

**513.4.01 Limits**

No additional payment will be made when barrel lengths, apron areas, backfilling, or other items are increased due to using the precast alternate.

The following items will not be paid for:

- Connecting hardware
- Mortar
- Joint materials
- Filler material used between multiple precast culvert lines

**513.5 Payment**

Payment for Precast Reinforced Concrete Box Culvert Barrel Sections and End Sections will be based on the cast-in-place alternate and will include conversions when using the precast design. Cast-in-place concrete will be paid for under Section 500 and reinforcing steel will be paid for under Section 511.

Payment for Foundation Backfill Type II will be made according to and Subsection 207.5, “Payment.”

**513.5.01 Adjustments**

General Provisions 101 through 150.

## **Section 514—Epoxy Coated Steel Reinforcement**

**514.1 General Description**

This work consists of furnishing and placing epoxy coated bar reinforcement steel according to these Specifications.

**514.1.01 Definitions**

General Provisions 101 through 150.

**514.1.02 Related References****A. Standard Specifications**

Section 511—Reinforcement Steel

Section 853—Reinforcement and Tensioning Steel

**B. Referenced Documents**

QPL 38

AASHTO M284

**514.1.03 Submittals****A. Mill Orders and Shipping Statements**

Submit mill orders and shipping statements as required in Subsection 511.1.03.A, “Mill Orders and Shipping Statements.”

**514.2 Materials**

When choosing an epoxy coating material, the Contractor may do either of the following:

- Use an epoxy coating material from QPL 38 of acceptable, powdered epoxy resins and their manufacturer.
- Use powder that meets AASHTO M284.

Ensure that uncoated, deformed steel bars meet the applicable requirements of Subsection 853.2.01, “Steel Bars for Concrete Reinforcement.”

Allow the Office of Materials and Research to sample and test materials any time.

**A. Epoxy Coating Requirements**

1. Notify the Office of Materials and Research at least two weeks before blast cleaning the steel reinforcement bars and applying the epoxy coating. This time will allow the Department to schedule an inspection.
2. You may request, in writing, that the Department accept the coating on the basis of a Certificate of Compliance. If the Department approves your request, you must meet the following conditions:
  - a. Ensure that the coating applicator has a quality assurance program approved by the Department.
  - b. Furnish the Department a Certificate of Compliance from the coating applicator with each shipment of coated bars. Ensure that the Certificate of Compliance:
    - Verifies that the coated bars and coating material have been tested in accordance with the requirements of this Specification
    - States the actual test results for each requirement
    - States that the test results comply with the requirements
3. Submit from the coating applicator at the time of shipping a written certification attached to a completed Form 166-A. Ensure that the certificate states that the coated reinforcing bars meet the requirements of this Specification.
4. The epoxy for the fabrication shop repair work shall also be suitable for use in the field by the Contractor installing the coated bars in the bridge deck.

**B. Fabrication**

1. Immediately before applying the epoxy coating, blast clean all surfaces of the steel bars to a near-white surface finish as per the Steel Structures Painting Council Surface Preparation Specification, SSPC-SP10, for Near-White Blast Cleaning.
  - a. Make the blast-cleaned surface correspond with either pictorial standard A Sa 2½, B Sa 2½, or C Sa 2½ of SSPC Vis 1.
  - b. Clear the surfaces of all dust and grit.
2. Coat all tie wires, clips, chair and bar supports, and other metallic materials used to install the epoxy-coated reinforcing bars with either:
  - The same powdered epoxy resin with a minimum thickness of 6 mils (0.15 mm)
  - A plastic material approved by the Office of Materials and Research
3. Coat the ends of the coated bars cut during fabrication with the epoxy used for repairs.
4. Repair damaged areas and coat the ends of cut bars within 12 hours and before any visible rusting appears.

**C. Acceptance**

1. The Office of Materials and Research will inspect the application and the finished coating at the applicators plant, according to the provisions of Subsection 106.03, "Samples, Tests, Cited Specifications," or will accept the Certificate of Compliance under the conditions listed in Subsection 514.2.A.
2. Grant the Department Inspector free access to the coating applicator's plant.
  - a. The Inspector may have any or all of the work specified in this section performed in his or her presence.
  - b. Furnish the Inspector with check samples of the coated bars on a random basis as the Inspector deems necessary for testing by the Office of Materials and Research.

**D. Materials Warranty**

General Provisions 101 through 150.

**514.2.01 Delivery, Storage, and Handling**

Before using epoxy coated steel bars, carefully load, unload, and store them on the Project site to prevent damage or contamination.

Handle the bars as follows:

1. Use systems for handling coated bars that have padded contact areas for the bars whenever possible.
2. Use padded bundling bands.
3. To prevent sags in the bar bundle, lift bundles with a strong back, multiple supports, or a platform bridge. Sags in the bundle cause bar-to-bar abrasion.
4. Do not drop or drag bars.

## 514.3 Construction Requirements

### 514.3.01 Personnel

General Provisions 101 through 150.

### 514.3.02 Equipment

General Provisions 101 through 150.

### 514.3.03 Preparation

General Provisions 101 through 150.

### 514.3.04 Fabrication

#### A. Fabrication Shop Repair Work

Refer to Subsection 514.2.B, "Fabrication"

### 514.3.05 Construction

#### A. Install Bars

To protect and preserve the epoxy coating, install coated bars in the bridge deck according to Subsection 511.3.05, "Construction," this Specification, and the Engineer's directions.

Have the Engineer approve additional splices to accommodate lengths suitable for coating equipment.

Cleaning and repair methods and materials for coated bars are subject to the Engineer's approval.

Install the bars as follows:

1. During and after installing bars into their deck locations, repair cuts, nicks, and abrasions in the bar coating with the epoxy repair material supplied by the powdered epoxy resin manufacturer.  
Repair damaged areas within 12 hours and before visible rusting appears.
2. Before they rust, repair damaged reinforcing steel and metallic accessories with the epoxy repair material supplied by the powdered epoxy resin manufacturer.
3. If small damaged areas are rusted, thoroughly remove the rust by sand blasting or other approved methods before repairing the areas.
4. Provide a rust-free and completely coated steel reinforcement system before placing the concrete in the deck to prevent subsequent rusting.
5. When the coated bars are incorporated into the work, keep them free from dirt, paint, oil, grease, or other foreign substance.
6. When necessary, clean the bars to the satisfaction of the Engineer.
7. Place the deck concrete using methods and equipment that will not damage the coated materials.
8. Since the epoxy coating is flammable, do not expose the coated bars to fire or flame. Do not cut coated bars by burning.

### 514.3.06 Quality Acceptance

General Provisions 101 through 150.

### 514.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

## 514.4 Measurement

The accepted epoxy coated steel reinforcing bars will be measured according to Subsection 511.4, "Measurement."

### 514.4.01 Limits

#### A. Theoretical Weight of Uncoated Bars

The Department will not add to or deduct from the theoretical weight per foot (meter) of the uncoated bars because of additional Specification requirements for blast cleaning and epoxy coating of the bars.

## 514.5 Payment

The accepted epoxy-coated steel reinforcing bars will be paid for according to Subsection 511.5, "Payment."

Payment will be made under:

Item No. 514	Epoxy Coated Bar Reinforcement Steel	Per pound (kilogram)
Item No. 514	Epoxy Coated Superstructure Reinforcement Steel, Bridge No. _____	Per lump sum

### 514.5.01 Adjustments

#### A. Additional Splices

Additional splices requested to accommodate lengths suitable for coating equipment will be subject to the Engineer's approval. Additional splices will be at the Contractor's expense.

#### B. Additional Expenses

Additional expenses incurred by the Contractor or suppliers because of the requirements in this Specification are considered incidental. These expenses are included in the Contract Price per pound (kilogram) or per Lump Sum.

## Section 515—Handrail-Ferrous Metal and Pipe

### 515.1 General Description

This work consists of placing handrail and posts made of ferrous metal pipe. It shall include setting anchorages, preparing bearing areas, and painting or galvanizing the handrail, whichever the Plans require.

#### 515.1.01 Definitions

General Provisions 101 through 150.

#### 515.1.02 Related References

##### A. Standard Specifications

Section 500—Concrete Structures

Section 501—Steel Structures

Section 535—Painting Structures

Section 645—Repair of Galvanized Coatings

##### B. Referenced Documents

ASTM A 123/A 123 M

ASTM A 153/A 153 M

#### 515.1.03 Submittals

General Provisions 101 through 150.

### 515.2 Materials

All materials shall meet the requirements of the following Specifications.

Material	Section
Structural Steel	851
Malleable Iron Castings	854.2.04
Steel Castings	854.2.05
Steel Pipe	847.2.01
Steel Bolts, Nuts, and Washers	852.2.01
Paint	870
Plain Steel Bars—Threaded Ends	852.2.02