

**SECTION 032116 – EPOXY-COATED REINFORCEMENT FOR STEAM UTILITY
DISTRIBUTION**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to this section.

1.2 SUMMARY

- A. This section includes the furnishing and placement of epoxy coated concrete reinforcement.
- B. Related sections include the following:
 - 1. Division 03 Section "Concrete Formwork for Steam Utility Distribution."
 - 2. Division 03 Section "Concrete Reinforcement for Steam Utility Distribution."
 - 3. Division 03 Section "Concrete Accessories for Steam Utility Distribution."
 - 4. Division 03 Section "Cast-in-Place Concrete for Steam Utility Distribution."
 - 5. Division 03 Section "Precast Concrete Tunnel."

1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this section shall comply with the following:
 - 1. ACI:
 - a. 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
 - b. 315 - Details and Detailing of Concrete Reinforcement.
 - c. 315R - Manual of Engineering and Placing Drawings for Reinforced Concrete Structures.
 - d. 318 - Building Code Requirements for Reinforced Concrete.
 - 2. ASTM Specifications:
 - a. A185 - Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement.
 - b. A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - c. A775 - Epoxy-Coated Reinforcing Steel Bars.
 - 3. AWS: D1.4 - Structural Welding Code-Reinforcing Steel.
 - 4. CRSI:
 - a. Manual of Standard Practice.

- b. Reinforcing Bar Detailing.
- c. Placing Reinforcing Bars.

1.4 SUBMITTALS

A. Shop Drawings:

1. Prepare Shop Drawings in accordance with ACI 315 and 315R and the CRSI Manual of Standard Practice and Reinforcing Bar Detailing.
2. Include the following:
 - a. Number, size, length, mark, and location of epoxy-coated reinforcement.
 - b. Bending diagrams.

B. Manufacturer's Literature for Epoxy Coating:

1. Manufacturer's Product Data.
2. Verification that the product has been tested and approved in accordance with ASTM A775.

C. Certified Mill Test Reports:

1. Submit upon request by Engineer.
2. Showing physical and chemical analysis for each heat of reinforcement used on Project.

1.5 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver reinforcement free of loose rust, scale, paint, oil coating, damage and structural defects.

B. Storage:

1. Store coated reinforcement on site so as to prevent damage to reinforcement and to epoxy coating.
2. Store coated reinforcement on padded or wooden cribbing off the ground.

C. Handling:

1. Contact areas of handling and hoisting systems shall be padded or be made of nylon or other acceptable material.
2. Use multiple pick-up points to lift bundles of coated steel to prevent bar to bar abrasion due to bundle sag.
3. Pad bundling bands or fabricate bands of nylon or other acceptable material.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General:

1. Concrete reinforcement and accessories shall be new, free from rust, scale, paint, oil and structural defects immediately before application of epoxy coating.
2. Reinforcement shall be the sizes indicated on the Drawings.

B. Epoxy Coating Material:

1. Corrosion Protection Coatings:
 - a. One part, heat curable, thermosetting powdered epoxy.
 - b. Conforming with ASTM A775.
2. Epoxy Coating Patching Material:
 - a. Compatible with factory applied epoxy coating.
 - b. Conforming with ASTM A775.

C. Reinforcing Bars:

1. ASTM A615.
2. Yield Stress: $F_y = 60,000$ psi.
3. Deformed unless noted otherwise; smooth where specifically indicated on the Drawings.

D. Welded Wire Fabric:

1. ASTM A185.
2. $F_y = 65,000$ psi.
3. Plain, cold drawn, electrically welded fabric.

E. Accessories:

1. Chairs, bolsters, anchors, spacers, stirrups, ties and other devices as required for spacing and fastening reinforcement in place shall conform to CRSI Manual of Standard Practice.
2. Supports for epoxy coated reinforcement shall be epoxy coated or shall be made of a dielectric material.
3. At exposed underside of concrete, use plastic-tipped chairs and bolsters.
4. Fasten coated reinforcing with plastic -, nylon -, or epoxy-coated steel tie wire.

2.2 FABRICATION

A. General:

1. Fabricate reinforcement to the dimensions indicated on the Drawings and the reviewed Shop Drawings, in accordance with the CRSI Manual of Standard Practice.
 2. Tolerances: As indicated in ACI 117.
 3. Bundle and tag reinforcement with suitable identification to permit checking, sorting and placing.
 4. Welding:
 - a. Not permitted unless specifically indicated on the Drawings.
 - b. When permitted, comply with AWS D1.4.
 - c. No tack welding permitted.
- B. Hooks:
1. Bend hooks in accordance with ACI 318.
 2. Cold bend bars in such a way that will not damage the reinforcement.
- C. Epoxy Coating:
1. Minimum 6 mils thick and uniform.
 2. Coat reinforcement after fabrication.
 3. Repair damage to epoxy coating in accordance with:
 - a. ASTM A775.
 - b. Epoxy-coating manufacturer's recommendations.

PART 3 - EXECUTION

3.1 PLACEMENT

- A. Place epoxy-coated reinforcement in accordance with:
1. Shop Drawings reviewed by Engineer.
 2. CRSI Placing Reinforcing Bars and Manual of Standard Practice.
 3. Tolerances indicated in ACI A117.
- B. Clearance:
1. Preserve clear space between bars of not less than 1 times the normal diameter of round bars.
 2. In no case let the clear distance be less than 1-inch or less than 1-1/3 times the maximum size of aggregate.
 3. In the absence of specific cover requirements on the Drawings, provide the following minimum concrete cover for reinforcement:
 - a. Cast against and permanently exposed to earth: 3 inches.

- b. Exposed to earth, weather or water:
 - 1) No. 6 through No. 18 bars: 2 inches.
 - 2) No. 5 bars, 5/8-inch wire and smaller: 1-1/2 inches.
- c. Not exposed to weather or in contact with the ground:
 - 1) Slabs, walls and joists:
 - a) No. 11 bars and smaller: 3/4-inch.
 - 2) Beams, girders and columns: 1-1/2 inches.
- C. Splices:
 - 1. Comply with ACI 318 and this section.
 - 2. In the absence of specific lap requirements on the Drawings, lap in accordance with ACI 318, Class B.
- D. Corner Bars:
 - 1. Provide corner bars for horizontal wall steel.
 - 2. In the absence of specific lap requirements on the Drawings, lap in accordance with ACI 318, Class B.
- E. Field Cutting and Bending: Permitted only under special conditions approved by Engineer.
- F. Field Welding:
 - 1. In accordance with AWS D1.4.
 - 2. Only when specifically indicated on the Drawings.
 - 3. Performed with adequate ventilation.
 - 4. No tack welding permitted.
- G. Welded Wire Fabric:
 - 1. Block up, lap, and tie welded wire fabric reinforcement.
 - 2. Lap welded steel fabric 1 mesh at sides and ends.
- H. Bar supports:
 - 1. Rest epoxy-coated steel reinforcement supported from formwork on coated wire bar supports, or on bar supports made of dielectric material or other suitable material.
 - 2. Coat wire bar supports with dielectric material for a minimum distance of 2 inches from the point of contact with the coated steel member.
 - 3. Reinforcing Bars Used as Support Bars: Epoxy coated.

I. Slabs On Grades:

1. Do not hook up welded wire fabric; either tie on supports at correct elevations, or lay on partial slab thickness of fresh concrete just prior to placing remainder of slab.
2. For chairs or bolsters resting on soil, place on either:
 - a. Sand plates.
 - b. Concrete bricks set flush with soil to provide bearing surface for chairs or bolsters.

3.2 FIELD QUALITY CONTROL

A. Notification:

1. Notify Engineer when reinforcing is in place so Engineer may review the reinforcement placement.
2. Provide a minimum of 24 hours notice prior to placement of concrete.

B. Repair:

1. Repair areas of damage resulting from fabrication, handling, cutting or welding in accordance with:
 - a. Coating manufacturer's recommendations.
 - b. ASTM A775.
2. Provide proper ventilation during patching operations.

END OF SECTION 032116