

## 401-R-750 VOID REDUCING ASPHALT MEMBRANE FOR HMA

(Adopted 01-20-22)

The Standard Specifications are revised as follows:

SECTION 101, AFTER LINE 144, INSERT AS FOLLOWS:

*VRAM* void reducing asphalt membrane

SECTION 401, BEGIN LINE 446, DELETE AND INSERT AS FOLLOWS:

**401.15 Joints**

Longitudinal joints in the surface shall be at the lane lines of the pavement. Longitudinal joints below the surface shall be offset from previously constructed joints by approximately 6 in. and be located within 12 in. of the lane line.

**(a) Hot Poured Joint Adhesive for Applications**

Hot poured joint adhesive in accordance with 906 shall be applied to longitudinal joints constructed between two adjacent HMA courses in the top course of *all category 2, 3 and 4 dense graded intermediate mixture courses, and all category 2 and 3 dense graded 4.75 mm, 9.5 mm, and 12.5 mm surface mixture courses, and all 4.75 mm surface mixture courses.* This includes joints within the traveled way as well as between any of the following: traveled way and an auxiliary lane; traveled way and a paved shoulder; and auxiliary lane and a paved shoulder.

The material shall be heated in a jacketed, double boiler melting kettle. The kettle shall have an attached pressure feed wand system with applicator shoe.

SECTION 401, AFTER LINE 500, INSERT AS FOLLOWS:

**(b) VRAM for Applications**

*VRAM, in accordance with 902 shall be applied under the area where a longitudinal joint will be formed in the top course of all category 4 dense graded 9.5 mm and 12.5 mm surface mixture courses. This shall include the area where a longitudinal joint will be formed within the traveled way, between the traveled way and an auxiliary lane, between the traveled way and a paved shoulder, and between an auxiliary lane and a paved shoulder.*

*Application of the VRAM material shall be with a distributor in accordance with 409.03(a) that is equipped with a heating and recirculating system along with a functioning auger agitating system or vertical shaft mixer in the tank to prevent localized heating. Material from a melting kettle may be dispensed through a pressure feed wand with an applicator shoe or through a pressure feed wand into a hand-operated thermal push cart used for transport and application. All transport and storage assets for the VRAM material shall be equipped with a heating and recirculating system along with a functioning auger agitating system or vertical shaft mixer in the tank to prevent localized heating.*

*Prior to the application of the VRAM, the existing surface to be treated shall be free of foreign materials deemed detrimental by the Engineer and shall also be dry and cleaned of all dust, debris and any substances that will prevent adherence. The VRAM may be placed before or after the tack coat. If after, the tack coat shall be fully cured prior to placement of VRAM.*

The width and minimum application rate shall be in accordance with the following table:

<i>VRAM Application Rate</i>			
<i>HMA Planned Lay Rate, lb/sq yd</i>	<i>VRAM Width, in.</i>	<i>VRAM Application Rate, lb/ft*</i>	<i>Coarse-graded mixture** VRAM Application Rate, lb/ft*</i>
<i>165</i>	<i>18</i>	<i>0.95</i>	<i>1.26</i>
<i>≥ 220</i>	<i>18</i>	<i>0.95</i>	<i>1.51</i>
<i>Tolerance</i>		<i>±10%</i>	<i>± 10%</i>
<p><i>* The application rate has a surface demand for liquid included within it. The nominal thickness of the VRAM may taper from the center of the application to a lesser thickness on the edge of the application. The width and weight per foot shall be maintained. If the material is placed under a joint formed between two mixtures requiring different rates, the lower application rate shall be used.</i></p>			
<p><i>** A coarse-graded mixture will be defined as a 9.5 mm mixture having less than 47% passing the No. 8 (2.36 mm) sieve or a 12.5 mm mixture having less than 39% passing the No. 8 (2.36 mm) sieve.</i></p>			

The application shall be within 2 in. of being centered under the joint of the HMA course being constructed. When only half of the joint is exposed, the application shall be applied at half of the prescribed width, shall be adjacent to the center of the joint, and the vertical face of the cold joint left in place shall also be coated.

The Contractor shall furnish a bill of lading, to the Engineer, for each tanker supplying material to the project. The flow, application rate, and tracking of material will be verified within the first 1,000 ft of the day's scheduled application length and every 12,000 ft the remainder of the day. For projects less than 3,000 ft, the rate will be verified once. A suitable paper or pan shall be placed at a random location in the path of placement. The paper or pan shall be picked up and weighed after application to determine the weight per ft yield. The Contractor shall replace the VRAM in the areas where the samples were taken.

The VRAM shall be applied in a single pass. A distributor or melting kettle shall apply the material to within 1 1/2 in. of the width specified. Placement shall stop and remedial action shall be taken if the material flows more than 2 in. from initial placement. Release paper shall be placed over the previous application to prevent doubling the thickness when starting another run.

The VRAM shall be suitable for construction traffic to drive on without pickup or tracking within 30 minutes of placement. Placement shall stop and damaged areas shall be repaired if pickup or tracking occurs. The paver end plate and grade control device shall be raised above the finished height of the material prior to start of paving.

Cores for density determination shall be in accordance with 401.16 and 401.20 and shall not be taken within 12 in. of either the confined edge or the non-confined edge of the course placed where VRAM has been applied.

Milled pavement corrugations, when specified in accordance with 606, shall be sealed using liquid asphalt sealant in accordance with 401.15(a) and 902.01(b).

SECTION 401, BEGIN LINE 913, INSERT AS FOLLOWS:

Joint adhesive will be measured by the linear foot in accordance with 109.01(a). Liquid asphalt sealant *and VRAM for HMA* will be measured by the linear foot.

SECTION 401, BEGIN LINE 930, INSERT AS FOLLOWS:

Joint adhesive will be paid for at the contract unit price per linear foot, complete in place. Liquid asphalt sealant will be paid for at the contract unit price per linear foot. *VRAM for HMA will be paid for at the contract unit price per linear foot for full width applications. VRAM for HMA will be paid for at half the contract unit price per linear foot for half width applications.*

SECTION 401, AFTER LINE 939, INSERT AS FOLLOWS:

*Void Reducing Asphalt Membrane for HMA .....LFT*

SECTION 902, AFTER LINE 140, INSERT AS FOLLOWS:

**(f) VRAM**

*The asphalt material comprising the VRAM shall be in accordance with the following:*

<i>Characteristics</i>	<i>Requirements</i>	<i>Test Method</i>
<i>Dynamic shear @ 88°C (unaged), <math>G^*/\sin \delta</math>, kPa</i>	<i>1.00 min.</i>	<i>AASHTO T 315</i>
<i>Creep stiffness @ -18°C (unaged), Stiffness (S), MPa m-value</i>	<i>300 max. 0.300 min.</i>	<i>AASHTO T 313</i>
<i>Ash, %</i>	<i>1.0 - 4.0</i>	<i>AASHTO T 111</i>
<i>Elastic Recovery, 100 mm elongation, cut immediately, 25°C, %</i>	<i>70 min.</i>	<i>AASHTO T 301</i>
<i>Separation of Polymer, Difference in °C of the softening point (Ring and Ball)</i>	<i>3 max.</i>	<i>ASTM D7173, AASHTO T 53</i>

*Elastomers shall be added to a base asphalt and shall be either a styrene-butadiene diblock or triblock copolymer without oil extension, or a styrene-butadiene rubber. Air blown asphalt, acid modification, or other modifiers will not be allowed.*

*VRAM shall be furnished by a supplier on the QPL of Performance-Graded Asphalt Binder Suppliers. A type A certification for the VRAM material shall be furnished in accordance with 916.*