

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 DESCRIPTION

- A. This Section includes furnishing materials and installation of concrete reinforcement as indicated on the Drawings and/or specified herein.
- B. Related Work: The following items of related work are specified in other sections.
 - 1. Section 03100: Concrete Formwork
 - 2. Section 03300: Cast-In-Place Concrete
- C. Work Included: This Section of these Specifications includes only the fabrication and erection of the concrete reinforcement for the cast-in-place concrete for this project. The Contractor's attention is directed to Section 03300 (Cast-In-Place Concrete) of these Specifications; all requirements of Part 1 – General – of Section 03300 govern all materials and work specified in this Section.
- D. General: All reinforcing including welded wire fabric (WWF), shall be detailed, bolstered and supported to comply with ACI 315 "Manual of Standard Practice for Detailing Reinforcing Concrete Structures" and the Concrete Reinforcing Steel Institute (CRSI) recommendations.

1.02 SUBMITTALS

- A. General: Comply with pertinent provisions of Section 01340.
- B. Shop Drawings: Make shop drawings in accordance with Section 03300, paragraph 1.03, Shop drawings. No reproduction of Contract Drawings for use as shop drawings will be permitted.
- C. Mill Certificates: Accompanying the shop drawings, submit steel producer's certificates of mill analysis, tensile, and bend test for reinforcing steel, when requested.

1.03 PRODUCT HANDLING

- A. Delivery: reinforcement to the job site bundled, tagged and marked. Use metal tags indicating bar size, lengths and other information corresponding to markings shown on placement diagrams.
- B. Storage: Store reinforcement at the job site in a manner to prevent damage and accumulation of dirt and excessive rust.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Reinforcing Bars: Comply with ASTM A 305, Deformed Bars. Conforming to ASTM 615, Grade 60, or ASTM 706, Grade 60 as indicated on the plans.
- B. Steel Wire: Comply with ASTM A 82.
- C. Welded Wire Fabric: Comply with ASTM A 185.
- D. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcement in place:
 - 1. Use wire bar type supports or plastic chairs or supports complying with CRSI recommendations unless otherwise indicated. Do not use wood, brick or other unacceptable materials.
 - 2. For slabs on grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
 - 3. For exposed to view concrete surfaces, where legs of supports are in contact with forms, provide supports with either hot-dip galvanized, stainless steel or plastic protected legs. For footings or other concrete that will be in direct contact with earth, provide supports with either hot-dipped galvanized, stainless steel, plastic protected steel legs, or supports made entirely of plastic or other acceptable, inert polymer. Do not use wood, brick or other unacceptable materials.

2.02 FABRICATION

- A. General: Fabricate reinforcing bars to conform to required shapes and dimensions, with fabrication tolerances complying with ACI Manual. In case of fabricating errors, do not rebend or straighten reinforcement in a manner that will injure or weaken the material. If clearances for reinforcing require hooks shorter than standard hooks, fabricator shall be responsible for providing shorter hooks, as required.
- B. Unacceptable materials: Reinforcement with any of the following defects will not be permitted in the Work:
 - 1. Bar lengths, depths and bends exceeding specified fabrication tolerances.
 - 2. Bends or kinks not indicated on Drawings or Final Shop Drawings.
 - 3. Bars with reduced cross-section due to excessive rusting or other cause.

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine the substrate, formwork, and the conditions under which concrete reinforcement is to be placed, and correct conditions which would prevent proper and timely completion

of the Work. Do not proceed with the work until unsatisfactory conditions have been corrected.

- B. Inspection: Before placement of concrete, a representative of the Owner shall observe the placement of all reinforcing and give his approval.

3.02 INSTALLATION

A. General:

1. Standards for details and methods of reinforcement placement and supports shall be in accordance with ACI requirements, CRSI Recommended Practices for Placing Reinforcing Bars, and as herein specified.
 2. Clean reinforcement to remove loose rust and mill scale, earth, and other materials, which reduce or destroy bond with concrete.
 3. Position, support and secure reinforcement and embedment against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal or plastic chairs, runners, bolsters, spacers, and hangers, as required and recommended by CRSI.
 4. Place reinforcement to obtain the minimum coverage's for concrete protection. Arrange, space and securely tie bars and bar supports together with 16 gauge wire to hold reinforcement accurately in position during concrete placement operations. Set wire ties so that twisted ends are directed away from exposed concrete surfaces.
 5. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces minimum of 8 inches. Welded wire fabric shall be continuously supported at 36" on center (O.C.) maximum.
 6. Provide sufficient numbers of supports and of strength to carry reinforcement. Do not place reinforcing bars more than 2" beyond the last leg of any continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.
 7. All vertical reinforcing shall be doweled to footings or the structure below. Dowels shall be the same size and at the same spacing as the vertical reinforcing scheduled or detailed for the element above, unless otherwise indicated on the plans.
 8. Dowels extending into footings shall terminate with a 90° standard ACI hook and shall extend to within 4-inches of the bottom of the footing.
 9. All embedments and dowels shall be securely tied to formwork or the adjacent reinforcing prior to the placement of concrete.
- B. Splices: Provide standard reinforcement splices by lapping ends, placing bars in contact, and tightly tying wire. Reinforcement shall be spliced only as shown or noted in the plans or specifications. Splices at other locations shall be approved in writing by the structural engineer.
 1. Horizontal wall reinforcing shall terminate at ends of walls and openings into the far end of the jamb column with a 90-degree hook plus a 6 bar diameter extension, unless otherwise shown on the Plans.
 2. Lap horizontal bars as noted above or as shown on the Plans. Horizontal wall reinforcing shall be continuous through construction and control joints. Splices in horizontal reinforcement shall be staggered so that the splice laps do not occur along

a single line. Splices in two curtains of reinforcing, where used, shall not occur in the same location. Splice laps shall not overlap other splices.

- C. Welding: Reinforcing bars shall not be welded unless specifically indicated on the plans.
- D. Place reinforcement as follows with the following clear cover, unless noted otherwise on the drawings:

1. Below Grade
 - a. Unformed 3"
 - b. Formed 2"
2. Walls/Joists 3/4"
3. Columns 1 1/2"
4. Beams/Girders 1 1/2"
5. Slabs 3/4"
6. Exposed Columns 2"
7. Exposed Beam/Girders 2"
8. Exposed Slabs #5 and smaller, 2" or otherwise.
 - a. Top 1 1/2"
 - b. Bottom 1 1/2"

- E. Detailing:

1. Wall openings 6' to 8' wide: Place (2) #5 bars or (1) #7 bar in 10" walls and thinner around all openings 6' or larger in any direction, and extend the reinforcing bars a minimum of 24" beyond the corner of the openings, unless specifically indicated otherwise. Where 24" beyond the opening is not available, extend bars as far beyond the opening as practical and terminate them with a 90-degree standard ACI hook.
2. Provide (2) #6 x 4'-0" long, diagonal bars or (1) #7 x 4'-0" long bar in 10" walls and thinner at the corner of all openings and reentrant corners, unless specifically indicated otherwise. Diagonal bars shall be centered on the corner of the opening. All recesses in concrete walls that interrupt the reinforcing steel shall be reinforced as if the recess were an opening.
3. All openings in slabs that are not shown on the structural Plans must be approved by the engineer, in writing.
4. Embedded pips, ducts, or conduits: The maximum diameter for embedded pipes, ducts, or conduits shall be 1/3 of the slab or wall thickness, spaced at a minimum of 3 conduit diameters on center.
5. Concrete Columns: All tied and spiral reinforced columns shall have ties or spirals spaced at one-half the required tie spacing for a distance of one-sixth of the column height above and below all floor (or beam) and roof (or beam) levels or any other point of lateral support, unless specifically indicated otherwise on the structural Plans.

END OF SECTION