

STATE OF SOUTH DAKOTA  
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION  
FOR  
STAINLESS REINFORCING STEEL

IM 29-3(38)79, PCEMS A443  
MINNEHAHA COUNTY

Structure Nos. 50-175-207 & 50-176-207

SEPTEMBER 30, 2003

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**1.0 Description:**

This structure requires the use of stainless steel deformed reinforcing bars for some parts of the structure, as shown on the plans. Stainless steel reinforcing bars shall conform to Section 480 with the following exceptions and/or additions.

**2.0 Material:**

Provide 2205 Duplex (UNS S31803), Grade 420, deformed stainless steel reinforcing bars conforming to the requirements of ASTM A 955M "Standard Specifications for Deformed and Plain Stainless Steel Bars for Concrete Reinforcement." Stainless steel reinforcing bars shall be free of mill scale. Certified Mill Test Reports and a Certificate of Compliance are required.

Verification Test Specimens:

Provide three additional straight bars for each size and/or heat combination, at the job site, for verification testing by SDDOT Central Laboratory. Each straight bar shall be two feet long.

Basis of Acceptance:

Stainless steel reinforcing bars will be accepted based on the following:

- (1) Receipt and approval of three copies of the Certified Mill Test Report, including corrosion test results, as per ASTM A955M.
- (2) Receipt of a Certificate of Compliance that indicates the stainless steel reinforcing bars comply with the provisions of ASTM A955M and these specifications, including corrosion resistance.
- (3) Satisfactory results of verification tests performed by SDDOT on the samples provided for testing.

(4) Visual inspection at the job site for conformance with dimensional and other requirements, including proper tagging and marking.

**3.0 Construction Requirements:**

(1) Bar supports shall be Class 1A-Maximum Protection Plastic-Protected Wire Bar Supports, for use with epoxy coated reinforcing bars, or 316 stainless steel. Bar supports with damaged coating shall not be used.

(2) Tie wire shall be 316L stainless, 16.5 gauge or heavier. Automatic tying equipment will not be allowed.

(3) Stainless steel rebar shall be shipped, handled and placed such that carbon steel does not come in contact with the stainless steel rebar. Padding shall be used to separate carbon steel bundling bands, or lifting devices, from the rebar. Wire rope shall not be used in lifting or handling the reinforcing.

(4) Cover stainless steel rebar with tarps during outdoor storage.

(5) Use wooden spacers to separate bundles of stainless steel rebar from other types of rebar.

(6) Use wooden supports to store stainless steel rebar off the ground or shop floor.

**4.0 Method of Measurement:**

Stainless steel reinforcing steel shall be measured as per Section 480.

**5.0 Basis of Payment:**

Stainless steel rebar shall be paid at the contract unit price per pound of Stainless Reinforcing Steel.

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## 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

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rejected and 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:

#### Bar Designation (English)

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

#### Bar Designation (Metric)

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).