

SECTION 03200 - CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

1.3 RELATED REQUIREMENTS

- A. Section 03100 - Concrete Forms and Accessories.
- B. Section 03300 - Cast-in-Place Concrete.
- C. Section 04820 - Reinforced Unit Masonry Assemblies: Reinforcement for engineered masonry.

1.4 REFERENCE STANDARDS

- A. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2005.
- B. ACI 318 - Building Code Requirements For Structural Concrete and Commentary; American Concrete Institute International; 2008.
- C. ACI SP-66 - ACI Detailing Manual; American Concrete Institute International; 2004.
- D. ASTM A 82/A 82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.
- E. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2007.
- F. ASTM A 996/A 996M - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement; 2006a.
- G. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel; American Welding Society; 2005.
- H. CRSI (DA4) - Manual of Standard Practice; Concrete Reinforcing Steel Institute; 2001.
- I. CRSI (P1) - Placing Reinforcing Bars; Concrete Reinforcing Steel Institute; Eighth Edition.

1.5 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
- C. The Contractor shall obtain completely detailed shop drawings showing placement plans, bar bending lists, etc. Include the specific location and size of all accessories, chairs and bar supports. The Contractor shall carefully check these drawings, then submit them to the Architect/Engineer. The Architect/Engineer may conduct limited spot checks aimed solely at determining general comprehension of the design intent, then return them to the Contractor. The Contractor shall then carefully recheck the shop drawings and approve them prior to fabrication.
 - 1. NOTE: Regardless of the fabricators standard policy or other industry standards of practice, all straight and bent bars shall be tagged with the member mark. If the fabricator elects to use member marks other than those shown on the structural drawings, the members must also be labeled with the original engineer's member marks in addition to those of the fabricator.
- D. The Engineer's spot check shall not relieve the Contractor from correcting, at his own expense, any items that may thereafter be found not to comply with the plans and specifications.
- E. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.
- F. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

1.6 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301.

PART 2 PRODUCTS

2.1 REINFORCEMENT

- A. ALL REINFORCING (Unless noted otherwise)
 - 1. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420).
 - a. Plain billet-steel bars.
- B. BEAM STIRRUPS and COLUMN TIES
 - 1. Reinforcing Steel: Deformed bars, ASTM A 996/A 996M Grade 40 (280), Type A.
- C. Reinforcement Accessories:
 - 1. Tie Wire: Annealed, minimum 16 gage.
 - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.2 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
- B. Welding of reinforcement is not permitted.
- C. Locate reinforcing splices not indicated on drawings at point of minimum stress.
 - 1. Review locations of splices with Architect/Structural Engineer of Record .

PART 3 EXECUTION

3.1 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.

3.2 FABRICATION

- A. Reinforcing shall be fabricated in accordance with "Manual of Standard Building Code Requirements for Reinforced Concrete" (ACI 318), latest edition. The Contractor shall be responsible for obtaining properly fabricated reinforcing and placing it properly.
- B. Reinforcing steel, at the time concrete is placed, shall be free from excessive rust, scale, dried concrete, or other coatings that will destroy or reduce bond, in the opinion of the Engineer.
- C. Reinforcing steel shall be accurately shop bent and placed in position, securely tied or supported to prevent movement during placing of concrete. Field bends will not be permitted without prior approval from Engineer. Authorized field bends shall be performed cold; no heating is permitted. Spacer bars, supports and accessories are not scheduled but are to be furnished and placed as described under MATERIALS paragraph in this Section. Raising of reinforcement (including welded wire fabric) during the pour will not be permitted.

3.3 CONCRETE COVER

- A. SUSPENDED STRUCTURES
 - 1. Unless detailed otherwise on plans, reinforcing bars shall have concrete cover as follows:
 - a. Beam Stirrups; top, bottom and sides, 1-1/2".
 - b. Column ties and spirals, 1-1/2".
 - c. Concrete joists and slabs, 3/4".
 - d. Spread or spot footings, 3".
- B. SLAB AND BEAMS ON FILL
 - 1. Chair and/or block reinforcing securely in position with concrete cover as follows:

- a. Beam stirrups; top, 1-1/2", bottom and sides 3".
 - b. Slab bars; 1-1/2" from top.
2. Support reinforcing steel on concrete blocks or bricks spaced at approximately 4'-0" o.c. in each direction.

3.4 SPLICES

- A. Necessary splices not shown on drawings or otherwise noted shall be in accordance with ACI specifications for bar sizes up to #11 size, but not less than 40 bar diameters. Splices in bars larger than #11 shall be made with approved thermal or mechanical coupling devices. Welding wire fabric shall be lapped 1-1/2 meshes, with a minimum lap of 8". All lap splices shall be contact type secured with annealed tie wire.

3.5 SLAB OPENINGS

- A. Unless shown otherwise, at slab openings of 12" or less, spread main reinforcing around opening. At slab openings greater than 12", provide 2 #4x4'-0" bottom placed diagonally at each corner. At sides of openings, provide one full bar for each bar cut at opening. No main bars shall be cut without Engineer's approval.

3.6 CONDUITS IN SLABS

- A. Electrical and mechanical conduit in slabs or joists shall run under upper layer of reinforcing or wire mesh; provide a minimum of 1-1/2" clear between conduits and between conduit and parallel reinforcing. Do not "bundle" conduits. See CONCRETE FORMWORK Section for thickened slab required at large conduits.

3.7 BEAM INTERSECTIONS

- A. Unless shown otherwise on plans, at corners, angle bends and at junction with other beams, provide four #7x6'-0" "corner bars" (3 ft. each leg) , 2 top and 2 bottom. For deep beams with scheduled intermediate bars, provide matching 80 diameter corner bars" of the same size. At "T" intersection, place all "corner bars" so that one leg is in outside face of outside beam.

END OF SECTION