

**SECTION 03200
CONCRETE REINFORCEMENT**

1.0 GENERAL

A. Description

Concrete reinforcement shall include, but not necessarily be limited to, furnishing and placing various types and/or sizes of steel reinforcing for embedment in Portland cement concrete as specified in the Contract Documents.

B. Related Work Included Elsewhere

1. Cast-In-Place Concrete: Section 03300
2. Pre-Cast Concrete: Section 03400

C. Quality Assurance

The Commission will inspect all materials before, during and after placement to ensure compliance with the Contract Documents.

2.0 MATERIALS

A. Materials Furnished by the Commission

The Commission will not furnish any materials for concrete reinforcement.

B. Contractor's Options

Substitution of smaller size bars will be permitted only upon specific authorization by the Commission. Substituted bars shall provide a steel area equal to or larger than that called for by the design provided the spacing is not reduced to a point where the clear distance between the bars is less than one and one-half times the nominal diameter of the bars, nor one and one-half times the maximum size of the course aggregate, nor 1-½ inches, and further provided that the planned cover is maintained. No additional compensation will be allowed because of the substitution of larger areas of steel.

C. Detailed Material Requirements

1. General

Reinforcing steel shall conform to the requirements of ACI 318.

2. Bar Reinforcement

Bar reinforcement shall consist of deformed bars meeting the requirements of AASHTO M 31, Grade 60. Grade 40 may be used for #5 and smaller bars where indicated on the Plans.

3. Tie or Dowel Bars

Tie or dowel bars shall be round steel bars meeting the requirements of AASHTO M 31, Grade 40 or ASTM A 36.

4. Welded Steel Wire Fabric

Welded steel wire fabric shall meet the requirements of AASHTO M 55. When galvanizing is specified, the fabric shall be galvanized after fabrication.
 5. Welded Deformed Steel Wire Fabric

Welded deformed steel wire fabric shall meet the requirements of AASHTO M 221.
 6. Galvanizing

Galvanizing for deformed steel bars shall be in accordance with ASTM A 153.
- D. Material Storage Note: Materials shall be stored in order to insure the preservation of their quantity, quality and fitness for Work. The Contractor shall place materials on wooden platforms, or other hard, clean surfaces, not on the ground, and the materials shall be placed under cover when directed by the Owner. Stored materials shall be located in order to facilitate prompt inspection by the Owner. Lawns, grass plots, or other private or public property shall not be used for storage purposes without written permission of the owner or lessee. Unless directed or noted otherwise in the Contract documents, there will be no payment for stored materials.

3.0 EXECUTION

- A. Fabrication
1. General

After bar lists and bending diagrams have been approved, fabricate each unit of reinforcement to the type, shape, size, grade, and dimensions shown on the approved shop drawings.
 2. Cutting and Bending

Perform cutting and bending of reinforcing bars before shipment to the site. Bend all bars cold in a manner that will not injure the material and in accordance with the Manual of Standard Practice of the Concrete Reinforcing Steel Institute.
- B. Shipping, Handling, and Protection of Material
- Reinforcing steel bars shall be shipped in standard bundles and tagged and marked in accordance with the provisions of the Code of Standard Practice of the Concrete Reinforcing Steel Institute. Bundles shall be kept intact and material undamaged and properly identified until ready for use.
- Reinforcing steel bars shall be stored on blocking, racks, or platforms so as not to be in contact with the ground.
- Bars shall be kept free from dirt, paint, oil, grease, loose or thick rust, detrimental mill scale, or other foreign substances. However, when steel has on its surface detrimental rust, mill scale, dust, or dirt, it shall be cleaned by a method approved by the Commission.
- C. Placing and Fastening

The placing of bars shall conform to the recommended practices in "Placing Reinforcing Bars" as published by the Concrete Reinforcing Steel Institute.

Reinforcing steel shall be accurately placed in the position shown on the plans and firmly held during the placing and setting of the concrete. Cover, or the distance between the external face of the bar and the face of the finished concrete, shall be as indicated on the Plans. Reinforcing steel bars embedded in concrete shall not be bent after they are in place. Bars shall be tied at all intersections with 16 ½ gage black annealed wire except that where spacing is less than 1 foot each direction alternate intersections need not be tied. All intersections shall be tied in the top mat of reinforcement placed on the top slabs of box culverts. Abrupt bends shall be avoided except where one steel bar is bent around the other. Stirrups and ties shall always pass around the outside of main bars and be securely attached thereto. All reinforcing steel shall be securely held at the proper distance from the forms by means of plastic coated steel chains. Blocks for holding reinforcement away from contact with earth shall be precast concrete blocks of approved shape, mix, and dimensions and shall have tie wires embedded in them. Layers of bars shall be separated by approved plastic coated metal chairs or bolsters.

Any broken or damaged concrete spacer blocks shall be removed before concrete is placed. The use of pebbles, pieces of broken stone or brick, metal pipe, or wooden blocks as spacers will not be permitted. Reinforcing steel when placed in the work shall be free from flake rust, dirt, and foreign material before any concrete is placed. Any mortar which may be adhering to the reinforcing steel shall be removed. No concrete shall be placed until the Commission has inspected the placing of the reinforcing steel and given permission to place the concrete. The Contractor shall allow the Commission ample time after the reinforcement and forms are in place to conduct the inspection. Any bars of incorrect size, length, or shape shall be removed and replaced with correct bars. Any bars located or spaced incorrectly shall be relocated or spaced correctly before approval is given to place concrete, and such replacements and corrections shall be at the Contractor's expense. All concrete placed in violation of these provisions shall be rejected and removed.

D. Splicing

Reinforcement shall be furnished in full lengths as indicated on the Plans. Splicing, except where shown on the Plans, will not be permitted without written approval from the Commission and if additional splices are used, the additional weight occasioned by such splices shall be at the Contractor's expense.

All splices shall conform to Class "B" in ACI 318 or as shown on the Plans. Splices shall be well distributed where conditions permit. Except where otherwise shown on the Plans, lap splices shall be made with the bars placed in contact and wired together. Lapped splices for reinforcement shall not be used for bar sizes larger than No. 11.

No welding of reinforcing steel or attachments thereto will be permitted without written authorization by the Commission, unless so indicated on the Plans. Welding, if permitted, shall be in accordance with AWS D1.4.

4.0 METHOD OF MEASUREMENT

Measurement for concrete reinforcement consisting of deformed bars, or wire mesh will not be made, but shall be included in the unit or lump sum price bid for cast-in-place concrete.

5.0 BASIS OF PAYMENT

A. General

1. Payment for concrete reinforcement consisting of deformed bars, or wire mesh will not be made as such, but the cost thereof shall be included in the lump sum price bid for cast-in-place concrete.

****END OF SECTION 03200****