

## ORIGNATION FORM

**Specification Section:** 458

**Subject:** Expansion Joints

**Origination date:** September 8, 2008

**Originator:** Steve Nolan & Cheryl Hudson

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**Problem statement:** Sidewalk Cover Plates and Edge Rails are fabricated items and, the material and installation requirements are specification items and need to be moved, from Design Indexes 21100 & 21110. Information on QPL acceptance also belongs in the Specification, not on the Design Indexes. Generally, the specification needs updating to active voice, and some sections could use rewording or rearranging for clarity.

**Information source:**

**Background data:** Notes for fabrication and materials for the sidewalk cover plates and edge rails are currently on Design Indexes 21100 and 21110, along with QPL application information. Moved these notes to this Specification, and after publication of the update, Structures will remove the notes from the Indexes.

**Recommended Usage Note:** Bridge Deck Expansion Joints less than 4" wide at 70° F.: Poured, Poured with Backer Rods and Strip Seal

**Estimated Fiscal Impact, if Implemented:** None



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## **M E M O R A N D U M**

**DATE:** October 29, 2008  
**TO:** Specification Review Distribution List  
**FROM:** Rudy Powell, Jr., P.E., State Specifications Engineer  
**SUBJECT:** Proposed Specification: **4580000, Bridge Deck Joints**

In accordance with Specification Development Procedures, we are sending you a copy of a proposed specification change.

This change was proposed by Cheryl Hudson of the State Structures Design Office. Material and installation requirements for sidewalk cover plates and edge rails, currently shown in the Design Standards, have been moved to this Section. Information on QPL requirements have been clarified in this Section or by reference to another Section.

Please share this proposal with others within your responsibility. Review comments are due within four weeks and should be sent to Mail Station 75 or to my attention via e-mail at ST986RP or rudy.powell@dot.state.fl.us. Comments received after December 3, 2008 may not be considered. Your input is encouraged.

RP/dr  
Attachment

**BRIDGE DECK JOINTS.**  
**(REV 10-17-08)**

SECTION 458 (of the Supplemental Specifications) is deleted and the following substituted:

**SECTION 458**  
**BRIDGE DECK JOINTS**

**458-1 Description.**

Furnish and install bridge deck joints of the types and at the locations shown in the plans.

*The following types of joints are covered by this Section:*

*Poured Joint*

*Poured Joint with Backer Rod System*

*Strip Seal Joint System*

~~458-2 Types of Joints.~~

~~———— The types of joints are designated as follows:~~

~~———— Poured Joint~~

~~———— Poured Joint with Backer Rod~~

~~———— Strip Seal~~

**458-32 Materials.**

**458-32.1 Poured Joint:** Meet the requirements of Section 932 for Joint Sealer or *Type A, B, or C* Low Modulus Silicone Sealant material.

**458-32.2 Poured Joint with Backer Rod System:** Furnish Poured Joint with Backer Rod Joint Systems that meet the requirements of Section 932 for Type D Silicone Sealant ~~and that are listed on the Qualified Products List.~~ Furnish joint systems consisting of Type D Silicone Sealant material, Foam Backer Rods, Sidewalk Cover Plates (as required) and all associated miscellaneous components.

**458-32.3 Strip Seal Joint System:** *Furnish Strip Seal Joint Systems in accordance with ASTM D 5973 and Design Index No. 21100.* ~~Meet the requirements of Design Index No. 21100.~~

Furnish Strip Seal Joint Systems that are ~~listed on the Qualified Products List (QPL).~~

*Manufacturers seeking approval of Strip Seal Joint Systems for inclusion on the QPL shall submit an application along with design documentation showing the expansion joint system meets these specifications. Include installation details. Strip Seal Systems shall include temporary or sacrificial support brackets, bolts, clamps, etc. that are compatible with decks constructed with or without blockouts.* Furnish joint systems consisting of watertight steel Edge Rails, Elastomeric Strip Seals, Sidewalk Cover Plates (as required) and all associated miscellaneous components. *Obtain the Elastomeric Strip Seals from the Edge Rail Manufacturer.*

**458-2.4 Sidewalk Cover Plates:** *Furnish 1/4" thick slip resistant steel Sidewalk Cover Plates in accordance with ASTM A 709, Grade 36 or 50. Sidewalk Cover Plates shall have a minimum coefficient of friction on the top surface of 0.8 in dry condition, as determined by ASTM F 1677 or F 1679, and 0.68 or 0.52 in a wet condition, as determined by ASTM F 1679 or ASTM F 1677 (respectively) and incorporate an anti-slip steel surface consisting of a random*

*hatch matrix or other suitable pattern. Do not use diamond plate or surface applied slip resistant tapes, films, nonmetallic coatings or other similar materials. After shop fabrication, hot-dip galvanize in accordance with Section 962 and the Cover Plate manufacturer's recommendations. Furnish flat head Stainless Steel Sleeve Anchors in accordance with ASTM F 593 Group 1 Alloy 304 for attaching Sidewalk Cover Plates. Install Sleeve Anchors in accordance with the anchor manufacturer's instructions. Submit shop drawings for Sidewalk Cover Plates showing all materials, project specific details and dimensions.*

#### **458-43 Construction Methods *Fabrication and Installation.***

**458-43.1 General:** Install the joint in accordance with the specific requirements of this Article, the plan details and the details shown on the Design Standards for the particular type of expansion joint called for.

**458-43.2 Poured Joint:** Install the joint at the locations and in accordance with the details shown in the plans *and the manufacturer's recommendations.*

#### **458-43.3 Poured Joint with Backer Rod *System:***

**458-43.3.1 Shop Drawings:** Submit shop drawings for Sidewalk Cover Plates (as required) showing all materials and project specific details and dimensions

~~**458-43.3.2 Sidewalk Cover Plate Fabrication:** Hot dip galvanize Sidewalk Cover Plates after shop fabrication in accordance with Section 962 and the manufacturer's recommendations.~~

#### ~~**458-43.3.3 Installation:**~~

~~(a ***Casting Expansion Joint Opening***)~~ When casting the ~~B~~bridge ~~D~~deck, ~~A~~approach ~~S~~slab or ~~R~~aised ~~S~~sidewalk adjacent to the *expansion* joint at temperatures other than 70° F, adjust *the joint opening* (Dim. "A") as shown on *Design Standards* Index No. 21110 at 70° F by the amount of the adjustment per 10° F shown in Structures Plans, Poured Expansion Joint Data Table. For temperatures above 70° F decrease the opening. For temperatures below 70° F increase the opening.

~~(b) **458-3.3.2 Installation of Poured Joint System:** After deck profiling, grinding, and grooving operations are complete, i~~Install Poured Joint with Backer Rod in accordance with the manufacturer's recommendations, when the joint opening is ~~between 1 3/4" and 2 1/4" ± 1/4" of the design joint opening (Dim "A" at 70° F) shown in the Structures Plans, Poured Expansion Joint Data Table. The minimum opening must not be less than 1" at the time of installation.~~and after deck profiling and grooving operations are completed. Place Poured Joint Material only when the ambient temperature is between 55° F and 85° F and is expected to rise for the next three hours minimum to provide for adequate joint opening and compression of the Poured Joint Material during curing.

#### **458-43.4 Strip Seal *System:***

**458-43.4.1 Elastomeric Seals *Seal Fabrication:*** Furnish continuous heavy duty bridge deck Elastomeric Seals sized *in accordance with the manufacturer's recommendations*, to perform satisfactorily for the opening range ~~shown~~ *shown in accordance with the manufacturer's recommendations*. Minimum movement classification is 4". ~~Seal shall be supplied by the manufacturer of the Edge Rails. Field vulcanization is not permitted. Shop vulcanization is permitted only~~*restricted to use* on horizontal turns on skewed bridges at upturn ends where the horizontal turn angle is greater than 35 degrees. *Field vulcanization is not permitted.*

#### ~~**458-43.4.2 Edge Rail and Sidewalk Cover Plate Fabrication:**~~

(a) *Furnish extruded, hot rolled or machined solid steel Edge Rails in accordance with ASTM A 709, Grade 36, 50 or 50(W). Furnish Edge Rails with a minimum mass of 19.2 lb/ft excluding studs, a minimum height of 8 inches, a minimum thickness of 1/2 inch and a maximum top surface (riding surface) width of 2 inches. Edge Rails manufactured from bent plate or built up pieces are not acceptable.*

(b) *Furnish Anchor Studs in accordance with ASTM A 108, and electric arc end-weld Anchor Studs with complete fusion. Anchor Studs may be piggy backed to achieve required lengths.*

(c) Perform all shop welding in accordance with the Bridge Welding Code ANSI/AASHTO/AWS D1.5. Do not weld to surfaces in contact with the Elastomeric Seal or the top surface (riding surface) except as shown in the Shop Splice Detail. Do not weld inside seal cavity.

(d) Fabricate Edge Rail Assemblies in one piece including upturns, except where the length or configuration prohibits shipping or proper installation or where phase construction requires separate assemblies. Shop splice sections of Edge Rail to obtain the required length by partial penetration double v-groove welds on prepared beveled edges and seal welds as shown in the Shop Splice Detail. Weld all around the joint as far as practical to achieve a watertight seal. Do not use short pieces of Edge Rail less than 6'-0" long unless required at curbs, sidewalks or phase construction locations.

(e) *After shop fabrication, h*Hot-dip galvanize Edge Rail Assemblies and Sidewalk Cover Plates after shop fabrication in accordance with Section 962 and the manufacturer's recommendations.

(f) Furnish temporary or sacrificial support brackets, bolts, clamps, etc. that are capable of resisting shipping, handling and construction forces without damage to the Edge Rail Assemblies or galvanized coating and are adjustable to account for variable temperature settings. Do not use temporary or sacrificial support brackets, bolts, clamps, etc. between the faces of the Edge Rails.

(g) Clearly match mark corresponding Edge Rail Assemblies with joint location and direction of stationing.

(h) Submit shop drawings showing all joint materials and project specific details and dimensions. Include name of manufacturer, seal model number, seal movement range and the assigned Qualified Products List Number.

#### **458-43.4.3 Installation:**

(a) Install the Edge Rail Assemblies at proper grade and alignment before or after deck planing in accordance with the manufacturer's instructions. When installed after deck planing *and grinding*, install the Edge Rail Assemblies in the blockouts on a profile tangent between the ends of the deck and/or approach slab to within a +0" and -1/4" variation. When installed before deck planing, install the Edge Rail Assemblies 3/8", ±1/16", below the top surface of the deck or approach slab to compensate for concrete removal during ~~planing~~ *planning and grinding*.

(b) Bolt, weld or clamp Edge Rail Assemblies in position using temporary or sacrificial brackets as required. For phased construction, install Edge Rail Assemblies in a given subsequent phase so as to align with those installed in an adjacent prior phase after deflection and rotation due to deck casting of adjoining spans has occurred.

(c) For installation *of Edge Rail Assemblies at* temperatures other than 70° F, adjust the opening of the joint (Dim. "A") as shown on Design Standard Index No. 21100 by the amount of the adjustment per 10° F shown in Structures Plans, *Strip Seal* Expansion Joint

Data table. For temperatures above 70° F decrease the opening. For temperatures below 70° F, increase the opening.

(d) After galvanizing ~~has been completed~~, do not weld within 2” of Edge Rail surfaces ~~that will be~~ exposed in the completed structure. Do not weld expansion joint components to or electrically ground to reinforcing steel or structural steel. Seal field butt joints and empty shipping and erection holes with caulk before placing deck concrete.

(e) Protect galvanized Edge Rail Assemblies during screeding operations per the manufacturer’s recommendations. Provide temporary blocking material in the Edge Rail seal cavities to prevent concrete intrusion during deck pour and finishing.

(f) Loosen any temporary or sacrificial support brackets, bolts, clamps, etc. that span across the joint after initial set of concrete, but not ~~more~~ later than two hours after conclusion of concrete placement.

(g) Install Elastomeric Seal after completion of deck casting. Remove all joint form material and blocking material prior to installing Elastomeric Seal. Field install Elastomeric Seal in accordance with manufacturer’s recommendations. Thoroughly coat all contact surfaces between the Elastomeric Seal and the Edge Rail seal cavities with an adhesive lubricant before setting Elastomeric Seal in place.

#### **458-54 Method of Measurement.**

**458-5.1 General:** The quantities to be paid will be plan quantity for the length of each type of joint constructed and accepted.

**458-5.2 Measurement of Joint Length for Payment:** ~~The length of each type of joint to be paid for will be plan quantity completed and accepted.~~

#### **458-56 Basis of Payment.**

**458-65.1 Basic Items of Joints.** The Contract unit price per foot for Joints will be full compensation for all work and materials necessary for the complete installation. Such price and payment will include, but not be limited to, the following specific incidental work:

(a) Any work required to clean and prepare the adjacent bridge deck, deck block out or deck joint gap.

(b) Any ~~necessary~~ repairs to the galvanizing on metallic joint components.

(c) Any additional work or materials required for non standardized or special construction or installation techniques.

(d) Any cost of erection and removal of any temporary supports which may be necessary for ensuring proper alignment and positioning of the joint relative to the bridge deck.

**458-65.2 Payment Items:** Payment shall be made under:

Item No. 458 - 1- Bridge Deck Expansion Joint – per foot.