SECTION 03 21 00

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 Section Includes:

A. All steel reinforcement, mesh, dowels, and related items to comply with drawings and specifications including materials, labor, and equipment to complete the building and work shown.

B. Observation and Required Special Inspections

1.2 RELATED WORK SPECIFIED ELSEWHERE:

A. Section 01 40 00 – Quality Control: Required Special Inspections

B. Section 03 35 20 – Polished Concrete Finish System

C. Section 03 11 00 - Concrete Form Work: Section

D. Section 03 30 00 - Cast-In-Place Concrete

E. Section 04 22 00 - Concrete Unit Masonry

1.3 QUALITY ASSURANCE:

A. Acceptable Manufacturers: Regularly engaged in manufacture of steel bar and welded wire fabric reinforcing.

B. Installer Qualifications:
   1. Three years experience in installation of steel bar and welded wire fabric reinforcing.

C. Requirements of Regulatory Agencies: Conform to requirements of local Building Code.

D. Allowable Tolerances:
   1. Fabrication:
      a. Sheared length: + or - 1 inch
      b. Stirrups, ties and spirals: + or - 1/2 inch
      c. All other bends: + or - 1 inch
   2. Placement:
      a. Concrete cover to form surfaces: + or - 1/4 inch
      b. Minimum spacing between bars: + or - 1/4 inch
      c. Top bars in slabs and beams:
         (1) Members 8 inches deep or less: + or - 1/4 inch
         (2) Members more than 8 inches, but not over 2 feet deep:+ or - 1/2 inch

(3) Members more than 2 ft. deep: + or - 1 inch

d. Crosswise of members: Spaced evenly within 2 inches of stated separation.

e. Lengthwise of members: + or - 2 inches.

3. Maximum bar movement to avoid interference with other reinforcing steel, conduits, or embedded items: 1 bar diameter.

1.4 SHOP DRAWINGS:

A. Comply with Section 01 33 00.

B. Show sizes and dimensions for fabrications and placing of reinforcing steel and bar supports.

C. Indicate bar schedule, stirrup spacing, and diagrams of bend bars.

D. All detailing, fabrication and erection of reinforcing bars shall comply with the A.C.I. Manual of Standard Practice for Detailing Reinforced Concrete Structures. (A.C.I. 315).ACI 315R- 18 is titled “Guide to Presenting Reinforcing Steel Design Details.”

E. Manufacturer's Literature: Manufacturer's specifications and installation instructions for splice devices.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING:

A. Deliver reinforcement to project site in bundles marked with durable tags indicating bar size and length.

B. Handle and store materials to prevent contamination.

PART 2 PRODUCTS

2.1 MATERIALS

A. REINFORCING STEEL. Reinforcing steel for concrete shall be deformed, clean, free from rust and new. It shall conform to ASTM Standard A 615 and shall be Grade 60 for bars No. 4 and larger and Grade 40 for No. 3 bars and smaller.

B. SMOOTH STEEL DOWEL BARS. Plain steel dowel bars for reinforcing concrete slab joints shall meet the requirements of ASTM A 615, Grade 60. These plain round dowel bars shall be free from burrs or other deformations restricting slippage in the concrete.

1. Smooth Dowel bars shall be held in position parallel to the surface and centerline of the slab by a metal assembly of sufficient strength and anchorage to prevent displacement during the paving operations. Immediately prior to placement of concrete, each bar shall be field coated for a minimum distance of 2 inches greater than half the length of the bar with an approved lubricant. Lubricated ends of adjacent bars shall be on alternating sides of the slab joint.

C. WIRE FABRIC. Wire fabric shall be electrically-welded wire fabric of cold-drawn wire (70,000 psi yield point) of the diameter and spacing required and shall conform to ASTM Standard A 185. Welded wire fabric or mesh shall be of gauge and mesh shown on plans and shall conform to "Standard Specifications for Welded Steel Wire Fabric for Concrete REINFORCEMENT: (ASTM A1064-Current Edition). Furnish mesh in flat sheets. ASTM A1064/A1064M – 17 is titled "Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete."

D. TIE WIRE: FS-QQ-W-461, annealed steel, black, 16 gauge minimum

E. BAR & WIRE MESH SUPPORTS: Conform to "Bar Support Specifications", CRSI Manual of Standard Practice. Metal bolsters required. No bricks or CMU allowed. Bars supports used over or against concrete surfaces which are exposed shall be plastic protected. The plastic shall have a thickness of 3/32" or greater at points of contact with the form work. The plastic shall extend upward on the wire to a point at least 1/2" above the form work. Provide following support types (CRSI Designation):
   1. Woven Wire Mesh: Type "SBU", linear, longest length possible.
   2. Steel reinforcement bars: Type "SBU", length as required to fit in trench and properly support bars.
   3. Note: "SBU" type supports to have two (2) bottom runners and one (1) top runner, all continuous.

F. DIAMOND PLATE DOWEL SYSTEM: Provide Diamond Dowel System manufactured by PNA construction technologies, "Speed Plate" System by SIKA Corp. or approved alternate. Plates are manufactured from steel certified to meet ASTMA36 (1/4" and 3/8") or ASTM A108 (3/4")
   1. Install at all construction joints at building slabs-on-grade.
   2. Provide diamond plate thickness as follows, depending on slab thickness:
      a. 1/4" (6mm) – typically used in 4"- 6" slab depths
      b. 3/8" (10 mm) – typically used in 7"- 8" slab depths
      c. 3/4" (20 mm) – typically used in 9" plus slab depths

## PART 3 EXECUTION

### 3.1 FABRICATION

A. In accord with CRSI Manual of Standard Practice.

### 3.2 INSTALLATION:

A. Placements:
   1. Bar Supports: CRSI Placing Reinforcing Bars (10th Edition)
   2. Reinforcing Bars: CRSI Supports for Reinforcement Used in Concrete (2016). Support footing reinforcement bars with SBU type supports. Space at no more than 4'-0" on center. Support reinforcement bars at each footing corner and intersection. **Rebar chairs will not be acceptable.** For large double layer reinforcement pad

footing mats, provide doubling of the SBU supports. Concrete bricks may be used as an option at large double-matted footings, **but only upon Architect's approval**.

3. Details shall be in accordance with "Building Code Requirements for Structural Concrete" (ACI 318-Current Edition)
4. **Place sufficient length supports for wire mesh concrete slab reinforcement no more than 3'-0" on center, or stagger at 2'-0" on center. Do not cut supports into small lengths.** Do not extend support through control joints.
5. Install #4 reinforcement hoops around slab penetrations 3" or larger in diameter. This would include, but not be limited to plumbing pipes, electrical conduit, floor drains, electrical floor boxes, etc.
6. Where groups of electrical conduits exceed 3" in diameter, install #4 reinforcement hoops around groups, or provide straight #4 bars around linear groups.

B. Steel Adjustment:
   1. Move within allowable tolerances to avoid interference with other reinforcing steel, conduits, or embedded items.
   2. Do not move bars beyond allowable tolerances without concurrence of Architect/Engineer.
   3. Do not heat, bend, or cut bars without concurrence of Architect/Engineer.

C. Concrete covering over reinforcement shall be not less than the following:
   1. Where concrete is deposited directly against earth: 3"
   2. Where formed concrete surface will be exposed to weather or ground: 2"
   3. Where formed concrete surface will not be exposed to weather or ground: for walls and slabs: 3/4"
   4. For beams, girders, and columns: 1-1/2"
   5. All covering: Nominal bar diameter

D. Splices:
   1. Lap splices: Tie securely with wire to prevent displacement of splices during placement of concrete.
   2. Splice devices: Install in accordance with manufacturer's written instructions.
   3. Welding: Do not weld reinforcement.
   4. Do not splice bars except at locations shown on drawings without concurrence of Architect/Engineer.

E. Wire Fabric:
   1. Install in longest practicable length.
   2. Lap adjoining pieces one full mesh minimum, and lace splices with 16-gauge wire.
   3. Do not make end laps midway between supporting beams, or directly over beams of continuous structures.
   4. Offset end laps in adjacent widths to prevent continuous laps.
   5. Do not continue wire fabric through control joints

F. Diamond Plate Dowel System:
   1. Install Diamond Plate Dowell System, following manufacturer's instructions.
   2. Provide diamond plate dowel spacing as follows, depending on slab thickness:

a. 4” -6” slab thickness: ¼” thick at 18” O.C.
b. 7” -8” slab thickness: 3/8” thick at 18” O.C.
c. 9” -11” slab thickness: ¾” thick at 20” O.C.

3.3 CLEANING:

A. Remove dirt, grease, oil, loose mill scale, excessive rust, and foreign matter that will reduce bond with concrete.

3.4 . PROTECTION DURING CONCRETING:

A. Keep reinforcing steel in proper position during concrete placement.

3.5 OBSERVATION AND SPECIAL INSPECTIONS

A. Reinforcement and placement shall be observed by the Architect prior to placing concrete. Inspection of reinforcement for conformance to the construction documents shall be completed by the designated third-party Special Inspector.

3.6 INSTALLATION OF MISCELLANEOUS ITEMS:

A. Contractor shall coordinate and check that all work required to be embedded in concrete is in place prior to pouring. Placement of such work is to be done without disturbing reinforcement in place.

END OF SECTION