

ITEM 556.9903 25 - MMFX 2 BAR REINFORCEMENT FOR STRUCTURES

1. DESCRIPTION:

- 1.01 The work will consist of furnishing and placing MMFX 2 reinforcing bars for concrete structures in accordance with the contract plans and in a manner satisfactory to the Engineer.

2. MATERIALS:

Materials for this work shall meet the following requirements:

- 2.01 **MMFX 2 Bar Reinforcement.** Bar reinforcement shall be MMFX 2 reinforcing steel. The MMFX 2 reinforcing bar consists of a corrosion-resistant, [REDACTED] for concrete reinforcement. The reinforcing steel shall conform to the following:

- MMFX 2 steel reinforcing bars shown on the contract plans shall be as manufactured by MMFX Steel Corporation of America, 8000 Corporate Center Drive, Suite 207, Charlotte, North Carolina, 28226, www.mmfxsteel.com.
- Corrosion-resistant steel shall be [REDACTED] with a minimum of [REDACTED] by weight [REDACTED] meeting all of the requirements of [REDACTED]

Certified copies of the results of chemical analyses and mechanical tests required by this specification for the reinforcing steel shall be furnished to the Authority. The certified test reports shall be examined by the Authority to assure conformance to the requirements of the Contract Documents.

- 2.02 **Mechanical Connectors.** Mechanical connectors used for MMFX 2 reinforcing steel shall be made of the same material as the reinforcing steel, or coated with a non-conducting material. The specific hardware the Contractor proposes to use shall be approved by the Authority Director, Structures Design Bureau (DSDB). Threaded connectors shall be used.
- 2.03 **Miscellaneous Hardware.** Chairs, tie wires, nuts, bolts, washers, other devices, and miscellaneous hardware used to support, position, or fasten the reinforcement shall be made of, or coated with, a non-conducting material. The specific hardware the Contractor proposes to use shall be approved by the Engineer.

3. CONSTRUCTION DETAILS:

3.01 General:

- A. **Storing and Handling MMFX 2 Bar Reinforcement.** All MMFX 2 bar reinforcement shall be stored above ground on wooden supports.

All bundles shall be lifted with a strong back, multiple supports, or a platform bridge.

Bars, or bundles of bars, shall not be dropped or dragged.

- B. **Placing and Fastening Bar Reinforcement Steel.** Prior to placing bar reinforcement steel, all grease, dirt, mortar, and any other foreign substances shall be removed.

Steel bar reinforcement shall be placed in the position indicated on the plans and within the allowable tolerances specified. Before concrete is placed, all reinforcement shall be securely fastened and supported with approved chairs or other approved devices.

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3. CONSTRUCTION DETAILS: (cont'd)

3.01 General: (cont'd)

- C. **Inspection.** Concrete shall not be placed until the bar reinforcement steel is inspected and permission for placing concrete is granted by the Engineer. All concrete placed in violation of this provision shall be rejected and removed at the Contractor's expense.

3.02 Bar Reinforcement

- A. **Ordering Bar Reinforcement.** Reinforcing steel ordered shall be delivered to the site, cut to length. Before ordering bar reinforcement, the Contractor shall carefully check all bar lists and assume full responsibility for their accuracy. No change in the bar list shall be made by the Contractor unless approved by the DSDB.

The Contractor shall be responsible for replacing any steel damaged due to his/her operations at no additional cost to the Authority.

- B. **Field Bending.** The alternatives of shop bending or field bending of MMFX 2 reinforcement will be at the option of the Contractor. Field bending shall be done by cold methods only. Direct heating of the bars shall not be permitted. All field bending shall be done in accordance with the bar manufacturer's recommendations.

MMFX 2 bar reinforcement damaged by bending work shall be evaluated and replaced in accordance with the requirements of Subsection 3.02(E).

- C. **Field Cutting.** When MMFX 2 bars are to be cut, care shall be taken to ensure that the metal shavings do not settle onto the other bars.

- D. **Bar Splices.** Bar Splices shall be permitted only where shown on the contract plans. Should the Contractor desire to splice bars at locations other than those shown on the contract plans, written permission to do so shall first be obtained from the DSDB. Such permitted splices shall be well distributed, or located at points of low tensile stress. Splices shall not be permitted unless a minimum of 2 inches can be provided between the spliced bar and the nearest adjacent bar.

Splices for bars shall be made by placing the bars in contact and wiring them together for the full length of the splice.

Welded splices shall not be allowed on this project. The Authority will allow mechanical connectors with prior approval of the materials and methods. The Contractor shall submit his proposed method of mechanically connecting in the field for the Authority's review and approval. Refer to Subsection 2.02 of this specification.

- E. **Placement in Structural Slabs.** Supports shall be spaced no farther apart than [REDACTED], nor shall any support be closer than [REDACTED] from the edge of any future concrete surface. Bridge slab reinforcement shall be placed in accordance with the following tolerances:

Vertical	±	[REDACTED]
Horizontal	±	[REDACTED]

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3. CONSTRUCTION DETAILS: (cont'd)

3.02 Bar Reinforcement (cont'd)

The structural slab reinforcement mats (top and bottom) shall be securely connected together. This connection shall be accomplished by wiring with non-conductive materials. Connections shall be placed no farther apart than [REDACTED]. The bar supports may be utilized for this purpose. Connecting devices shall neither deflect the bar reinforcement nor interfere with the smooth flow of concrete.

Immediately prior to placement of concrete, the Engineer shall verify that the reinforcing steel is positioned within the above stated tolerances. If the allowable tolerances are exceeded, the Engineer shall order that the position of the reinforcing steel be corrected before granting permission for placing concrete.

Subsequent to placement of concrete, the Engineer shall verify, at random, that the vertical clear distance from the top of the structural slab to the top mat of main reinforcing, as shown on the contract plans, is no more than [REDACTED] from the bar's theoretical placement position. If this allowable tolerance is exceeded, the Engineer shall reject the work and so advise the Contractor and the Chief Engineer in writing, stating the deficiencies upon which the rejection is based. The Chief Engineer shall review the nature and extent of the deficiencies and shall designate one or more of the following alternatives:

1. The affected concrete placement shall be removed and replaced in whole or in part.
2. The Contractor shall provide special corrective measures as directed by the Chief Engineer.
3. The concrete placement shall be accepted without corrective action, but with a monetary credit to compensate for a reduced life expectancy, increased cracking, and future maintenance.

The removal of the rejected concrete placement and its subsequent replacement, or other corrective work which the Contractor is directed to perform, shall be accomplished at no additional cost to the Authority.

4. METHOD OF MEASUREMENT:

- 4.01 **Reinforcement.** The quantity of bar reinforcement shall be measured as the number of pounds of steel bars placed. The weight of bar reinforcing will be computed by the Engineer utilizing the unit weight for each size bar. Unit weights for computation shall be as described by the Concrete Reinforcing Steel Institute.

5. BASIS OF PAYMENT:

- 5.01 **Reinforcement.** The Contractor shall include in the unit price the cost of the reinforcing steel, steel reinforcing fabrication, delivery and installation.

The unit price bid per pound shall include the cost of all labor, materials, and equipment necessary to complete the work. The unit price shall also include the cost of chairs, supports, fastenings, connections, and all splices including those splices not specifically shown on the plans. If the Engineer permits the substitution of larger bars than those specified, or the DSDB permits splices not shown on the plans, payment will be made only for the amount of steel which would have been required if the specified size and length had been used.