

SECTION 03200  
CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope

1. Furnish and install steel bars, steel wire and wire fabric required for the reinforcement of concrete

B. Additional Requirements Specified Elsewhere

1. Section 01010: Summary of Work
2. Section 01340: Shop Drawings, Product Data, and Samples
3. Section 01400: Quality Control
4. Section 01500: Construction Facilities and Temporary Controls

C. Related Requirements Specified Elsewhere

1. Section 03100: Concrete Formwork
2. Section 03300: Cast-in-Place Concrete

1.2 QUALITY ASSURANCE

A. Project References

1. Contractor shall keep at least one copy of the following in the field office at all times
  - a. CRSI-WCRSI-Placing Reinforcing Bars

B. Installer Qualifications

1. Welders certified in accordance with AWS B12.1
2. Submit copies of current certification prior to commencing work

C. Allowable Tolerances

1. Fabrication tolerances: Conform to the following
  - a. Sheared length:  $\pm 1"$
  - b. Depth of truss bars:  $\pm \frac{1}{2}"$
  - c. Stirrups, ties and spirals:  $\pm \frac{1}{2}"$
  - d. All other bends:  $\pm 1"$
2. Placement tolerances: Conform to the following
  - a. Concrete cover to form surface:  $\pm \frac{1}{4}"$
  - b. Minimum spacing between bars:  $\pm \frac{1}{4}"$
  - c. Top bars in slabs and beams
    - 1) Members 8" deep or less:  $\pm \frac{1}{4}"$

- 2) Members between 8" and 2':  $\pm\frac{1}{2}$ "
  - 3) Members 2' deep or greater:  $\pm\frac{1}{2}$ "
  - d. Crosswise of members: Spaced evenly within 2"
  - e. Lengthwise of members:  $\pm 1$ "
3. Maximum bar movement to avoid interference with other reinforcing steel, conduit or embedded items: 1 bar diameter

#### D. References

- 1. Meet the requirements of the following except as modified or supplemented herein
  - a. *AASHTO Standard Specifications of Highway Bridges*
  - b. *American Concrete Institute Standards (ACI)*
    - 1) 301-99 Specifications for Structural Concrete for Buildings, Section 3, Reinforcement
    - 2) 318-02 Building Code Requirements for Reinforced Concrete Manual of Standard Practice for Detailing Reinforced Concrete Structures
  - c. *Concrete Reinforcing Steel Institute (CRSI-WCRSI)*
    - 1) Placing Reinforcing Bars
  - d. *American Welding Society (AWS)*
    - 1) D12.1 Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction

### 1.3 SUBMITTALS

- A. Refer to Section 01340 - Shop Drawings, Product Data and Samples; supplement with the following
  - 1. Shop Drawings
    - a. Show sizes and dimensions for fabrication and placing of reinforcing steel and bar supports
    - b. Indicate bar schedules, stirrup spacing and diagrams of bent bars
  - 2. Certificates
    - a. Mill test certificates identifying chemical and physical analysis of each load of reinforcing steel delivered
    - b. Welder Qualification Certificates

### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver reinforcement to project site in bundles marked with metal tags indicating bar size and length
- B. Handle and store materials to prevent contamination and contact with the ground

## PART 2 - PRODUCTS

### 2.1 MATERIALS

#### A. Bars

- 1. Deformed billet steel: ASTM A615, Grade 60

2. Bend Test: Meet 90° bend test at 60°F minimum temperature around a 10-bar diameter bend without cracking
- B. Wire
1. Cold drawn steel: ASTM A82
  2. Deformed steel: ASTM A496 minimum size D-4
- C. Welded Wire Fabric
1. Welded steel
    - a. ASTM A185
    - b. Welded intersections spaced maximum of 6" in direction of principal reinforcement
- D. Tie Wire
1. Annealed steel
    - a. Fed. Spec. QQ-W-461
    - b. 16 gauge minimum
- E. Bar Supports
1. Conform to "Bar Support Specifications," CRSI Manual of Standard Practice
    - a. Class B - Pregalvanized cold-drawn wire
  2. All bar supports in contact with formwork for exposed concrete surfaces shall be provided with plastic tips
- F. Fiber Reinforcement
1. Polypropylene fibers
  2. Fibermesh® 150 by Propex Concrete Systems
  3. Supply 1.5 cubic feet per cubic yard of concrete in manufacturer's standard volumetric packaging

## 2.2 FABRICATION

- A. In accordance with CRSI Manual of Standard Practice

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Remove all mud, oil, loose rust or mill scale, and other foreign materials that may reduce bond prior to placing concrete
- B. "Tight" rust or mill scale will be permissible without cleaning or brushing provided weights and dimensions are not less than the minimum required by referenced specifications

### 3.2 INSTALLATION

#### A. Bar Placement

1. Conform to CRSI-WCRSI "Placing Reinforcing Steel"
2. Position bars in accordance with above tolerances and secure in place
3. When bars are placed in two or more layers the bars in the top or outside layer shall be placed directly over bars in the bottom or inside layer

#### B. Bar Supports

1. Provide minimum number of supports as required by ACI 315
2. Do not use pebbles, pieces of broken stone, brick or concrete, metal pipe, or woodblocks to support reinforcement
3. Do not use bar supports as support for runways for concrete buggies or similar loads
4. Do not place bars more than 2" beyond the last leg at the end of a run of continuous reinforcement
5. Bar supports resting on subgrade material shall have footings of sufficient area to support reinforcing without being displaced or penetrating into subgrade material

#### C. Concrete Cover

1. Provide the following minimum clearance for concrete coverage
  - a. Footing and slab bottoms: 3"
  - b. Formed surfaces in contact with earth or exposed to weathering
    - 1) #6 bars or larger: 2"
    - 2) Bars smaller than #6: 1½"
2. Unless otherwise indicated on the drawings

#### D. Reinforcing Adjustment

1. Move only within allowable tolerances to avoid interference with other reinforcing steel, conduits or embedded items
2. Do not move bars beyond allowable tolerances without approval of Engineer
3. Do not heat, bend or cut bars without approval of Engineer

#### E. Splices

1. Do not splice bars, except at locations shown on the drawings, without approval of Engineer
2. Lap splices
  - a. Lap bar splices a minimum of 38 bar diameters, except top bars which shall lap 48 bar diameters, unless otherwise noted on the drawings
  - b. Tie bars securely with wire to prevent displacement during placement of concrete
3. Welding
  - a. Except where indicated on the drawings or approved by Engineer, welding or tack welding reinforcement is prohibited

### 3.3 FIELD QUALITY CONTROL

A. Refer to Section 01400 - Quality Control for responsibilities

END OF SECTION