

ACCESSORY MATERIALS FOR CONCRETE PAVEMENT AND CONCRETE STRUCTURES

SECTION 931 METAL ACCESSORY MATERIALS FOR CONCRETE PAVEMENT AND CONCRETE STRUCTURES

931-1 Reinforcement Steel (for Pavement and Structures).

931-1.1 Steel Bars: Billet steel bars for concrete reinforcement shall conform to the requirements of ASTM A 615 [ASTM A 615M] except that the process of manufacture will not be restricted. For processes not included in ASTM A 615 [ASTM A 615M] the phosphorus content will be limited to 0.08%. When the use of Rail Steel is permitted by the plans such steel shall meet the requirements of AASHTO M 42 [AASHTO M 42M].

The following special requirements shall apply:

- (1) Unless otherwise specified or shown on the plans all reinforcement bars No. 10 and larger shall be deformed bars.
- (2) All billet-steel bars shall be of the grade called for on the plans.
- (3) Twisted bars shall not be used.
- (4) Wherever in the Specifications the word “purchaser” appears it shall be taken to mean the Department.

Acceptance of reinforcing steel shall be based on test samples taken randomly by the Department and manufacturer’s certified mill analysis of test results meeting the specification limits of the ASTM or AASHTO designation for the particular size, grade and any additional requirements. Randomly taken test samples and certification of test values, representing each production LOT of reinforcing steel, shall be provided to the Engineer for each Contract prior to use. Randomly taken test samples shall be cut from bundled steel that is shipped to the jobsite.

931-1.2 Metal Fabric: Welded steel wire fabric for concrete reinforcement shall meet the requirements of AASHTO M 55.

Welded deformed steel wire fabric for concrete reinforcement shall meet the requirements of AASHTO M 221.

Wherever the word “purchaser” is used it shall mean the Department.

931-2 Metal Materials for Joints in Concrete Pavement.

931-2.1 Sheet Metal Bottom Strips: The sheet metal strip for protecting the bottom and side edges of transverse expansion joints shall be composed of galvanized sheet metal of 0.0157 inch [0.40 mm] minimum thickness and shall conform to the requirements of ASTM A 653 [ASTM A 653M]. The sheets shall be furnished in accordance with the dimensions shown on the plans. They may be in one continuous piece, or spliced. When splicing is used the metal shall be lapped not less than 3 inches [75 mm] and securely fastened, by welding or otherwise, in such manner as to leave the spelter undamaged and produce a smooth sliding surface in contact with the pavement slab. The splices shall be spaced not less than 10 feet [3 m] apart and not less than 5 feet [1.50 m] from either end. The complete sheet shall not vary from a straight line by more than 1 inch [25 mm] from end to end.

The Contractor shall provide the Engineer a certified test report from the manufacturer of the sheet metal bottom strips confirming that the requirements of this Section are met. The certified test report shall conform to the requirements of Section 6 and include test results for thickness, dimension, grade, length, size, and spacing. Each certification shall cover only one type of metal materials for joints.

931-2.2 Bars and Chairs for Longitudinal Joints: Transverse reinforcing steel across the joint shall be deformed steel bars conforming to the requirements of 931-1.1 except that the bars may be any Grade shown in ASTM A 615 [ASTM A 615M].

These bars, and the chairs to hold them in place, shall be of the type and spacing as indicated on the plans.

931-2.3 Dowel Bars: Dowel bars shall be plain steel bars conforming to the requirements of ASTM A 615 [ASTM A 615M] for any Grade of steel shown. They shall be of the length, size and spacing as shown on the plans.

The Contractor shall provide the Engineer a certified test report from the manufacturer of the dowel bars confirming that the requirements of this Section are met. The certified test report shall conform to the requirements of Section 6 and include metallurgical mill analysis, grade, length and size. Each certification shall cover only one LOT for dowel bars.

931-2.4 Chairs and Metal Expansion Caps: The chairs and metal expansion caps shall be of an approved type as shown on the plans.

Dowel bars for expansion joints shall have a metal cap on one end so placed to provide ample space for movement of the slab. Continuous sleeves covering 1/2 of the length of the bar will not be permitted. Other fasteners may be approved. Dowel bars shall be coated with an approved material to break the bond.

931-3 Metal Dowel Bar Assemblies for Joints in Concrete Pavement.

931-3.1 Qualified Products List: The dowel bar assembly used shall be a product included on the Qualified Products List.

Manufacturers or distributors seeking approval of their material in accordance with this specification shall demonstrate the performance of their products in accordance with the requirements in 931-3.2 thru 931-3.6.

931-3.2 Rigidity: The dowel bars shall be supported by an approved welded assembly possessing sufficient rigidity to hold the dowel bars in position to such accuracy that error or deviation from its required position in any bar in the entire installation after the pavement has been finished shall be no greater than 1/2 inch [13 mm].

The assembly shall have continuous parallel spacer bars and two continuous parallel bearing members of no less than 1/4 inch [6.3 mm] diameter wire. One spacer bar shall be located at or near each end of the dowel. Alternate ends of dowels shall be welded to a spacer bar in such a manner as to maintain the dowels parallel to each other and permit sliding movement in the joint.

The free ends of each dowel shall be retained securely in place by means of wire loops or metal tubes welded to the other spacer bar. An expansion cap shall be installed on one end of each bar if the dowels are being used in an expansion joint.

Suitable struts or ties shall be provided to hold the assembly in correct position during installation.

The assembly shall have an upright support welded to the spacer bar and continuous bearing member at the end of each dowel and a continuous bearing member.

If the upright support consists of a single vertical wire, the support shall be no less than 5/16 inch [8 mm] diameter wire. Otherwise, the support shall be no less than 1/4 inch [6.3 mm] in diameter.

931-3.3 Sand Plates: Sand plates, if required, shall be made from no less than 3/8 inch [9.5 mm] sheet steel. Each plate shall have no less than 0.1 ft² [0.001 m²] of bearing area. The plates shall be furnished in sufficient number to provide uniform support for the complete assembly. They may be furnished separate from the assembly units, or attached thereto by welding, suitable clips, or other approved means.

931-3.4 Welds: The welds of the assembly shall be made securely. A broken weld will be cause for rejection of the length of section of the assembly where it occurs.

931-3.5 Assembly Placement: When the dowel bar assembly is in place, it shall act as a rigid unit with each component part securely held in position relative to the other member of the assembly.

The entire assembly shall be held securely in place during placing, consolidating, and finishing the concrete by means of metal pins. Pins used on granular subbase or cold mixed bituminous stabilized subbase shall penetrate at least 12 inches [300 mm] below the dowel bar assembly. The pins shall be of no less than 1/4 inch [6.3 mm] diameter wire and shall be provided with a hook or arm welded to the pin in such a manner that it shall secure the assembly in place.

Nail securing systems may be used as an anchoring device on hot bituminous stabilized subbase. The nail shall be no less 1/8 inch [3 mm] in diameter, no less than 2 inches [50 mm] in length and the nail head or attached washer shall be not less than 1/2 inch [13 mm] outside diameter. The nail shall be driven through both ends of a metal strap after it has been placed around one of the lower transverse bars on the dowel bar assembly.

At least eight pins or nails shall be used for each 12 foot [3.6 m] section (a lane width) of assembly. Sand plates, if required, shall be drilled to receive the pins.

The Contractor shall provide the equipment and personnel necessary to verify dowel bar location after the concrete is placed and has received the initial screeding.

931-3.6 Materials: The wire for the welded assembly shall be in accordance with all applicable requirements of ASTM A 82.

One coat of zinc chromate paint shall be used as specified in 971-5. Application shall be in accordance with Section 561.