

Section 03210

REINFORCING STEEL

PART 1 GENERAL

1.01 SUMMARY

This Section includes the furnishing and subsequent placing of reinforcing steel, deformed and smooth, chairs, ties, splicing devices, and other reinforcing accessory items required to complete Work excluding concrete for utility construction or otherwise as shown on Plans and specified in other Specification Sections.

1.02 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment for Work performed under this Section, except as indicated below. Include cost of same in Contract price bid for Work of which this is a component part.
- B. Measure “Extra Reinforcing Steel,” when approved by the ENGINEER, by pound of calculated weight of steel actually placed. Pay for “Extra Reinforcing Steel” at Contract unit price bid per pound of “Extra Reinforcing Steel” placed.

1.03 REFERENCES

- A. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
- B. ASTM A615/A615M REV A - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- C. AWS D1.4/D1.4M - Structural Welding Code—Reinforcing Steel

1.04 SUBMITTALS

Submit the following in accordance with Specification Section 01330 – Submittal Procedures

- A. Product data for all materials used.
- B. Shop drawings indicating location, placement, sizes, and bending.
- C. When welding is required, furnish report of chemical analysis, showing percentages of carbon, manganese, phosphorus, and sulphur.
- D. Certificate of Compliance

Submit certified copy of mill certificates of compliance with requirements herein specified.

E. Special Equipment

Submit information on mechanical splicing devices, couplers, and all other reinforcing accessories

1.05 RELATED REQUIREMENTS

Section 01330 – “Submittal Procedures”

1.06 QUALITY ASSURANCE

Reinforcement and placement to be in accordance with the requirements and guidelines as specified within ACI 315.

1.07 SYSTEM DESCRIPTION (NOT USED)

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver to jobsite free from dirt, loose scale and rust, paint, oil, or other foreign material.
- B. Store above surface of ground upon platforms, skids, or other supports, and protect from mechanical injury and surface deterioration caused by exposure to conditions producing rust or other damage.
- C. Handle so as not to sustain crimping, bending, or warping before and during placement.

1.09 – 1.13 NOT USED

PART 2 PRODUCTS

2.01 MANUFACTURER(S) (NOT USED)

2.02 MATERIALS AND/OR EQUIPMENT

A. General Requirements

- 1. Nominal size, area, and theoretical weight in accordance with ASTM A615/A615M Rev A Table(s) 1a/1b.

2. Bending

Bends to be completed in shop, cold, true to shapes shown on Plans. Any irregularities in bending are cause for rejection.

3. Fabrication tolerances as necessary to satisfy clearance requirements indicated within Paragraph 3.03.A.2 of this Specification Section.

4. Splices

a. Splices are not permitted except where shown on Plans without Project Manager's prior written approval.

b. Splices are not permitted in main reinforcement at points of maximum stress, unless shown otherwise on Plans.

c. Splices not indicated on Plans, but permitted with Project Manager's prior written approval, are subject to the following:

1) Not larger than No. 8 bars.

2) Not permitted in bars 30 feet or less in length, except vertical.

3) Splices center to center not less than 30 feet, and no individual bar length less than 10 feet.

4) Maintain specified concrete cover and tie bars together securely.

5) Stagger main bar splices in adjacent bars a minimum of two splice lengths.

d. Lap Splices

1) Lap bars in accordance with table shown on Plans.

2) Lap bars so that both bars shall be in the same plane parallel with the nearest concrete surface.

3) All splices to be full contact lap splices and securely tied together.

e. Welded Splices

1) Procedures and electrodes as specified in AWS D1.4.

- 2) For bars No. 6 and smaller, use lap weld splices with fillet weld equal to one-half bar diameter on each side for 4 inches in length.
 - 3) For bars No. 7 and larger, use butt weld splices in accordance with AWS D1.4.
 - 4) Prepare ends for butt welding in the field, and deliver bars of sufficient length to permit this practice.
- f. All splices, whether lap weld, mechanical, or coupler, to develop full strength of bar.

B. Reinforcing Steel

1. Deformed, conforming to ASTM A615/A615M Rev A Grade 40 and Grade 60, as shown on Plans.
2. Welded wire fabric conforming to ASTM A1064/A1064M.
3. Cold drawn steel wire conforming to ASTM A1064/A1064M.
4. Spiral reinforcement to be deformed bars conforming to ASTM A615/A615M Rev A, or smooth bars or wire conforming to ASTM A1064/A1064M.
5. Smooth dowels for expansion joints, conforming to ASTM A615/A615M Rev A Grade 60.

C. Epoxy

Unless otherwise specified or shown, the epoxy for grouting reinforcement into existing concrete shall conform to the materials as specified within these Contract Documents.

PART 3 EXECUTION

3.01 ERECTION/INSTALLATION/APPLICATION AND/OR CONSTRUCTION

- A. Place reinforcing steel in positions indicated on Plans and approved shop drawings.**
1. Dimensions shown on Plans are to centers of bars, unless otherwise noted.
 2. Hold bars securely in place with tie wires and other approved means during placement of concrete.

- a. In plane of steel parallel to nearest surface of concrete, bars not to vary from placement shown on Plans, by more than one-twelfth of spacing between bars.
 - b. In plane of steel perpendicular to nearest surface of concrete, bars not to vary from placement shown on Plans, by more than ¼-inch.
3. Looped wire bar ties (“pig tails”) will be permitted for concrete pavement only. Do not use looped wire bar ties (“pig tails”) for structural concrete.
4. Do not tack weld reinforcing.
5. Space steel required distance from forms or earth by galvanized metal spacers, metal spacers with plastic coated tips, stainless steel spacers, plastic spacers, or precast mortar or concrete blocks. Prior to installation receive approval from the ENGINEER of spacers or precast mortar concrete blocks.
 - a. For approval of plastic spacers, provide samples of plastic which show no indications of deterioration after immersion in a 5 percent solution of sodium hydroxide for 120 hours.
 - b. Cast precast block, maximum 2-½ inches square, to thickness required for proper reinforcement clearance from forms, or seal slabs.
6. Use galvanized metal chairs to support all reinforcing steel. For pavement use plastic chairs as manufactured by Sheplers (or approved equal) or metal chairs to support all reinforcing steel. Metal chairs for pavement need not be galvanized. Spacing for plastic or metal chairs to be 24-inch, center to center each way to support reinforcing in concrete pavement. Metal chairs to be secured with wire to the reinforcing steel.
7. Use heavy bolster to support bottom layer of reinforcing in abutment caps, bent caps, and other beams.
8. In bridge deck slab, use two rows of supports for bottom layer of reinforcing parallel to beams for each bay between beams. Use high chairs to support top layer.
9. Clean all mortar, mud, dirt, etc. from reinforcement before placing concrete.
10. Protect exposed steel from corrosion or other damage.
11. Correct placement of steel to be verified by Contractor before concrete is placed.
12. Provide adequate support for reinforcement extending out of formwork to ensure proper alignment.

13. Tie reinforcing steel for all structural slabs at all intersections, except where spacing is less than one foot in each direction, alternate intersections only need to be tied. Tie reinforcing steel in concrete pavement at a minimum of alternate intersections.
 14. For reinforcing steel cages for other structural members, tie steel at enough intersections to provide a rigid cage of steel.
- B. Grout reinforcing steel into existing concrete when shown on Plans.
1. Holes to receive reinforcement may be wet or dry drilled using rotating machines only.
 2. Drill holes within ¼-inch of the location shown on Plans.
 3. Flush wet drilled holes with clean water to remove residue and blow out using oil-free compressed air.
 4. Blow out dry drilled holes with oil-free compressed air.
 5. Clean oil-contaminated hole using appropriate solvents and bottle brush. Solvents to be flushed and hole blown out with oil-free compressed air.
 6. Backfill over-drilled holes with epoxy grout.
 7. Reinforcement grouted in place to be free of contaminants. Use the appropriate solvents and wire brushing to remove contaminants.
 8. Provide adequate support for reinforcement to ensure alignment and maintain reinforcement in the center of the drilled hole.

3.04 – 3.10 NOT USED

END OF SECTION