



# Material Inspection Guide

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August 2019

Materials and Tests Division

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## SECTION 1 - OVERVIEW

### 1.1 A Look Ahead

This manual outlines the sampling, testing, and inspecting procedures and instructions for specific roadway materials. These procedures and instructions aid the Project Engineer as well as Construction Division, Materials and Pavements Section (MTD) personnel in performing sampling, testing, inspecting, and related functions. Sections are further divided into the following subsections.

- Functions of the Project Engineer
- Functions of MTD
- Sampling and Testing
- Remarks

Other subsections appear as the subject warrants.

### 1.2 Reference

Refer any questions to MTD, using the contact list below.

MTD Contact List	
Materials and Tests Division Director	512-506-5808
MTD Section Deputy Director	512-506-5843
QA Programs and Calibration	512-506-5802
Flexible Pavements Section	512-506-5836
▪ Asphalt Binder Branch	512-506-5217
▪ Bituminous Branch	512-506-5841
Coatings and Traffic Materials Section	512-506-5889
Soils and Aggregates Section	512-506-5907
Rigid Pavements and Concrete Materials Section	512-506-5858
Prefabricated Structural Materials Section	512-506-5932

## **SECTION 2 - AGGREGATE FOR ASPHALT TREATED BASE (PLANT-MIXED)**

### **2.1 Functions of the Project Engineer**

The Project Engineer:

- samples aggregate 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, and
- performs 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 MTD**

MTD:

- performs Los Angeles Abrasion testing of aggregate used to produce asphalt treated base plant mix when required by the [Standard Specifications](#), special specifications, special provisions, or plan notes, and
- performs quality testing (wet ball mill, gradation, plasticity index, sand equivalent, decantation, and crushed faces), 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 MTD for quality tests, the Project Engineer completes [Form 202, "Identification of Material Samples."](#)

Los Angeles Abrasion testing requires three working days after receipt of the samples.

## **SECTION 3 - AGGREGATE FOR BITUMINOUS MIXES**

### **3.1 *Functions of the Project Engineer***

The Project Engineer:

- 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 MTD for quality testing, and
- 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 MTD does not maintain resident inspectors at the producer’s plant.

### **3.2 *Functions of MTD***

MTD:

- performs quality testing (Los Angeles Abrasion, Five-Cycle Magnesium Sulfate Soundness, Surface Aggregate Classification, and Micro-Deval) for aggregate on bituminous mixes when required by the [Standard Specifications](#), special specifications, special provisions, or plan notes,
- administers the AQMP as stated in [Tex-499-A, “Aggregate Quality Monitoring Program,”](#)
- performs quality testing on all samples submitted by the Districts, and
- performs job control testing at commercial producers of aggregate for bituminous mixes where MTD maintains resident inspectors and when production of the bituminous mixture is completed by the same producer. In this case, MTD 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 MTD.

- 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.”](#)
- Sampling and testing for quality tests are not required when the published value of the source, as listed in the current Material Producer List entitled “[Aggregates \(Bituminous Rated Source Quality Catalog\),](#)” meets the project specifications.
- 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 MTD 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 the 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; and
- identification marks or district number of this sample.

Allow 3–4 weeks for testing.

## **SECTION 4 - AGGREGATE FOR FLEXIBLE BASE**

### **4.1 Functions of the Project Engineer**

The Project Engineer:

- performs job control testing 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, and
- performs 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 Functions of MTD**

MTD 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 MTD for quality 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:

- samples aggregate 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 MTD for quality testing, and
- performs 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 MTD**

MTD:

- performs quality testing (Los Angeles Abrasion, Five-Cycle Magnesium Sulfate Soundness, and Micro-Deval) 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,”](#) and
- performs 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 MTD.
  - Sample in accordance with [Tex-400-A, “Sampling Stone, Gravel, Sand, and Mineral Aggregates.”](#)
  - Sampling and testing for quality tests are not required when the published value of the source, as listed in the current Material Producer List entitled “[Aggregates \(Concrete Rated Source Quality Catalog\)](#),” meets the project specifications.

- 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 MTD for quality tests, the Project Engineer completes and submits [Form 202, “Identification of Material Samples.”](#)

Include the following information for each Form 202:

- month, day, and year the sample was taken;
- name of Area Engineer;
- name of the 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; and
- identification marks or district number of this sample.

Allow 3–4 weeks for testing.

## SECTION 6 - AGGREGATE FOR SURFACE TREATMENT

### 6.1 Functions of the Project Engineer

The Project Engineer:

- 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 MTD for quality testing, and
- performs job control testing as required by the [Standard Specifications](#), special specifications, special provisions, or plan notes when MTD does not maintain resident inspectors at the producer’s plant.

### 6.2 Functions of MTD

MTD:

- performs quality testing (Los Angeles Abrasion, Five-Cycle Magnesium Sulfate Soundness, Surface Aggregate Classification, Micro-Deval) 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,”](#)
- performs quality testing on all samples submitted by the Districts, and
- performs job control testing at commercial plants where MTD maintains resident inspectors. In this case, MTD 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 entitled “[Aggregates \(Bituminous Rated Source Quality Catalog\)](#),” meets the project specifications.

#### Quality Tests

- QM Sources
  - District laboratory samples aggregate sources that are under the AQMP when notified by MTD.

- 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 MTD for quality tests, the Project Engineer completes [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 the 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; and
- identification marks or district number of this sample.

Allow 3–4 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:

- obtains a completed [Form 1818 \(D-9-USA-1\), “Material Statement,”](#) with mill test reports (MTRs) and certifications for all anchor bolts and accompanying nuts and washers, (See [SECTION 16 – BUY AMERICA DOCUMENTATION PROGRAM.](#))
- inspects anchor bolts for full threading, dimensions, fit of the nuts, and length of galvanizing/zinc coating,
- contacts MTD when:
  - material, threads, or coating appear questionable,
  - fit of bolts and nuts appears to be improper, such as too loose or too tight, and
- verifies that the anchor bolts for traffic signal poles, roadway illumination poles (shoe base and CTB mounted), high mast illumination poles, intelligent transportation system (ITS) poles, and overhead sign support structures are lubricated and tightened per Item 449 when the structure is erected.

### **7.3 Functions of MTD**

MTD 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 MTD for instructions.

## **SECTION 8 – ANTI-GRAFFITI COATINGS**

### **8.1 Overview**

This material is an anti-graffiti coating as specified in [DMS-8111, “Anti-Graffiti Coating”](#) and Item 740, “Graffiti Removal and Anti-Graffiti Coating.”

### **8.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that furnished anti-graffiti coatings are from a Department-approved source on the current Material Producer List entitled “[Paint, Anti-Graffiti.](#)” and
- samples coating, one sample per project, and submits to MTD for testing.

### **8.3 Functions of MTD**

MTD:

- tests samples submitted by the Project Engineer.
- maintains the Material Producer List entitled “[Paint, Anti-Graffiti.](#)”

### **8.4 Sampling and Testing**

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

### **8.5 Remarks**

Coating must be thoroughly agitated before sampling or use. Samples must be shipped in clean friction top cans.

The Project Engineer completes [Form 202, “Identification of Material Samples.”](#) for all samples submitted to MTD. Inquiries should include the type of material, quantity, name of manufacturer, and batch number.

## **SECTION 9 - ANTI-ICER/DE-ICER MATERIALS**

### **9.1 Overview**

MTD pre-qualifies anti-icer/de-icer materials per [DMS-6400, “De-Icer/Anti-Icer.”](#)

Anti-icers/de-icers from a Department-approved source on the current Material Producer List entitled “[De-Icer/Anti-Icer](#)” will not require sampling for testing unless deemed necessary by the Engineer.

### **9.2 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.

### **9.3 Functions of MTD**

MTD:

- tests samples of salt and other chemical de-icer submitted by the Project Engineer,
- issues test reports to the Project Engineer, and
- maintains the Material Producer List entitled “[De-Icer/Anti-Icer.](#)”

### **9.4 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, and
- place a liquid sample in a sealed plastic container.

Allow 10 working days for testing.

## 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:

- For asphalts approved at the point of origin:
  - verifies that the MTD lab number shown on the producer's invoice is a valid, passing lab number for the appropriate material and supplier;
  - samples each grade and source of asphalt, oil, or emulsion once, per project when required by the [Guide Schedule of Sampling and Testing](#);
  - collects additional samples as required by particular specification:
    - Item 316 one sample, per day to be retained, and
    - Item 340/341/342/344/346/347/348 one sample, per lot to be retained;
  - samples any asphalt, oil, or emulsion suspected of being contaminated or not conforming to specification requirements;
  - samples asphalt from the project that has been stored for more than a month;
  - submits sample to MTD for testing;
  - provide justification for acceptance of failing project samples, and document it in SiteManager within 30 days of the binder being used on the project;
  - rejects materials that are not preapproved or that are improperly identified;
  - source materials using the assistant to associate MTD QM samples to the project within 30 days of the binder being used on the project; and
  - if the binder source or grade changes, source materials using the assistant to associate MTD QM samples to the project. This can be found in the [Asphalt Binder Inspection Guide](#).

NOTE: Asphalts stored on a project, for a period more than a month, are considered to be an unapproved product. Sample these products and submit to MTD for reverification and re-approval.

- For asphalts approved at the point of consumption (i.e. asphalt rubber and injected latex):
  - collect or witness the collection of samples,
  - perform required field testing on the samples, and
  - submit samples to MTD for laboratory testing.

### 10.3 Functions of MTD

#### MTD:

- maintains a [Material Producer List \(MPL\)](#) of asphalt binder suppliers who are prequalified to supply asphalt to TxDOT projects;
- samples, tests, and preapproves asphalt, oils, and emulsions at the source before shipment to the Department projects; and
- tests and reports any samples submitted by the Project Engineer with clear indication whether or not the material meets the specifications.

### 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 containers.

- AC or PG Asphalt – 1-qt. (1-liter) double friction top can.
- Cutbacks – 1-qt. (1-liter) screw-top cans.
- Emulsions – 1-qt. (1-liter) wide-mouth plastic jars.

Log samples into SiteManager and label according to Tex-500-C and MTD guidance document, the [Asphalt Binder Inspection Guide](#). The minimum required information for asphalt samples in SiteManager are:

- producer,
- producer facility location,
- grade,
- district,
- date sampled, and
- project information, including highway and CSJ.

## 10.5 Reference Documents

- Details and guidance for collecting and labelling samples can be found in the [Asphalt Binder Inspection Guide](#).
- Details of how to create a sample in SiteManager can be found in the [Asphalt Binder Inspection Guide](#).
- Details of how to associate QM samples with projects in SiteManager can be found in the [Asphalt Binder Inspection Guide](#).
- Details of how to associate non-test project samples with projects in SiteManager can be found in the [Asphalt Binder Inspection Guide](#).

## 10.6 Remarks

Take care 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 512-506-5217 or 512-506-5147, or in writing to the Texas Department of Transportation, MTD, 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, asphaltic patching mixes, and microsurfacing.

### ***11.2 Functions of the Project Engineer***

The Project Engineer performs plant inspection, sampling, and job control testing except at commercial producers of bituminous mixtures where MTD maintains authorized inspectors.

### ***11.3 Functions of MTD***

MTD:

- tests samples submitted by the Project Engineer, including referee samples,
- tests re-core referee samples,
- performs forensic investigations as requested,
- samples, tests, and inspects bituminous mixtures where MTD 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,
- maintains Material Producer Lists for pre-qualified asphaltic patching mixtures, and
- administers state-wide proficiency program for Level 1A certified technicians.

### ***11.4 Sampling and Testing***

When it is necessary for the Project Engineer to sample at destination, sample in accordance with [Tex-221-F, “Sampling Aggregate for Bituminous Mixtures, Surface Treatments, and Limestone Rock Asphalt,”](#) 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,” and Table IX, “Microsurfacing.”

### ***11.5 Remarks***

When shipping samples to MTD for quality tests, the Project Engineer completes and submits [Form 202, “Identification of Material Samples.”](#) or [Form Tx2Performance, “Performance Testing Request Form.”](#)

Include the following information (if applicable):

- month, day, and year the sample was taken;

- name of Area Engineer;
- name and contact information of the Department employee or industry representative who obtained the sample;
- name of Contractor;
- name of producer;
- project district;
- project control, section, and job number;
- federal project number;
- mix type, including if the sample is warm mix asphalt;
- specification item relating to this sample;
- SiteManager number;
- actual asphalt grade;
- Rice gravity;
- identification marks or district number of this sample;
- tests to be performed; and
- molding information including number of gyrations and weight.

## **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, and
- 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 MTD has qualified the manufacturer to supply the material:

- rubber asphalt crack sealer,
- bituminous marker adhesive, and
- fiber reinforced polymer patching materials.

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

MTD 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 MTD 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, and
- 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), or
- 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 Drains.”

### **13.3 Functions of the Project Engineer**

The Project Engineer:

- verifies that furnished box culvert sections are from a Department-approved fabricator on the current Material Producer List entitled “[Reinforced Concrete Pipe and Machine-Made Precast Box Culvert Fabrication Plants.](#)” and that the fabricator’s designated approval stamp is placed on the box culvert sections;

NOTE: See the Material Producer List for each fabricator’s designated approval stamp.

- inspects precast machine-made box culverts received on the job site for the following:
  - excessive cracking and other damage,
  - proper size and fill height (size and fill height are marked on box culverts), and
  - proper installation;
- attaches SiteManager QM test reports; and
- advises MTD of unacceptable material received at the job site.

### **13.4 Functions of MTD**

MTD:

- maintains the Material Producer List entitled “[Reinforced Concrete Pipe and Machine-Made Precast Box Culvert Fabrication Plants.](#)” and
- assists the Project Engineer when requested.

## **SECTION 14 - BRIDGE BEARINGS AND ASSEMBLIES**

### **14.1 References**

Refer to the [Standard Specifications](#) for information on Item 434, “Bridge Bearings,” and Item 442, “Metal for Structures.”

### **14.2 Functions of the Project Engineer**

The Project Engineer:

- accepts plain or laminated elastomeric bearings, sliding elastomeric bearings, high load multi-rotational (HLMR) bearings, 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 (e.g., direction of pad slope, location);
  - Sliding Elastomeric Bearings – Checks each sliding bearing for the Department monogram and checks for shipping damage; and
  - HLMR Bearings, Pedestals, and Shoes – Checks each HLMR bearing, pedestal, and shoe for the Department monogram and checks for shipping damage; checks for galvanizing damage on pedestals (See [SECTION 32 – GALVANIZED COATINGS](#)); and
- advises MTD of unacceptable materials received at the job site.

### **14.3 Functions of MTD**

MTD:

- 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 MTD performs inspection,
- issues Structural Test Reports for all material inspected or tested by MTD, and
- 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:

- 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 current Material Producer List entitled “[Polymer Concrete](#)” and that the lab number has not expired; and
- verifies that joint sealer material furnished is from a Department-approved source on the Material Producer List entitled “[Joint Sealers](#)” and that the lab number has not expired.

### **15.3 Functions of MTD**

MTD:

- performs tests for pre-approval of sealed expansion joint systems,
- assists the Project Engineer when requested, and
- maintains the Material Producer Lists entitled “[Polymer Concrete](#)” and “[Joint Sealers](#).”

### **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 6.1.1, “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 6.1.1 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.

MTD 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 MTD are as follows:

### Steel and Iron Items Inspected and Tested by MTD

- Project Engineer receives MTD Structural Test Reports as proof of compliance with the requirements of the specifications, and
- MTD 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 MTD

- The Project Engineer:
  - submits samples with the required documentation obtained from the supplier (completed [Form 1818 \(D-9-USA-1\), “Material Statement”](#) with attached MTRs, certifications, galvanizing reports, etc.) to MTD for testing, and
  - receives MTD 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

- Project Engineer obtains from the supplier the completed [Form 1818 \(D-9-USA-1\), “Material Statement”](#) (Section 16.5, “Documentation”), with attached MTRs, certifications, galvanizing reports, etc., and
- MTD assists the Project Engineer when requested.

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

- Project Engineer:
  - obtains documentation verifying the material was obtained from a regional or District warehouse, and
  - when requested to inspect and test, obtains from the supplier the completed [Form 1818 \(D-9-USA-1\), “Material Statement”](#) (Section 16.5, “Documentation,”) with attached MTRs, certifications, galvanizing reports, etc.

### Reinforcing Steel Used in Concrete

[Form 1818 \(D-9-USA-1\), “Material Statement”](#) is not required for reinforcing steel used in concrete. Project Engineer obtains only mill test reports and any applicable coating certifications for reinforcing steel furnished in accordance with Item 440, “Reinforcement for Concrete.”

## 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, and
  - notarized statement attesting to the domestic origin of the furnished steel strand.

**WARNING:** If 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 MTD) 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 - CHAIN LINK FENCE**

### **17.1 References**

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

### **17.2 Functions of the Project Engineer**

The Project Engineer:

- 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 32 – GALVANIZED COATINGS.](#))
  - zinc daggers or icicles – long, sharp projections of zinc, if minor, are acceptable if removed by filing. Watch for brittle coating, and
- advises MTD of questionable material received at the job site.

### **17.3 Functions of MTD**

MTD assists the Project Engineer when requested.

### **17.4 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 18 - CONCRETE ADMIXTURES**

### **18.1 Overview**

The chemical admixtures for concrete specifications are outlined in [DMS-4640, “Chemical Admixtures for Concrete.”](#) It includes admixtures for air-entrainment, water reduction, retardation, acceleration, water reduction and retardation, water reduction and acceleration, high-range water reduction, high-range water reduction and retardation, and latex. DMS-4640 is referenced in Item 421, “Hydraulic Cement Concrete.”

### **18.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that furnished concrete admixtures are from a Department-approved source on the current Material Producer List, entitled [“Chemical Admixtures for Concrete,”](#)
  - obtains copies of the Contractor’s invoices 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 MTD for testing, and
- approves the use of chemical admixtures not included in the Department’s Material Producer List. (See this Section 18.5, “Remarks.”)

### **18.3 Functions of MTD**

MTD:

- samples, pre-tests, and approves concrete admixtures in the laboratory,
- maintains the Material Producer List entitled [“Chemical Admixtures for Concrete,”](#) and
- tests concrete admixture samples submitted by the Project Engineer.

### **18.4 Sampling and Testing**

- Sampling frequency – sample if questionable quality or when deemed necessary
- Sample size – 1-pt. plastic bottle

### **18.5 Remarks**

Follow the manufacturer’s storage instructions and agitate any admixture stored for an extended period before use.

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

Any admixture proposed for use that is not on the Department's Material Producer List will require a minimum of 12 months to test.

For Type S, "Specific Performance Admixtures for Concrete," The Project Engineer is responsible for approving the use of Type S admixtures when not specified in the plans. Document the justification for using Type S admixtures and ensure it meets requirements outlined in ASTM C494 "Standard Specification for Chemical Admixtures for Concrete." For assistance in reviewing the use of Type S chemical admixtures, contact MTD.

## **SECTION 19 - CONCRETE MEMBRANE CURING COMPOUNDS**

### **19.1 Overview**

Refer to [DMS-4650, “Hydraulic Cement Concrete Curing Materials and Evaporation Retardants,”](#) for information on these materials.

Concrete membrane curing compound is sampled at the point of manufacture and submitted to MTD for testing.

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

### **19.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that furnished concrete membrane curing compound is from a Department-approved source listed on the current Material Producer List entitled [“Concrete Curing Compounds \(Liquid Membrane-Forming\),”](#)
- samples material of questionable quality received at the job site if desired,
- ensures that curing compounds are thoroughly agitated before use or sampling, and
- ensures that product is not diluted before or during application.

### **19.3 Functions of MTD**

MTD:

- samples and tests for quality assurance at origin or job site to ensure conformance to Department specifications,
- maintains the Material Producer List entitled [“Concrete Curing Compounds \(Liquid Membrane-Forming\).”](#) and
- tests samples submitted by the Project Engineer.

### **19.4 Sampling and Testing**

Sampling at the project site for testing is not required but may be performed if material is of questionable quality. Sample questionable material for testing, if desired, in accordance with [Tex-718-I, “Sampling Liquid Membrane-Forming Compounds for Curing Concrete.”](#)

## **19.5 Remarks**

Curing compounds must be thoroughly agitated before sampling, and samples must be shipped in new friction top cans.

The Project Engineer completes [Form 202, "Identification of Material Samples,"](#) for all samples submitted to MTD. Inquiries should include the type of material, quantity, name of manufacturer, and batch number.

## **SECTION 20 - CONCRETE REPAIR MATERIAL – INORGANIC CEMENTING MATERIALS**

### **20.1 Overview**

This material is an inorganic cementing material with specifications as outlined in [DMS-4655, “Concrete Repair Materials.”](#) It includes rapid repair materials (Type A), ultra-rapid repair materials (Type B), vertical or overhead repair materials (Type C), and standard (non-rapid) repair materials (Type D). 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. DMS-4655 is referenced in Standard Specification Items 361, 429, 431, and 720.

### **20.2 Functions of the Project Engineer**

The Project Engineer:

- obtains copies of the Contractor’s invoice showing the concrete repair materials to be used on the project,
- verifies that furnished concrete repair materials are from a Department-approved source on the current Material Producer List entitled [“Concrete Repair Materials.”](#) and
- samples any concrete repair material of questionable quality and submits to MTD for testing.

### **20.3 Functions of MTD**

MTD:

- samples, pre-tests, and approves concrete repair materials in the laboratory,
- maintains the Material Producer List entitled [“Concrete Repair Materials.”](#) and
- tests concrete repair material samples submitted by the Project Engineer.

### **20.4 Sampling and Testing**

- sampling frequency: sampling at the job site for testing is not required but may be performed if material is of questionable quality.
- sample size: when sampling is desired, submit approximately 300 pounds of concrete repair material to MTD in moisture-resistant containers of the original package.

## 20.5 Remarks

When submitting samples to MTD, show complete information on [Form 202, “Identification of Material Samples.”](#)

## **SECTION 21 - CONCRETE REPAIR MATERIAL – POLYMERIC MATERIALS**

### **21.1 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. DMS-6170 is referenced in Item 720, “Repair of Spalling in Concrete.”

### **21.2 Functions of the Project Engineer**

The Project Engineer:

- obtains copies of the Contractor’s invoice showing the concrete repair materials to be used on the project,
- verifies that furnished concrete repair materials are from a Department-approved source on the current Material Producer List entitled [“Polymeric Materials for Patching Spalls in Concrete Pavement,”](#) and
- samples any concrete repair material of questionable quality and submits to MTD for testing.

### **21.3 Functions of MTD**

MTD:

- samples, pre-tests, and approves concrete repair materials in the laboratory,
- maintains the Material Producer List entitled [“Polymeric Materials for Patching Spalls in Concrete Pavement,”](#) and
- tests concrete repair material samples submitted by the Project Engineer.

### **21.4 Sampling and Testing**

- sampling frequency: sampling at the job site for testing is not required but may be performed if material is of questionable quality.
- sample size: when sampling for testing is required or desired, sample polymeric concrete repair material in accordance with [Tex-734-I, “Sampling Epoxy.”](#)

### **20.5 Remarks**

When submitting samples to MTD, show complete information on [Form 202, “Identification of Material Samples.”](#)

## **SECTION 22 - CONCRETE REPAIR MATERIAL – PNEUMATICALLY APPLIED**

### **22.1 Overview**

This material consists of pneumatically applied concrete or mortar as outlined in Item 431, “Pneumatically Placed Concrete,” and [DMS-4655, Type C – “Vertical or Overhead Repair Materials.”](#) Use pre-bagged concrete materials for concrete structure repair unless otherwise shown on the plans.

### **22.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that furnished concrete repair materials are from a Department-approved source on the current Material Producer List entitled [“Concrete Repair Materials,”](#) Type C,
- samples pre-bagged materials for testing (if desired),
- performs the following for mix design approval:
  - observes measuring and mixing of component materials and
  - observes application of concrete for installation test panels, and
- verifies curing, sampling, and testing of test panels.

### **22.3 Functions of MTD**

MTD:

- samples, pre-tests, and approves concrete repair materials in the laboratory,
- maintains the Material Producer List entitled [“Concrete Repair Materials,”](#) and
- tests concrete repair material samples submitted by the Project Engineer.

### **22.4 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 MTD.

### **22.5 Remarks**

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

## **SECTION 23 - CONCRETE SURFACE FINISHES**

### **23.1 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, and silicone resin emulsion paint (SREP).

Refer to [DMS-8110, “Coatings for Concrete.”](#) for information on Adhesive grout, concrete paint, and opaque sealer, and [DMS-8141, “Paint, Silicone Resin for Concrete.”](#) for information on SREP.

### **23.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that the furnished adhesive grout, concrete paint, and opaque sealers are from a Department-approved source on the current Material Producer List entitled [“Surface Finishes for Concrete.”](#)
- verifies that the furnished SREP is from a Department-approved source on the current Material Producer List entitled, [“Paint, Silicone Resin,”](#)
- samples containers (one sample per project) and submits to MTD for testing, and
- samples material of questionable quality received at the job site (if desired).

### **23.3 Functions of MTD**

MTD:

- maintains the Material Producer Lists entitled [“Surface Finishes for Concrete”](#) and [“Paint, Silicone Resin,”](#)
- tests project samples submitted by the Project Engineer, and
- assists the Project Engineer when requested.

### **23.4 Sampling and Testing**

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

### **23.5 Remarks**

Paint must be thoroughly agitated before 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 MTD. Inquiries should include the type of material, quantity, name of manufacturer, and batch number.

## **SECTION 24 - CONCRETE TRAFFIC BARRIER (PRECAST)**

### **24.1 References**

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

- Item 512, “Portable Traffic Barrier”
- Item 514, “Permanent Concrete Traffic Barrier”

### **24.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that furnished precast concrete traffic barrier, fabricated at a multi-project fabrication plant, is from a Department-approved fabricator on the current Material Producer List entitled [“Concrete Traffic Barrier Fabrication Plants \(Multi-Project\)”](#) and that the fabricator’s designated approval stamp is placed on the material,

NOTE: Item 424 defines multi-project fabrication plants. See the Material Producer List for each fabricator’s designated approval stamp. When portable barrier is to be furnished and then 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, “Portable Traffic Barrier.”)

- attaches SiteManager QM test report for precast concrete traffic barrier furnished by Department-approved multi-project plants, and
- advises MTD when items of unacceptable quality are received on the job site.

### **24.3 Functions of MTD**

MTD:

- maintains the Material Producer List entitled [“Concrete Traffic Barrier Fabrication Plants \(Multi-Project\),”](#) and
- assists the Project Engineer when requested.

## **SECTION 25 - CORRUGATED METAL PIPE**

### **25.1 References**

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

- Item 460, “Corrugated Metal Pipe”
- Item 467, “Safety End Treatment”

### **25.2 Functions of the Project Engineer**

The Project Engineer:

- 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 32 – 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 MTD if questionable material is received on the job site.

### **25.3 Functions of MTD**

MTD assists the Project Engineer when requested.

## **25.4 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 26 – DELINEATORS, OBJECT MARKERS, AND BARRIER REFLECTORS**

### **26.1 Overview**

The specifications for these materials are outlined in [DMS-8600, “Delineators, Object Markers, and Barrier Reflectors.”](#) DMS-8600 is referenced in Item 658, “Delineator and Object Marker Assemblies.”

### **26.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that furnished barrier reflectors are from a Department-approved source on the current Material Producer List entitled [“Barrier Reflectors.”](#)
- 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, and
  - 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, and
- samples material of questionable quality received at the job site if desired.

### **26.3 Functions of MTD**

MTD:

- tests samples submitted by the Project Engineer, and
- maintains the Material Producer List entitled [“Barrier Reflectors.”](#)

### **26.4 Sampling and Testing**

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

### **26.5 Remarks**

See [SECTION 27 – DELINEATOR AND OBJECT MARKER POSTS](#) for the reflector unit supports.

The Project Engineer completes [Form 202, "Identification of Material Samples,"](#) for all samples submitted to MTD. Inquiries should include the type of material, quantity, name of manufacturer, and batch number.

## **SECTION 27 - DELINEATOR AND OBJECT MARKER POSTS**

### **27.1 Overview**

The specifications for some of these materials are outlined in [DMS-4400, “Flexible Delineator and Object Marker Posts \(Embedded and Surface Mount Types\).”](#) DMS-4400 is referenced in Item 658, “Delineator and Object Marker Assemblies.”

### **27.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that furnished flexible posts are from a Department-approved source on the Material Producer List entitled [“Flexible Delineator and Object Marker Posts.”](#)
- samples material of questionable quality received at the job site,
- verifies that thin-walled tubing post wedge anchor systems are from a source approved by the Traffic Operations Division,
- obtains a completed [Form 1818 \(D-9-USA-1\), “Material Statement,”](#) with mill test reports (MTRs,) certifications, and galvanizing reports for wing channel posts, and (See [SECTION 16 – BUY AMERICA DOCUMENTATION PROGRAM.](#)), and
- visually inspects steel posts for damage or defects in the galvanizing coating. (See [SECTION 32 – GALVANIZED COATINGS.](#))

### **27.3 Functions of MTD**

MTD:

- tests samples submitted by the Project Engineer, and
- maintains the Material Producer List entitled [“Flexible Delineator and Object Marker Posts.”](#)

### **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. Sample flexible posts, if desired, in accordance with [Tex-737-I, “Sampling Flexible Delineator and Object Marker Posts.”](#)

### **27.5 Remarks**

The Project Engineer completes [Form 202, “Identification of Material Samples,”](#) for all samples submitted to MTD. Inquiries should include the type of material, quantity, name of manufacturer, and batch number.

## **SECTION 28 - ELASTOMERIC MATERIALS**

### **28.1 Reference**

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

### **28.2 Functions of the Project Engineer**

The Project Engineer:

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

### **28.3 Functions of MTD**

MTD assists the Project Engineer when requested.

### **28.4 Sampling and Testing**

Sampling and testing are not required.

## **SECTION 29 - EPOXIES (OTHER THAN PAINT)**

### **29.1 Overview**

Epoxies on the Material Producer List 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.

### **29.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that furnished epoxy is from a Department-approved source on the current Material Producer List entitled "[Epoxies and Adhesives.](#)"
- samples and sends epoxy to MTD if the material is not from an approved source, and
- samples epoxy purchased by the Contractor on the open market, unless prior arrangements have been made to sample at origin.

### **29.3 Functions of MTD**

MTD:

- tests samples submitted by the Project Engineer, and
- maintains the Material Producer List entitled "[Epoxies and Adhesives](#)"

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

### **29.4 Sampling and Testing**

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

### **29.5 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 30 – FIBERS FOR CONCRETE**

### **30.1 Overview**

The specifications, requirements, and specific test methods to determine the dosage of fibers for Class A and B concrete are outlined in [DMS-4550, “Fibers for Concrete.”](#)

### **30.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that furnished fibers for concrete are from a Department-approved source on the current Material Producer List entitled “[Fibers for Class A and Class B Concrete Applications,](#)” and
- ensures the minimum dosage listed in [DMS-4550, “Fibers for Concrete”](#) is used.

### **30.3 Functions of MTD**

MTD:

- samples, pre-tests, and approves fibers for concrete in the laboratory, and
- maintains the Material Producer List entitled “[Fibers for Class A and Class B Concrete Applications.](#)”

### **30.4 Sampling and Testing**

Sampling frequency for concrete made with materials appearing on the Material Producer List entitled “[Fibers for Class A and Class B Concrete Applications](#)” must be tested in accordance with the frequency established in the [Guide Schedule of Sampling and Testing.](#)

## **SECTION 31 - FRAMES, GRATES, RINGS, AND COVERS**

### **31.1 Reference**

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

### **31.2 Functions of the Project Engineer**

The Project Engineer:

- visually inspects the galvanized coating of welded steel frames and grates and the overall workmanship of these items, (See [SECTION 32 – GALVANIZED COATINGS.](#))
- visually inspects frame, grate, ring, and cover castings to ensure smooth surfaces that are free from cracks, blow holes, or other defects, and
- obtains a completed [Form 1818 \(D-9-USA-1\), “Material Statement,”](#) with mill test reports (MTRs) and certifications representing frames, grates, rings, and covers. (See [SECTION 16 – BUY AMERICA DOCUMENTATION PROGRAM.](#))

NOTE: Bridge Division (BRG) has approved frame, grate, ring, and cover casting products that are a part of the Standard Inlet and Manhole Program. These approved products can be found on the “Approved Cast Iron Product Sheets” maintained by BRG.

### **31.3 Functions of MTD**

MTD assists the Project Engineer when requested.

### **31.4 Sampling and Testing**

Sampling and testing are not required.

## **SECTION 32 - GALVANIZED COATINGS**

### **32.1 Reference**

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

### **32.2 Functions of the Project Engineer**

The Project Engineer:

- performs visual inspection of galvanized items received at the project,
- inspects galvanizing in accordance with Section 32.5, “Galvanized Coating Thickness and Defects” for items not previously inspected by MTD, and
- advises MTD of questionable material received at the job site.

### **32.3 Functions of MTD**

MTD:

- inspects galvanized coatings on items normally inspected by MTD, before shipment to the job site. Approved items bear the Department monogram,
- issues Structural Test Reports for all material inspected or tested by MTD, and
- assists the Project Engineer when requested.

### **32.4 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 MTD to inspect the galvanized coating in the field.

### **32.5 Galvanized Coating Thickness and Defects**

Coating thickness measurements are not required if MTD inspected the material. When questionable material is found, contact MTD for instructions.

Visually inspect coating finish before installation. Use good judgment to determine acceptable coating. Different steels (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 32-1—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 32-2—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 32-3—Heavy Runs/Drips**

- **Red Rust**

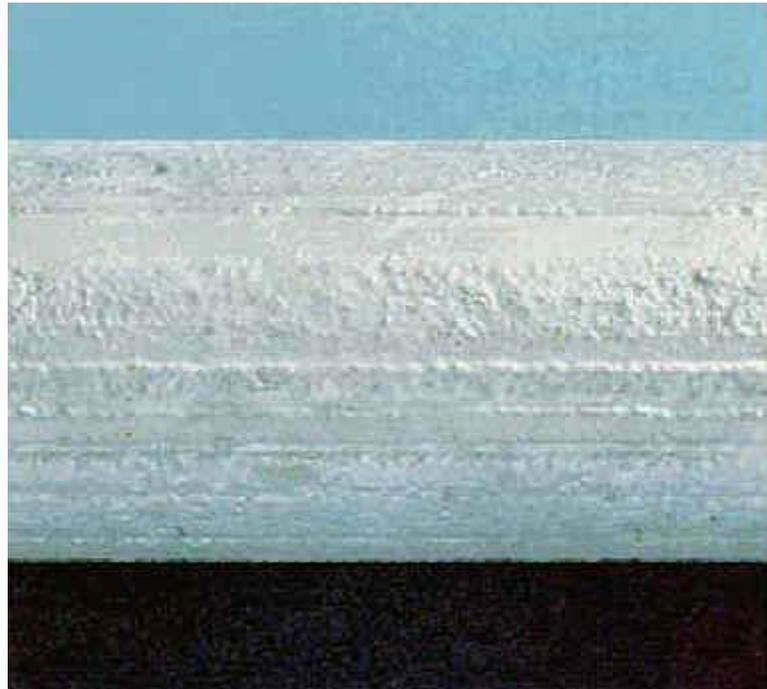
- Appearance: red, rusty stains
- Potential cause: coated items in contact with rusty steel items, weeping of pickling acid from unsealed seams and joints, presence of uncoated areas
- Action: remove by cleaning (power brush or grind to bare metal for small areas, then repair); unacceptable if large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



**Figure 32-4—Red Rust**

- **Surface Roughness**

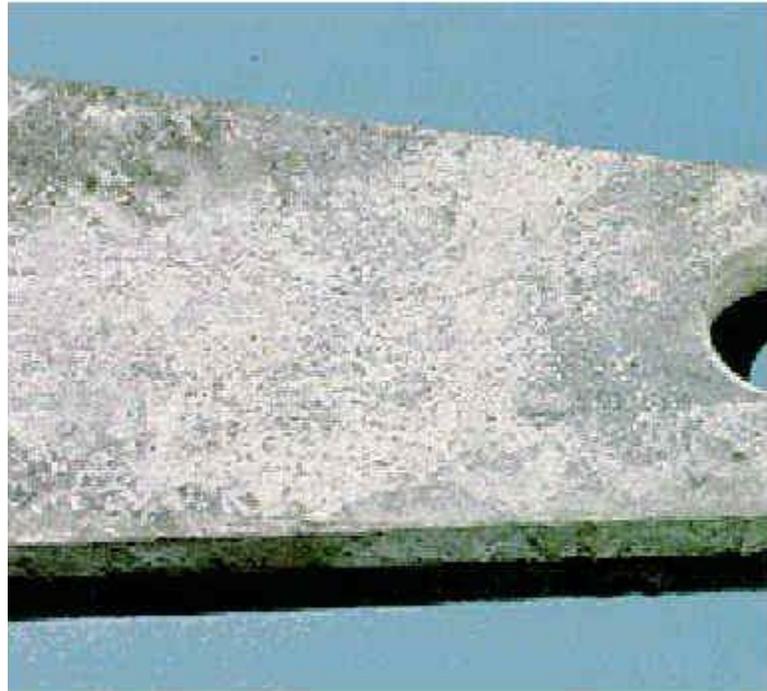
- Appearance: sandpaper surface appearance
- Potential cause: base metal chemical composition, excessive pickling, sand/shot blasting
- Action: acceptable if the chemistry of the steel meets specifications; check coating for proper thickness and adhesion



**Figure 32-5—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 32-6 –White Rust**

## **32.6 Remarks**

The *Manual of Inspection for Galvanizing* is available from MTD (512/506-5923).

## **SECTION 33 - GEOSYNTHETICS**

### **33.1 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 maintained by MTD. These materials include filter fabric, silt fence, fabric underseal, and fabric joint underseal. Materials from Department-approved sources on the Material Producer Lists will not require sampling for testing unless deemed necessary by the engineer.

### **33.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that furnished filter fabric, silt fence, and fabric underseal are from a Department-approved source on the Material Producer List entitled [“Silt Fence, Filter Fabric, and Fabric Underseal,”](#) and fabric joint underseal, is from a Department-approved source on the Material Producer List entitled [“Reinforced Fabric Joint Underseal,”](#)
- samples and sends geosynthetics to MTD if the material is not on the Material Producer Lists, and
- ensures all rolls have lot or roll numbers.

### **33.3 Functions of MTD**

MTD:

- randomly tests samples to ensure quality of material,
- maintains the Material Producer Lists entitled [“Silt Fence, Filter Fabric, and Fabric Underseal,”](#) and [“Reinforced Fabric Joint Underseal,”](#) and
- tests samples submitted by the Project Engineer.

### **33.4 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 34 - GLASS TRAFFIC BEADS**

### **34.1 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.”

### **34.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that furnished traffic beads are from a Department-approved source on the current Material Producer List entitled [“Glass Traffic Beads.”](#)
- verifies that the types of beads specified are used, and
- samples material of questionable quality received at the job site if desired.

### **34.3 Functions of MTD**

MTD:

- tests samples submitted by the Project Engineer,
- maintains the Material Producer List entitled [“Glass Traffic Beads.”](#) and
- assists the Project Engineer when requested.

### **34.4 Sampling and Testing**

Sampling at the project site for testing is not required but may be performed if material is of questionable quality. When sampling, sample one bag of beads selected at random in accordance with [Tex-830-B, “Sampling Traffic Beads.”](#)

### **34.5 Remarks**

The Project Engineer completes [Form 202, “Identification of Material Samples.”](#) for all samples submitted to MTD.

## **SECTION 35 - GROUND BOXES**

### **35.1 Reference**

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

### **35.2 Functions of the Project Engineer**

The Project Engineer:

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

### **35.3 Functions of MTD**

MTD performs testing on ground boxes received from TRF or the job site.

### **35.4 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 MTD for instructions.

## **SECTION 36 - HEADWALLS AND WINGWALLS (PRECAST)**

### **36.1 Reference**

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

NOTE: Item 466 defines headwalls and wingwalls in Section 466.2.2.1, “General.”

### **36.2 Functions of the Project Engineer**

The Project Engineer:

- verifies proper marking information (manufacturer’s name or trademark, type and size designation, and casting date),
- verifies correct diameter or design (headwalls),
- verifies correct type/wall height (wingwalls),
- verifies concrete design strength requirements achieved before shipment, and
- 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, and
  - improper or inadequate repairs.

### **36.3 Functions of MTD**

MTD assists the Project Engineer when requested.

### **36.4 Sampling and Testing**

Sampling and testing are not required.

## **SECTION 37 - HIGH MAST ILLUMINATION POLES**

### **37.1 References**

Refer to the [Standard Specifications](#) for information on Item 613, “High Mast Illumination Poles”

### **37.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that high mast illumination poles are furnished from a Department-approved fabricator on the current Material Producer List entitled [“High Mast Illumination Pole Fabrication Plants”](#) and that the fabricator’s designated approval stamp is placed on the material.

NOTE: See the Material Producer List for each fabricator’s designated approval stamp.

- verifies proper dimensions and general fabrication, (Also see [SECTION 7 – ANCHOR BOLTS.](#))
- inspects for damage or defects in the galvanized coatings such as bare spots, peeling, flaking, etc., (See [SECTION 32 – GALVANIZED COATINGS.](#))
- advises MTD of any questionable material received at the job site, and
- verifies that anchor bolts are lubricated and tightened, when erecting the pole, in accordance with Standard Specification Item 449, “Anchor Bolts.”

### **37.3 Functions of MTD**

MTD:

- obtains a completed [Form 1818 \(D-9-USA-1\), “Material Statement,”](#) with mill test reports (MTRs) and certifications for all furnished high mast illumination poles,
- maintains the Material Producer List entitled [“High Mast Illumination Pole Fabrication Plants,”](#)
- issues Structural Test Reports for all furnished high mast illumination poles, and
- assists the Project Engineer when requested.

### **37.4 Sampling and Testing**

Sampling and testing are not required.

## **SECTION 38 - HIGH MAST RINGS AND SUPPORT ASSEMBLIES**

### **38.1 References**

Refer to the [Standard Specifications](#) for information on Item 614, “High Mast Illumination Assemblies.”

### **38.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that high mast rings and support assemblies are furnished from a Department-approved fabricator on the current Material Producer List entitled [“High Mast Rings and Support Assembly Fabrication Plants,”](#) and that the fabricator’s designated approval stamp is placed on the material,

NOTE: See the Material Producer List for each fabricator’s designated approval stamp.

- verifies proper dimensions and general fabrication,
- inspects for damage or defects in the galvanized coatings such as bare spots, peeling, flaking, etc., (See [SECTION 32 – GALVANIZED COATINGS.](#))
- verifies 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 38.4, “Sampling and Testing,”
- verifies that high mast assembly kits and light fixtures are furnished from manufacturers listed on the current Material Producer List entitled [“Roadway Illumination and Electrical Supplies”](#) maintained by the Traffic Operations Division (TRF), and
- advises MTD of any questionable material received at the job site.

### **38.3 Functions of MTD**

MTD:

- obtains a completed [Form 1818 \(D-9-USA-1\), “Material Statement,”](#) with mill test reports (MTRs) and certifications for all furnished high mast rings and support assemblies,
- maintains the Material Producer List entitled [“High Mast Ring and Support Assembly Fabrication Plants,”](#)
- tests material sampled and received for testing,

- issues Structural Test Reports for all furnished high mast rings and support assemblies, and
- assists the Project Engineer when requested.

### ***38.4 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.

Have the Contractor test installed light fixtures per Item 616, “Performance Testing of Lighting Systems.”

## **SECTION 39 - HYDRAULIC CEMENT AND SUPPLEMENTARY CEMENTITIOUS MATERIALS**

### **39.1 Overview**

This section covers the functions of the Project Engineer and MTD for sampling and testing of certified sources (those appearing on the Department-approved Material Producer Lists) and non-certified sources of hydraulic cement, fly ash, slag cement, silica fume, and metakaolin. These materials are referenced in Item 421, “Hydraulic Cement Concrete.”

### **39.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that furnished cement is from a Department-approved source on the current Material Producer List entitled “[Hydraulic Cement](#),” and supplementary cementing materials are from Department-approved sources on the current Material Producer Lists entitled “[Fly Ash](#)” and “[Slag Cement](#),”
- samples hydraulic cement, slag cement, 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,
- casts cylinders made from trial batches when silica fume is used and delivers them to MTD to verify the material is completely and uniformly dispersed in the mix,
- samples hydraulic cement, fly ash, slag cement, silica fume, and metakaolin when material is of questionable quality, and
- samples hydraulic cement from certified and non-certified sources when requested by MTD.

### **39.3 Functions of MTD**

MTD:

- 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, slag cement, and metakaolin job samples for compliance with [DMS-4630, “Silica Fume,”](#) [DMS-4620 “Slag Cement,”](#) and [DMS-4635, “Metakaolin,”](#)
- tests silica fume samples from trial batches submitted by Districts to verify material dispersion in the mix, and

- maintains the Material Producer Lists entitled [“Hydraulic Cement.”](#) [“Slag Cement.”](#) and [“Fly Ash.”](#)

### **39.4 Sampling**

- Producers submit a QM sample once a month for all certified hydraulic cement, fly ash, and slag cement sources. MTD may take additional samples at any time.
  - Sample hydraulic cement and slag cement in accordance with [Tex-300-D, “Sampling Hydraulic Cement,”](#) and
  - Sample fly ash, silica fume, and metakaolin in accordance with [Tex-733-I, “Sampling Fly Ash.”](#)

## **SECTION 40 – INTELLIGENT TRANSPORTATION SYSTEM (ITS) POLES**

### **40.1 Reference**

Refer to Special Specification 6064, “Intelligent Transportation System (ITS) Pole with Cabinet.”

### **40.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that ITS poles are furnished from a Department-approved fabricator on the current Material Producer List entitled [“Intelligent Transportation System \(ITS\) Pole Fabrication Plants”](#) and that the fabricator’s designated approval stamp is placed on the material,

NOTE: See the Material Producer List for each fabricator’s designated approval stamp.

- verifies proper dimensions and general fabrication, (Also see [SECTION 7 – ANCHOR BOLTS.](#))
- inspects for damage or defects in the galvanized coatings such as bare spots, peeling, flaking, etc., (See [SECTION 32 – GALVANIZED COATINGS.](#))
- advises MTD of unacceptable material received at the job site, and
- verifies that anchor bolts are lubricated and tightened, when erecting the structure, per Item 449, “Anchor Bolts.”

### **40.3 Functions of MTD**

MTD:

- obtains a completed [Form 1818 \(D-9-USA-1\), “Material Statement.”](#) with mill test reports (MTRs) and certifications for all furnished ITS poles,
- maintains the Material Producer List entitled [“Intelligent Transportation System \(ITS\) Pole Fabrication Plants.”](#)
- issues Structural Test Reports for all furnished ITS poles, and
- assists the Project Engineer when requested.

### **40.4 Sampling and Testing**

Sampling and testing are not required.

## SECTION 41 - JOINT SEALANTS AND FILLERS

### 41.1 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."](#)

### 41.2 Functions of the Project Engineer

The Project Engineer:

- verifies that furnished Class 1, 2, 3, 4, 5, 7, and 8 joint sealants are from a Department-approved source on the current Material Producer List 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 Material Producer List entitled "[Joint Sealers.](#)"
  - for all preformed seals, visually inspects to verify size and configuration and to identify possible defects, and
  - 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 MTD 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 Flexible Pavements and Asphalt Section of MTD, and
  - 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, "Joint Sealants and Fillers"](#)), and
- for joint sealants Class 1, 2, 3, 4, 5, 7, 8, and 6 (1.625 in. nominal width and greater) not appearing on the Material Producer List entitled "[Joint Sealers.](#)" samples and submits to MTD for testing.

### **41.3 Functions of MTD**

MTD:

- tests samples submitted by the Project Engineer, and
- maintains the Material Producer List entitled [“Joint Sealers.”](#)

### **41.4 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.”](#) and
  - 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 MTD for testing.

## **SECTION 42 – JUNCTION BOXES, MANHOLES, AND INLETS (PRECAST)**

### **42.1 Reference**

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

### **42.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that precast concrete junction boxes, manholes, and inlets, fabricated at a multi-project fabrication plant, are furnished from a Department-approved fabricator on the current Material Producer List entitled [“Junction Boxes, Manholes, and Inlets Fabrication Plants \(Multi-Project\)”](#) and that the fabricator’s designed approval stamp is placed on the material,

NOTE: Item 424 defines multi-project fabrication plants. See the Material Producer List for each fabricator’s designated approval stamp.

- attaches SiteManager QM test report for precast concrete junction boxes, manholes and inlets furnished by Department- approved multi-project plants, and
- advises MTD when items of unacceptable quality are received on the job site.

NOTE: For precast manhole and inlet steel and iron appurtenances, see [SECTION 31 – FRAMES, GRATES, RINGS, AND COVERS](#).

### **42.3 Functions of MTD**

MTD:

- maintains the Material Producer List entitled [“Junction Boxes, Manholes, and Inlets Fabrication Plants \(Multi-Project\).”](#) and
- assists the Project Engineer when requested.

## **SECTION 43 – LIME AND LIME SLURRY**

### **43.1 Overview**

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

Lime producers are pre-qualified and monitored by MTD for compliance with [DMS-6330, “Pre-Qualification of Lime Sources.”](#) Only producers listed in the Material Producer List entitled [“Lime.”](#) will be allowed to supply lime to Department projects.

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

### **43.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that furnished lime is from a Department-approved source on the current Material Producer List entitled [“Lime.”](#) and
- 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 MTD for testing.

### **43.3 Functions of MTD**

MTD:

- samples lime at origin when deemed necessary,
- maintains the Material Producer List entitled [“Lime.”](#)
- tests quality for compliance with [DMS-6350, “Lime and Lime Slurry.”](#)
- tests samples submitted by the Project Engineer in accordance with [Tex-600-J, “Sampling and Testing Lime,”](#) and
- 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 properties may be altered by exposure to air and/or moisture. Use dry buckets for sampling, keep tightly closed, and submit for testing without delay.

WARNING: Quicklime is extremely hazardous and capable of inflicting severe caustic burns to skin, lung damage, eye injury, and even blindness if handled improperly. Personnel handling, sampling, or testing quicklime should wear proper protective clothing, respirators, dust-proof goggles, and waterproof gloves to prevent injury.

## **SECTION 44 – MECHANICAL COUPLERS FOR REINFORCING STEEL**

### **44.1 Overview**

The mechanical couplers for reinforcing steel specifications are outlined in [DMS-4510](#), “[Mechanical Couplers for Reinforcing Steel](#).” DMS-4510 is referenced in Item 440, “Reinforcement for Concrete.”

### **44.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that furnished mechanical couplers for reinforcing steel are from a Department-approved fabricator on the current Material Producer List entitled “[Mechanical Couplers](#),”
- obtains a completed [Form 1818 \(D-9-USA-1\)](#), “[Material Statement](#),” with mill test reports (MTRs) and certifications, (See [SECTION 16 – BUY AMERICA DOCUMENTATION PROGRAM](#).)
- verifies the written installation instructions previously obtained from the manufacturer, (These instructions must be specifically for the coupler type, model, bar size and grade in use.)
- witnesses the Contractor assemble 4 randomly sampled mechanical couplers from each sample lot, and submits the assembled mechanical couplers to MTD for testing.

### **44.3 Functions of MTD**

MTD:

- maintains the Material Producer List entitled “[Mechanical Couplers](#),”
- samples, pre-tests, and approves mechanical couplers in the laboratory, and
- tests mechanical coupler samples submitted by the Project Engineer.

### **44.4 Sampling and Testing**

Sample 4 mechanical couplers randomly from each sample lot as defined in [DMS-4510](#), “[Mechanical Couplers for Reinforcing Steel](#).” Testing performed by MTD in accordance with Tex-743-I.

## 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:

- verifies that furnished Metal Beam Guard Fence material is from a Department-approved source on the current Material Producer Lists entitled:
  - [“Timber Treating Plants and Suppliers”](#) for timber blocks and posts,
  - [“Composite Material Blocks and Posts for Metal Beam Guard Fence”](#) for composite material blocks and posts,
  - [“Metal Beam Guard Fence Rail Element Manufacturers”](#) for rail elements,

NOTE: Each approved manufacturer’s rail element brand description is shown on the Material Producer 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 Section 492.2.2, “Identification” in the [Standard Specifications.](#))
- visually inspects galvanized coating on steel items for bare spots, peeling, flaking, or handling damage, (See [SECTION 32 – GALVANIZED COATINGS.](#))
- attaches SiteManager QM test report for timber blocks and posts, composite material blocks and posts, and rail elements,
- obtains a completed [Form 1818 \(D-9-USA-1\), “Material Statement,”](#) with mill test reports (MTRs), certifications, and galvanizing reports for **all steel components** of metal beam guard fence (see [SECTION 16 – BUY AMERICA DOCUMENTATION PROGRAM](#)), and
- advises MTD of any unacceptable material received at the job site.

### 45.3 Functions of MTD

MTD:

- administers the inspection and testing of timber blocks and posts performed by a contract commercial agency,

- maintains the Material Producer Lists entitled [“Timber Treating Plants and Suppliers,”](#) [“Composite Material Blocks and Posts for Metal Beam Guard Fence,”](#) and [“Metal Beam Guard Fence Rail Element Manufacturers,”](#) and
- 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, or
- [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 Item 481, “PVC Pipe for Drains” and Item 556, “Pipe Underdrains.”

### **46.3 Functions of the Project Engineer**

The Project Engineer:

- visually inspects for damage, cracks, and proper diameter,
- visually inspects galvanized coating on steel pipe for damage or defects, (See [SECTION 32 – 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](#)), and
- 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 Functions of MTD**

MTD 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 MTD for instructions.

## SECTION 47 - MULTIPLE-PIECE TIE BARS

### 47.1 Reference

Refer to [DMS 4515, “Multiple-Piece Tie Bars for Concrete Pavement”](#) for information on multiple-piece tie bars for concrete pavement. DMS-4515 is referenced in Item 360, “Concrete Pavement.”

### 47.2 Functions of the Project Engineer

The Project Engineer:

- verifies that furnished multiple-piece tie bars are from a Department-approved source on the current Material Producer List entitled [“Multiple-Piece Tie Bar Producers,”](#)
- collects project samples from all Department projects that use multi-piece tie bars for concrete pavement in accordance with [Tex-711-I, “Sampling Multiple-Piece Tie Bars for Concrete Pavement,”](#)
- obtains a completed [Form 1818 \(D-9-USA-1\), “Material Statement”](#) with mill test reports (MTRs) and certifications (see [SECTION 16 – BUY AMERICA DOCUMENTATION PROGRAM](#)),
- witnesses the Contractor assemble 10 randomly selected multiple-piece tie bar assemblies according to manufacturer’s instructions from materials delivered to the project,
- submits the project samples to MTD per [Tex-701-I, “Tagging/Labeling, Documenting, and Shipping”](#) including the documentation provided by the Contractor,
- verifies proper installation, fit, and tightening of the tie bars as follows:
  - pinging 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,
  - looking at the thread area; if more than a few of the external threads are not engaged with the internal threads, perform further investigation, and
  - gripping 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 current Material Producer List entitled [“Epoxy Applicators for Reinforcing Steel.”](#) (See [SECTION 61 – REINFORCING STEEL.](#))

### **47.3 Functions of MTD**

MTD:

- tests material sampled by the Project Engineer,
- maintains the Material Producer List entitled [“Multiple-Piece Tie Bar Producers,”](#)
- provides tie bar pull-out testing equipment when requested, and
- 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 6038, “Multipolymer Pavement Markings.”

### **48.2 Functions of the Project Engineer**

The Project Engineer:

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

### **48.3 Functions of MTD**

MTD:

- tests samples of questionable material when submitted by the Project Engineer,
- maintains Material Producer List entitled [“Multipolymer Pavement Markings.”](#) and
- assists the Project Engineer when requested.

### **48.4 Sampling and Testing**

Sampling at the project site for testing is not required but may be performed if material is of questionable quality. Sample 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 MTD. Inquiries should include the type of material, quantity, name of manufacturer, and batch number.

## **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:

- verifies that overhead sign supports are furnished from a Department-approved fabricator on the current Material Producer List entitled [“Overhead Sign Support Structure Fabrication Plants”](#) and that the fabricator’s designated approval stamp is placed on the material,

NOTE: See the Material Producer List for each fabricator’s designated approval stamp.

- verifies proper dimensions and general fabrication, (Also see [SECTION 7 – ANCHOR BOLTS.](#))
- inspects for damage to members or galvanized coating, (See [SECTION 32 – 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, and
- advises MTD of unacceptable material received at the job site.

### **49.4 Functions of MTD**

MTD:

- obtains a completed [Form 1818 \(D-9-USA-1\), “Material Statement”](#), with mill test reports (MTRs), and certifications for all furnished overhead sign supports,
- maintains the Material Producer List entitled [“Overhead Sign Support Structure Fabrication Plants,”](#)
- issues Structural Test Reports for all furnished overhead sign supports, and

- assists the Project Engineer when requested.

### **49.5 Sampling and Testing**

Have each member of the bolting crew in the field perform an acceptable pre-installation verification test on fasteners for field bolted connections per Section 447.4.1, “Verification Testing,” of the [Standard Specifications](#).

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

## **SECTION 50 - PAINT FOR STRUCTURAL STEEL**

### **50.1 Overview**

The specifications for this material are outlined in [DMS-8100, “Structural Steel Paints – Formula,”](#) [DMS-8101, “Structural Steel Paints – Performance,”](#) and [DMS-8105, “Paint, One Coat Overcoat.”](#) These DMSs are referenced in Item 446, “Field Cleaning and Painting Steel.”

### **50.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that furnished paint for Systems I-B, II, III, and IV are from a Department-approved source on the current Material Producer List entitled [“Structural Steel Paints – Performance,”](#)
- verifies that furnished paint for System I-A is from a Department-approved source on the current Material Producer List entitled [“Paint, One Coat Overcoat,”](#) and
- samples all paint, one sample per project, and submits to MTD for testing.

### **50.3 Functions of MTD**

MTD:

- For Structural Steel Paints – Formula:
  - samples and tests for quality assurance at the origin to ensure conformance to Department specifications.
  - tests samples submitted by the Project Engineer,
- For Structural Steel Paints – Performance:
  - maintains Material Producer List entitled [“Structural Steel Paints – Performance,”](#)
  - tests samples submitted by the Project Engineer,
- For One Coat Overcoat Paints:
  - maintains Material Producer List entitled [“Paint, One Coat Overcoat,”](#)
  - tests samples submitted by the Project Engineer, and
- assists the Project Engineer when requested.

### **50.4 Sampling and Testing**

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

### **50.5 Remarks**

Structural paints must be thoroughly agitated before sampling or use. Samples must be shipped in clean friction top buckets or cans.

The Project Engineer completes [Form 202, "Identification of Material Samples,"](#) for all samples submitted to MTD. 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 Functions of the Project Engineer**

The Project Engineer:

- 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 furnished pedestal pole bases are from Department-approved manufacturers on the current Material Producer List entitled [“Roadway Illumination and Electrical Supplies.”](#) maintained by the Traffic Operations Division (TRF),
- 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 for damage or defects in the galvanized coating. (See [SECTION 32 – GALVANIZED COATINGS.](#))
- verifies proper dimensions and assembly, and
- advises MTD or TRF if questionable material is received on the job site.

### **51.3 Functions of MTD**

MTD 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**

### **52.1 Overview**

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

### **52.2 Functions of the Project Engineer**

The Project Engineer:

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

### **52.3 Functions of MTD**

MTD:

- maintains Material Producer List entitled [“Penetrating Concrete Surface Treatments.”](#) and
- tests samples submitted by the Project Engineer.

### **52.4 Sampling and Testing**

Sample material for testing 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 material, quantity, name of manufacturer, product destination, and batch number.

## SECTION 53 - PRECAST NONSTRESSED CONCRETE

### 53.1 Overview

This section addresses precast nonstressed concrete items requiring fabrication per Item 424, “Precast Concrete Structural Members (Fabrication).” These items are to be fabricated by multi-project and project-specific fabrication plants as defined 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 Drains” for formed precast boxes, and  
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:

- verifies that furnished precast nonstressed items are from a Department-approved fabricator on the current Material Producer List entitled [“Nonstressed Member Fabrication Plants \(Multi-Project\)”](#) and that the fabricator’s designated approval stamp is placed on the precast nonstressed items.  
NOTE: See the Material Producer List for each fabricator’s designated approval stamp.
- attaches SiteManager QM test reports for precast railing produced at Department approved multi-project fabrication plants,
- inspects for excessive cracking or other damage,
- ensures proper fit and aesthetics,
- inspects precast items at project-specific nonstressed member fabrication plants, and
- advises MTD when items of questionable quality are received on the job site.

### 53.3 Functions of MTD

MTD:

- provides quality assurance (QA) inspection of precast items fabricated at Department-approved multi-project nonstressed member fabrication plants,
- except for precast railing, issues Structural Test Reports for all other precast nonstressed items fabricated at Department-approved multi-project nonstressed member fabrication plants,
- maintains the Material Producer List entitled [“Nonstressed Member Fabrication Plants \(Multi-Project\).”](#) and
- 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 include Types B and C pavement markings. DMS-8240 is referenced in Item 662, “Work Zone Pavement Markings,” and Item 668, “Prefabricated Pavement Markings.”

### **54.2 Functions of the Project Engineer**

The Project Engineer:

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

### **54.3 Functions of MTD**

MTD:

- tests samples submitted by the Project Engineer,
- maintains the Material Producer List entitled [“Permanent Prefabricated Pavement Markings.”](#) and
- assists the Project Engineer when requested.

### **54.4 Sampling and Testing**

Sampling at the project site for testing is not required but may be performed if material is of questionable quality. Sample 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.”](#) DMS-8241 is referenced in Item 662, “Work Zone Pavement Markings.”

### **55.2 Functions of the Project Engineer**

The Project Engineer:

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

### **55.3 Functions of MTD**

MTD:

- tests samples submitted by the Project Engineer,
- maintains the Material Producer List entitled [“Temporary \(Removable\) Prefabricated Pavement Markings,”](#) and
- assists the Project Engineer when requested.

### **55.4 Sampling and Testing**

Sampling at the project site for testing is not required but may be performed if material is of questionable quality. Sample questionable material for testing, if desired, in accordance with [Tex-732-I, “Sampling Prefabricated Pavement Marking Materials.”](#)

The Project Engineer completes [Form 202, “Identification of Material Samples,”](#) for all samples submitted to MTD. Inquiries should include the type of structural coating, quantity, name of manufacturer, product destination, and batch number.

## SECTION 56 - PRESTRESSED CONCRETE

### 56.1 Overview

This section addresses precast prestressed concrete items requiring fabrication per Item 424, "Precast Concrete Structural Members (Fabrication)." These items are to be fabricated by multi-project and project-specific fabrication plants as defined 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, "Concrete Superstructures" for bridge deck panels, and
- 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:

- verifies that furnished prestressed concrete items are from a Department-approved fabricator on the current Material Producer List entitled "[Prestressed Member Fabrication Plants \(Multi-Project\)](#)" and that the fabricator's designated approval stamp is placed on the precast nonstressed items.

NOTE: See the Material Producer List for each fabricator's designated approval stamp.

- attaches SiteManager QM test report for prestressed concrete piling produced at Department approved multi-project fabrication plants,
- inspects 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, and
- advises MTD when items of questionable quality are received on the job site.

### 56.3 Functions of MTD

MTD:

- 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
  - X-beams
  - U-beams
  - box beams
  - slab beams
  - decked slab beams
  - tee beams
  - bridge deck panels
  - piling
  - bent caps
  - any other prestressed concrete items to be fabricated per Item 424,
- issues Structural Test Reports for all prestressed concrete items fabricated at Department-approved multi-project prestressed member fabrication plants, except for prestressed concrete piling.
- maintains the Material Producer List entitled [“Prestressed Member Fabrication Plants \(Multi-Project,\)”](#) and
- 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:

- checks metal railing inspected by MTD for Department monogram,
- inspects metal railing for proper dimensions, hole sizes and location, general fabrication, bare spots, peeling, flaking, or handling damage to the steel galvanized coating or paint coating, (See [SECTION 32 – 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 MTD. MTRs must contain the following information:
  - heat or lot number,
  - chemical analysis of base metal,
  - physical properties of cast metal, and
  - number of items per heat or lot,
- checks cast aluminum rail posts for damage listed in Section 450.3.1.3, “Castings” of the [Standard Specifications](#),
- samples cast aluminum rail posts for testing according to Section 57.4, “Sampling and Testing,” and
- advises MTD of any metal railing posts or panels received at the job site that are of unacceptable quality.

NOTE: Steel W-beam elements for Types T631 and T631LS rail are not inspected by MTD and must bear brands from approved manufacturers. (See the Material Producer List entitled [“Metal Beam Guard Fence Rail Element Manufacturers.”](#))

### **57.3 Functions of MTD**

MTD:

- 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 MTD performs inspection,
- tests material sampled and received for testing,
- issues Structural Test Reports for all material inspected or tested by MTD, and
- 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 galvanized coating testing. The Project Engineer may also sample questionable W-beam 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**

The specifications for Raised pavement markers are outlined in [DMS-4200, “Pavement Markers \(Reflectorized\),”](#) [DMS-4210, “Snowplowable Pavement Markers,”](#) and [DMS-4300, “Traffic Buttons.”](#) These materials are specified in Item 672, “Raised Pavement Markers.”

### **59.2 Functions of the Project Engineer**

The Project Engineer:

- verifies that furnished marker materials are from a Department-approved source on the current Material Producer Lists entitled [“Pavement Markers and Traffic Buttons”](#) or [“Pavement Markers \(All-Weather, Reflectorized, Snowplowable\),”](#)
- samples marker material of questionable quality received at the job site if desired,
- 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 current Material Producer List entitled [“Epoxies and Adhesives”](#) or [“Bituminous Marker Adhesive.”](#)

NOTE: Traffic marker adhesives are designated as Type II on the Material Producer List entitled [“Epoxies and Adhesives.”](#)

### **59.3 Functions of MTD**

MTD:

- tests samples submitted by the Project Engineer,
- maintains the Material Producer Lists entitled [“Pavement Markers and Traffic Buttons”](#) or [“Pavement Markers \(All-Weather, Reflectorized, Snowplowable\),”](#) and
- assists the Project Engineer when requested.

### **59.4 Sampling and Testing**

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

The Project Engineer completes [Form 202, “Identification of Material Samples,”](#) for all samples submitted to MTD. Inquiries should include the type of material, quantity, name of manufacturer, and batch number.

## 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:

- verifies that furnished RCP sections are from a Department-approved fabricator on the current Material Producer List entitled [“Reinforced Concrete Pipe and Machine-Made Precast Box Culvert Fabrication Plants,”](#) and that the fabricator’s designated approval stamp is placed on the RCP sections,

NOTE: See the Material Producer List for each fabricator’s designated approval stamp.

- verifies the proper size, and class or D-load,
- Inspects for damage/defects,
- attaches SiteManager QM test reports,
- 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 with 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 MTD when pipe sections of unacceptable quality are received on the job site.

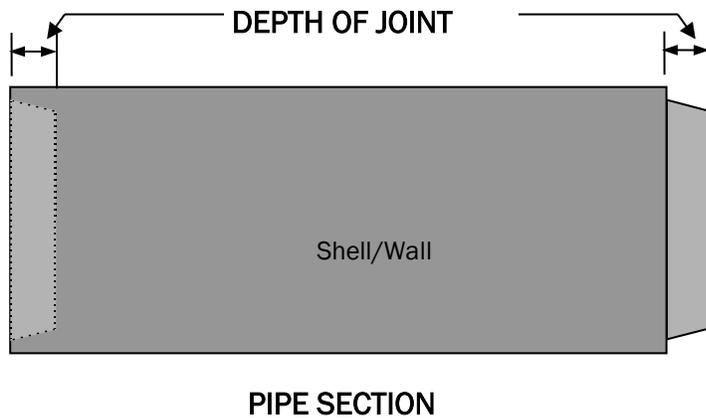


Figure 60-1—Depth of Joint

Honeycombed concrete renders pipe unacceptable for use:



Figure 60-2—Honeycombed Concrete

### 60.3 Functions of MTD

MTD:

- maintains the Material Producer List entitled [“Reinforced Concrete Pipe and Machine-Made Precast Box Culvert Fabrication Plants.”](#) and
- 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:

- verifies that furnished uncoated reinforcing steel is from a Department-approved producing mill on the current Material Producer List entitled [“Reinforcing Steel Mills,”](#)

NOTE: Deformed bar identification markings for each approved bar mill can be found on the MPL.

- verifies that furnished epoxy coated reinforcing steel is from a Department-approved epoxy applicator on the current Material Producer List entitled [“Epoxy Applicators for Reinforcing Steel,”](#)
- inspects proper size and grade of steel is used,
- attaches SiteManager QM test reports,
- ensures all visible damage to epoxy coating from handling or placement is properly repaired before the placement of concrete,
- obtains mill test reports (MTRs) for all uncoated and epoxy coated reinforcing steel furnished to the project,

NOTE: [Form 1818 \(D-9-USA-1\), “Material Statement,”](#) is NOT required to be furnished for reinforcing steel. (See [SECTION 16 – BUY AMERICA DOCUMENTATION PROGRAM](#)).

- obtains a copy of a written certification and the epoxy applicator’s control tests for epoxy coated reinforcing steel furnished to the project (see Section 440.2.7, “Epoxy Coating” in the [Standard Specifications](#).), and
- contacts MTD when:
  - uncoated or epoxy coated reinforcing steel is of questionable quality, and
  - uncoated or epoxy coated reinforcing steel is from an unapproved producing mill or an unapproved epoxy applicator.

### **61.3 Functions of MTD**

MTD:

- maintains the Material Producer Lists entitled [“Reinforcing Steel Mills,”](#) and [“Epoxy Applicators for Reinforcing Steel,”](#) and
- 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."](#) For epoxy coated reinforcing steel, contact MTD for sampling instructions when sampling of this material desired.

## **SECTION 62 - RETAINING WALLS (PRECAST)**

See [SECTION 53 – PRECAST NON STRESSED CONCRETE.](#)

## **SECTION 63 - RIGHT OF WAY MARKERS**

### **63.1 Overview**

Right of way markers are constructed from 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:

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

### **63.4 Functions of MTD**

MTD 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:

- verifies that flasher controller assemblies are from a Department-approved manufacturer on the current Material Producer List entitled [“Traffic Signals”](#) maintained by Traffic Operations Division (TRF),
- verifies that pedestal pole bases are from a Department-approved manufacturer on the approved Material Producer List entitled [“Roadway Illumination and Electrical Supplies”](#) maintained by TRF,
- verifies that solar powered flasher controller assemblies, when required, are from a Department-approved manufacturer on the approved Material Producer List entitled, [“Traffic Signals”](#) maintained by TRF,
- 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](#)), and
- advises MTD or TRF if questionable material is received on the job site.

### **64.3 Functions of MTD**

MTD or TRF assists the Project Engineer when requested.

### **64.4 Sampling and Testing**

Sampling and testing are not required.

## SECTION 65 - ROADSIDE SIGN SUPPORTS

### 65.1 References

Refer to the [Standard Specifications](#) for information on Item 644, “Small Roadside Sign Supports and Assemblies,” and Item 647, “Large Roadside Sign Supports and Assemblies.”

### 65.2 Functions of the Project Engineer

The Project Engineer:

- verifies that the following small roadside sign support types are furnished by Department-approved manufacturers on the Material Producer List 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 32 – GALVANIZED COATINGS](#)) or shipping damage (bent, twisted, etc.),
  - Department monogram for Type G and bridge mounted small roadside sign supports inspected by MTD, and
  - Obtains completed [Form 1818 \(D-9-USA-1\), “Material Statement.”](#) with attached mill test reports (MTRs), certifications, and galvanized reports for all steel sign supports not inspected by MTD, (See [SECTION 16 – BUY AMERICA DOCUMENTATION PROGRAM.](#))
- inspects large roadside sign supports for the following:
  - galvanized coating damage (see [SECTION 32 – GALVANIZED COATINGS](#)) or shipping damage (bent, twisted, etc.),
  - Department monogram for large roadside sign supports inspected by MTD, and
- advises MTD when supports appear questionable.

### **65.3 Functions of MTD**

MTD:

- obtains completed [Form 1818 \(D-9-USA-1\), “Material Statement.”](#) with attached mill test reports (MTRs), certifications, and galvanized reports for 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 MTD performs inspection,
- issues Structural Test Reports for all material inspected or tested by MTD,
- assists TRF, when requested, in maintaining the approved MPL, and
- 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:

- verifies that furnished roadway illumination poles and luminaire arms are from a Department-approved fabricator on the current Material Producer List entitled [“Roadway Illumination Pole and Luminaire Arm Fabrication Plants,”](#) and that the fabricator’s designated approval stamp is placed on the material,  
NOTE: See the Material Producer List for each fabricator’s designated approval stamp.
- verifies proper dimensions and general fabrication, (Also see SECTION 7 – ANCHOR BOLTS.)
- inspects for visual defects in the welds,
- inspects for damage or defects in the galvanized or paint coatings such as bare spots, peeling, flaking, etc., (See [SECTION 32 – 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 66.4, “Sampling and Testing,”
- verifies that furnished roadway illumination light fixtures and transformer bases are from manufacturers on the Material Producer List entitled [“Roadway Illumination and Electrical Supplies,”](#) maintained by the Traffic Operations Division (TRF),
- verifies that anchor bolts (for shoe base, concrete traffic barrier base, bridge mounted, and retaining wall mounted 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,
- verifies that transformer base poles are installed per the RID plans sheets, and
- advises MTD of any unacceptable material received at the job site.

### **66.3 Functions of MTD**

MTD:

- obtains [Form 1818 \(D-9-USA-1\)](#), “[Material Statement](#),” with mill test reports (MTRs) and certifications for all furnished roadway illumination poles, and luminaire arms,
- maintains the Material Producer List entitled “[Roadway Illumination Pole and Luminaire Arm Fabrication Plants](#).”
- issues Structural Test Reports for all furnished roadway illumination poles and luminaire arms, and
- 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. Have the Contractor test installed roadway illumination assemblies per Item 616, “Performance Testing of Lighting Systems.”

## **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.”](#) DMS-8242 is referenced in Item 662, “Work Zone Pavement Markings.”

### **67.2 Functions of the Project Engineer**

The Project Engineer:

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

### **67.3 Functions of MTD**

MTD:

- tests samples submitted by the Project Engineer,
- samples and tests for quality assurance temporary flexible reflective roadway marker tabs at the origin to ensure conformance to Department specifications,
- maintains the Material Producer List entitled [“Temporary Flexible, Reflective Roadway Marker Tabs,”](#) and
- 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.”](#)

The Project Engineer completes [Form 202, “Identification of Material Samples,”](#) for all samples submitted to MTD. Inquiries should include the type of material, quantity, name of manufacturer, and batch number.

## **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:

- verifies the following:
  - proper marking information (manufacturer's name or trademark, type and size designation, and casting date),
  - correct diameter, slope, or bevel, and
  - concrete design strength requirements achieved before 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, and
- 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 32 – 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 Functions of MTD**

MTD assists the Project Engineer when requested.

### **68.4 Sampling and Testing**

Sampling and testing are not required.

## **SECTION 69 - SIGN WALKWAYS**

### **69.1 Overview**

Sign walkways are installed on overhead sign supports for access to dynamic message signs.

### **69.2 Reference**

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

### **69.3 Functions of the Project Engineer**

The Project Engineer:

- verifies that furnished sign walkways are from a Department-approved fabricator on the current Material Producer List entitled "[Overhead Sign Support Structure Fabrication Plants](#)" and that the fabricator's designated approval stamp is placed on the material.

NOTE: See the Material Producer List for each fabricator's designated approval stamp.

- inspects for shipping damage to galvanized coating, (See [SECTION 32 - GALVANIZED COATINGS](#).)
- inspects for proper assembly, and
- advises MTD of any unacceptable materials received at the job site.

### **69.4 Functions of MTD**

MTD:

- obtains a completed [Form 1818 \(D-9-USA-1\)](#), "[Material Statement](#)," with mill test reports (MTRs) and certifications for all furnished sign walkways,
- maintains the Material Producer List entitled "[Overhead Sign Support Structure Fabrication Plants](#),"
- issues Structural Test Reports for all furnished sign walkways, and
- assists the Project Engineer when requested.

### **69.5 Sampling and Testing**

Sampling and testing are not required.

## SECTION 70 - SIGNS

### 70.1 Reference

Refer to the [Standard Specifications](#) for information on Item 636, “Signs.”

### 70.2 Functions of the Project Engineer

The Project Engineer:

- inspects signs for the following:
  - proper completion of the sign identification decals required on the back side lower left hand corner of each sign (See Item 643, “Sign Identification Decals.”)
  - shipping or handling damage (See Section 636.3.2, “Storage and Handling” of the [Standard Specifications](#) for sign damage criteria.)
  - proper storage (See Section 636.3.2, “Storage and Handling” of the [Standard Specifications](#) for proper sign storage.)
  - uniform color, appearance, and retroreflectivity of sign legend, symbols, borders, and background when viewed both day and night
  - proper assembly

NOTE: See the [“Sign Inspection Guidance Document”](#) under “Sign Inspection Updates” on the TRF Policy and Standards Branch website. This document provides more information on sign inspection and documentation mentioned above.

- advises MTD of questionable signs received at the job site,
- obtains the following documentation for all furnished signs on a project:
  - a copy of completed [Form 2273, “Signing Material Statement.”](#) from the fabricator with proper attachments (sign component material certifications, etc.)
  - copy of notarized certification from the fabricator stating that the signs were fabricated per the plans and specifications.

### 70.3 Functions of MTD

MTD:

- tests sign face materials for quality assurance from the source to ensure conformance to [DMS-8300, “Sign Face Materials.”](#)
- maintains the Material Producer List entitled, [“Sign Face Materials”](#) and
- assists the Project Manager when requested.

## **70.4 Sampling and Testing**

Sampling and testing are not required at the job site unless a problem is identified.

## **70.5 Remarks**

Construction Signs are no longer inspected by MTD when fabricated. The Project Engineer completes [Form 202, "Identification of Material Samples."](#) for all signs sampled, if desired, for submission to MTD.

## **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 pre-tensioning 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 442, “Metal for Structures”
- Item 446, “Field Cleaning and Painting Steel”
- Item 447, “Structural Bolting”
- Item 448, “Steel Field Welding”

### 72.2 Functions of the Project Engineer

The Project Engineer:

- verifies that furnished structural steel is from a Department-approved fabricator on the current Material Producer List entitled [“Steel Bridge/Steel Truss Bridge Fabrication Shops”](#) and that the fabricator’s designated approval stamp is placed on the material.

NOTE: See the Material Producer List for each fabricator’s designated approval stamp.

- inspects structural steel rolled beams, welded I-section plate girders, box girders, tub girders, bent caps, and diaphragms for the following:
  - 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, “Field Cleaning and Painting Steel,”
- verifies that fasteners for field bolted connections are properly installed per Item 447, “Structural Bolting,”
- verifies that welding for field welded connections is properly performed per Item 448, “Steel Field Welding,” and

NOTE: Department Bridge Division Field Operations Section provides technical support for field welding inspection of structural steel bridges.

- advises MTD of unacceptable material received at the job site.

## 72.3 Functions of MTD

MTD:

- provides quality assurance (QA) inspection of structural steel bridge members fabricated at Department-approved fabrication shops.
- obtains a completed [Form 1818 \(D-9-USA-1\), “Material Statement”](#) with Mill Test Reports (MTRs) and certifications for all furnished structural steel bridge members.
- attaches SiteManager QM test reports,
- maintains the Material Producer List entitled [“Steel Bridge/Steel Truss Bridge Fabrication Shops.”](#) and
- assists the Project Engineer when requested.

## 72.4 Sampling and Testing

Have each member of the bolting crew in the field perform an acceptable pre-installation verification test on fasteners for field bolted connections per Section 447.4.1, “Verification Testing,” of the [Standard Specifications](#).

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

## **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:

- verifies that furnished thermoplastic pavement marking material is from a Department-approved source on the current Material Producer List entitled [“Thermoplastic Pavement Marking Materials,”](#)
- verifies that furnished traffic beads are from a Department-approved source on the current Material Producer List entitled, [“Glass Traffic Beads.”](#) (See [SECTION 34 - GLASS TRAFFIC BEADS.](#))
- verifies that the types of glass beads specified are used and applied in the specified sequence, and
- samples material of questionable quality received at the job site if desired,.

### **73.3 Functions of MTD**

MTD:

- tests samples submitted by the Project Engineer,
- maintains the Material Producer Lists entitled [“Thermoplastic Pavement Marking Materials,”](#) and [“Glass Traffic Beads.”](#) and
- 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 MTD. 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:

- verifies that furnished traffic paint is from a Department-approved source on the current Material Producer List entitled [“Traffic Paint.”](#)
- verifies that furnished traffic beads are from a Department-approved source on the current Material Producer List entitled, [“Glass Traffic Beads.”](#) (See [SECTION 34 - GLASS TRAFFIC BEADS.](#))
- verifies that the types of glass beads specified are used and applied in the specified sequence, and
- samples material of questionable quality received at the job site if desired.

### **74.3 Functions of MTD**

MTD:

- tests samples of questionable material when submitted by the Project Engineer,
- samples and tests for quality assurance traffic paint at origin or job site and maintains the Material Producer Lists entitled [“Traffic Paint.”](#) and [“Glass Traffic Beads.”](#) and
- 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 MTD. 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:

- verifies that furnished traffic signal poles, mast arms, and luminaire arms are from a Department-approved fabricator on the current Material Producer List entitled [“Traffic Signal Pole Assembly Fabrication Plants.”](#) and that the fabricator’s designated approval stamp is placed on the material,

NOTE: See the Material Producer List for each fabricator’s designated approval stamp.

- verifies proper dimensions and general fabrication, (Also see [SECTION 7 – ANCHOR BOLTS.](#))
- inspects for visual defects in the welds,
- inspects for damage or defects in the galvanized or paint coatings such as bare spots, peeling, flaking, etc., (See [SECTION 32 – GALVANIZED COATINGS.](#))
- advises MTD 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,” and
- visually inspects traffic signal pole mast arms, after installation with signal heads attached, for vertical vibration at arm tip that might require damping devices.

NOTE: See “VIBRATION WARNING” section of the single mast arm assembly (SMA) and dual mast arm assembly (DMA) Traffic Signal Support Structures plan sheets.

### **75.3 Functions of MTD**

MTD:

- obtains a completed [Form 1818 \(D-9-USA-1\), “Material Statement,”](#) with mill test reports (MTRs) and certifications for all furnished traffic signal poles, mast arms, and luminaire arms,
- maintains the Material Producer List entitled [“Traffic Signal Pole Assembly Fabrication Plants,”](#)
- issues Structural Test Reports for all furnished traffic signal poles, mast arms, and luminaire arms, and

- 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

#### Treated Timber Poles for Electrical Services

Project Engineer 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 stated in Table 1, “Retention of Preservative Treatment” of Item 627,
- compliance of the dimensional and quality requirements of the poles, and
- proper marking of the poles per Table 2, “Timber Pole Markings” of Item 627.

#### Treated Piling, Lumber, Wire Fence Posts, and Metal Beam Guard Fence (MBGF) Posts and Blocks

All treated piling, lumber, wire fence posts, and MBGF posts and blocks proposed for Department use must be inspected at the treating plant by a commercial inspection agency authorized by MTD. The Project Engineer verifies the following:

- all furnished material is from a Department-approved treating plant or supplier on the current Material Producer List entitled [“Timber Treating Plants and Suppliers.”](#) and attaches SiteManager QM test report,
- completed [Form 2148, “Certification of Compliance \(Treated Timber Products\).”](#) is received for each shipment, (See Section 492.2.2, “Identification” in the [Standard Specifications.](#))
- shipping invoice is received for each shipment,
- the material complies with dimensional and quality requirements, and
- advises MTD of any unacceptable treated timber products received at the job site.

#### Treated Glued Laminated Timber (for timber bridge decks)

The Project Engineer verifies:

- compliance of the material dimensional and quality requirements,
- that a legible AITC quality inspected mark or an APA EWS trademark is placed on each glued laminated timber panel, and
- receipt of completed [Form 2148, “Certification of Compliance \(Treated Timber Products\)”](#) for each shipment. (See Special Specification “Pressure Treated Timber Bridge Deck (Glulam).”)

- advises MTD of any unacceptable glued laminated timber panels received at the job site.

## **76.2 Functions of MTD**

MTD:

- administers the inspection services performed by a commercial inspection agency for the following treated timber products:
  - posts (for MBGF and Wire Fence)
  - blocks (for MBGF)
  - lumber
  - piling
- maintains the Material Producer List entitled [“Timber Treating Plants and Suppliers.”](#)
- 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 Functions of the Project Engineer**

The Project Engineer:

- 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, “Chemical Limits for Mix Water” of Item 421 before use,

NOTE: Water from municipal suppliers approved by the Texas Department of State Health Services does 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, “Hydraulic Cement Concrete” and
  - verifies that testing of blended wash water by the Contractor is performed at the frequency stated in Item 421, Section 421-2-5, “Water” of the [Standard Specifications](#) and
- samples water and blended wash water of questionable quality used at the job site if desired.

### **77.3 Functions of MTD**

MTD 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.”](#)
- Sample water for testing if it’s possibly contaminated, or has high sulfate and/or chloride content levels when using for soil lime or cement treatment.

### **77.5 Remarks**

Allow 3 days for testing.