

SECTION 03 20 00
REINFORCING STEEL

PART 1 - GENERAL

1.1 SCOPE

- A. Includes furnishing all material, equipment, transportation, and facilities, and performing all labor necessary for preparation and submittal of shop drawings, furnishing and placing reinforcing. Refer to other sections for reinforcing steel in connection with site concrete.
- B. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications section apply to Work of this section.
- C. Alternate bids: Refer to other sections for description.

1.2 CODES AND STANDARDS

- A. The Work described in this section, unless otherwise noted on the Drawings or herein specified, shall be governed by the latest editions of the following Codes or Specifications:
 - 1. ACI 301, "Specification for Structural Concrete for Buildings".
 - 2. ACI 315, "Manual of Standard Practice for Reinforced Concrete".
 - 3. ACI 318, "Building Code Requirements for Reinforced Concrete".
 - 4. ASTM A185, "Standard Specification for Welded Steel Wire Fabric for Concrete Reinforcement".
 - 5. ASTM A615/A615M, "Standard Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement".
 - 6. ASTM A706/A706M, "Standard Specification for Low-Alloy Steel Deformed Bars for Concrete Reinforcement".
 - 7. Concrete Reinforcing Steel Institute, "Manual of Standard Practice".
 - 8. ASTM A775/A775M, "Standard specification for epoxy-coated reinforcing steel bars".
 - 9. ACI 117, "Standard Specifications for Tolerances for Concrete Construction and Materials".

1.3 QUALITY ASSURANCE

- A. If reinforcing steel is purchased direct from a United States mill, manufacturer's test sheets will suffice. Steel supplier shall furnish mill certificate reports.
- B. If steel is from an undetermined origin or manufacturer's test sheets or mill certificate reports are unavailable, Testing Laboratory shall perform tension and bending tests on three separate samples of each size of bar in every five tons of each type of steel as specified in the appropriate ASTM Specifications. Contractor shall furnish all material for testing and pay for all such tests.

1.4 ALLOWABLE TOLERANCES

- A. Fabricating: Conform to ACI 315.
- B. Placing:
 - 1. Concrete cover measured perpendicular to concrete surface in direction of tolerance:
 - a. Member size of 12" or less: -3/8 in.
 - b. Member size of over 12": -1/2 in.
 - c. Reduction of cover shall not exceed one-third specified concrete cover.
 - d. Reduction of cover to formed soffits shall not exceed 1/4 in.
 - 2. Clear distance to side forms and resulting concrete surfaces and clear distance to formed and resulting concrete soffits in direction of tolerance:
 - a. Member size of 4" or less: +1/4", -3/8 in.
 - b. Member size of over 4" but not over 12": +/-3/8 in.
 - c. Member size of over 12" but not over 2 feet +/-1/2 in.
 - d. Member size of over 2 feet: +/-1 in.
 - 3. Distance between reinforcing:
 - a. Joists: +/- 3/8 in.
 - b. Beams, girders: +/- 1/2 in.
 - c. Columns: +/- 1/4 in.
 - d. All other members: one-quarter specified distance not to exceed 1".
 - e. Distance between bars shall not be less than the greater of the bar diameter or 1" for unbundled bars.
 - 4. Conform to ACI 117 for any tolerances not shown.
- C. Maximum bar relocation to avoid interference with other reinforcing steel, conduits, or other embedded items: 1 bar diameter.

1.5 SUBMITTALS

- A. Shop Drawings: Submit shop drawings and installation drawings including complete bending diagrams, assembly diagrams, splicing and laps of bars, shapes, dimensions and details of bar reinforcing and accessories.
 - 1. Show complete layout plan for each layer of reinforcing of slabs and beams showing number, arrangement, spacing, location, marking, orientation, etc., of reinforcement required for layer being described.
- B. Certificates:
 - 1. Reinforcing Steel: Certified copies of mill test reports, evidencing compliance with the requirements of these Specifications, shall be delivered to the Architect with deliveries of reinforcing steel.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver reinforcement to project site in bundles marked with metal tags indicating bar size, length and mark.
- B. Unload reinforcing carefully to prevent damage. Store above ground in dry, well drained area and protect from mud, dirt, paint, corrosion, etc.

1.7 SCHEDULING/SEQUENCING

- A. Coordinate Work of this Section with work of other Sections as required to properly execute the Work and as necessary to maintain satisfactory progress of the work of other Sections.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Reinforcing Bars: ASTM A615/A615M, new, deformed billet steel bars, Grade 60 and Grade 75 as indicated on Structural Drawings. All reinforcement specifically noted as being welded shall be new billet steel conforming to ASTM A706.
- B. Welded Wire Fabric Reinforcing: Flat cutsheets ASTM A185, new, steel wire spot welded at intersections and of sizes indicated.
- C. Metal Accessories: Include spacer, chairs, bolsters, ties and other devices necessary for properly placing, spacing, supporting and fastening reinforcement in place, conforming to the requirements of CRSI "Manual of Standard Practice for Detailing Reinforced Concrete Structures" and ACI 315. Metal accessories shall

be plastic protected where legs will be exposed in finished concrete surfaces. Plastic protection shall be the color of the concrete. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer coated wire bar supports.

- D. Bar supports for concrete resting on earth shall be precast briquettes, having tie wires embedded therein, or Individual High Chairs No. HCP with welded plates on bottom as manufactured by Hohmann & Barnard, Inc.
- E. Tie Wire: FS QQ-W-461, black annealed steel, 16 ga. minimum.
- F. Tension Splices: In accordance with Contract Documents.
- G. Compression Splices (Vertical Reinforcing Bars): In accordance with Contract Documents.
- H. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A775/A775M.
- I. Studrails shall conform to ASTM A1044, Latest Edition. Studrail manufacturer shall provide proof of ICBO ES Evaluation for studrail assembly proposed. All studrail welding shall take place in an ICBO ES Audited Facility.

2.2 FABRICATION

- A. In accordance with CRSI "Manual of Standard Practice" and ACI 315.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Cleaning: Before placing in work thoroughly clean reinforcement of loose rust, mill, scale, dirt, oil, and other coating which might tend to reduce bonding. Reinspect reinforcing left protruding for future bonding, or following delay in work, and reclean if necessary.

3.2 INSTALLATION

- A. Bar Placement: In accordance with ACI 301, ACI 315, ACI 318, and CRSI "Manual of Standard Practice".
- B. Bending: Bend bars cold; do not heat reinforcement or bend by makeshift methods. Discard heat bent, kinked or otherwise damaged bars.
- C. Splices: In accordance with ACI 315.

- D. Placing: Reinforcement shall be accurately placed and securely saddle tied in accordance with CRSI recommended practice with No. 16 gauge black annealed wire, and shall be rigidly held in place during the placing of the concrete by means of metal chairs or spacers.
 - 1. Bars in concrete walls and columns shall be held in position, and to proper clearance, by means of metal spacers made especially for the locations where spacers are required.
 - 2. Bars in footings, beams and slabs shall be held to exact location during placing of concrete by spacer, chairs, or other necessary supports.
- E. Supports: In accordance with ACI 301 and ACI 315 for number, type, spacing and placing.
- F. Protection: Conform to ACI 318, Chapter 7.

3.3 WIRE FABRIC PLACEMENT

- A. Install in longest practicable lengths.
- B. Do not make end laps midway between supporting beams, or directly over beams of continuous structures.
- C. Offset end laps in adjacent widths to prevent continuous lap.
- D. Keep wire in proper position during concrete placements.
- E. Lap splices shall be in accordance with ACI 318.

3.4 WELDING

- A. No welding of reinforcing steel will be permitted unless specifically indicated on the Drawings.
- B. Welding of reinforcing steel shall conform to AWS D1.4.

3.05 FIELD QUALITY CONTROL

- A. Testing Laboratory services shall be in accordance with Section 01 43 26. Provide all inspections and testing as required by the 2006 International Building Code.
- B. Testing Laboratory shall perform visual inspection prior to placement of size, type and quality of materials.

- C. Testing Laboratory shall observe and report on placement of reinforcement, including size, quantity, vertical location, horizontal spacing, correctness of bends, splices, clearance between bars and forms, firmness of installation, and security of supports and ties, immediately prior to concreting.

END OF SECTION