

DIVISION 3 - CONCRETE
SECTION 03010
CONCRETE REINFORCEMENT

PART 1 - GENERAL

03010 - 1.1 DESCRIPTION

- A. Furnish all labor, materials, equipment, and incidentals to install all steel bars, steel wire, and wire fabric required for the reinforcement of concrete, as shown on the Construction Drawings and as specified herein.
- B. The cost for concrete reinforcement shall be included in the prices bid for the various items of the proposals and shall be full compensation for the furnishing, testing, storing, protecting, shaping, placing and maintaining in position of all steel reinforcement, irrespective of type, together with any supporting chairs and clips, tie wires, spacers, bolsters, and other fastenings, wire clips for wrapping, and the furnishing of all labor, materials, tools and appliances necessary to complete the work as shown on the Construction Drawings, specified or required for the proper completion of the installation.

03010 - 1.2 REFERENCE DOCUMENTS

- A. American Concrete Institute (ACI)
- B. American Society for Testing and Materials (ASTM)
- C. Concrete Reinforcing Steel Institute (CRSI)

03010 - 1.3 QUALITY ASSURANCE

- A. All testing agencies shall meet the requirements of "Recommended Practice for Inspection and Testing Agencies for Concrete, Steel and Bituminous Materials as Used in Construction", ASTM E329.
- B. Cut and bend reinforcing steel to conform to the dimensions shown and within the following tolerances:

Sheared length	<u>+1</u> inch
Stirrups, ties and spirals	<u>+1</u> inch
All other bends	<u>+1</u> inch

03010 - 1.4 SHOP DRAWINGS AND SUBMITTALS

- A. Detail reinforcing in accordance with the requirements of ACI 315 "Details And Detailing of Concrete Reinforcement," and ACI-315R "Manual of Engineering and Placing Drawings for Reinforced Concrete Structures."
- B. Shop drawing submittals shall include: bar lists and bending diagrams showing the individual weight of each bar; the total weight of each bar size; and the total weight of bars on the list.

- C. Submit certified copies of mill tests showing chemical and physical analyses.
- D. Have testing performed in accordance with ASTM A615 as modified by ACI 318 building code requirements for reinforced concrete.
- E. Submit certificates stating that materials meet the specified requirements.

03010 - 1.5 RELATED WORK

- A. Cast-In-Place Concrete, Section 03020
- B. Forms and Formwork, Section 03030.

03010 - 1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Ship reinforcing steel in bundles.
- B. Tag each bundle at the mill with a waterproof tag, in accordance with "Manual of Standard Practice" of the CRSI, showing the name of the mill, heat number, grade, size and identifying number.
- C. Concrete reinforcement shall be stored above ground on platforms or other supports, in an orderly manner to facilitate inspection and checking, and be protected from physical damage or contamination.

PART 2 - PRODUCT

03010 - 2.1 GENERAL

- A. All reinforcement steel shall be of the grade and type as specified herein or indicated on the Construction Drawing.
- B. Bars shall be bent cold to the shapes and dimensions as indicated in the Construction Drawings, or as required by the current "Manual of Standard Practice" of the CRSI. Steel shall not be bent or straightened in a manner that will injure the material. Bars with kinks or improper bends shall not be used.
- C. Reinforcing steel shall be clean and free of scale, oil, and defects.
- D. The diameter of bend measured on the inside of the bar for standard hooks, other than stirrups and tie hooks, shall not be less than the values on the table 3010-1.

TABLE 3010-1

MINIMUM DIAMETERS OF BEND

<u>Bar Size</u>	<u>Minimum Diameter</u>
#3 through #8	6 bar diameters
#9, #10, and #11	8 bar diameters
#14 and #18	10 bar diameters

03010 - 2.2 MATERIAL

- A. Reinforcing Bars:
1. Deformed and Plain Billet-Steel Bars: ASTM A615, Grade 60 of USA Manufacture.
 2. Epoxy-Coated Reinforcing Bars: ASTM A775.
 3. Rail-Steel Deformed and Plain Bars: ASTM A616.
 4. Axle-Steel Deformed and Plain Bars: ASTM A617.
 5. Low Alloy Steel Deformed Bars: ASTM A706.
 6. Fabricated steel bar or rod mats of the clipped type shall conform to ASTM A184.
- B. Plain Welded Wire Fabric:
1. Conform to ASTM A185, with the gage and mesh as indicated on the Plan.
- C. Deformed Welded Wire Fabric:
1. Conform to ASTM A497, with the gage and mesh indicated on the Plan.
- D. Plain Tie Wire:
1. Conform to Cold Drawn Steel Wire for Concrete Reinforcement, ASTM A82, 16-1/2 gage minimum size.
- E. Coated Tie Wire:
1. Epoxy-coated reinforcing bars shall be tied with plastic-coated, epoxy-coated, or nylon-coated tie, 16 1/2 gage minimum size.
- F. Metal Bar Supports:
1. Type 1, Standard
 - a. All metal bar supports shall be fabricated from cold-drawn steel wire in accordance with current CRSI Standards.
 2. Type 2, Stainless Steel Protected
 - a. Shall be Type 1, with stainless steel wire conforming to ASTM A493 attached to the tips of the support so the non-stainless wire will lie no closer than 1/4 inch from the form surface.
 3. Type 3, Plastic Protected
 - a. Shall be of Type 1, with plastic coating of polyethylene conforming to ASTM D1248 on the legs and tips.
- G. Concrete Bar Supports:
1. Precast Concrete Brick Supports Conform to ASTM C55, Type 1, Grade N.

PART 3 - EXECUTION

03010 - 3.1 CUTTING AND BENDING - REINFORCEMENT

- A. Do not bend bars in the field except to correct minor errors or damage in shipment or handling, or to make shipment of certain bars practicable. Bending shall be in accordance with Sub-section 2.01. Welding of reinforcement will not be permitted.

03010 - 3.2 BAR SUPPORTS AND SPACERS

- A. Support bars by means of bolsters or chairs with no less than the minimum required by ACI 315 Manual of Standard Practice for Detailing Reinforced Concrete Structures.
- B. Reinforcing steel in the bottom of slabs resting on earth may be supported by concrete brick or mortar blocks.
- C. Hold reinforcing steel in position in walls, columns, piers, and abutments by means of mortar blocks, bar supports, or spacers wired to reinforcing steel.
- D. Do not use stones, clay bricks, wood blocks, or pieces of broken concrete to support reinforcing steel.
- E. Do not place bars or fabricated mats on layers of fresh concrete as the work progresses.
- F. Place reinforcement a minimum of 2-inches of any metal pipe or fitting.

03010 - 3.3 STEEL REINFORCEMENT

- A. Arrange and place reinforcing steel as shown on the Construction Drawings.
- B. Secure reinforcement positively against displacement during placing of concrete.
- C. Wire or clip bars together as recommended in Concrete Reinforcing Steel Institute, "Recommended Practice for Placing Reinforcing Bars."
- D. Place steel which is free from dirt, rust and mill scale, oil, grease, and other foreign matter.
- E. Placing Reinforcing Steel

Variation of protective coating 2 inch cover	\pm 1/4 inch
Variation of protective coating 3 inch cover	\pm 1/2 inch
Variation from indicating space	\pm 1 inch

03010 - 3.4 SPLICING

- A. Furnish reinforcing bars in full lengths as shown on the Construction and Shop Drawings.
- B. Do not splice bars unless approved by the Project Manager in writing.
- C. No splices less than 48 bar diameters or less than 1'-0 whichever is greater..

03010 - 3.5 CONCRETE PROTECTION FOR REINFORCEMENT

- A. Reinforcement shall be protected by the thickness of concrete indicated in the Construction Drawings. Where not otherwise shown, the thickness of concrete over the reinforcement shall be as follows.
 1. Where concrete is deposited against the ground without the use of forms other than flat slabs - not less than 3 inches.
 2. Where concrete is exposed to weather, ground sewage, or sewage gases, but placed in forms - not less than 2 inches for bars larger than No. 5 and 1-1/2 inches for No. 5 bars and smaller, except in beams, girders and columns.
 3. In slabs and walls not exposed to ground, weather, sewage or sewage gases –

not less than 3/4 inch.

4. In beams, girders, and columns not exposed to ground, weather, sewage, or sewage gases - not less than 1-1/2 inches all sizes.
5. In slabs on grade - not less than 1-1/2 inches.

03010 - 3.6 FIELD QUALITY CONTROL

- A. Construct elements to meet the allowable tolerances of the dimensions, elevations, and positions shown and specified in Section 03020 Cast-In-Place Concrete.
- B. Deposit concrete only when the forms and placement of the reinforcement steel has been checked and approved by the Project Manager. The Contractor shall provide notice to the Project Manager at least 24 hours in advance of any contemplated concrete pour.

END OF SECTION