

SPECIFICATIONS - DETAILED PROVISIONS
Section 03200 - Reinforcing

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**SECTION 03200
REINFORCING**

PART 1 - GENERAL

1.01 DESCRIPTION

Provide reinforcing work, complete as indicated, specified and required.

A. Work Included in This Section. Principal items are:

1. Furnishing and placing bar and mesh reinforcing for cast-in-place concrete including dowels for masonry work.
2. Furnishing reinforcing steel bars for masonry, including delivery to the site.

B. Related Work Not Included in This Section.

1. Installation of reinforcing in masonry (Section 04220).
2. Formwork (Section 03150).
3. Cast-in-Place Concrete (Section 03300).

1.02 QUALITY ASSURANCE

A. Code Requirements. Unless otherwise specified, all work specified herein and as shown on the drawings shall conform to the applicable requirements of Chapter 26 of the Uniform Building Code, latest edition.

B. Testing. Materials shall be tested as hereinafter specified and unless specified otherwise, all sampling and testing shall be performed by a District-approved Testing Laboratory with cost borne by the Contractor.

1. Test Samples. Bars, ties, and stirrups shall be selected by Testing Laboratory representative from material at the site or from place of distribution. Selection shall include at least two (2) pieces, each 18" long, of each sampling.
2. Required Tests.
 - a) Identified Bars. Testing will not be required if reinforcement is taken from bundles as delivered from the mill, identified as to heat number

and accompanied by certified mill analyses and certified mill test reports, and is properly tagged with Identification Certificate so as to be readily identified, unless otherwise directed by the Engineer.

- b) Unidentified Bars. When positive identification cannot be made or when random samples are taken, tests shall be made from each five (5) tons or fraction thereof for each size. One tensile and one bend test shall be made from specimens of each size of reinforcement. Contractor shall bear costs and delays caused by testing unidentified bars.

- C. Standard. Reinforcing steel installations shall conform to the specification requirements of the Concrete Reinforcing Steel Institute "Manual of Standard Practice" (herein referred to as the CRSI Manual) except as otherwise indicated or specified.

- D. Field Quality Control. Continuous inspections, where required by the Special Conditions, shall be performed by the "Special Inspector" qualified and approved by Governing Building Code Authority or Inspector as otherwise qualified and approved by the District.
 - 1. Inspection of Reinforcing. Provide twenty-four (24) hour advance notice to permit inspection of in-place reinforcement prior to closing forms, and refer to applicable requirements of Section 03300, "Cast-In-Place Concrete".
 - 2. Concreting Operations. During concrete placing, assign construction personnel to inspect reinforcement and maintain bars in correct positions at each pour location.
 - 3. Welding Inspection. Where allowed, perform shop and field welding of reinforcing steel under continuous inspection of the District's Inspector or an Inspector representative of the Testing Laboratory approved by the District. Notify District at least twenty-four (24) hours in advance of any procedure involving the welding of reinforcement.

1.03 SUBMITTALS

Submit the following in advance of fabrication in conformance with applicable requirements of General Conditions.

- A. Shop Drawings. Submit six (6) sets of shop drawings for reinforcing steel prepared in accordance with ACI 315, "Manual of Standard Practice for Detailing Reinforced Concrete Structures". Show layouts, bending diagrams, assembly diagrams, dimensioned types and locations of all bar laps and splices, and shapes, dimensions, and details of bar reinforcing and accessories. Include layout plans for bar supports and chairs, with typical details. District's review shall be general, and acceptance will not relieve Contractor of responsibility for accuracy.

- B. Samples. Submit two (2) 12" long samples of each bar support and two (2) samples of each individual type chair, with catalog data.

PART 2 - PRODUCTS

2.01 REINFORCING

Use deformed bars conforming to ASTM A615, Grade 60 Type "S". Where welding of reinforcing is required, use deformed bars conforming to ASTM A706 unless otherwise specifically designated on Drawings.

2.02 WELDED WIRE MESH

Conform to ASTM A185.

2.03 TIE WIRE

Annealed steel, 16 gage minimum.

2.04 COUPLER SPLICE DEVICES

Reinforcing bar coupler/splice devices which bear current I.C.B.O. Research Recommendation Approval, and which develop at least 125 percent of bar yield strength in tension may be used in lieu of lapped bar type splices. Submit for District's approval in each instance.

2.05 SUPPORTS AND ACCESSORIES

Use no aluminum, galvanized steel, plastic or stainless steel supports or accessories. Supports shall conform to CRSI Manual of Standard Practice, Chapter 3, for Types SB, BB, BC, JC, HC, CHC, and others of standard types as required, or precast concrete block supports (DOBIES) with embedded wire ties or dowels. Metal chairs shall be Class "1" plastic coated chairs and spacers.

2.06 DOWELS

Where and as designated on Structural Drawings, provide reinforcing bar dowels in new work and for anchorage to existing concrete.

2.07 FABRICATION AND DELIVERY

Conform to CRSI Manual Chapters 6 and 7 except as otherwise indicated or specified. Bundle reinforcement and tag with suitable identification to facilitate sorting and placing, and transport and store at site so as not to damage material. Keep a sufficient supply of tested, approved, and proper reinforcement at site to avoid delays.

- A. Bending and Forming. Fabricate bars of indicated size and accurately form to shapes and lengths indicated and required by methods not injurious to materials. Do not heat reinforcement for bending. Bars with kinks or bends not scheduled

will be rejected. Field bend NO bars that are partially embedded in concrete, except as shown on the plans or specifically approved by the Engineer.

- B. Reinforcing Bars for Masonry. Bars shall be detailed and fabricated at the shop, ready for installation by masons.

PART 3 - EXECUTION

3.01 PLACING

Unless otherwise indicated or specified, conform to CRSI Manual Chapter 8 including placement tolerances, except no reduction of concrete cover is allowable for bars at concrete surfaces exposed in liquid or water-containing structures.

- A. Cleaning. Before placing reinforcing, and again before concrete is placed, clean reinforcement of loose mill scale, oil, or other coating that might destroy or reduce bond. Do not allow form coatings, release agents, bond breaker, or curing compound to contact reinforcement.
- B. Concrete Coverage. Concrete coverage over reinforcing bars shall be as indicated on the Drawings. The coverage shall be to the outer edge of ties, stirrups, bar spacers, hangers, and like items, and the reinforcing shall be detailed and fabricated accordingly. Refer to Structural General Note requirements of the Drawings.
- C. Securing in Place. Accurately place reinforcement and securely wire tie in precise position at all points where bars cross. Tie stirrups to bars at both top and bottom. Bend ends of binding wires inward allowing no encroachment on the concrete cover; exercise special care at surfaces to remain exposed and unpainted. Support bars in accordance with CRSI Manual Chapter 3, Specifications for Placing Bar Supports, using approved chairs and supports. Ties or supports for reinforcing bars and mesh properly placed and tied into position are not to be removed or dislodged for the convenience of other crafts or for the purpose of crawl holes.
- D. Splices. Splices shall be wired contact lap splices unless otherwise indicated or approved. Splices shall conform to ACI 318, (Class A) (Class C) top bars and Typical Structural Details, except where lap length is indicated on the Drawings.
 - 1. Vertical Bars. Splicing of vertical bars in concrete is not permitted except at the indicated or approved horizontal construction joints or as otherwise specifically detailed.

2. Horizontal Bars. Unless otherwise shown, make lap splices with at least one continuous bar between adjacent splices. Splices in any one run of bar shall be spaced at least twenty (20) feet apart with splices in adjacent bars offset at least ten (10) feet. Where double mats of bars occur in walls, lap splices in opposite mats shall be offset at least five (5) feet.
- E. Welding. Welding of reinforcing bars is not permitted unless indicated or approved in each case, with continuous inspection as hereinbefore required. Welds for securing crossing bars are not allowed. Perform welding in shop or field by direct electric arc process, with thoroughly trained and experienced certified operators qualified in accordance with AWS Code. Conform all welding to AWS "Structural Welding Code - Reinforcing Steel". Use low-hydrogen electrodes. Welds shall develop at least 125 percent of the yield strength of the connected bars.
1. Preparation. Clean surfaces to be welded of loose scale and all foreign material. Clean welds each time electrode is changed. Chip burned edges clean before welds are deposited.
 2. Characteristics of Welds. When brushed with wire brushes, completed welds shall exhibit uniform section, smoothness of welded metal, feather edges without undercuts or overlays, freedom from porosity and clinkers, and good fusion with penetration into base metal. Cut out welds or parts of welds found defective with chisel and replace with proper workmanship; cutting torch for removing defective welding is not acceptable.
- F. Additional Reinforcing. Provide additional reinforcing bars at sleeves and openings as indicated or required. Where additional bars are not shown for such locations, obtain Engineer's instructions and provide additional bars as directed, at no extra cost to the District.
- G. Welded Wire Mesh. Install necessary supports and chairs to hold in place during concrete pours. Straighten mesh to lay in flat plane and bend mesh as shown or required to fit work. Laps shall be no less than one complete mesh unless otherwise detailed. Tie every other wire at laps.
- H. Dowels. For anchorage where shown or required to existing construction, use non-shrink epoxy type grout or deferred bolting devices as approved in each instance and conforming to "Product" Article requirements of Section 03300, "Cast-In-Place Concrete".

Holes for epoxying dowels in place in existing concrete shall provide 1/2" minimum clearance on all sides of dowel bar.

END OF SECTION 03200

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