SECTION 03200

CONCRETE REINFORCEMENT

PART 1 - Description

The work covered in this section includes: reinforcing steel bars, wire fabric, and rod mats for cast-in-place concrete; support chairs, bolsters, bar supports, and spacers for supporting reinforcement; and fiber reinforced concrete.

PART 2 – Materials

2.01 Submittals

A. Manufacturer's Certificate: Submit mill test certificates of supplied concrete reinforcement, indicating physical and chemical analysis.

B. Welder's certification.

C. Shop Drawings.

1. Indicate sizes, spacings, locations, and quantities of reinforcing steel, wire fabric, bending and cutting schedules, splicing, stirrup spacing, supporting, and spacing devices.

2. When required, prepare Shop Drawings by an engineer who complies with Tennessee licensing law having jurisdiction and acceptable to agency having jurisdiction.

D. Fiber Reinforced Concrete

1. Submit one (1) copy of manufacturer's printed product data indicating proposed fibrous concrete reinforcement materials. Printed data should state the application rate of fibers to be added to each cubic yard of each type of concrete.

2. Submit one (1) copy of a manufacturer's printed batching and mixing instructions.

3. Submit one (1) copy of a certificate prepared by the concrete supplier and/or material testing laboratory providing information on the application rate of fibers for the type or mix design of concrete. Each certificate shall be accompanied by one (1) copy of each batch delivery ticket indicating amount of fibrous concrete reinforcement material added to each batch of concrete.

2.02 Materials

A. Concrete Reinforcement Materials

1. Reinforcing Steel: Reinforcement shall be in accordance with ASTM A 615 deformed bars, grade, and type as indicated, either uncoated or as indicated on the drawings or other specifications. When no grade is indicated, use 60 ksi (414 MPa) yield grade steel. Use ASTM A 706 steel if welding is indicated or specified.

2. Welded Steel Wire Fabric: In accordance with ASTM A185 plain type; in flat sheets or coiled rolls either uncoated or as indicated.

3. Stirrup Steel: In accordance with ASTM A 82.

4. Plain Dowel Bars for Expansion Joints: In accordance with ASTM A 615, 60 ksi (414 MPa) yield grade steel.

    a. Epoxy coated in roadway pavements.

    b. Provide metal dowel can at one end of dowel to permit longitudinal movement of dowel within concrete section. Design caps with 1 end closed.

    c. Provide for movement equal to joint width plus 1/2 inch (12.5 mm).

    d. For load transfer bars, paint with 1 coat of paint conforming to AASHTO M 254 and coat 1/2 with grease.

B. Fibrous Concrete Reinforcement Material

1. 100 percent virgin polypropylene fibrillated fibers containing no reprocessed olefin materials and specifically manufactured to an optimum gradation for use as concrete secondary reinforcement. Volume per cubic yard shall equal a minimum of 3 to 5 pounds per cubic yard of concrete.

2. Fiber reinforced concrete shall be Fibermesh 650 as manufactured by Propex Concrete Systems, 6025 Lee Highway, Chattanooga, TN 37422 or equal. The type of fiber to be specified shall be outlined in the construction drawings or as directed by the Engineer. If the specifications or drawings do not specify the type of fiber reinforcing, then Fibermesh 650 or equal shall be provided.

3. Fibrous concrete reinforcement materials provided in this Section shall produce concrete conforming to the requirements for each type and class of concrete required, as indicated on the drawings or specifications where the concrete is tested in accordance with ASTM C-94 and ASTM C1116 Type 1114.1.3 and ASTM C-116 (Ref: ASTM C-1018) Performance Level I5 outlined in Section 21 Note 17.

C. Accessory Materials

1. Tie Wire: Minimum 16 gage steel wire shall be plain, cold drawn and shall comply with ASTM A 82.

2. Supports for reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcement in place:

   a. Use wire bar type supports complying with CRSI recommendations unless otherwise indicated. Do not use wood, brick, and other unacceptable materials.

   b. For slabs on grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

   c. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with either hot-dip galvanized for plastic protected legs.

D. Fabrication

1. Fabricate reinforcement in accordance with ACI 315, providing for the concrete cover.

2. Locate reinforcing splices not indicated on drawings at points of minimum stress. Indicate location of splices on Shop Drawings.

3. Weld reinforcing bars in accordance With AWS D1.4.

4. Unacceptable materials: Reinforcement with any of the following defects will not be permitted in the Work:

   a. Bar lengths, depths, and bends exceeding specified fabrication tolerances.

   b. Bends or kinks not indicated on Drawings or final Shop Drawings.

   c. Bars with reduced cross-section due to excessive rusting or other cause.

PART 3 - Execution

3.01 Product Handling

A. Deliver 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: Take all means necessary to protect reinforcement materials before, during, and after installation and to protect the installed work of other trades. Store all reinforcement materials in a manner to prevent excessive rusting and fouling with grease, dirt, and other bond-breaking coatings. Take all necessary precautions to maintain identification after bundles are broken. In the event of damage or errors, immediately make all repairs or replacements necessary and at no additional cost to the OWNER.

3.02 Placing

A. All reinforcement to be free of loose mill scale, loose or thick rust, dirt, paint, oil or grease.

B. Place all reinforcement in the exact position indicated. With tie wire, tie bars together at all intersections.

C. Maintain the distance from vertical forms and between layers of reinforcement by means of prefabricated chairs, ties, hangers, or other approved devices. Placing and fastening of reinforcement in each section of the Work must be approved before concrete is placed.

D. Overlap sheets of metal mesh one square plus 6 inches (150 mm) to maintain a uniform strength. Securely fasten at the ends, edges, and supports to maintain clearances.

3.03 Splicing

A. Furnish all reinforcement in the full lengths indicated unless otherwise permitted. Splicing of bars, except where indicated is not permitted without written approval. Stagger splices where possible.

B. Unless indicated otherwise, overlap reinforcing bars a minimum of 30 diameters to make the splice. In lapped splices, place the bars and wire to maintain the minimum distance for clear spacing to the surface of the concrete.

C. Do not use lap splices on bars greater in diameter than No. 11 (35) unless approved.

D. Weld reinforcing steel only if indicated or if authorized in writing. Weld in conformance to AWS D1.4.

E. Do not bend reinforcement after embedding in hardened concrete.

F. Do not permit reinforcement or other embedded metal items bonded to the concrete, to extend continuously through any expansion joint, except dowels in floors bonded on only one side of joints.

3.04 Placing Embedded Items

A. Place all sleeves, inserts, anchors, and embedded items prior to concrete placement. Temporarily fill voids in embedded items to prevent entry of concrete.

B. Give all trades whose work is related to the concrete Section ample notice and opportunity to introduce or finish embedded items before concrete placement.

3.05 Fiber Reinforced Concrete

A. Add fibrous concrete reinforcement to concrete materials at the time concrete is batched in amounts in accord with approved submittals for each type of concrete required.

B. Mix batched concrete in strict accord with fibrous concrete reinforcement manufacturer's instructions and recommendations for uniform and complete dispersion.

END OF SECTION