

SECTION 03200
CONCRETE REINFORCEMENT

PART 1 - GENERAL**1.01 DESCRIPTION OF WORK**

- A. Provide and install all reinforcement and associated items required for cast-in-place.

1.02 RELATED SECTIONS

- A. Concrete Formwork.....Section 03100
B. Cast-in-Place Concrete.....Section 03300

1.03 SUSTAINABILITY REQUIREMENTS - NOT USED**1.04 REFERENCES**

References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

- A. American Society of Testing and Materials (ASTM) standards, latest editions.
- A82 Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
- A184 Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
- A185 Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete Reinforcement.
- A496 Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
- A497 Standard Specification for Steel Welded Wire Reinforcement, Deformed for Concrete Reinforcement.
- A615 Standard Specifications for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- A706 Standard Specifications for Low-Alloy Steel Deformed and Plain Bars for Concrete reinforcement
- B. American Concrete Institute (ACI) standards, latest editions.

- ACI 301 Specification for Structural Concrete for Buildings.
- ACI 315 Details and Detailing of Concrete Reinforcement.
- ACI 318-11 Building Code Requirements for Reinforced Concrete (With modifications per Section BC 1908 of the 2014 NYC Building Code).
- C. Placing Reinforcing Bars - CRSI-WCRSI Recommended Practices, latest edition. Concrete Reinforcing Steel Institute.
- D. Structural Welding Code - Reinforcing Steel D1.4 - American Welding Society (AWS).

1.05 DESIGN REQUIREMENTS

- A. In lieu of placing reinforcement bars, the contractor has the option of using welded wire reinforcement (WWR).
1. WWR must be demonstrated to the satisfaction of the engineer of record that they are of equivalent strength to the reinforcing bars that are being substituted.
 2. As per ACI 318, yield strength greater than 60,000 psi may be used (for WWR) provided the yield strength is measured at a strain of 0.0035 in./in. in accordance with ACI code requirements.
- B. Detailing requirements for reinforced concrete structures shall meet the structural integrity requirements as set in Section BC 1916 of the 2014 NYC Building Code.

1.06 SUBMITTALS

- A. Product Data

Submit manufacturers' information for the following:

1. Steel welded wire fabric
 2. Steel welded wire reinforcement.
 3. Supports
 4. Mechanical connectors
- B. Shop Drawings
1. Immediately after award of Contract, prepare shop drawings showing all fabrication dimensions and

locations for placing of the reinforcing steel and accessories. Shop Drawings are to be prepared by a rebar detailer.

2. Follow detailing recommendations of ACI 315.
3. Submit drawings gradually and not all at the same time so that sufficient time is allowed for checking and approval. Improperly prepared and incomplete shop drawings will be disapproved without review.
4. Shop drawings will be checked for size of material and spacing by the Engineer of Record, which shall not render the Engineer responsible for any errors in construction dimensions, quantities, bends, etc. that have been made in preparation of the shop drawings. The Contractor shall assume full responsibility for the correctness of quantities, dimensions and fit.
5. Do not order or deliver reinforcement to job site prior to approval of drawings.

C. Quality Control Submittals

1. Certificates

- a. Submit certificate stating that reinforcement meets or exceeds the specified requirements.
- b. If WWR is used, provide certificate from the manufacturer that WWR meets or exceeds the requirements specified in ACI 318 and provide calculations that it is of equivalent strength to the reinforcing bars that are being substituted.

2. Contractor Qualifications

Provide proof of Installer and Detailer qualifications specified under "Quality Assurance".

1.06 QUALITY ASSURANCE

A. Qualifications

1. Rebar Installer: Company specializing in performing the Work of this Section shall have three years minimum experience on successful projects of similar size.
2. Rebar Detailer: Company shall be specialized in the detailing of reinforcing bar shop drawings with a minimum of three years experience.

B. Regulatory Requirements

1. Building Code

Work of this section shall conform to all requirements of the NYC Building Code. Deliveries will be rejected unless:

- a. All reinforcing bars are identifiable as to point of origin, grade of steel, and size.
- b. All bundles or rolls of cold drawn steel wire reinforcement are securely tagged to identify the manufacturer, the grade of steel, and the size.

Where more severe requirements than those contained in the Building Code are given in this Section and ACI 318, the requirements of this Section and ACI 318 shall govern.

2. Industry Standards

Details of Concrete reinforcement not covered herein shall be in accordance with "Building Code Requirements for Reinforced Concrete" (ACI 318) and "Details and Detailing of Concrete Reinforcement" (ACI 315), latest editions and the Concrete Reinforcing Steel Institute Manual on "Placing Reinforcing Bars" (CRSI).

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store in location to prevent rusting, etc.
- B. Protect reinforcement before, during, and after installation.
- C. Insure proper identification after bundles are broken.
- D. WWR is shipped in two forms; rolls or sheets. If the rolls or sheets must be lifted by crane at the job site, the contractor may request the manufacturer to install lifting eyes. At all times during off loading of materials, caution must be exercised and all safety regulations and practices must be observed.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Reinforcing Bars

1. All reinforcing bars, except those to be welded, shall be of deformed type of new billet steel

conforming to current requirements of ASTM A615. No rail or re-rolled steel will be permitted. Reinforcement to be welded shall conform to the requirements of ASTM A706.

2. Grade or yield strength of reinforcing bars is indicated on Drawings.
- B. Welded Steel Wire Fabric
1. Wire Fabric shall conform to the requirements of ASTM A185.
 2. Required net area, placement details, and other requirements are indicated on Drawings.
- C. Welded Wire Reinforcement (WWR)
1. Welded Wire Reinforcement shall conform to ASTM A497 and shall be made of wire conforming to ASTM A496.
- D. Supports for Reinforcement
1. Supports for reinforcement supported by formwork or deck shall consist of metal bolsters and chairs of adequate strength, size, and number. Provide CRSI Class **1** supports (plastic **protected**) for formed concrete surfaces and Class **3** (bright basic) for metal deck.
 2. Supports for reinforcement of slabs supported by ground shall consist of above supports with sand plates or horizontal runners. Support for reinforcement of footings/pile-caps shall consist of the above supports or precast concrete block, 4" square, having a compressive strength equal to that of the concrete being placed.

2.02 FABRICATION

- A. Fabricate reinforcing bars in accordance with fabricating allowances given in ACI 315.

PART 3 - EXECUTION

3.01 PLACEMENT

- A. General
1. Place reinforcement in accordance with CRSI "Placing Reinforcement Bars" and Section BC 1907.5.

2. Unless otherwise permitted, welding of crossing bars (tack welding) for assembly of reinforcement is prohibited.
3. Avoid cutting or puncturing vapor barrier during placement.

B. Supports

1. Support and fasten together all reinforcement to prevent displacement by construction loads or placing of concrete.
2. Provide supports specified in Article 2.01.
3. Provide Continuous High Chair Upper (CHCU) or Continuous Support (CS) for welded wire fabric in the metal deck and place every four feet (4') parallel to the supporting beams.
4. Lifting of bars, welded wire fabric, and welded wire reinforcement into position during placement of concrete is not permitted.
5. Where the concrete surface will be exposed to the weather in the finished structure, the portions of all accessories within 1/2" of the concrete surface shall be non-corrosive or protected against corrosion.
6. The following guidelines for WWR support spacing can be used for supported concrete slabs whether formed or placed on composite metal decks.

<u>Wire Size</u>	<u>Wire Spacing</u>	<u>Support Spacing</u>
W or D9 and larger	12" and greater	4-6 ft.
W or D5 to W or D8	12" and greater	3-4 ft.
W or D9 and larger	Less than 12"	3-4 ft.
W or D4 to W or D8	Less than 12"	2-3 ft.
Less than W or D4	Less than 12"	2-3 ft. or less.

C. Cover

Provide minimum protective cover given in Section BC 1907.7.1 if not indicated on Drawings.

D. Splices

1. All splices not shown on the Project Drawings shall be shown on the shop drawings and approved by the Engineer of Record.
2. Provide welded splices where indicated on Drawings. All welding shall conform to AWS D1.4. At these locations, only reinforcement conforming to ASTM A706 shall be used.

3. Provide mechanical connectors where indicated on Drawings. Install in accordance with splice device manufacturer's recommendations.

E. Embedment Lengths

All embedment lengths not shown on the Project Drawings shall be shown on the shop drawings and approved by the Engineer of Record.

3.02 TOLERANCES

- A. Place reinforcing bars in accordance with the tolerances given in Section BC 1907.5.2.
- B. Move bars as necessary to avoid interference with other reinforcement, conduits, or imbedded items. If bars are moved more than one bar diameter, or enough to exceed the above tolerances, the resulting arrangements are subject to approval by the Engineer of Record.

3.03 FIELD QUALITY CONTROL

- A. Under the requirements of Section BC 1704.4, the Authority will assign a Special Inspector to inspect the size and placement of reinforcement. A record will be made of all inspection of reinforcement at the bending bench and in place.
- B. Do not proceed with the completion of wall forms until all reinforcement has been approved and recorded by the Special Inspector.
- C. Do not proceed with concreting until all reinforcing in place has been approved and recorded.
- D. Promptly correct all reinforcement displaced during pouring of concrete.
- E. Damaged reinforcement shall not be used.

3.04 CLEANING

- A. Steel reinforcement shall be free of all rust, scale, oil, paint, grease, loose mill scale, and all other foreign matter that will prevent bonding of concrete and steel just prior to pouring of concrete.

END OF SECTION

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:	_____	_____
1. Welded wire fabric		
2. Welded wire reinforcement		
3. Supports		
4. Mechanical connectors		
Shop Drawings:	_____	_____
1. Reinforcement layout		
Certificates:	_____	_____
1. Reinforcing bars		
2. Welded wire fabric		
3. Welded wire reinforcement		
Qualifications:	_____	_____
1. Rebar Installer		
2. Rebar Detailer		

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