports (MTRs), certifications, and galvanizing reports for the steel anchor bolts. (See SECTION 16 –BUY AMERICA DOCUMENTATION PROGRAM.)
- checks aluminum rail finish for uniformity with no discoloration.
- checks cast aluminum rail post heat or lot numbers versus those numbers on the mill test reports (MTRs). If heat or lot numbers die stenciled on the web or top of the base of each post do not correspond to those numbers on the MTRs, contact CST/M&P. MTRs must contain the following information:
 - heat or lot number
 - chemical analysis of base metal
 - physical properties of cast metal
 - number of items per heat or lot.
- checks cast aluminum rail posts for damage listed in Item 450, Section 450.3.A.3, "Castings."
- samples cast aluminum rail posts for testing according to Section 57.4, "Sampling and Testing."
- advises CST/M&P of any [metal railing](#) posts or panels received at the job site that are of questionable quality.

NOTE: Steel W-beam elements welded into a tubular shape (for T-6 rail) are inspected at the fabricator by CST/M&P. All other steel W-beam elements (for T-101 rail, etc.) are not inspected by CST/M&P and must bear brands from approved manufacturers. (See the Material Producer List (MPL), entitled ["Metal Beam Guard Fence Rail Element Manufacturers."](#))

57.3 Functions of CST/M&P

CST/M&P performs the following functions:

- obtains a completed [Form 1818 \(D-9-USA-1\), "Material Statement,"](#) with MTRs and certifications for all inspected metal railing.

- inspects and stamps, with the Department monogram, metal railing fabricated at locations where CST/M&P performs inspection.
- tests material sampled and received for testing.
- issues Structural Test Reports to the project engineer for all material inspected or tested by CST/M&P.
- assists the project engineer when requested.

57.4 Sampling and Testing

Sample cast aluminum posts for testing in accordance with [Tex-731-I, "Sampling Cast Aluminum Railing Posts."](#)

If desired, sample questionable bolts and nuts in accordance with [Tex-708-I, "Sampling Galvanized Metal Products for Coating Weight,"](#) for testing. The project engineer may also sample questionable metal beam rail elements in accordance with [Tex-713-I, "Sampling Metal Beam Guard Fence Rail Element,"](#) for testing.

A copy of the MTRs must accompany all samples.

SECTION 58 - RAILING (PRECAST)

See SECTION 53 - PRECAST NONSTRESSED CONCRETE.

SECTION 59 - RAISED PAVEMENT MARKERS

59.1 Overview

Raised pavement markers include jiggle bar tiles ([DMS-4100](#)), reflectorized pavement markers ([DMS-4200](#)), snowplowable reflectorized pavement markers ([DMS-4210](#)), and traffic buttons ([DMS-4300](#)). These materials are specified in Item 672, "Raised Pavement Markers."

59.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that furnished marker materials are from a Department-approved source on the Material Producer List (MPL) entitled "[Jiggle Bar Tiles, Pavement Markers, and Traffic Buttons](#)" or "[Snowplowable Pavement Markers](#)."
- if desired, samples marker material of questionable quality received at the job site.
- verifies that the specified marker adhesive material is furnished.
NOTE: The Contractor may propose alternative adhesive materials for consideration and approval by the engineer as stated in Item 672.
- verifies that furnished adhesive material is from a Department-approved source on the MPL entitled "[Epoxies and Adhesives](#)" or "[Bituminous Marker Adhesive](#)."
NOTE: Traffic marker adhesives are designated as Type II on the MPL entitled "[Epoxies and Adhesives](#)."

59.3 Functions of CST/M&P

CST/M&P performs the following functions:

- tests samples submitted by the project engineer.
- maintains the approved MPLs.
- assists the project engineer when requested.

59.4 Sampling and Testing

Sample questionable marker materials for testing per [Tex-729-I, "Sampling Traffic Markers."](#)

SECTION 60 - REINFORCED CONCRETE PIPE

60.1 Reference

Refer to the [Standard Specifications](#) for information on Item 464, "Reinforced Concrete Pipe."

60.2 Functions of the Project Engineer

The project engineer performs the following functions:

- inspects reinforced concrete pipe (RCP) sections received on the job site for the following:
 - verifies that RCP sections are furnished from a Department-approved fabricator on the MPL entitled "Reinforced Concrete Pipe Fabrication Plants" and that the fabricator's designated approval stamp is placed on the RCP sections.
NOTE: See the MPL for each fabricator's designated approval stamp.
 - the proper size, and class or D-load.
 - damage/defects.
- indicates the source in the Contract Information Segment (CIS) for CIS projects or attaches QM samples for SiteManager projects.
- Rejects pipe sections furnished to the project for any of the following:
 - fractures or cracks passing through the pipe shell/wall except for a single end crack that does not extend past the depth of the joint. (See Figure 60-1.)
 - defects that indicate imperfect proportioning, mixing, and molding. These defects cause conditions such as delamination, misalignment, or inadequate cover of reinforcing steel.
 - surface defects indicating honeycombed or open texture (see Figure 60-2).
 - damaged ends that prevent making a satisfactory joint.
 - any continuous crack having a width of 0.01 in. or more and extending for a length of 12 in. or more, regardless of position in the wall of the pipe. These cracks do not need to pass through the shell/wall in order for the condition to be rejectable.
- advises CST/M&P when pipe sections of questionable quality are received on the job site.

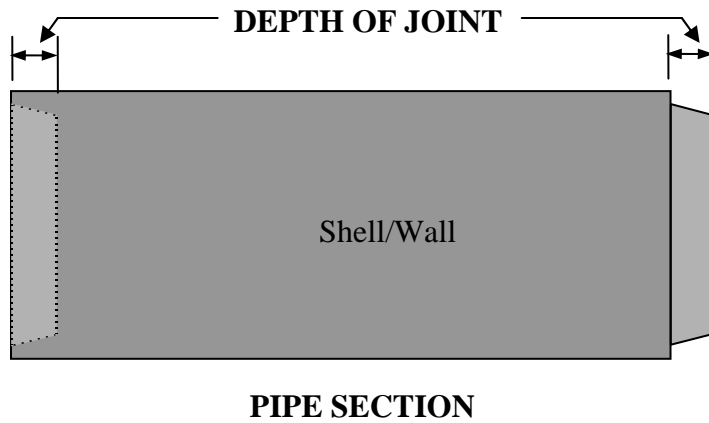


Figure 60-1—Depth of Joint.

The following condition (honeycombed concrete) renders pipe unacceptable for use.



Figure 60-2—Honeycombed Concrete.

60.3 Functions of CST/M&P

CST/M&P performs the following functions:

- maintains the MPL entitled "[Reinforced Concrete Pipe Fabrication Plants.](#)"
- maintains a list of approved sources in the CIS for CIS projects or maintains QM samples for SiteManager projects.
- assists the project engineer when requested.

60.4 Sampling and Testing

Sampling and testing are not required.

SECTION 61 - REINFORCING STEEL

61.1 Reference

Refer to the [Standard Specifications](#) for information on Item 440, "Reinforcing Steel."

61.2 Functions of the Project Engineer

The project engineer performs the following functions:

- inspects uncoated reinforcing steel to verify that:
 - proper size and grade of steel is used.
 - material is furnished from a Department-approved producing mill on the Material Producer List (MPL) entitled "[Reinforcing Steel Mills](#)" and indicates the source in the Contract Information Segment (CIS) for CIS projects or attaches QM samples for SiteManager projects.
NOTE: Deformed bar identification marking for each approved bar can be found on the MPL.
- inspects epoxy coated reinforcing steel to verify that:
 - steel is of the proper size and grade.
 - material is furnished from a Department-approved epoxy applicator on the MPL entitled "[Epoxy Applicators for Reinforcing Steel](#)" and indicates the source in the CIS for CIS projects or attaches QM samples for SiteManager projects.
 - all visible damage to epoxy coating from handling or placement is properly repaired prior to the placement of concrete.
- obtains mill test reports (MTRs) and certifications for all uncoated and epoxy coated reinforcing steel furnished to the project.
- contacts CST/M&P when:
 - uncoated or epoxy coated reinforcing steel is of questionable quality.
 - uncoated or epoxy coated reinforcing steel is from an unapproved producing mill or an unapproved epoxy applicator.

61.3 Functions of CST/M&P

CST/M&P performs the following functions:

- maintains the lists of Department-approved reinforcing steel producing mills and epoxy applicators on the MPLs.
- maintains a list of approved sources in the CIS for CIS projects or maintains QM samples for SiteManager projects.
- assists the project engineer when requested.

61.4 Sampling and Testing

Sampling at the project site for testing is not required but may be performed if material is of questionable quality. Sample uncoated reinforcing steel, when desired, in accordance with [Tex-709-I, "Sampling Reinforcing Steel,"](#) and sample epoxy-coated reinforcing steel, when desired, in accordance with [Tex-739-I, "Sampling and Testing Epoxy Coated Reinforcing Steel."](#)

SECTION 62 - RETAINING WALLS (PRECAST)

See SECTION 53 - PRECAST NONSTRESSED CONCRETE.

SECTION 63 - RIGHT OF WAY MARKERS

63.1 Overview

Right of way markers may be either precast or cast-in-place concrete.

63.2 Reference

Refer to the [Standard Specifications](#) for information on Item 538, "Right of Way Markers."

63.3 Functions of the Project Engineer

The project engineer performs the following functions:

- inspects the construction of cast-in-place concrete right of way markers.
- verifies the shape and dimensions for right of way markers according to the plans.

63.4 Function of CST/M&P

CST/M&P assists the project engineer when requested.

63.5 Sampling and Testing

Sampling and testing are not required.

63.6 Remarks

When bronze disks are required by the plans, the Department will furnish them to the contractor at no cost.

SECTION 64 - ROADSIDE FLASHING BEACON ASSEMBLIES

64.1 Reference

Refer to the [Standard Specifications](#) for information on Item 685, "Roadside Flashing Beacon Assemblies."

64.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that flasher assemblies are from a Department-approved manufacturer. The Traffic Operations Division (TRF) maintains a list of pre-qualified flasher assembly manufacturers.
- verifies that pedestal pole bases are from a Department-approved manufacturer. TRF maintains a list of pre-qualified pedestal pole base manufacturers.
- verifies that solar powered flasher controller assemblies, when required, are from a Department-approved manufacturer. TRF maintains a list of pre-qualified solar powered controller assemblies.
- checks for the Department monogram on signs inspected by CST/M&P (monogram is placed on the back side of the signs).

64.3 Functions of CST/M&P

CST/M&P performs the following functions:

- inspects signs per SECTION 70 - SIGNS.
- issues Structural Test Reports for all signs inspected or tested by CST/M&P.
- assists project engineer and TRF when requested.

SECTION 65 - ROADSIDE SIGN SUPPORTS

65.1 References

Refer to the [Standard Specifications](#) for information on the following:

- Item 644, "Small Roadside Sign Supports and Assemblies"
- Item 647, "Large Roadside Sign Supports and Assemblies."

65.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that the following small roadside sign support types are furnished by Department-approved manufacturers on the Material Producer List (MPL), entitled "[Crashworthy Small Roadside Sign Supports](#)":
 - wedge anchor system with thin-walled tubing post.
 - universal anchor system with thin-walled tubing post or fiberglass-reinforced plastic (FRP) post.
- verifies that triangular slipbase system mounts (small roadside sign support type) comply with the detail drawings located on the Traffic Operations Division (TRF) website.
NOTE: The slipbase component for this mount type must be furnished by a Department-approved manufacturer on the MPL.
- inspects small roadside sign supports for the following:
 - galvanized coating damage (See SECTION 34 - GALVANIZED COATINGS.) or shipping damage (bent, twisted, etc.)
 - Department monogram for Type G and bridge mounted small roadside sign supports inspected by CST/M&P.
NOTE: [Form 1818 \(D-9-USA-1\)](#), "[Material Statement](#)," and attached mill test reports (MTRs) or certifications must be furnished for all steel sign supports not inspected by CST/M&P. (See SECTION 16 - BUY AMERICA DOCUMENTATION PROGRAM.)
- inspects large roadside sign supports for the following:
 - galvanized coating damage (See SECTION 34 - GALVANIZED COATINGS.) or shipping damage (bent, twisted, etc.)
 - Department monogram for large roadside sign supports inspected by CST/M&P.
- advises CST/M&P when supports appear questionable.

65.3 Functions of CST/M&P

CST/M&P performs the following functions:

- obtains a completed [Form 1818 \(D-9-USA-1\)](#) with MTRs and certifications on all inspected large roadside sign supports and Type G and bridge-mounted small roadside sign supports.

- inspects and stamps with the Department monogram all large roadside sign supports and Type G and bridge mounted small roadside sign supports fabricated at locations where CST/M&P performs inspection.
- issues Structural Test Reports for all material inspected or tested by CST/M&P.
- assists TRF, when requested, in maintaining the approved MPL.
- assists the project engineer when requested.

65.4 Sampling and Testing

Sampling and testing are not required.

SECTION 66 - ROADWAY ILLUMINATION ASSEMBLIES

66.1 Reference

Refer to the [Standard Specifications](#) for information on Item 610, "Roadway Illumination Assemblies."

66.2 Functions of the Project Engineer

The project engineer performs the following functions:

- inspects roadway illumination assemblies for the following:
 - Department monogram for roadway illumination poles, luminaire arms, and anchor bolts inspected by CST/M&P.
 - proper dimensions and general fabrication. (Also see SECTION 7 - ANCHOR BOLTS.)
 - visual defects in the welds.
 - damage or defects in the galvanized steel or paint coatings such as bare spots, peeling, flaking, etc. (See SECTION 34 - GALVANIZED COATINGS.)
 - obtains a manufacturer's certification for transformer bases that lists ASTM material specification, metal alloy and temper, and that the base metal meets the physical and chemical test requirements.
 - samples light fixtures for testing according to Section 65.4, "Sampling and Testing."
 - verifies that roadway illumination light fixtures and transformer bases are furnished from manufacturers on the Material Producer List (MPL), entitled "[Roadway Illumination and Electrical Supplies](#)," maintained by the Traffic Operations Division (TRF).
- advises CST/M&P of any unacceptable material received at the job site.
- verifies that anchor bolts (for shoe base and concrete traffic barrier base poles) are lubricated and tightened, when erecting the structure, per Standard Specification Item 449, "Anchor Bolts."
- verifies that transformer bases are stamped, incised, or marked by other approved permanent means to show the fabricator's name or logo, and model number.

66.3 Functions of CST/M&P

CST/M&P performs the following functions:

- obtains [Form 1818 \(D-9-USA-1\)](#), "[Material Statement](#)," with mill test reports (MTRs) and certifications for all inspected roadway illumination poles, luminaire arms, and anchor bolts.
- inspects and stamps with the Department monogram roadway illumination poles, luminaire arms, and anchor bolts fabricated at locations where CST/M&P performs inspection.
- issues Structural Test Reports to the project engineer for the following materials inspected or tested by CST/M&P:
 - roadway illumination poles
 - luminaire arms
 - anchor bolts.
- assists the project engineer when requested.

66.4 Sampling and Testing

Perform sampling and testing for light fixtures, if required, in accordance with [Tex-1110-T, "Sampling Lighting Assemblies."](#) Contact TRF for any special instructions.

SECTION 67 - ROADWAY MARKER TABS (TEMPORARY, FLEXIBLE)

67.1 Overview

The specifications for this material are outlined in [DMS-8242, "Temporary Flexible, Reflective Roadway Marker Tabs."](#) Refer to the [Standard Specifications](#) for information on Item 662, "Work Zone Pavement Markings."

67.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that furnished temporary flexible reflective roadway marker tabs designated for use are from a Department-approved material source on the Material Producer List (MPL), entitled "[Temporary Flexible, Reflective Roadway Marker Tabs.](#)"
- if desired, samples material of questionable quality at the job site.

67.3 Functions of CST/M&P

CST/M&P performs the following functions:

- tests samples submitted by the project engineer.
- samples and tests for quality assurance temporary flexible reflective roadway marker tabs at the origin, warehouse, or jobsite and maintains the approved MPL.
- assists the project engineer when requested.

67.4 Sampling and Testing

Sample questionable material for testing, if desired, in accordance with [Tex-729-I, "Sampling Traffic Markers."](#)

SECTION 68 - SAFETY END TREATMENTS (PRECAST)

68.1 Reference

Refer to the [Standard Specifications](#) for information on Item 467, "Safety End Treatments."

68.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies the following:
 - proper marking information (manufacturer's name or trademark, **type and size designation**, and casting date).
 - correct diameter, slope, or bevel.
 - concrete design strength requirements achieved prior to shipment.
- may reject precast SET units for the following:
 - improper optional headwall height (headwall projections above pipe SET slopes that are greater than allowed in the plans increase the hazard to errant vehicles).
 - broken ends that prevent proper jointing.
 - fractures or cracks passing through the wall.
 - surface defects indicating honeycombed or open texture surfaces.
 - improper jointing (out of round pipe).
 - **improper/inadequate repairs.**
- inspects the components for safety end treatments (pipe runners, plates and angles, bolts and nuts) for proper sizes, dimensions, coating quality, and acceptability. (See SECTION 34 - GALVANIZED COATINGS for information on galvanized steel.)
- obtains completed [Form 1818 \(D-9-USA-1\), "Material Statement,"](#) with attached mill test reports (MTRs), certifications, and galvanizing reports for the safety end treatment steel components. (See SECTION 16 – BUY AMERICA DOCUMENTATION PROGRAM.)

68.3 Function of CST/M&P

CST/M&P assists the project engineer when requested.

68.4 Sampling and Testing

Sampling and testing are not required.

SECTION 69 - SIGN WALKWAYS

69.1 Reference

Refer to the [Standard Specifications](#) for information on Item 654, "Sign Walkways."

69.2 Functions of the Project Engineer

The project engineer performs the following functions:

- inspects sign walkways for the following:
 - Department monogram for sign walkways inspected by CST/M&P.
 - shipping damage to galvanized coating. (See SECTION 34 - GALVANIZED COATINGS.)
 - proper assembly.
- advises CST/M&P of any unacceptable materials received at the job site.

69.3 Functions of CST/M&P

CST/M&P performs the following functions:

- obtains a completed [Form 1818 \(D-9-USA-1\), "Material Statement,"](#) with mill test reports (MTRs) and certifications for all inspected sign walkways.
- inspects and stamps with the Department monogram sign walkways fabricated at locations where CST/M&P performs inspection.
- issues Structural Test Reports for all material inspected or tested by CST/M&P.
- assists the project engineer when requested.

69.4 Sampling and Testing

Sampling and testing are not required.

SECTION 70 - SIGNS

70.1 Functions of the Project Engineer

The project engineer performs the following functions:

- inspects signs for the following:
 - Department monogram for signs inspected by CST/M&P. (Monogram is placed on the back side of the signs.)
 - shipping or handling damage. (See Section 636.3.B, "Storage and Handling" of the Standard Specifications for sign damage criteria.)
 - proper storage. (See Section 636.3.B, "Storage and Handling" of the Standard Specifications for proper sign storage.)
 - proper assembly.

70.2 Functions of CST/M&P

CST/M&P performs the following functions:

- obtains a completed [Form 2273, "Signing Material Statement,"](#) with proper attachments (sign component material certifications, etc.) for all inspected signs.
- inspects and stamps with the Department monogram signs fabricated at locations where CST/M&P performs inspection.
- verifies proper completion of the sign identification decals required on the back side, lower left hand corner of the signs. (See Item 643, "Sign Identification Decals.")
- issues Structural Test Reports for all material inspected or tested by CST/M&P.
- assists the project engineer when requested.

70.3 Sampling and Testing

Sampling and testing are not required at the job site.

70.4 Remarks

Construction signs are not inspected by CST/M&P.

SECTION 71 - SOUND/NOISE WALLS (PRECAST)

See SECTION 53 - PRECAST NONSTRESSED CONCRETE for precast sound/noise walls that are not pretensioned or post-tensioned.

See SECTION 56 - PRESTRESSED CONCRETE for precast sound/noise walls fabricated by the process of pretensioning or post-tensioning or a combination of both methods.

SECTION 72 - STRUCTURAL STEEL BRIDGE MEMBERS

72.1 References

Refer to the [Standard Specifications](#) for information on the following:

- Item 441, "Steel Structures"
- Item 446, "Cleaning and Painting Steel"
- Item 447, "Structural Bolting"
- Item 448, "Steel Field Welding."

72.2 Functions of the Project Engineer

The project engineer performs the following functions:

- inspects structural steel rolled beams, welded I-section plate girders, box girders, tub girders, bent caps, and diaphragms for the following:
 - Department monogram for structural steel inspected by CST/M&P.
 - damage such as dents, bends or twists, and missing studs.
 - damage or deterioration to the paint.
 - markings that would affect uniform weathering on weathering steel.
 - match marks, according to erection plans, for bolted connections.
 - proper fit during and after erection.
- verifies that field painting is properly performed per Item 446.
- verifies that fasteners for field bolted connections are properly installed per Item 447.
- verifies that welding for field welded connections is properly performed per Item 448.
NOTE: TxDOT Bridge Division Field Operations Section provides technical support for field welding of structural steel bridges.
- advises CST/M&P of unacceptable material received at the job site.

72.3 Functions of CST/M&P

CST/M&P performs the following functions:

- obtains a completed [Form 1818 \(D-9-USA-1\), "Material Statement,"](#) with Mill Test Reports (MTRs) and certifications for all inspected structural steel.
- inspects and stamps with the Department monogram structural steel fabricated at locations where CST/M&P performs inspection.
- issues Structural Test Reports for all material inspected by CST/M&P.
- assists the project engineer when requested.

72.4 Sampling and Testing

Perform in the field an installation verification test on fasteners for field bolted connections per Section 447.4.A, "Equipment Preparation," of the [Standard Specifications](#).

If desired, perform, jobsite Rotational Capacity (RC) testing on fasteners for field bolted connections per [Tex-452-A, "Rotational Capacity Testing of Fasteners Using a Tension Measuring Device."](#)

If desired, sample bolts, nuts, and washers (i.e., fasteners) for field bolted connections per [Tex-719-I, "Sampling High Strength Bolts, Nuts, and Washers."](#)

SECTION 73 - THERMOPLASTIC PAVEMENT MARKINGS

73.1 Overview

The specifications for this material are outlined in [DMS-8220, "Hot Applied Thermoplastic."](#) It is used as a Type I Marking Material as stated in Item 666, "Reflectorized Pavement Markings."

73.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that furnished thermoplastic pavement marking material is from a Department-approved source on the Material Producer List (MPL), entitled "[Thermoplastic Pavement Marking Materials.](#)"
- if desired, samples material of questionable quality received at the job site.

73.3 Functions of CST/M&P

CST/M&P performs the following functions:

- tests samples submitted by the project engineer.
- maintains the approved MPL.
- assists the project engineer when requested.

73.4 Sampling

Sample material for testing, if desired, in accordance with [Tex-862-B, "Sampling Thermoplastic Pavement Marking Material."](#)

73.5 Remarks

The project engineer completes [Form 202, "Identification of Material Samples,"](#) for all samples submitted to CST/M&P. Inquiries should include the quantity, name of manufacturer, product destination, and batch number.

SECTION 74 - TRAFFIC PAINT

74.1 Overview

The specifications for this material are outlined in [DMS-8200, "Traffic Paint."](#) It is used as a Type II Marking Material as stated in Item 666, "Reflectorized Pavement Markings."

74.2 Functions of the Project Engineer

The project engineer performs the following functions:

- verifies that furnished traffic paint is from a Department-approved source on the Material Producer List (MPL), entitled "[Traffic Paint Producers.](#)"
- if desired, samples material of questionable quality received at the job site.

74.3 Functions of CST/M&P

CST/M&P performs the following functions:

- tests samples of questionable material when submitted by the project engineer.
- samples and tests for quality assurance traffic paint at origin, warehouse, or job site and maintains the approved MPL.
- assists the project engineer when requested.

74.4 Sampling and Testing

Sample questionable material for testing, if desired, in accordance with [Tex-736-I, "Sampling Structural Coatings."](#)

74.5 Remarks

The project engineer completes [Form 202, "Identification of Material Samples,"](#) for all samples submitted to CST/M&P. Inquiries should include the quantity, name of manufacturer, product destination, and batch number.

SECTION 75 - TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)

75.1 Reference

Refer to the [Standard Specifications](#) for information on Item 686, "Traffic Signal Pole Assemblies."

75.2 Functions of the Project Engineer

The project engineer performs the following functions:

- inspects traffic signal pole assemblies for the following:
 - Department monogram for assemblies (including anchor bolts) inspected by CST/M&P.
 - proper dimensions and general fabrication. (Also see SECTION 7 - ANCHOR BOLTS.)
 - visual defects in the welds.
 - damage or defects in the galvanized or paint coatings such as bare spots, peeling, flaking, etc. (See SECTION 34 - GALVANIZED COATINGS.)
- advises CST/M&P of any unacceptable material received at the job site.
- verifies that anchor bolts are lubricated and tightened, when erecting the structure, per Standard Specification Item 449, "Anchor Bolts."
- visually inspects traffic signal pole mast arms, after installation with signal heads, for vertical vibration at arm tip that might require damping devices. (See "Vibration Warning" in mast arm signal pole plan sheets.)

75.3 Functions of CST/M&P

CST/M&P performs the following functions:

- obtains a completed [Form 1818 \(D-9-USA-1\), "Material Statement,"](#) with mill test reports (MTRs) and certifications for all inspected traffic signal poles, mast arms, luminaire arms, and anchor bolts.
- inspects and stamps, with the Department monogram, traffic signal poles, mast arms, luminaire arms, and anchor bolts fabricated at locations where CST/M&P performs inspection.
- issues Structural Test Reports for all material inspected or tested by CST/M&P.
- assists the project engineer when requested.

75.4 Sampling and Testing

Sampling and testing are not required.

SECTION 76 - TREATED TIMBER PRODUCTS

76.1 Functions of the Project Engineer

The project engineer performs the following functions:

Treated Timber Poles for Electrical Services

Performs inspection to verify compliance with Item 627, "Treated Timber Poles," which includes verification of the following:

- receipt of a treatment certification indicating the preservative treatment type and that the treatment values shown meet the required minimum net retention of preservative.
- compliance of the dimensional and quality requirements of the poles.
- proper marking of the poles.

Treated Piling, Lumber, Posts, and Blocks

All treated piling, lumber, posts for metal beam guard fence (MBGF) and wire fence, and blocks for MBGF proposed for Department use must be inspected at the treating plant by a commercial inspection agency authorized by CST/M&P. The project engineer verifies the following:

- all furnished material is from a Department-approved treating plant or supplier on the Material Producer List (MPL), entitled "[Timber Treating Plants and Suppliers](#)," and indicates the source in the Contract Information Segment (CIS) for CIS projects or attaches QM samples for SiteManager projects.
- completed [Form 2148, "Certification of Compliance \(Treated Timber Products\)"](#) is received for each shipment. (See Item 492 documentation requirement.)
- shipping invoice is received for each shipment.
- the material is hammer-marked with a Department-authorized Commercial Inspection Agency's identification mark and the Inspector's number, such as "L20." In this example, the letter "L" is Lee Inspection's identification mark, and the number "20" is a unique number assigned to one of their inspectors.

NOTE: The Department monogram will not appear on these treated timber products.

- a legible brand mark or tag with the name of the treater, the date of treatment or lot number, and the AWPA treatment specification symbol is included on all bundles of treated timber products.
- the material complies with dimensional and quality requirements.

The project engineer informs CST/M&P of any unacceptable treated timber products received at the job site.

Treated Glued Laminated Timber

The project engineer verifies:

- compliance of the material dimensional and quality requirements.
- that a legible AITC quality inspected mark is placed on each piece of glued laminated timber.

- receipt of completed [Form 2148, "Certification of Compliance \(Treated Timber Products\)"](#) for each shipment.

The project engineer informs CST/M&P of any unacceptable glued laminated timber products received at the job-site.

76.2 Functions of CST/M&P

CST/M&P performs the following functions:

- administers the inspection by a commercial inspection agency of the following treated timber products:
 - posts (for MBGF and Wire Fence)
 - blocks (for MBGF)
 - lumber
 - piling.
- maintains the approved MPL.
- maintains a list of approved sources in the CIS for CIS projects or maintains QM samples for SiteManager projects.
- assists the project engineer when requested.

76.3 Sampling and Testing

Sampling and testing are not required.

76.4 Remarks

Untreated lumber is accepted based on visual inspection by the project engineer or other responsible district personnel.

SECTION 77 - WATER

77.1 References

Refer to the [Standard Specifications](#) for information on Item 421, "Hydraulic Cement Concrete."

77.2 Function of the Project Engineer

The project engineer performs the following functions:

- for concrete mixing and curing water furnished from sources not approved by the Texas Department State Health Services, verifies receipt of test reports from the contractor showing compliance with Table 1 of Item 421 before use.
NOTE: Water from municipal suppliers approved by the Texas Department of State Health Services will not require testing.
- for concrete mix water that is a blend of concrete wash water and other acceptable water sources:
 - verifies testing by the Contractor of the blended wash water for compliance with Tables 1 and 2 of Item 421.
 - verifies that testing of blended wash water by the Contractor is performed at the frequency stated in Item 421.
- if desired, samples water and blended wash water of questionable quality used at the job site.

77.3 Functions of CST/M&P

CST/M&P tests samples of water submitted by the project engineer and issues test reports.

77.4 Sampling and Testing

Sample water for testing, if desired, per [Tex-702-I, "Sampling Water for Use in Batching and Curing Concrete."](#)

77.5 Remarks

Allow 3 days for testing.