

**Standard Specifications
for
Road and Bridge
Construction**



NEVADA DEPARTMENT OF TRANSPORTATION

2014

SECTION 505

REINFORCING STEEL

DESCRIPTION

505.01.01 General. This work consists of furnishing and placing reinforcing steel and welded wire reinforcement.

MATERIALS

505.02.01 General. Material shall conform to the following Subsections:

Bar Steel Reinforcement	Subsection 713.03.01
Welded Wire Reinforcement	Subsection 713.03.02

Use Grade 420 (60) bar steel reinforcement unless otherwise specified on the plans.

Spiral reinforcement may be either bar steel reinforcement or steel wire, of the equivalent size of the bar steel.

Use epoxy coatings listed in the QPL.

Tie wire shall be commercial quality 1.5 mm diameter (16 gage) minimum, black annealed soft-iron wire, unless otherwise approved. Tie wires used on epoxy coated reinforcing steel shall be coated with plastic or an equal type coating as approved.

505.02.02 Samples. Furnish one extra bar of each diameter for each 90 metric tons (100 tons) or fraction thereof. Select this bar from the longest bar of each size so that the bar, or a portion of it, can be used to replace any bar of that diameter which is selected to be used as a field sample. Supply field sample of sufficient length to provide for two 750 mm (30 in.) samples of each diameter. Indicate the extra bars on the fabricator's details.

505.02.03 Specifications for Coating Reinforcing Steel. Coating of bar steel reinforcement shall conform to AASHTO M284 (ASTM A775). Fabrication and handling of coated reinforcing steel shall conform to AASHTO M317 (ASTM D3963) except as provided herein. Patching or repair material shall conform to AASHTO M284 (ASTM A775) and shall be obtained from the coating manufacturer utilized to initially coat the reinforcement.

Coating of welded wire reinforcement shall conform to ASTM A884, Class A. When approved in writing, zinc coating conforming to ASTM A993 may be substituted for epoxy coating.

The coating fabricator for epoxy coated reinforcing steel shall be certified by the Concrete Reinforcing Steel Institute's Certification Program for Fusion Bonded Epoxy Coating Applicator Plants. Submit a copy of the Epoxy Coating Certification along with notification of the starting date of coating application.

Give notification of the date and location of the coating operation, in writing, at least 10 days before the planned date for beginning the coating operation. Allow the Engineer free access to the plant of the coating applicator for inspection. If the representative so elects, perform preparation of the bars, coating and curing of the bars in the representative's presence.

505.02.04 Welded Hoop Reinforcing. Fabricate welded hoop reinforcing consisting of bar steel reinforcing formed into a circular shape with ends connected by complete joint penetration butt welding or resistance butt welding according to Subsection 505.03.05 and the requirements herein.

(a) General. Designate in writing a welded hoop reinforcing Quality Control Manager (QCM). The QCM shall be responsible directly to the Contractor for the quality of all welded hoop reinforcing including the inspection of materials and workmanship performed by the Contractor and all subcontractors and submitting, receiving, and approving all correspondence, required submittals, and reports regarding welded hoop reinforcing to and from the Engineer.

The QCM shall not be employed or compensated by any subcontractor, or by other persons or entities hired by subcontractors, who will provide other services or materials for the project. The QCM may be an employee of the Contractor. The QCM shall be qualified as an AWS Certified Welding Inspector or approved equivalent and shall have a minimum of 3 years experience in the inspection/oversight of reinforcing steel welding. Provide verification of QCM qualifications at least 10 days before the planned date for beginning the welding operation.

Maintain distance from the vertical and horizontal forms by means of stays, blocks, ties, hangers, or other approved supports. Hold reinforcing bars from contact with the forms or between layers of bars by use of precast mortar blocks of approved shape, dimensions and compressive strength of not less than 21 MPa (3,000 psi). Fabricate metal chairs which are in contact with the exterior surface of the concrete of either galvanized steel, or with steel tips plastic coated to at least 19 mm (3/4 in.) into the concrete, or of stainless steel conforming to ASTM A493, Type 430. Do not use pebbles, pieces of broken stone, brick, metal pipe, or wooden blocks. Do not place concrete until reinforcement is inspected and approved. Concrete placed in violation of this provision may be rejected and its removal required.

If welded wire reinforcement is shipped in rolls, straighten into flat sheets before placing.

For epoxy coated reinforcing steel, use compatible types of bar supports to minimize damage to the coating on the bars during field placing. Make bar supports of dielectric material or coat with dielectric material. If precast concrete blocks with embedded tie wires or precast concrete doweled blocks are used, epoxy coat or plastic coat the wires or dowels. Epoxy coat reinforcing bars that are used as support bars. In walls reinforced with epoxy coated bars, epoxy coat spreader bars. Make proprietary combination bar clips and spreaders that are used in walls of corrosion resistant material or coat with dielectric material. Coat wire bar supports with dielectric material, such as epoxy or plastic, for a distance of at least 50 mm (2 in.) from point of contact with the epoxy coated reinforcing bars.

The following requirements shall apply to epoxy coated and plastic coated wire bar supports:

1. Keep the wire surface free of contaminants that affect the adhesion of the epoxy coating or plastic coating to the wire.
2. Apply the epoxy coating by the electrostatic spray method, fluidized bed, or by flocking.
3. Apply the plastic coating by spraying, dipping, or as a powder.
4. Provide coating thickness at least 125 μm (5 mil).
5. It is not expected that epoxy coated or plastic coated wire bar supports will be completely free of damage. Hanger marks on the coated bar supports, resulting from the coating application process, are acceptable and will not be considered as damaged coating. Make the repair of damaged coating with patching material and according to the material manufacturer's recommendations. The patching material shall be compatible with the epoxy coating material or plastic coating material and be inert in concrete.
6. Furnish a Certificate of Compliance for each shipment of coated wire bar supports.

When permanent corrugated metal forms are used, make the bar supports resting on the metal forms of a dielectric material or coated with a dielectric material whether the reinforcing steel is epoxy coated or not. Epoxy coat reinforcing bars that are used as support bars and resting on the metal forms. Epoxy coat or plastic coat the portion of wire bar supports which are in contact with the metal forms for a distance of at least 19 mm (3/4 in.) from the point of contact.

Position reinforcing in concrete deck slabs on approved metal or plastic supports or chairs or on precast mortar blocks to maintain accurately the specified clearance to the surface of the concrete. Do not space metal support units greater than 1.2 m (4 ft) in either direction when supporting bar sizes No. 16 (#5) and larger. For No. 10 or 13 (#3 or #4) bars, do not space more than 0.9 m (3 ft) in either direction. Do not space plastic or mortar support units greater than 0.9 m (3 ft) in either direction for all bar sizes.

Do not tack weld reinforcing bars, unless authorized in writing.

For reinforcing placement in other than deck slabs, do not space support units (steel, plastic, mortar) more than 1.2 m (4 ft).

Use bar support units sufficient in number and adequate in strength to carry all imposed loads without measurable deflection or displacement of the reinforcing steel. More closely space bar supports than the above maximums as necessary to meet these requirements.

Do not cut reinforcement which has been placed, inspected, and approved unless authorized in writing. Repair any unauthorized cutting of reinforcement satisfactorily. Use approved methods and materials in the repair. Such repair may include complete removal and replacement.