designer Notes

*All notes to the designer are highlighted. Please read the notes carefully. This special provision has been developed by MassDOT and shall be used for all modified asphaltic bridge joint systems.*

*The full text of this Special Provision as presented below is written as a Unit Price Item. However, it can also be used as a Heading within a Lump Sum item, such as Item 995.01, by making the following modifications. The Designer shall modify only the content highlighted in yellow following the instructions below to make this a Lump Sum item heading.*

*Delete “ITEM 971.2” and “FOOT” from the title. Delete the entire “METHOD OF MEASUREMENT AND BASIS OF PAYMENT” section at the end of this Special Provision.*

*Refer to the latest MassDOT Bridge Manual, Part II for related details. Please only modify content highlighted in yellow. Unhighlighted content shall not be modified.*

*DELETE ALL DESIGNER NOTES, AND REMOVE HIGHLIGHTING PRIOR TO SUBMITTAL*

# ITEM 971.2 modified asphaltic bridge joint system foot

The work under this Item shall conform to the relevant provisions of Subsection 971, as modified below and as follows.

The work under this Item shall include preparation and installation of a multi-component joint system. The work under this Item differs from the requirements contained in Subsection 971 as follows:

1. A pre-compressed seal joint system shall be used in place of the backer rod.
2. An air gap between the binder and pre-compressed seal shall be maintained through the section at the roadway.
3. A non-woven fabric material shall be used in place of the bridge plate.

Incidental to this Item shall be the placement of a pre-compressed seal joint system and non-sag joint sealer above the pre-compressed seal through the safety curb, sidewalk, median and barrier joint.

At locations where the seal is exposed on a sidewalk a non-sag joint sealer shall be installed over the width of the pre-compressed seal itself flush with the top of sidewalk.

*Use paragraph below for joint replacement on existing bridge where existing steel sliding plates are to remain on any barriers, medians, safety curbs or sidewalks.*

Locations with an existing removable steel sliding plate including the safety curb, median, and barrier, that are to remain may omit the non-sag joint sealer. The removal and reinstallation of the existing plate shall be considered incidental to this Item. Any repairs required to the steel plate shall be paid under separate Item.

## MATERIALS

ASPHALTIC BINDER, COMPACTED AGGREGATE, AND NON-SAG JOINT SEALER

Materials for the Asphaltic Binder and Aggregate for the Modified Asphaltic Bridge Joint System shall meet the requirements specified in the following Subsections of Division III, Materials:

Polyurethane Joint Sealer, Non-Sag M9.14.4

Asphaltic Binder for Asphaltic Bridge Joint System M9.17.0

Aggregate for Asphaltic Bridge Joint System M9.17.1

### PRE-COMPRESSED SEAL JOINT SYSTEM

The pre-compressed seal joint system assembly shall consist of a preformed/pre-compressed seal epoxy adhesive, injected silicone sealant bands, all combined in manner required by the manufacturer’s specification and to form a continuous watertight seal.

The materials comprising the pre-compressed seal joint system shall be capable of accommodating minimum movements of +50%, -50% (Total 100%) of nominal material size.

Depth and installation of seal shall be as recommended by manufacturer.

The preformed, pre-compressed, self-expanding, sealant system with silicon pre-coated surface shall be comprised of three components:

1) cellular polyurethane foam impregnated with hydrophobic 100% acrylic (to be certified in writing by independent laboratory tested FTIR and DSC analysis to be free in composition of any waxes or wax compounds), water based emulsion, factory coated with highway-grade, fuel resistant silicone;

2) field-applied epoxy adhesive primer;

3) field-injected silicone sealant bands.

Impregnation agent is to have proven non-migratory characteristics. Silicone coating to be highway-grade, low-modulus, fuel resistant silicone applied to the impregnated foam sealant at a width greater than maximum allowable joint extension and which when cured and compressed will form a bellow. Size of the seal shall be as recommended by manufacturer for the specific location and may vary along the length of the joint. The foam seal shall be installed into manufacturer’s standard field-applied epoxy adhesive. The seal system is to be recessed from the deck surface such that after the field applied injection band of silicone is installed between the substrates and the foam, the highest part of the pre-applied silicone facing will be below the deck surface.

Changes in plane and direction at locations, such as gutter line and face of barriers, shall be executed using factory-fabricated “universal 90” or custom transition assemblies supplied by the manufacturer of the pre-compressed seal. Transitions shall be warranted to be watertight at inside and outside corners through the full movement capabilities of the product.

The contractor shall certify in writing that the expansion joint seal system is capable of withstanding 150°F for three hours while compressed down to the minimum of movement capability dimension of the basis of design product (-50 percent of nominal material size) without evidence of any bleeding of impregnation medium from the material, and that the same material after the heat stability test will self-expand to the maximum of movement capability dimension of the basis-of-design product (+50 percent of nominal material size) within 24 hours at room temperature 68°F.

The Contractor shall submit measurements of the joint at a given temperature for the District Bridge Engineer to confirm the modified asphaltic plug joint does not need an adjustment of the joint opening or seal size. The joint opening shall be 1½" at 50 degrees for a 2” pre-compressed seal.

All material for the pre-compressed joint seal system shall be stored indoors, in a dry area out of direct sunlight at room temperature.

### BRIDGING MATERIALS

The bridging material shall be a nonwoven fabric compatible with paving operations.

The Contractor shall use one of the following products unless otherwise approved by the Engineer:

1. Mirafi MPV500 Paving Fabric manufactured by Tencate Mirafi Geosynthetics
2. TerraTex OLI manufactured by Hanes Geo Component
3. US 100 P manufactured by USFabrics
4. FX42A/O manufactured by Carthage Mills
5. Or approved equal meeting the material requirements below.

|  |  |  |
| --- | --- | --- |
| **Property** | **Test Method** | **Minimum Value** |
| Grab Tensile Strength | ASTM D-4632 | 100 lbs |
| Grab Tensile Elongation | ASTM D-4632 | 50% |
| Asphalt Retention | ASTM D-4160 | 0.20 gal / SY |
| Melting Point | ASTM D-276 | 300° F |
| UV Resistance @ 500 Hours | ASTM D-4355 | 70% |

### ANTI-TACKING MATERIAL

The anti-tacking material shall be a fine graded granular material with 100% passing the 3/16” sieve and no more than 5% passing the #200 when tested in accordance with AASHTO T-27.

## CONSTRUCTION METHODS

*Include this paragraph for joint replacement on and existing bridge deck:*

Any existing joint removal, deck reconstruction and wearing surface placement shall take place in advance of the new joint installation. Any existing concrete to remain below the joint shall be inspected for signs of deterioration. If necessary deteriorated sections of concrete and steel shall be repaired as directed by the Engineer and shall be paid under separate Item(s).

*Include the following paragraphs on new bridge, bridge replacement, superstructure replacement and deck replacement projects with HMA wearing surfaces. And for joint replacements on existing bridge decks if the entire bridge wearing surface is being stripped and repaved.*

Prior to the start of the asphalt pavement operation, the Contractor shall place a marks on each curb or barrier on either side of the paved roadway. These marks shall be aligned with the proposed edges of the bridge joint, based on the joint opening, and shall be placed so that they will not be covered or otherwise obscured by the asphalt pavement. A 19 inch strip of roofing felt shall be centered over the joint location prior to the placement of any waterproofing membrane or asphalt pavement.

Any membrane waterproofing and wearing surface shall be placed uniformly across the deck and joint locations.

After the completion of the paving operation, the Contractor shall snap a straight chalk line on the pavement between these marks. The Contractor shall then saw cut the pavement along this line and the wearing surface and membrane waterproofing shall be removed within the limits of the proposed joint system.

The Contractor shall protect the blockout from damage by equipment and construction operations. If the entire length of the joint system cannot be installed in the same shift, a bond breaker (such as tar paper) shall be placed in the blockout and the blockout filled with compacted hot mix asphalt. When the joint system is to be installed the HMA and bond breaker shall be removed, and the block cleaned.

Prior to installation of the joint system, the joint opening should be sandblasted to a CSP of 3-6 and blown clean using compressed air. The compressed air shall be free of moisture and oil. To ensure cleanliness, the joint walls shall be wiped clean with a solvent-dampened, lint-free rag to the depth of the bottom of the pre-compressed seal material plus one inch (1”) to remove any dust remaining. The joint gap shall be inspected for cleanliness by The Engineer. Should any contaminates remain, the joint must be re-cleaned.

The pre-compressed seal, epoxy adhesive, and injected silicone sealant band shall be installed in accordance with the contract drawings. The pre-compressed seal joint system shall be continuous through median barriers, and parapets. Continuity of seal shall be achieved through the use of factory-fabricated universal or custom transitions supplied by the pre-compressed joint seal manufacturer. Install silicone corner beads and silicone band forced down alongside of pre-compressed seal on both sides.

The bridging material shall only be installed after the materials of the pre-compressed seal joint are fully cured and set for at least thirty (30) minutes.

Place tack coat, binder or primer (as specified by the manufacturer) on deck surfaces and install bridging material in accordance with the manufacturer’s recommendations. There shall be no joints or laps in the paving fabric material.

The minimum ambient air temperature shall be 40°F and rising during any installation of the joint components.

Following the completion of the installation of the binder, the finished joint shall be dusted with anti-tacking material. Non-sag joint sealer shall be applied in sidewalk, median and barrier joints where applicable.

The Contractor shall be responsible for removing all binder material that leaks through the joint and is deposited on any bridge component, including underside of decks, headers, beams, diaphragms, bearings, abutments, and piers.

## QUALITY CONTROL

### MANUFACTURER’S FIELD REPRESENTATIVE

The Contractor shall arrange with the pre-compressed seal joint system’s manufacturer or distributor to have the services of a competent field representative at the work site prior to any installation to instruct the work crews in the proper installation procedures. The field representative shall remain at the job site after work commences and continue to instruct until the representative and the Contractor, Inspector and/or Engineer are satisfied that the crew has mastered the technique of installing the system successfully. The representative shall make periodic visits to the project as the work progresses and shall confer on each visit with the Contractor, Inspector and/or Engineer.

A qualified employee of the asphaltic binder manufacturer or an installer certified by the manufacturer and approved by the Department shall be at the job site prior to the beginning of the joint construction process to instruct the work crews in proper join construction procedures and shall remain on the job site for the duration of the installation of the asphaltic material.

The manufacturer's field representatives must be fully qualified to perform the work and shall be subject to the approval of the Engineer.

The Contractor shall be completely responsible for the expense of the service of the required field representatives and the bid contract price shall be full compensation for all costs in connection therewith.

### QUALITY CONTROL PLAN

The Contractor shall submit a Quality Control Plan at least 30 days before the start of work to the Engineer for approval.

The submittal shall include:

The qualifications of the installer.

List of manufactured materials and their properties

Material Certificates and Certificates of Compliance for the asphalt binder, aggregate and pre-compressed seal joint.

Detailed step by step installation procedure

List of the specific equipment to be used for the installation.

The Quality Control Plan must fully comply with the specifications and address all anticipated field conditions, including periods of inclement weather. The Contractor’s QC personnel will perform Quality Control inspection and testing of polymeric modified asphalt binder heating, blending, placement, compaction, and finishing.

The Installer shall have previously demonstrated the ability to have successfully produced a joint of similar nature and shall provide documentation of a working joint to the Department.

The Contractor shall provide a daily field QC Inspection Report to the Engineer within 48 hours of the work. The report shall include at a minimum the weather conditions during installation, material temperature, materials details, and pictures (or videos) of each step from preparation to open to traffic.

## METHOD OF MEASUREMENT

Item 971.2 Modified Asphaltic Bridge Joint System will be paid for at the contract unit bid price per Foot, as measured along the joint centerline between curb lines complete in place.

The joint treatment at the safety curb, sidewalk, median and barriers shall be considered incidental to the work done under this Item. This shall include the removal and reinstallation of any steel sliding plates. *(use last sentence where applicable)*

## BASIS OF PAYMENT

Payment shall be considered full compensation for installation of the Modified Asphaltic Bridge Joint System including all labor, material, equipment, manufacturer’s representative, and all items incidental to the satisfactory completion of the work.

Removal of existing joints and materials will be paid for under separate Item.