

## SECTION 480 REINFORCING STEEL

### 480.1 DESCRIPTION

This work consists of furnishing and placing steel of the specified size and type, as reinforcement in concrete.

### 480.2 MATERIAL

Reinforcement shall conform to Section 1010. Reinforcement shall be furnished in the full lengths indicated on the plans.

### 480.3 CONSTRUCTION REQUIREMENTS

- A. Protection of Material:** Steel reinforcement shall be protected from injury and when placed in the work, it shall be free from dirt, detrimental scale, paint, oil, and other foreign substance. Steel reinforcement shall be stored above ground on platforms, skids, or other supports.

When epoxy coated steel reinforcements is specified, the following requirements also apply:

1. In order to protect the coated reinforcement from damage, the Contractor shall use padded or non-metallic slings or straps to load, unload or move epoxy coated reinforcement.
2. Bundled bars shall be handled in manner as to prevent excessive sagging of the bars so as not to damage the epoxy coating.
3. To prevent damage to the epoxy coating, care shall be taken during placement of epoxy coated reinforcement to assure that the bars are not dropped or dragged.
4. Damaged areas shall be repaired by removing all rust and contaminants from the damaged area and applying an epoxy coating to the damaged area. The touch up epoxy coating material shall be inert in concrete and compatible with the epoxy coating applied to the new epoxy coated reinforcing steel. This coating material shall be the epoxy coating touch up material supplied by an epoxy coating manufacturer who supplies coating for material for new epoxy coated reinforcing steel. Touch up epoxy coatings from spray cans will not be permitted. The touch up epoxy coating shall be allowed to cure for a minimum of 24 hours or as per the manufacturer's recommendations, whichever is more stringent, before concrete is placed.
5. Epoxy coated reinforcing steel shall be covered with a heavy duty waterproof opaque covering to protect the epoxy coating from dirt and debris and from the effects of ultraviolet rays if the reinforcing steel will be stored for more than 30 days.

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- B. Bending:** Reinforcement shall be bent to the shapes specified. Bending and bundling shall conform to the standard practice currently specified by the Concrete Reinforcing Steel Institute.
- C. Placing and Fastening:** Reinforcing steel shall be accurately placed and firmly held in the positions specified using chairs or other approved methods. Bars shall be tied at all intersections except where spacing is less than one foot (300 mm) in each direction, in which case alternate intersections shall be tied.

In addition to the requirements for tying bars at intersections, the top mat of bridge slab and box culvert reinforcing steel shall be tied down with 16 gage (1.6 mm) diameter (minimum) tie wires or other approved devices. Ties will be plastic coated when used in conjunction with epoxy coated reinforcing steel. Wire bar supports, such as ferrous metal chairs and bolsters, shall conform to industry practice as described in the manual of Standard Practice of the Concrete Reinforcing Steel Institute. Such chairs or bolsters which bear against the forms for exposed surfaces shall be either Class 1 - Maximum Protection (plastic protected) or Class 2, Type B-Moderate Protection (stainless steel tipped) for which the stainless steel conforms to ASTM A493, Type 430. For epoxy coated reinforcement, all wire bar supports and bar clips shall be plastic or epoxy coated.

On girder bridges, ties shall be used along each line of beams at longitudinal intervals not to exceed eight feet (2.5 meters). The ties shall be secured to the shear transfer devices protruding from the top of the beam. Where shear transfer devices are not available, the ties may be secured to the bottom mat of slab reinforcing steel.

Other types of bridges shall have the top mat of reinforcement tied down at a maximum of 12 feet (3.5 meters) longitudinal and transverse intervals with the ties secured to either the forms or bottom mat of slab reinforcing steel.

When placing bridge deck reinforcement individual high chair (HC) bar supports shall not be used. Either slab bolster upper (SBU) or beam bolster upper (BBU) bar supports shall be used between mats of reinforcing steel and placed transverse to the girders. Slab bolsters (SB) or beam bolsters (BB) shall be used under the bottom mat placed parallel to the girders. Chair spacing shall not exceed four feet (one meter) in either the transverse or parallel direction. The Engineer may require a closer chair spacing for mat rigidity. Plastic chairs shall not be used.

Distances from the forms shall be maintained by stays, blocks, ties, chairs, or hangers. Devices for holding reinforcement from contact with the forms shall be of approved shape and dimensions. Layers of bars shall be separated by approved metal devices. The use of pebbles, stone, brick, metal pipe, and wooden blocks will not be permitted. It will not be permissible to tack weld reinforcement. Reinforcement in any member shall be inspected and approved, before the placing of concrete begins.

The placing of any reinforcement except mesh during the process of placing the concrete will not be permitted. Concrete placed in violation of this provision may be rejected and

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ordered removed.

Welding of reinforcing steel will not be permitted.

### 480.4 METHOD OF MEASUREMENT

Reinforcing Steel will be measured by the pound (kg), based on the theoretical weight complete in place. The weights calculated shall be based upon the following table:

<b>Bar Designation (English)</b>										
Size	1/4"	No 3	No.4	No.5	No.6	No.7	No.8	No.9	No.10	No.14
Weight (kg/m)	0.167	0.376	0.668	1.043	1.502	2.044	2.670	3.400	4.303	7.650

<b>Bar Designation (Metric)</b>									
Size	10	15	20	25	30	35	45	55	
Weight (kg/m)	0.78	1.57	2.35	3.92	5.49	7.85	11.77	19.62	

Allowance will not be made for the clips, wire, or other fastening devices for holding the steel in place.

### 480.5 BASIS OF PAYMENT

Reinforcing steel will be paid for at the contract unit price per pound (kg).