ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: January 9, 2014 Special Provision No. 12-0817

SUBJECT: High Friction Surface Treatments for Asphalt Pavements,
Project Number 99-303-690-000-302, Jefferson County

Alabama Standard Specifications, 2012 Edition, shall be amended by the addition of a new SECTION 431:

SECTION 431
HIGH FRICTION SURFACE TREATMENTS FOR ASPHALT PAVEMENTS

431.01 Description.
This Section shall cover the work of furnishing and applying Thin Polymer Overlays (TPO) and Methyl Methacrylate Overlays (MMA) on dense graded asphalt pavements to waterproof and provide a skid resistant riding surface.

431.02 Materials.
(a) GENERAL.
Materials furnished for use shall conform to the appropriate requirements of Division 800, Materials, and the requirements noted in this Section.
(b) OVERLAY MATERIAL.
The overlay material shall be a completely non-porous polymer or acrylic based overlay system designed for low temperature applications. The overlay system shall consist of polymer epoxy or acrylic based binder and aggregate. The overlay system shall not contain any fillers or volatile solvents. The overlay system shall meet the properties in Table 1 for TPO’s and Table 2 for MMA’s.

<table>
<thead>
<tr>
<th>Table 1: Properties of TPO’s</th>
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</thead>
<tbody>
<tr>
<td>Property</td>
</tr>
<tr>
<td>Viscosity poises Class C</td>
</tr>
<tr>
<td>Tensile Strength, min. psi. @ 7 days</td>
</tr>
<tr>
<td>Elongation, % min. @ 7 days</td>
</tr>
<tr>
<td>Adhesive Strength, min. psi. @ 24 hours**</td>
</tr>
<tr>
<td>Compressive Strength, min. psi. @ 3 hours</td>
</tr>
<tr>
<td>Compressive Strength, min. psi. @ 7 days</td>
</tr>
<tr>
<td>Water Absorption, % by wt. max.</td>
</tr>
<tr>
<td>Durometer Hardness (shore D)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2: Properties of MMA’s</th>
</tr>
</thead>
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<tr>
<td>Property</td>
</tr>
<tr>
<td>Viscosity poises Class C</td>
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<td>Tensile Strength, min. psi. @ 7 days</td>
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</tbody>
</table>

*Based on samples cured and tested at 73 ± 2°F
** Or 100% substrate failure
(c) AGGREGATE.

All aggregates used shall be 100 percent fractured, non-polishing, and non-friable. Aggregates shall be calcined bauxite. The physical and chemical properties of the aggregate shall meet the requirements in Table 3.

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polish Stone Value</td>
<td>38 min.</td>
<td>AASHTO T 279</td>
</tr>
<tr>
<td>Resistance to Degradation</td>
<td>20% max</td>
<td>AASHTO T 96</td>
</tr>
<tr>
<td>Moisture Content</td>
<td>0.2% max</td>
<td>AASHTO T 255</td>
</tr>
<tr>
<td>Aluminum Oxide</td>
<td>87% min.</td>
<td>ASTM C 25</td>
</tr>
</tbody>
</table>

(d) STORAGE AND HANDLING.

Overlay materials shall be transported, stored, and handled in accordance with the manufacturer’s recommendations. Overlay binder components shall be packaged in sealed containers and labeled with the type of material, the mixing ratio of the component, and any special mixing instructions. The Overlay binder component labels shall also contain brand name, name of manufacturer, lot or batch number, temperature range for storage, and expiration date. Aggregate shall be labeled and packaged in a manner that protects the aggregate from rain, moisture, and contaminants. Aggregate labels shall contain the name of the manufacturer and the location of the processing facility. All aggregates shall be stored in their original containers until the time of use.

(e) OTHER REQUIREMENTS.

All requirements listed in this Subarticle shall be submitted to ALDOT no less than 30 days prior to placement of the overlay. The Contractor shall submit a copy of the manufacturer’s tests report or a certified test report from an independent laboratory with actual test results verifying that the materials meet all the requirements specified in Article 431.02 including Tables 1, 2, and 3. The Contractor shall submit a verification test report for each material lot or batch number to be used on ALDOT projects.

The Contractor shall provide the Materials and Tests Engineer performance history data from a minimum of three projects consisting of a cumulative minimum of 10,000 square yards where the proposed overlay system has been used. The performance data must be from the last three years and demonstrate that the overlay system can achieve a friction rating of 65 FN40R when tested in accordance with AASHTO T 242, Standard Method of Test for Frictional Properties of Paved Surfaces Using a Full-Scale Tire. The performance history shall be from projects located in Alabama. If no performance history data is available from Alabama, then data from any southeastern states with similar climate conditions, such as temperature and humidity as Alabama may be accepted. A Contractor who does not meet these minimum qualifications shall be allowed to install an overlay system provided they supply the Department with written documentation from the overlay manufacturer certifying that they are approved to install the proposed overlay system.

431.03 Construction Requirements.

(a) SUBMITTALS.

The Contractor shall submit to the Engineer three sets of copies of product data that completely identifies the physical components, and performance characteristics of the overlay system. The submittal shall also include safety data sheets for all materials to be used.

The overlay materials shall not be ordered until the product data has been accepted by the Engineer as providing an adequate description of the overlay system.

The following items shall be included as a part of the product data submittal:
- material composition (type of materials, curing agents, coloring additives, etc.)
- surface preparation (special cleaning requirements, required extent of cleaning, etc.)
- curing requirements (acceptable ambient temperature range, acceptable level of humidity, etc.)
- application requirements and, application equipment requirements, etc.

No less than 30 days prior to construction of the overlay, the Contractor shall submit to the Engineer for approval a work plan for constructing the overlay. The work plan shall include, but not be limited to, construction procedures, anticipated schedule for traffic control, overlay placement procedure, proposed pavement cleaning procedure, and test reports for each lot or batch number of each material to be used.

(b) EQUIPMENT.

The use of mechanical equipment for the application of the overlay will be required on projects consisting of more than two linear miles of pavement. ALDOT will allow manual application of the overlay on projects consisting of less than two linear miles of pavement and on projects deemed to be special projects by ALDOT, due to factors such as but not limited to low traffic volume. When the use of mechanical equipment is required, the overlay shall be placed using mechanical equipment capable of mixing, metering, and distributing all components of the overlay system in a continuous application as per the overlay manufacturer’s specifications. The equipment shall be capable of heating and maintaining the components of the binder at a constant temperature. The equipment shall be capable of mixing the components of the binder at a constant ratio and shall be capable of consistent application rates of both the binder and the aggregate and have the capability to display and record the application rates of both materials. The use of agricultural type spreaders for the distribution of the aggregates will not be allowed when mechanical equipment for application of the overlay is required.

(c) SURFACE PREPARATION.

The entire area to be overlaid shall be cleaned by pressure washing to provide a surface free from dust, dirt, oil, grease, paint, and all foreign matter. The use of mild detergents in the pressure washing procedure is acceptable. The entire area to be overlaid shall be completely dried prior to the placement of the overlay by means of compressed air or hot compressed air. All traffic markings and striping shall be taped off prior to the placement of the overlay. Damaged or worn traffic markings and striping shall be removed prior to the placement of the overlay based on the recommendation of the Engineer.

(d) APPLICATION OF OVERLAY.

Pavement joints and cracks greater than 0.025 inches in width shall be pre-treated with the mixed TPO or MMA binder specified herein. After the binder in the pre-treated areas has gelled the installation of the overlay system may proceed.

Overlays shall be placed in one layer unless otherwise recommended by the manufacturer. The layer shall consist of a layer of binder followed with a layer of aggregate. The layer of aggregate shall completely cover the binder. No exposed binder shall be visible after the placement of the aggregate. The application rate of the binder shall be 25 to 32 square feet per gallon. The application rate of the high friction aggregate shall be 12 to 15 pounds per square yard.

The overlay operation shall proceed in a timely manner to ensure that mixed materials are not allowed to separate, cure, dry, be exposed or harden in such a way as to impair retention and bonding of the aggregate. The high friction aggregate shall be applied within 5 minutes (± 1 minute) of the binder application onto the pavement surface. The Contractor shall remove all excess aggregate by hand, mechanical, or suction sweeping before opening the overlaid section to traffic. The excess aggregate may be reused on other sections to be overlaid, provided the aggregate is clean, dry, and is not contaminated. Overlay applications on high speed highways such as interstates and interstate ramps will require additional sweeping three days after the completion of the installation.

The Contractor shall plan and execute the work in a manner to provide at least eight hours of curing or the minimum cure time recommended by the manufacturer prior to opening the section to traffic. Walking, standing, or any form of contact or contamination with the wet uncured binder prior to the application of the aggregate without the use of spiked shoes to minimize the disturbance to the binder layer shall not be allowed and will result in that section of binder being removed and replaced at the Contractor’s expense.
The overlay manufacturer shall have a representative present at the job site at all times during placement of the overlay. The Engineer will suspend placement of the overlay system based on the advice of the manufacturer’s representative or his/her own observations that the procedure or materials are no meeting specifications. Work shall not resume until the Engineer is satisfied that appropriate remedial action has been taken by the Contractor.

Overlays shall not be placed when the ambient temperature is below 55°F or above 90°F and when the surface temperature is below 60°F. Placement of overlays will not be permitted when rain is forecast within 24 hours of application.

(e) PERFORMANCE GUARANTEE.

The overlay manufacturer shall provide ALDOT with a five year performance warranty after the application of the overlay is complete. The warranty shall be submitted to the Engineer for review. The overlay will not be accepted, and final payment made until the Contractor is notified in writing by the Engineer that the warranty is acceptable.

The warranty shall include the requirement that the Manufacturer will be fully responsible for all corrective work required due to performance related issues and to restore the overlay to a serviceable condition.

The warranty shall state that the overlay shall be restored to a serviceable condition by the manufacturer within sixty days of notification by ALDOT that corrective work is required.

431.04 Method of Measurement.

(a) PRESSURE CLEANING.

The area of the pavement pressure cleaned prior to placing the overlay will be measured in square yards computed from surface measurements taken to the nearest 0.1 of a foot [0.1 m].

(b) THIN POLYMER OVERLAY.

The area acceptably overlaid will be measured in square yards computed from surface measurements taken to the nearest 0.1 of a foot [0.1 m].

(c) METHYL METHACRYLATE OVERLAY.

The area acceptably overlaid will be measured in square yards computed from surface measurements taken to the nearest 0.1 of a foot [0.1 m].

431.05 Basis of Payment.

(a) UNIT PRICE COVERAGE.

1. PRESSURE CLEANING.

Payment for the measured areas at the contract unit price per square yard of “Pressure Cleaning” will be considered full payment for all expenses associated with the blast cleaning operation.

2. THIN POLYMER OVERLAY.

The accepted quantity will be paid for at the contract unit price per square yard of “Thin Polymer Overlay”. Layers will not be paid for individually. This price shall include all materials, procurement, handling, hauling and processing, coring for pull of testing, guarantee, and includes all equipment, tools, labor, and incidentals required to complete the work.

3. METHYL METHACRYLATE OVERLAY.

The accepted quantity will be paid for at the contract unit price per square yard of “Methyl Methacrylate Overlay”. This price shall include all materials, procurement, handling, hauling and processing, coring for pull of testing, guarantee, and includes all equipment, tools, labor, and incidentals required to complete the work.
(b) PAYMENT WILL BE MADE UNDER ITEM NO.:
   431-A  Pressure Cleaning - per square yard
   431-B  TPO Overlay - per square yard
   431-C  MMA Overlay - per square yard