
SECTION 03010 REINFORCING STEEL

PART I: GENERAL

1.1 GENERAL REQUIREMENTS

- A. Furnishing, fabrication and installation of all reinforcing bar, and for placement in concrete.
- B. Requirements for placing, tying and supporting reinforcing steel in concrete.

1.2 MEASUREMENT AND PAYMENT

A. UNIT PRICES:

- 1. No separate payment shall be made for reinforcing steel used as part of a new cast-in-place structure or concrete paving. Include cost for labor, materials and equipment in the cost of the bid item for the structure or paving.
- 2. Refer to Section 01270 – Measurement and Payment for unit price procedures.

B. Stipulated Price (Lump Sum):

- 1. If Contract is Stipulated Price Contract, payment for work in this Section is included in Total Stipulated Price.

1.3 REFERENCES

A. ACI – American Concrete Institute.

- 1. ACI 318-18 – Building Code Requirements for Reinforced Concrete and Commentary.
- 2. ACI SP-66 – Detailing Manual.

B. AWS – American Welding Society.

- 1. AWS – D1.4 – Structural Welding Code -Reinforcing Steel.

C. ASTM – American Society for Testing and Materials.

- 1. ASTM A82 – Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
- 2. ASTM A185 – Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete Reinforcement.
- 3. ASTM A497 – Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete Reinforcement.
- 4. ASTM A615 – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- 5. ASTM A706 – Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
- 6. ASTM A767 – Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
- 7. ASTM A775 – Standard Specification for Epoxy-Coated Reinforcing Steel Bars.

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- D. CFTS – City of Friendswood Technical Specifications.
- E. CRSI – Concrete Reinforcing Steel Institute.
 - 1. Placing Reinforcing Bars.
 - 2. Manual of Standard Practice.
- F. ICBO – International Conference of Building Officials.
 - 1. ICBO Research Report.
- G. WRI – Wire Reinforcement Institute.
 - 1. Manual of Standard Practice, Welded Wire Reinforcement.

1.4 SUBMITTALS

- A. Conform to requirements of Section 01330 – Submittal Procedures.
- B. Action Submittals:
 - 1. Shop Drawings prepared in accordance with CRSI Manual of Standard Practice and ACI SP-66 Detailing Manual:
 - a. Bending lists.
 - b. Placing drawings.
- C. Informational Submittals:
 - 1. Lab test reports for reinforcing steel showing stress-strain curves and ultimate strengths.
 - 2. Mechanical Threaded Connections:
 - a. Current International Conference of Building Officials (ICBO) Research Report or equivalent code agency report listing findings to include acceptance, special inspection requirements, and restrictions.
 - b. Manufacturer's instructions.
 - c. Verification that device threads have been tested and meet requirements for thread quality, in accordance with manufacturers published methods.
- D. Welding Qualification: Prior to welding, submit welder qualifications and nondestructive testing procedures.
- E. Test results of field testing.
- F. Shop drawings shall show all bars, sizes, dimensions, spacings, clearances, and placement patterns.

1.5 QUALITY ASSURANCE

- A. Provide manufacturer's affidavits that steel was manufactured in compliance with standards referenced in this Section.
- B. Provide manufacturer's affidavits that steel is American made and not imported.
- C. Welder Qualifications: Certified in accordance with AWS D1.4.
- D. Independent Testing Laboratory, contracted by the City, shall inspect all items that are welded and shall report results to the Project Manager.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Unload, store, and handle bars in accordance with CRSI publication "Placing Reinforcing Bars."

- B. Reinforcing steel shall not remain on the ground for any length of time.

PART II: PRODUCTS

2.1 MATERIALS

- A. Deformed Billet-Steel Reinforcing Bars:
 - 1. Includes stirrups, ties, and spirals.
 - 2. ASTM A615, Grade 60, where welding is not required.
 - 3. ASTM A706/A706M, Grade 60, for reinforcing to be welded.
 - 4. ASTM A767/767M, Grade 60, for galvanized bars.
- B. Mechanical Splices and Connections:
 - 1. Metal Sleeve Splice: Furnish with cast filler metal, capable of developing, in tension or compression, one hundred twenty-five percent (125%) of minimum tensile strength of bar. Manufacturer and Product:
 - a. Erico Products, Inc., Cleveland, OH, Cadweld T-Series.
 - 2. Mechanical Threaded Connections: Furnish metal coupling sleeve with internal threads engaging threaded ends of bars developing in tension or compression one hundred twenty-five percent (125%) of yield strength of bar. Manufacturers and Products:
 - a. Erico Products, Inc., Cleveland, OH; Lenton Reinforcing Steel Couplers.
 - b. Richmond Screw Anchor Co., Inc., Fort Worth, TX; Richmond DB-SAE Dowel Bar Splicers.
- C. Welded Wire Reinforcement:
 - 1. ASTM A185 or A497 and ACT 31 8/318R, using ASTM A82 wire of seventy-five kilo-pounds per square inch (75 ksi) minimum tensile strength.
 - 2. Furnish flat sheets only; rolled sheets shall not be permitted.

2.2 ACCESSORIES

- A. Tie Wire:
 - 1. Black, soft-annealed sixteen (16) gauge wire.
 - 2. Nylon-, epoxy-, or plastic-coated wire.
- B. Bar Supports and Spacers:
 - 1. Precast concrete bar supports, cementitious fiber-reinforced bar supports, or all-plastic bar supports and side form spacers meeting requirements of CRSI Manual of Standard Practice. Other types of supports or spacers shall not be permitted.
 - 2. In concrete exposed to view after form removal: Small rectangular concrete blocks made up of same color and strength as concrete being placed around them, or all-plastic bar supports and side form spacers.
 - 3. Precast concrete supports of same strength as concrete for reinforcing in concrete placed on grade.

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4. Plastic Bar Supports: As manufactured by Aztec Concrete Accessories, Bloomington, CA.

2.3 FABRICATION

- A. Follow CRSI Manual of Standard Practice.
- B. Bend bars cold.

PART III: EXECUTION

3.1 PREPARATION

- A. Notify the Project Manager when reinforcing is ready for inspection and allow sufficient time for inspection prior to placing concrete.
- B. Clean reinforcing bars of loose mill scale, oil, earth, and other contaminants.
- C. Coat wire projecting from precast concrete bar supports with dielectric material, epoxy, or plastic.

3.2 REINFORCING BAR INSTALLATION

- A. Bundle or space bars, instead of field bending, where construction access through reinforcing is necessary.
- B. Spacing and Positioning: Conform to ACI 381/318R. There shall be a minimum of one inch (1 In) spacing between end of reinforcing bars and the face of the form.
- C. Location Tolerances: In accordance with CRSI publication, "Placing Reinforcing Bars".
- D. Splicing:
 1. Follow ACI 318/1318R.
 2. Use lap splices of not less than eighteen inches (18 In), unless otherwise shown on the Drawings or unless other methods are permitted in writing by the Project Manager.
 3. Stagger splices in adjacent bars where indicated.
- E. Mechanical Splices and Connections:
 1. Use only in areas specifically approved in writing by the Project Manager.
 2. Install threaded rods as recommended by manufacturer with threads totally engaged into coupling sleeve and in accordance with ICBO Research Report.
 3. For metal sleeve splice, follow manufacturer's installation recommendations.
 4. Maintain a minimum edge distance and concrete cover.
- F. Tying Reinforcing Bars:
 1. Tie every other intersection on mats.
 2. All edges shall be one hundred percent (100%) tied.
 3. No two (2) consecutive reinforcing bars in either direction shall

- be untied.
- 4. Bend ties wire away from concrete surface to provide clearance of one inch (1 In) from surface of concrete to tie wire.
- G. Reinforcing Steel Mat Supports.
 - 1. Reinforcing Steel Mat supports shall be either plastic, metal with plastic tips, or concrete brick only.
 - 2. Supports shall be of the size and height needed to maintain position of reinforcing steel in the concrete.
 - 3. Supports shall be installed underneath the crossing bar closest to the subgrade (bottom).
 - 4. Supports shall be placed in a checkerboard fashion similar to that for tying of the reinforcing steel.
- G. Reinforcement Around Openings: On each side and above and below pipe or opening, place an equivalent length and area of steel bars to replace steel bars cut for opening. Extend steel reinforcing a standard lap length beyond opening at each end.
- H. Straightening and Re-bending: Field re-bending of reinforcing steel bars is not permitted.
- I. Unless permitted by the Project Manager, do not cut reinforcing bars in the field.

3.3 WELDED WIRE REINFORCEMENT INSTALLATION

- A. Use only where specifically shown.
- B. Extend reinforcement to within two inches (2 In) of edges of slab, and lap splices at least eighteen inches (18 In).
- C. Tie laps and splices securely at ends with tie wire, and at least every twenty-four inches (24 In).
- D. Place welded wire reinforcement on concrete blocks and rigidly support equal to that provided for reinforcing bars. Do not use broken concrete, brick, or stone.
- E. Follow ACI 318/1318R and current Manual of Standard Practice, Welded Wire Reinforcement.
- F. Do not use rolled fabric or flat mats that have been rolled. Install flat sheets only.

3.4 TESTS AND INSPECTION

- A. An independent testing agency shall be retained by the City to visually inspect and test reinforcing steel welds in accordance with AWS D1.4.
- B. An independent testing agency shall be retained by the City to inspect each mechanical splice and verify each component is installed in accordance with manufacturer's instructions and ICBO Research Report.
- C. Special inspection shall be provided by the City as indicated on the Drawings.

END OF SECTION

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