S U P P L E M E N T A L S P E C I F I C A T I O N

SECTION 559 – ASPHALTIC PLUG EXPANSION JOINT, ASPHALTIC PLUG CRACK CONTROL

This supplemental specification adds a new section to the NHDOT Standard Specifications for Road and Bridge Construction.

Description

1.1 This work shall consist of all the work, including saw cutting and asphalt removal, as required to furnish and install a water tight asphaltic plug expansion joint and/or a water tight asphaltic plug for crack control, as shown on the plans. The asphaltic plug expansion joint and crack control is a commercial product and must be installed in accordance with the manufacturer's recommendations. When joint repair is specified, this work shall also include saw cutting, removal and disposal of the existing joint materials, as required to furnish and install a water tight asphaltic plug expansion joint and/or crack control, as shown on the plans.

Materials

2.1 The asphaltic plug expansion joint shall be one of the products listed on the NHDOT Qualified Product List, Item 559. The asphaltic materials (hot applied polymer modified asphaltic binder and aggregate) shall be applied by an applicator approved by the Manufacturer and shall meet the requirements of ASTM D6297. All components (except closed cell expansion material) of the asphaltic plug joint system shall be from one manufacturer.

2.2 Asphaltic Plug Material. The asphaltic plug material for crack control shall be one of the products listed on the NHDOT Qualified Product List, Item 559. The asphaltic materials (hot applied polymer modified asphaltic binder and aggregate) shall be applied by an applicator approved by the Manufacturer and shall meet the requirements of ASTM D6297.

2.3 Asphaltic Binder Material. The asphaltic binder material for both expansion joint and crack control shall meet the polymeric modified asphaltic requirements of ASTM D6297.

2.4 Steel Support Plate. The steel support plate for the asphaltic plug expansion joint shall meet the requirements of ASTM D6297 or as recommended by the Manufacturer. The plate shall be galvanized as specified in Section 550.2.9, have a maximum length of 6 ft., and shall have pre-drilled holes at 12-in. (300 mm) on center for inserting the locating pins.

2.5 Backer Rod. The backer rod for the asphaltic plug expansion joint shall be a closed cell, high temperature, heat resistant material that meets the requirements of ASTM D5249.

2.6 Closed Cell Expansion Material. The closed expansion material used as a joint filler between the deck and approach slab or stub wall shall be a pre-formed, low-density, closed cell,

cross-linked, EVA polyethylene co-polymer or polyethylene (XLPE) material that is flexible, waterproof, chemical resistant, and to be used as a compressible foam between concrete pours for full-depth protection. The product shall be resistant to abrasion, oxidation, oils, gasoline, salt and other materials that may come in contact with the surface. The material shall conform to ASTM D-1056, 2B2 and be a product as listed on the QPL, Section 559.

2.6.1 The closed cell expansion material shall have the following physical properties per ASTM D3575:

Property	Test Method	Requirement
Water absorption	Suffix L	< 0.03 lb/ft²
Density	Suffix W	2.0 – 4.0 pcf
Compression Deflection	Suffix D	5 psi @ 25% min.
Elongation	Suffix G	200% min.
Tensile Strength	Suffix T	50 psi min.
Tear Strength	Suffix G	10 pli min.
Compression Set (@ 50% for 22 hrs)	ASTM D-1056 Suffix B	15% max. @ 24 hr. recovery

2.6.2 The closed cell expansion material shall be furnished as detailed on the plans and shall be accepted based upon receipt of Certificate of Compliance stating that the product complies with the requirements of Section 2.6.1.

Construction Requirements

3.1 The treatment of the deck, at grade approach slab, asphalt, and membrane waterproofing surface, and the preparation and installation of material shall be as recommended by the Manufacturer.

3.2 Certificate of Compliance. At least one week prior to the installation of the asphaltic plug expansion joint and/or crack control, the Engineer shall be provided with a certificate of compliance stating that all materials and equipment used for proper installation for the asphaltic joint complies with the requirements of this specification. All material delivered to the job site shall have a written certification that includes the following: 1) A label clearly showing the manufacturer's name, lot or batch number, date of manufacture, and date of packaging. 2) The date, if any, beyond which the material shall not be used without approval. 3) All the materials have been pre-tested and will meet the requirements of this specification. 4) The manufacturer's instruction for use and installation. All necessary equipment and manufacturer personnel as recommended shall be on site prior to beginning construction. 5) Certificate of analysis of the asphaltic plug material.

3.3 Basis of Acceptance. All materials and equipment shall be accepted upon certification by the qualified manufacturer, to the Engineer, that all the requirements of this specification have been met.

3.4 Installation. For each project, as recommended by the manufacturer, a trained, and certified technical representative with not less than 3 years of experience specializing in the installation of an asphaltic plug joint, shall be present during initial installations of the asphaltic plug expansion joint system to aid and instruct the Contractor as required to achieve an installation in accordance with the Manufacturer's requirements and specifications.

3.4.1 For the asphaltic plug expansion joint, sawcut and completely remove the asphalt or existing asphaltic plug joint and membrane, down to the steel plate location as shown on the plans, to create a neatly formed blockout. The joint area shall be blast cleaned of debris and asphalt. The joint area shall be thoroughly dried using hot compressed air immediately prior to applying the asphaltic material. The blockout sides and base shall be inspected for defects and those noted shall be brought to the attention of the Engineer for direction regarding repairs of these areas. The sides of the blockout shall be vertical and clean with no loose material after inspection. The base shall be LEVEL between both sides of the bridge expansion gap. Proper leveling shall only be achieved by grinding or thin-set mortar. Mastic product or asphaltic binder material shall not be used under the support plates to create a level surface.

3.4.2 For repair of an existing asphaltic plug joint, the existing plug joints shall be saw cut and removed to full depth in accordance with the plans or as ordered by the Engineer. Waterproof membrane materials, if present, shall be removed as required. If a steel plate is present, it shall be replaced with a new plate, as shown on the plans. Any concrete repair work required to provide a level surface between both sides of the expansion gap, shall be paid for under Section 109.4. All concrete, steel, and asphalt joint surfaces shall be prepared and treated as recommended by the Manufacturer's technical representative.

3.4.3 For the asphaltic plug for crack control, sawcut and completely remove the asphalt and membrane or existing asphaltic material as shown on the plans, to create a neatly formed blockout. The bottom of the blockout shall be level with the top of the deck concrete. The blockout area above the deck concrete shall be free of asphalt, and the blockout area over approach roadway asphalt shall be blast cleaned to be free of loose asphalt debris. The joint area shall be thoroughly dried using hot compressed air immediately prior to applying the asphaltic material.

3.4.4 The backer rod shall continue into the curb gap and be placed at a uniform depth following the geometry of the curb for placement and tooling of sealant as shown on the plans. The bridge asphaltic joint shall be completely cool before installation of the curb sealant over the backer rod.

3.4.5 The asphaltic material shall be heated, mixed and placed in two (2) lifts using machinery and/or equipment supplied or recommended by the Manufacturer.

3.4.6 Placement, screeding, and compaction of the asphaltic plug material shall be as recommended by the Manufacturer. Compaction shall be accomplished utilizing plate compactors or rollers.

3.4.7 A skim coat of liquid asphaltic binder material shall be applied to fill any remaining surface voids.

3.4.8 To prevent joint damage from tire traffic, shot blast media (clean, unused) shall be broadcast onto the finished joint surface while the asphaltic material is still warm.

3.4.9 The application of the asphaltic binder and the asphaltic material shall be performed only if 1) The surface temperature is a at least of 40° F (4° C) and rising, 2) The road surface is dry, 3) Weather conditions are favorable with no signs of imminent rain.

3.4.10 Protect the joint from traffic until the material has cooled to 125° F (51° C)± and is able to support traffic.

3.5 Warranty for Asphaltic Plug Expansion Joint (Item 559.4)

3.5.1 Limits of Warranted Work. The warranted work includes all asphaltic expansion joint systems and installation within the project limits unless otherwise indicated in the proposal. This includes all necessary Maintenance of Traffic, all incidentals, and any uniformed traffic control personnel required to complete the warranted work. The Maintenance of Traffic shall be designed and implemented in accordance with the Contract requirements and with the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD).

3.5.2 Warranty Period. The length of warranty will be three (3) years from the acceptance date of construction, as specified in the following sections of the specification and in compliance with Section 106.04 and 107.14 of NHDOT Standard Specifications for Road and Bridge Construction.

3.5.3 Warranty Parameters. The following parameters shall be used to measure the performance of the asphaltic plug expansion joint system during the warranty period. Each condition parameter has a threshold limit (listed in Section 3.5.4) that defines when corrective action (warranty work) is required.

3.5.3.1 Debonding. Physical separation of the asphaltic expansion joint from the adjacent vertical face of the pavement or the bridge deck.

3.5.3.2 Transverse crack. Any open crack that extends more in the transverse direction (perpendicular to traffic flow) than in the longitudinal direction.

3.5.3.3 Longitudinal crack. Any open crack that extends more in the longitudinal direction (parallel to traffic flow) than in the transverse direction.

3.5.3.4 Leakage. Visual seepage of water.

3.5.3.5 Rutting. Depression, displacement, or dislodgment of the asphaltic plug expansion joint surface.

3.5.4 Warranty Requirements. The following table lists the allowable threshold limit for each condition parameter for each asphaltic plug expansion joint. If any of the warranty thresholds are exceeded, corrective action (warranty work) is required.

ASPHALTIC PLUG EXPANSION JOINT WARRANTY REQUIREMENTS	
Condition Parameter	**Threshold Limit for each Asphaltic Expansion Joint**
Debonding (any edge)	5% total of the joint length, with no single debonded section greater than two (2) feet.
Transverse cracking	sum length of all cracks > 5% total length of joint, with no single crack greater than two (2) feet.
Longitudinal cracking	sum length of all cracks > joint longitudinal dimension
Leakage	Visible seepage of water
Rutting	Maximum depth ½”

3.5.4.1 Warranty Work (Corrective Action). If any of the threshold limits for the asphaltic plug expansion joint are exceeded, the Contractor shall submit in writing the Manufacturer’s corrective action plan to the Department for approval.

Method of Measurement

4.1 Asphaltic plug expansion joint will not be measured, but shall be the linear foot (linear meter) final pay quantities in accordance with 109.11 as shown on the plans.

4.2 Repair asphaltic plug expansion joint will not be measured, but shall be the linear foot (linear meter) final pay quantities in accordance with 109.11 as shown on the plans.

4.3 Asphaltic plug for crack control will not be measured, but shall be the linear foot (linear meter) final pay quantities in accordance with 109.11 as shown on the plans.

Basis of Payment

5.1. Asphaltic plug type expansion joint is final pay quantity item and will be paid at the contract unit price per linear foot (linear meter) complete in place in accordance with 109.11.

5.2. Repair asphaltic plug type expansion joint is final pay quantity item and will be paid at the contract unit price per linear foot (linear meter) complete in place in accordance with 109.11.

5.3. Asphaltic plug for crack control is a final pay quantity item and will be paid at the contract unit price per linear foot (linear meter) complete in place in accordance with 109.11.

5.4 The closed cell expansion material will be subsidiary to Item 559.4 Asphaltic Plug Expansion Joint.

Pay item and unit:

559.40XX	Asphaltic Plug Expansion Joint (F)	Linear Foot (Linear Meter)
559.41XX	Asphaltic Plug for Crack Control (F)	Linear Foot (Linear Meter)
559.412XX	Repair Asphaltic Plug Expansion Joint (F)	Linear Foot (Linear Meter)