

SECTION 032000
CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 RELATED SECTIONS

- A. Section 013330 - Structural Submittals.
- B. Section 014525 - Structural Testing/Inspection Agency Services.
- C. Section 031000 – Concrete Formwork
- D. Section 033000 – Cast-In-Place Concrete.

1.2 REFERENCES

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
- B. ACI 301 - Standard Specifications for Structural Concrete.
- C. ACI 318- Building Code Requirements for Structural Concrete.
- D. ASTM A1064- Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete Reinforcement.
- E. ASTM A615- Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- F. ASTM A706- Standard Specification for Low-Alloy Steel Deformed Bars for Concrete Reinforcement.
- G. AWS D1.4- Structural Weld Code - Reinforcing Steel.
- H. CRSI - Manual of Practice, and Documents 63 and 65.

1.3 SUBMITTALS

- A. Shop drawings:
 - 1. Notify Design Professional prior to detailing reinforcing steel shop drawings.
 - 2. Include placing drawings that detail fabrication, bending, and placement. Provide elevations of all wall reinforcement.
 - 3. Include locations of proposed construction joints for approval by EOR. Contractor to submit sequence of placing concrete.
 - 4. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement. Reinforcement detailing of standard hooks, splices and development lengths shall conform to ACI 318 unless noted otherwise on drawings.
 - 5. Include proposed field bending or cutting locations and cutting methods for approval by EOR.
 - 6. Written description of reinforcement without adequate sections, elevations, and details is not acceptable.
 - 7. All revisions to shop drawings shall be clouded.
 - 8. Reproduction of Structural Drawings for shop drawings is not permitted. Electronic drawing files will not be provided to the Contractor.
- B. Submit a certification from each manufacturer or supplier stating that materials meet the requirements of the ASTM and ACI standards referenced.
- C. Submit mill test reports
- D. Submit manufacturer's data for tensile and compressive splicers.
- E. Submit manufacturer's data including installation recommendations for dowel adhesive.

1.4 QUALITY ASSURANCE

- A. Coordinate and schedule in a timely manner with the Structural Testing/Inspection Agency the following quality related items:
 - 1. Verify reinforcing steel for quantity, size, location, and support.
 - 2. Verify proper reinforcing steel concrete coverage.
 - 3. Inspect mechanical splice couplers and reinforcement welding.
- B. Structural Testing/Inspection Agency shall provide special inspections as required by Chapter 17 of the building code and as required by Specification 014525.

- C. The Structural Testing/Inspection Agency shall be qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

1.5 STORAGE AND PROTECTING

- A. Store reinforcing steel above ground so that it remains clean. Maintain steel surfaces free from materials and coatings which might impair bond.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Deformed reinforcing steel shall conform to ASTM A615, refer to Structural Drawings for grade (Grade 60 minimum).
- B. Welded steel wire fabric shall conform to ASTM A1064.

2.2 ACCESSORY MATERIALS

- A. Annealed steel tie wire shall be 16-1/2 gage minimum.
- B. Bar supports shall be plastic-tipped steel Class I bar supports conforming to CRSI Specifications. Concrete brick may be used to support reinforcement to obtain proper clearance from earth.

2.3 SPLICERS

- A. Tensile splicers shall be capable of developing 125% of the reinforcing steel ASTM specified minimum yield strength.
- B. Compression splicers shall be the mechanical type such that the compression stress is transmitted by end bearing held in concentric contact.

2.4 DOWEL ADHESIVE

- A. Adhesive for reinforcing dowels in existing concrete shall conform to ASTM C881-13, Type IV, Grade 3, CLASS A, B, & C except gel times and epoxy content. Adhesive shall consist of a two component adhesive system contained in side by side packaging connected to a mixing nozzle which thoroughly mixes the components as it is injected into the hole. Adhesive shall have passed ICC Evaluation Services, Inc. Acceptance Criteria 308 for long term creep and be specifically approved for use in cracked concrete.

PART 3 - EXECUTION

3.1 FABRICATION

- A. Fabricate steel in accordance with ACI 318 and CRSI standards.
- B. Bend bars cold. Do not heat or flame cut bars. No field bending of bars partially embedded in concrete is permitted, unless specifically approved Design Professional and checked by Testing and Inspection Agency for cracks.
- C. Weld only as indicated. Perform welding in accordance with AWS D1.4.
- D. Tag reinforcing steel for easy identification.

3.2 INSTALLATION

- A. Before placing concrete, clean reinforcement of foreign particles and coatings.
- B. Place, support on chairs, and secure reinforcement against displacement in accordance with ACI 318 and CRSI standards. Do not deviate from alignment or measurement. Maximum support spacing shall not exceed 48 inches.
- C. Place concrete beam reinforcement support parallel to main reinforcement.
- D. Install welded-wire reinforcement in longest practicable lengths.
 - 1. Locate welded wire fabric in the top third of slabs unless otherwise noted in drawings. WWF shall be supported on chairs.
 - 2. Overlap mesh one lap plus two inches at side and end joints. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wires.
 - 3. Support spacing of welded wire reinforcement shall not exceed 24 inches, unless noted otherwise on plans.
- E. Furnish and install dowels or mechanical splices at intersections of walls, columns and piers to permit continuous reinforcement or development lengths at such intersections.
- F. Maintain cover and tolerances in accordance with ACI and CRSI Specifications, unless indicated otherwise on Structural Drawings.

- G. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
 - H. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
 - 3.3 INSTALLATION TOLERANCES
 - A. Comply with ACI 117 for installation tolerances.
 - 3.4 SPLICES
 - A. Do not splice reinforcement except as indicated on Structural Drawings.
 - B. Stagger splices in accordance with ACI 318.
 - C. Tension couplers may be used and installed in accordance with manufacturer's specifications.
 - 3.5 DOWELS IN EXISTING CONCRETE
 - A. Install dowels and dowel adhesive in accordance with manufacturer's recommendations.
 - B. Minimum embedment length shall be 12 bar diameters, unless noted otherwise.
- END OF SECTION