

SECTION 03 20 00
CONCRETE REINFORCING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Steel reinforcement and accessories for concrete.

1.2 RELATED SECTIONS

A. Section 03 11 00 – Concrete Forming.

B. Section 03 30 00 – Cast-In-Place Concrete.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. Referenced Standards:

1. ACI 117 – Specifications for Tolerances for Concrete Construction and Materials.
2. ACI 301 – Specifications for Structural Concrete.
3. ACI 318/318R – Building Code Requirements for Structural Concrete and Commentary.
4. ACI SP-66 – ACI Detailing Manual.
5. ASTM A82 – Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
6. ASTM A496/A496M – Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
7. ASTM A497/A497M – Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.
8. ASTM A615/A615M – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
9. ASTM A706/A706M – Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
10. ASTM E94 – Standard Guide for Radiographic Examination.
11. AWS D1.4 – Structural Welding Code – Reinforcing Steel.
12. CRSI Manual of Standard Practice.

1.4 SUBMITTALS

- A. General: Submit in accordance with Division 01.
- B. Product Data: Submit manufacturer's descriptive literature, installation instructions, and product specification for the following products:
 - 1. Mechanical splicing devices.
 - 2. Bar supports.
- C. Placement Drawings:
 - 1. Prepare in accordance with ACI SP-66.
 - 2. Indicate bar sizes, spacing, locations, and quantities of steel reinforcement, bending and cutting schedules, and supporting and spacing devices.
 - 3. Identify placement drawings with reference to sheet and detail numbers from the Contract Documents.
 - 4. Do not use scaled dimensions from Drawings to determine lengths of steel reinforcement.
 - 5. Submit one copy of reproducible placement drawings in addition to those required by Division 01.
 - 6. Contractor shall be responsible for correctness and completeness of steel reinforcing requirements.
 - 7. Begin fabrication only when placement drawings have been accepted.
- D. Samples:
 - 1. Bar supports: One for each type and grade.
 - 2. Mechanical splicing devices: One of each type.
- E. Quality Assurance/Control Submittals:
 - 1. Submit reports of radiographic weld tests per ASTM E94, and testing per 2013 CBC Section 1913A "Concrete Testing," Article 1913A.2 "Tests of Reinforcing Bars".
 - 2. Submit certified copies of mill test reports of reinforcing materials analysis to Owner's testing agency.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with CRSI Manual of Standard Practice; ACI 301; and 2016 California Building Code (CBC) Chapter 17A "Special Inspections and Tests", and Chapter 19A "Concrete", and as follows:
 - 1. Steel Reinforcement, Tests and Materials: CBC Section 1903A "Specifications for Tests and Materials".
 - 2. Anchorage: CBC Section 1905A.1.8.
 - 3. Reinforcing Bar Welding: Per Section 1705A, Table 1705A.3 "Required Special Inspections and Tests of Concrete Construction" and Table 1705A.2.1 "Required Verification and Inspection of Steel Construction", Item 5b.

- B. Structural Testing for Seismic Resistance: Perform tests for seismic resistance as required by CBC Chapter 17A, Section 1705A.13 "Testing for Seismic Resistance" and Paragraph 1705A.13.1 "Structural Steel".
- C. Structural Tests and Inspections: Refer to DSA Statement of Structural Tests and Special Inspections (DSA Form DSA-103).
- D. Pre-Installation Meetings:
 - 1. Conduct pre-installation meeting in accordance with Division 01.
 - 2. Convene pre-installation meeting prior to commencing Work of this Section.
 - 3. Coordinate Work in this Section with Work in related Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of Division 01.
- B. Deliver steel reinforcement in bundles marked with identification tags.
- C. Handle and store materials to prevent damage and contamination, excessive rusting or coating with grease, oil, or other objectionable materials.
- D. Store steel reinforcement, fabricated assemblies, and accessories off the ground on platforms, skids, or other supports.
- E. Deliver and store welding electrodes in accordance with AWS D1.4.

PART 2 PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60, low-alloy deformed steel bars.
- B. Reinforcing Steel Indicated to be Welded: ASTM A706/A706M, Grade 60, low-alloy deformed steel bars.
- C. Plain Steel Wire (for Spiral Reinforcement): ASTM A82.
- D. Deformed Steel Wire: ASTM A496/A496M.
- E. Tie Wire: ASTM A497/A497M; double annealed steel wire; No. 16 gauge.

2.2 ACCESSORIES

- A. Bar Supports (Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars in place): Provide in accordance with CRSI Manual of Standard Practice from steel wire, plastic, or precast concrete or fiber-reinforced concrete of equal to or greater compressive strength than surrounding concrete. Provide as follows:
 - 1. Footings: Precast concrete blocks with tie wires.
 - 2. Slab on ground: Precast concrete blocks, plastic coated steel fabricated with bearing plates, or specifically designed wire-fabric supports fabricated of plastic.

3. Where legs of wire bar supports contact forms: CRSI Class 1 plastic-protected or CRSI Class 2 stainless steel bar supports.
 4. Where support is no closer to concrete surface than 1/2 inch: CRSI Class 3 wire supports.
 5. Supports placed against ground: Precast concrete blocks not less than 4 inch square with embedded wire.
- B. Welding Materials For Reinforcing Steel:
1. Weld Filler Material: AWS D1.4; low hydrogen, 80 ksi tensile strength.
- C. Mechanical Splices: Splicing devices capable of developing 125 percent of the specified yield strength of the bar in compression and tension.
1. Metal Sleeve with Cast Filler Metal:
 - a. Acceptable Product: Cadweld Rebar by Erico International Corporation, Solon, OH; 800-248-2677; www.erico.com, or accepted equal.
 2. Mechanical Threaded Connections: Provide threaded mechanical connections using a metal coupling sleeve with internal threads.
 - a. Acceptable Product: Lenton Couplers by Erico International Corporation DB-SAE Dowel Bar Splicers by Dayton Concrete Accessories, Miamisburg, OH; 800-745-3700, www.daytonconcreteacc.com, or accepted equal.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine job site conditions and verify field dimensions.
- B. Report unacceptable conditions to Architect. Begin installation only when unacceptable conditions have been corrected.

3.2 PREPARATION

- A. Clean steel reinforcement of rust and mill scale, earth, moisture, and other foreign materials before fabrication or placement.

3.3 STEEL REINFORCEMENT FABRICATION

- A. Fabricate to shapes, dimensions, and tolerances in accordance with accepted placement drawings conforming to CRSI Manual of Standard Practice, ACI SP-66, ACI 318/318R, ACI 117, and CBC Chapter 19A.
- B. Standard Hooks and Bends: Conform to ACI 318/318R.
- C. Bending: Cold bend steel reinforcement in the field or at the mill. Heating for bending is not permitted unless otherwise specifically allowed by Architect and DSA.
- D. Weld steel reinforcement in accordance with AWS D1.4.

3.4 PLACEMENT

- A. Place steel reinforcement in accordance with accepted placement drawings in conformance with tolerances specified in ACI 117.
- B. Install steel reinforcement in largest practical lengths. Accurately position, support, and secure reinforcement against displacement. Locate support reinforcement with bar supports to maintain minimum concrete cover.
- C. Secure reinforcement against displacement within tolerances permitted in ACI 318, Article 7.5.2. Point wire tie ends away from forms.
- D. Concrete Cover: Refer to Drawings. Cover tolerances shall comply with ACI 117.
- E. Laps: Refer to Drawings.
 - 1. Offset laps in adjacent bars.
- F. Splices:
 - 1. Splice reinforcing as shown.
 - 2. Tie lap splices securely to prevent displacement during concrete placement.
 - 3. Install mechanical splice in accordance with manufacturer's written instructions.
 - 4. Locate splices only where shown and accepted by Architect.
- G. Welding:
 - 1. Welding is not permitted unless specifically detailed on Drawings or accepted by Architect.
 - 2. Employ shielded metal-arc method. Comply with AWS D1.4.
 - 3. Welding is not permitted on bars where the carbon content is not known or is determined to exceed 0.75 percent.
 - 4. Welding is not permitted within two bar diameters of any bent portion of a bar which has been bent cold.
 - 5. Welding of crossing bars is not permitted.
- H. Maintain minimum clear distance between parallel bars at not less than 1-1/2 times nominal bar diameter, 1-1/2 times maximum size of coarse aggregate, or 1-1/2 inch.
- I. Dowels: Place where indicated on Drawings. Grease loose end to prevent concrete from bonding to dowel. Sleeves may be used when accepted by Architect.
- J. Field Adjustments: Move steel reinforcement as necessary to avoid interference with other reinforcing steel or other embedded items within accepted tolerances.
 - 1. Sleeves and embedded items: Do not cut bars to clear sleeves or slots through slabs or walls. Wrap bars around these openings.
 - 2. Openings: Compensate for steel reinforcement terminated at openings in slabs by placing one half of steel reinforcement terminated on each side of openings for the full span length.
 - 3. Steel reinforcement moved to avoid interference with other reinforcements,

conduits, or embedded items, including additional steel reinforcement to meet structural requirements are subject to inspection and approval before concrete placement.

3.5 FIELD QUALITY CONTROL

- A. General: Comply with requirements of Division 01.
- B. Testing Service: Owner will select and pay for independent testing agency, which will perform the following:
 - 1. Inspect shop and field welding per AWS D1.4, including checking materials, equipment, procedures, and welder qualifications.
 - 2. Inspector shall employ non-destructive testing or any other aid to visual inspection deemed necessary to assure adequacy of weld.
 - 3. Additional requirements for testing and inspection: Refer to Structural Drawings and to DSA Statement of Structural Tests and Special Inspections (DSA Form DSA-103).
- C. Project Inspector shall inspect placement of steel reinforcement.

3.6 PROTECTION

- A. Protect steel reinforcement from damage and displacement.
- B. Protect for potential rust staining of adjacent surfaces. Wrap steel reinforcement with impervious tape or other methods as accepted by Architect. Remove protective cover and clean reinforcement before concrete placement.
- C. Install safety caps on all exposed ends of vertical steel reinforcement that pose a danger to life safety.

END OF SECTION