



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

December 20, 2019

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **458**  
Proposed Specification: **4580200 Bridge Deck Joints.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Steven Nolan from the State Structures Office to accommodate equivalent systems by allowing the use of silicone in lieu of elastomer for glands in strip seal expansion joints and clarify edge rail requirements.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**BRIDGE DECK JOINTS****(REV ~~120-1925~~-19)**

ARTICLE 458-2 is deleted and the following substituted:

**458-2 Materials.**

**458-2.1 General:** Transport, store and prepare all joint materials and components for all joint types as per the manufacturer's recommendations.

**458-2.2 Poured Joint:** Furnish a Type D silicone sealant material meeting the requirements of Section 932 that is listed on the Approved Product List (APL).

**458-2.3 Poured Joint with Backer Rod System:** Furnish poured joint with backer rod systems consisting of Type D silicone sealant material, foam backer rods, sidewalk cover plates (as required) and all associated miscellaneous components.

The Type D silicone sealant material used in the system shall be listed on the APL and meet the requirements of Section 932.

**458-2.4 Strip Seal Joint System:** Furnish strip seal joint systems ~~in accordance with ASTM D5973 and Standard Plans, Index 458-100~~ that are listed on the APL. Manufacturers seeking evaluation of their product for the APL shall submit an application in accordance with Section 6. Design documentation showing the expansion joint system shall include installation details and temporary or sacrificial support brackets, bolts, clamps, etc. that are compatible with decks constructed with or without block-outs. Furnish joint systems consisting of watertight steel edge rails, ~~elastomeric strip seals, glands sidewalk cover plates (as required)~~ and all associated miscellaneous components.

**458-2.4.1 Strip Seal Joint Systems with elastomeric glands:** Product must meet the requirements of ASTM D5973 and Standard Plans, Index 458-100. Obtain the ~~elastomeric strip seals~~ elastomeric glands from the edge rail manufacturer.

**458-2.4.2 Strip Seal Joint Systems with silicone glands:** Product must meet the requirements of Standard Plans, Index 458-100. Adhesives must be supplied by the same manufacturer as the glands and must meet ASTM C793 with no cracking, ozone chalking or degradation.

~~**458-2.5 Sidewalk Cover Plates:** Furnish slip resistant, random hatch matrix or suitable pattern, galvanized steel sidewalk cover plates fabricated from steel meeting the requirements of ASTM A36 or ASTM A709, Grade 36 or 50. Do not use diamond plate or surface applied slip resistant tapes, films, nonmetallic coatings or other similar materials. Fabricate cover plates in accordance with Standard Plans, Indexes 458-100 and 458-110. After shop fabrication, hot dip galvanize cover plates in accordance with Section 962. Galvanized sidewalk cover plates shall have a minimum coefficient of friction on the top surface of 0.8 in dry condition, and 0.65 in a wet condition, as determined by ASTM F1677-05 or ASTM F1679-04. Furnish flat head stainless steel sleeve anchors in accordance with ASTM F593 Group 1 Alloy 304 for attaching sidewalk cover plates. Install sleeve anchors in accordance with the manufacturer's instructions.~~

**458-2.56 Modular Joint:** Furnish modular joints meeting the requirements of this Section. Submit manufacturer certification that modular joint components meet the following material requirements.

Table 2-6.1 Component Material Requirements	
Solid Separation Beams, Steel Extrusions, Support	ASTM A588 or ASTM A572, Grade 50

Bars, Plate and Milled Steel Shapes	
Box Seals	ASTM D3542
Strip Seals	ASTM D5973
Seal Adhesive	ASTM D4070
Stud Shear Connectors and Threaded Studs	ASTM A108
Stainless Steel Sliding Plates	ASTM A240, Type 316
PTFE Sliding Surface	ASTM D4895
*Provide seals with hardness Type A durometer equal to 55 (plus or minus 5) by ASTM D2240.	

Supply test results from the manufacturer verifying the maximum coefficient of friction between mating surfaces. Testing must be performed by an independent testing laboratory according to the manufacturer's stated precompression values for the system to a minimum of two million cycles. Maximum allowed coefficient of friction is 0.10.

Bond PTFE (polytetrafluorethylene) using a heat cured, high temperature epoxy capable of withstanding temperatures of minus 40°F to plus 250°F.

For springs, bearing, and equidistance devices (i.e. control springs), use the same material composition and formulation, manufacturer, fabrication procedure and configuration as those used in the prequalification test. Components manufactured from polyurethane compounds are not permitted.

**458-2.65 Sidewalk Cover Plates:** Furnish slip resistant, random hatch matrix or suitable pattern, galvanized steel sidewalk cover plates fabricated from steel meeting the requirements of ASTM A36 or ASTM A709, Grade 36 or 50. Do not use diamond plate or surface applied slip resistant tapes, films, nonmetallic coatings or other similar materials. Fabricate cover plates in accordance with Standard Plans, Indexes 458-100 and 458-110. After shop fabrication, hot-dip galvanize cover plates in accordance with Section 962. Galvanized sidewalk cover plates shall have a minimum coefficient of friction on the top surface of 0.8 in dry condition, and 0.65 in a wet condition, as determined by ASTM F1677-05 or ASTM F1679-04. Furnish flat head stainless steel sleeve anchors in accordance with ASTM F593 Group 1 Alloy 304 for attaching sidewalk cover plates. Install sleeve anchors in accordance with the manufacturer's instructions.

SUBARTICLE 458-4.4.1 is deleted and the following substituted:

#### 458-4.4 Strip Seal System:

**458-4.4.1 Elastomeric Glands for Joint Seal Fabrication:** ~~Furnish~~ Seals must be continuous heavy duty bridge deck ~~elastomeric seals glands~~ sized in accordance with the manufacturer's recommendations, to perform satisfactorily for the opening range shown. Minimum movement classification is 4 inches.

**458-4.4.1.1 Elastomeric Gland Seals:** Shop vulcanization is 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.

**458-4.4.1.2 Silicone Gland Seals:** Meet the following requirements:

<u>Property</u>	<u>Test Method</u>	<u>Range</u>
<u>Durometer (Shore A)</u>	<u>ASTM D2240</u>	<u>55 +/- 5</u>
<u>Elongation</u>	<u>ASTM D412</u>	<u>350% (min)</u>

<u>Tensile</u>	<u>ASTM D412</u>	<u>550 psi (min)</u>
<u>Tearing (die B ppil)</u>	<u>ASTM D624</u>	<u>80 lb/in (min)</u>
<u>Compression Set</u>	<u>ASTM D395</u>	<u>30% max at 350° F</u>
<u>Temperature Range</u>		<u>-60° F to 450° F</u>
<u>Specific Gravity</u>		<u>1.51</u>

SUBARTICLE 458-4.4.2 is deleted and the following substituted:

#### **458-4.4.2 Edge Rail Fabrication:**

1. Furnish extruded, hot rolled or machined solid steel edge rails in accordance with ASTM A709, 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~~ must have continuous longitudinal welds. Built-up member connections directly supporting wheel loads must use complete penetration welds.

2. Furnish anchor studs in accordance with ASTM A108, and electric arc end-weld anchor studs with complete fusion. Anchor studs may be piggy backed to achieve required lengths.

3. 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.

4. Fabricate edge rail assemblies ~~in one piece including~~ upturns when required to hold the gland in place, integral to the edge rail assemblies by full length welds or extruded sections. Splices in an individual joint are only permitted where a construction joint is specifically required by the Plans, joint segment length exceeds 50 feet, or approved by the Engineer in writing. 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 feet 0 inches long unless required at curbs, sidewalks or phase construction locations.

5. After shop fabrication, hot-dip galvanize edge rail in accordance with Section 962 and the manufacturer's recommendations.

6. 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.

7. Clearly match mark corresponding edge rail assemblies with joint location and direction of stationing.

SUBARTICLE 458-4.4.3 is deleted and the following substituted:

#### **458-4.4.3 Installation:**

1. 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 block-outs on a profile tangent between the ends of the deck and/or approach slab to within a plus 0 inch and minus 1/4 inch variation. When installed before deck planing, install the edge rail assemblies 3/8 inches, plus or minus 1/16 inch, below the top surface of the deck or approach slab to compensate for concrete removal during planing and grinding.

2. 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 to align with those installed in an adjacent prior phase after deflection and rotation due to deck casting of adjoining spans has occurred.

3. For installation of edge rail assemblies at temperatures other than 70°F, adjust the opening of the joint (Dim. A as shown in Standard Plans, Index 458-100) by the amount of the adjustment per 10°F shown in the Structures Plans, Strip Seal Expansion Joint Data Table. For temperatures above 70°F, decrease the opening. For temperatures below 70°F, increase the opening.

4. After galvanizing, do not weld within 2 inches of edge rail surfaces 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.

5. 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.

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

7. Install elastomeric seal after completion of deck casting. Remove all joint form material and blocking material prior to installing glands~~elastomeric seal~~. Field install glands~~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.~~

**BRIDGE DECK JOINTS****(REV 12-19-19)**

ARTICLE 458-2 is deleted and the following substituted:

**458-2 Materials.**

**458-2.1 General:** Transport, store and prepare all joint materials and components for all joint types as per the manufacturer's recommendations.

**458-2.2 Poured Joint:** Furnish a Type D silicone sealant material meeting the requirements of Section 932 that is listed on the Approved Product List (APL).

**458-2.3 Poured Joint with Backer Rod System:** Furnish poured joint with backer rod systems consisting of Type D silicone sealant material, foam backer rods, sidewalk cover plates (as required) and all associated miscellaneous components.

The Type D silicone sealant material used in the system shall be listed on the APL and meet the requirements of Section 932.

**458-2.4 Strip Seal Joint System:** Furnish strip seal joint systems that are listed on the APL. Manufacturers seeking evaluation of their product for the APL shall submit an application in accordance with Section 6. Design documentation showing the expansion joint system shall include installation details and temporary or sacrificial support brackets, bolts, clamps, etc. that are compatible with decks constructed with or without block-outs. Furnish joint systems consisting of watertight steel edge rails, strip seal glands and all associated miscellaneous components.

**458-2.4.1 Strip Seal Joint Systems with elastomeric glands:** Product must meet the requirements of ASTM D5973 and Standard Plans, Index 458-100. Obtain the strip seal elastomeric glands from the edge rail manufacturer.

**458-2.4.2 Strip Seal Joint Systems with silicone glands:** Product must meet the requirements of Standard Plans, Index 458-100. Adhesives must be supplied by the same manufacturer as the glands and must meet ASTM C793 with no cracking, ozone chalking or degradation.

**458-2.5 Modular Joint:** Furnish modular joints meeting the requirements of this Section. Submit manufacturer certification that modular joint components meet the following material requirements.

Table 2-6.1 Component Material Requirements	
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PTFE Sliding Surface	ASTM D4895
*Provide seals with hardness Type A durometer equal to 55 (plus or minus 5) by ASTM D2240.	

Supply test results from the manufacturer verifying the maximum coefficient of friction between mating surfaces. Testing must be performed by an independent testing

laboratory according to the manufacturer's stated precompression values for the system to a minimum of two million cycles. Maximum allowed coefficient of friction is 0.10.

Bond PTFE (polytetrafluorethylene) using a heat cured, high temperature epoxy capable of withstanding temperatures of minus 40°F to plus 250°F.

For springs, bearing, and equidistance devices (i.e. control springs), use the same material composition and formulation, manufacturer, fabrication procedure and configuration as those used in the prequalification test. Components manufactured from polyurethane compounds are not permitted.

**458-2.6 Sidewalk Cover Plates:** Furnish slip resistant, random hatch matrix or suitable pattern, galvanized steel sidewalk cover plates fabricated from steel meeting the requirements of ASTM A36 or ASTM A709, Grade 36 or 50. Do not use diamond plate or surface applied slip resistant tapes, films, nonmetallic coatings or other similar materials. Fabricate cover plates in accordance with Standard Plans, Indexes 458-100 and 458-110. After shop fabrication, hot-dip galvanize cover plates in accordance with Section 962. Galvanized sidewalk cover plates shall have a minimum coefficient of friction on the top surface of 0.8 in dry condition, and 0.65 in a wet condition, as determined by ASTM F1677-05 or ASTM F1679-04. Furnish flat head stainless steel sleeve anchors in accordance with ASTM F593 Group 1 Alloy 304 for attaching sidewalk cover plates. Install sleeve anchors in accordance with the manufacturer's instructions.

SUBARTICLE 458-4.4.1 is deleted and the following substituted:

**458-4.4 Strip Seal System:**

**458-4.4.1 Glands for Joint Seal:** Seals must be continuous heavy duty bridge deck glands sized in accordance with the manufacturer's recommendations, to perform satisfactorily for the opening range shown. Minimum movement classification is 4 inches.

**458-4.4.1.1 Elastomeric Gland Seals:** Shop vulcanization is 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.

**458-4.4.1.2 Silicone Gland Seals:** Meet the following requirements:

Property	Test Method	Range
Durometer (Shore A)	ASTM D2240	55 +/- 5
Elongation	ASTM D412	350% (min)
Tensile	ASTM D412	550 psi (min)
Tearing (die B ppil)	ASTM D624	80 lb/in (min)
Compression Set	ASTM D395	30% max at 350° F
Temperature Range		-60° F to 450° F
Specific Gravity		1.51

SUBARTICLE 458-4.4.2 is deleted and the following substituted:

**458-4.4.2 Edge Rail Fabrication:**

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and a maximum top surface (riding surface) width of 2 inches. Edge rails manufactured from built up pieces must have continuous longitudinal welds. Built-up member connections directly supporting wheel loads must use complete penetration welds.

2. Furnish anchor studs in accordance with ASTM A108, and electric arc end-weld anchor studs with complete fusion. Anchor studs may be piggy backed to achieve required lengths.

3. 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.

4. Fabricate edge rail assemblies upturns when required to hold the gland in place, integral to the edge rail assemblies by full length welds or extruded sections. Splices in an individual joint are only permitted where a construction joint is specifically required by the Plans, joint segment length exceeds 50 feet, or approved by the Engineer in writing. 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 feet 0 inches long unless required at curbs, sidewalks or phase construction locations.

5. After shop fabrication, hot-dip galvanize edge rail in accordance with Section 962 and the manufacturer's recommendations.

6. 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.

7. Clearly match mark corresponding edge rail assemblies with joint location and direction of stationing.

SUBARTICLE 458-4.4.3 is deleted and the following substituted:

**458-4.4.3 Installation:**

1. 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 block-outs on a profile tangent between the ends of the deck and/or approach slab to within a plus 0 inch and minus 1/4 inch variation. When installed before deck planing, install the edge rail assemblies 3/8 inches, plus or minus 1/16 inch, below the top surface of the deck or approach slab to compensate for concrete removal during planing and grinding.

2. 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 to align with those installed in an adjacent prior phase after deflection and rotation due to deck casting of adjoining spans has occurred.

3. For installation of edge rail assemblies at temperatures other than 70°F, adjust the opening of the joint (Dim. A as shown in Standard Plans, Index 458-100) by the amount of the adjustment per 10°F shown in the Structures Plans, Strip Seal Expansion Joint



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

4. After galvanizing, do not weld within 2 inches of edge rail surfaces 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.

5. 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.

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

7. Install elastomeric seal after completion of deck casting. Remove all joint form material and blocking material prior to installing glands. Field install glands in accordance with manufacturer's recommendations.