

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 except that the process of manufacture will not be restricted. For processes not included in ASTM A-615 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.

The following special requirements shall apply:

- (1) Unless otherwise specified or shown on the plans all reinforcement bars No. 3 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 minimum thickness and shall conform to the requirements of ASTM A-653. 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 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 apart and not less than 5 feet from either end. The complete sheet shall not vary from a straight line by more than 1 inch from end to end.

The Contractor shall provide the Engineer a certified mill analysis from the manufacturer of the sheet metal bottom strips including test results for thickness, dimension, grade, length, size, and spacing. Each certified mill analysis shall cover only one type of metal material 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.

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 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 one half 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.

The assembly shall have continuous parallel spacer bars and two continuous parallel bearing members of no less than 1/4 inch 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 diameter wire. Otherwise, the support shall be no less than 1/4 inch in diameter.

931-3.3 Sand Plates: Sand plates, if required, shall be made from no less than 3/8 inch sheet steel. Each plate shall have no less than 0.1 ft² 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 below the dowel bar assembly. The pins shall be of no less than 1/4 inch 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 in diameter, no less than 2 inches in length and the nail head or attached washer shall be not less than 1/2 inch 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 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.

Apply one coat of rust preventative compound meeting the requirements of 560-2.6. Apply the rust preventive in accordance with the manufacturer's recommendations.