ITEM 415.01XXYY03 - PAVER PLACED SURFACE TREATMENT

DESCRIPTION
This work shall consist of providing and placing ITEM 415.01XXYY03 - PAVER PLACED SURFACE TREATMENT in accordance with the contract documents and as directed by the Engineer.

Paver Placed Surface Treatment consists of a polymer modified asphalt emulsion coat followed immediately with a thin hot mix asphalt wearing course.

MATERIALS
Mix Designs: Formulate a job mix formula that satisfies the design limits listed in Table 1- Mixture Requirements and submit it to the Regional Materials Engineer for approval.

<table>
<thead>
<tr>
<th>Sieve Sizes (in)</th>
<th>Type A</th>
<th>Type B</th>
<th>Type C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Design Limits % Passing</td>
<td>Production Tolerance</td>
<td>Design Limits % Passing</td>
</tr>
<tr>
<td>3/4</td>
<td>100</td>
<td>± 4</td>
<td>100</td>
</tr>
<tr>
<td>1/2</td>
<td>100</td>
<td>± 4</td>
<td>85 - 100</td>
</tr>
<tr>
<td>3/8</td>
<td>85 - 100</td>
<td>± 4</td>
<td>85 - 100</td>
</tr>
<tr>
<td>1/4</td>
<td>85 - 100</td>
<td>± 4</td>
<td>85 - 100</td>
</tr>
<tr>
<td>No. 4</td>
<td>40 - 60</td>
<td>± 3</td>
<td>30 - 55</td>
</tr>
<tr>
<td>No. 8</td>
<td>21 - 37</td>
<td>± 3</td>
<td>24 - 45</td>
</tr>
<tr>
<td>No. 16</td>
<td>21 - 37</td>
<td>± 3</td>
<td>21 - 37</td>
</tr>
<tr>
<td>No. 30</td>
<td>16 - 26</td>
<td>± 3</td>
<td>16 - 26</td>
</tr>
<tr>
<td>No. 50</td>
<td>12 - 20</td>
<td>± 2</td>
<td>12 - 20</td>
</tr>
<tr>
<td>No. 100</td>
<td>8 - 16</td>
<td>± 2</td>
<td>8 - 16</td>
</tr>
<tr>
<td>% PG Binder</td>
<td>4.9 - 5.3</td>
<td></td>
<td>4.8 - 5.2</td>
</tr>
</tbody>
</table>

(1) All aggregate percentages are based on total mass of aggregate.

Aggregate: §703-02 except as modified herein. Use coarse aggregate with a minimum coarse-aggregate angularity (CAA) of 90% one fractured face and 85% two fractured faces.

1. Coarse Aggregate Type F1 Conditions.
   a. Limestone, dolomite, or a blend of the two, having an acid-insoluble residue content of not less than 20.0%.
b. Sandstone, granite, chert, traprock, ore tailings, slag or other similar non-carbonate materials.

c. Gravel, a natural, or a manufactured blend of the following types of materials: limestone, dolomite, gravel, sandstone, granite, chert, traprock, ore tailings, slag, or other similar materials meeting the following requirements:

Type A Mixes – Noncarbonate plus No. 8 particles must comprise a minimum of 30.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 95.0% of plus No. 4 particles must be noncarbonate.

Type B Mixes – Noncarbonate plus 1/8 inch particles must comprise a minimum of 30.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 95.0% of plus No. 4 particles must be noncarbonate.

Type C Mixes – Noncarbonate plus 1/8 inch particles must comprise a minimum of 30.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 95.0% of plus 3/8 inch particles must be noncarbonate.

2. Coarse Aggregate Type F2 Conditions.

a. Limestone, dolomite, or a blend of the two having an acid insoluble residue content of not less than 20.0%.

b. Sandstone, granite, chert, traprock, ore tailings, slag or other similar non-carbonate materials.

c. Gravel, a natural, or a manufactured blend of the following types of materials: limestone, dolomite, gravel, sandstone, granite, chert, traprock, ore tailings, slag, or other similar materials, meeting the following requirements:

Type A Mixes – Noncarbonate plus No. 8 particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 20.0% of plus No. 4 particles must be noncarbonate.

Type B Mixes – Noncarbonate plus 1/8 inch particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 20.0% of plus No. 4 particles must be noncarbonate.

Type C Mixes – Noncarbonate plus 1/8 inch particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 20.0% of plus No. 4 particles must be noncarbonate.
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materials of different specific gravities). Additionally, a minimum of 20.0% of plus 3/8 inch particles must be noncarbonate.

3. Coarse Aggregate Type F3 Conditions.

a. Limestone or a blend of limestone and dolomite having an acid insoluble residue content of not less than 20.0%.

b. Dolomite.

c. Sandstone, granite, chert, traprock, ore tailings, slag or other similar non-carbonate materials.

d. Gravel, a natural, or a manufactured blend of the following types of materials: limestone, dolomite, gravel, sandstone, granite, chert, traprock, ore tailings, slag, or other similar materials, meeting the following requirements:

Type A Mixes – Noncarbonate plus No. 8 particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 20.0% of plus No. 4 particles must be noncarbonate.

Type B Mixes – Noncarbonate plus 1/8 inch particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 20.0% of plus No. 4 inch particles must be noncarbonate.

Type C Mixes – Noncarbonate plus 1/8 inch particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 20.0% of plus 3/8 inch particles must be noncarbonate.

4. Additional Coarse Aggregate Requirements. Coarse aggregate must also meet the requirements listed in Table 2 - Coarse Aggregate Properties.

<table>
<thead>
<tr>
<th>Property</th>
<th>Method</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Flakiness Index</td>
<td>NFP 18-561</td>
<td>20</td>
</tr>
<tr>
<td>Maximum Flakiness Coefficient (G/E)</td>
<td>NFP 18-561</td>
<td>1.58</td>
</tr>
<tr>
<td>Maximum percent passing No. 30, %</td>
<td>AASHTO T 11, T 27</td>
<td>2</td>
</tr>
</tbody>
</table>

(1) Where G is the smallest square opening the particle can pass through and E is the smallest slot the particle can pass through.

5. Fine Aggregate. Use 100% screenings, free from deleterious materials and manufactured from sources of stone or slag meeting the requirements of §703-02, Coarse
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Aggregate, having a minimum sand equivalent of 60%, as determined by AASHTO T 176, “Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test.”

**Mineral Filler:** § 703-08, Mineral Filler.

**Asphalt Binder:** §401-2.04 Performance-Graded Binder. Use the appropriate performance graded binder for the project’s location.

**Polymer Modified Asphalt Emulsion:** § 702 - Bituminous Materials, CRS-1p, Item 702-4001P.

**Equipment:**

1. **Paving.** Use a self-priming paver capable of spraying the polymer modified asphalt emulsion, applying the hot mix asphalt overlay and smoothing the surface of the mat in one pass. The self-priming paver must be equipped with a receiving hopper, feed conveyor, emulsion storage tank, metered high-pressure emulsion spray bar, and a variable width, heated screed. The screed must have the ability to be crowned at the center both positively and negatively and have vertically adjustable extensions to accommodate the desired pavement profile.

2. **Compaction.** Use steel wheeled double drum rollers weighing at least 10 tons, equipped with functioning water systems and scrapers to prevent material from adhering to the roller drums.

3. **Hauling.** Use vehicles that meet § 402-3.03, Hauling Equipment, to transport the hot mix asphalt wearing course.

**CONSTRUCTION DETAILS:**

**Hot Mix Production:** The requirements of §401-3, Construction Details apply with the following modifications. If a test value for any sieve varies from the target value by more than the production tolerance given in Table 1 - Mixture Requirements, the Regional Materials Engineer will evaluate the material represented by that test to determine acceptability.

A delivery ticket meeting the requirements of §401-4, Method of Measurement shall accompany each vehicle supplying HMA.

**Surface Preparation:** Perform all surface preparation prior to applying the wearing course.

1. Thoroughly clean the entire area to be overlaid. The surface of the area to be overlaid must be free of dirt, oil, and other foreign materials. Remove all debris and standing water. A damp surface is acceptable if favorable weather conditions are expected during paving operations.

2. Cover all manhole covers, water boxes, catch basins, and other such utility structures within the area to be paved with plastic, building felt or other material approved by the Engineer. Reference each for location and adjustment after paving. Remove the covers each day.

3. Abrade pavement markings in accordance with contract documents.
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Application: The requirements of § 402-3.01, Weather and Seasonal Limitations apply, except as modified herein. Placement may begin if the surface temperature is at least 45°F and rising.
1. Apply the polymer modified asphalt emulsion at a temperature of 140 - 175°F. Provide a uniform application across the entire width to be overlaid, at a rate of 0.15 - 0.25 gallons/square yard. Continuously monitor the spray rate.
2. No equipment shall come in contact with the polymer modified asphalt emulsion before the hot mix asphalt wearing course is applied.
3. Immediately after applying the polymer modified asphalt emulsion, apply the hot mix asphalt overlay across the full width of the emulsion at a temperature of 290 - 325°F.
4. Apply the hot mix asphalt at a rate within the appropriate application range, listed in Table 3 – Wearing Course Application Ranges. The finished treatment has a minimum thickness of 1/2 inch for Type A, and 5/8 inch for Type B and Type C.
5. Paver Placed Surface Treatment shall not be applied to freshly placed concrete surfaces. Concrete surfaces must cure for a minimum of 90 days before being overlaid.

TABLE 3 - WEARING COURSE APPLICATION RANGES

<table>
<thead>
<tr>
<th>Type</th>
<th>Minimum (lb/ft²)</th>
<th>Maximum (lb/ft²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>55</td>
<td>65</td>
</tr>
<tr>
<td>B</td>
<td>60</td>
<td>70</td>
</tr>
<tr>
<td>C</td>
<td>65</td>
<td>75</td>
</tr>
</tbody>
</table>

Compaction: Begin compaction immediately after application of the wearing course. Use a minimum of two static passes. Avoid using vibratory compaction. The roller(s) will not be allowed to stop on the freshly placed wearing course. Use an adequate number of rollers to complete compaction before the pavement temperature falls below 185°F. Protect the wearing course from traffic until the rolling operation is complete and the material has cooled sufficiently to resist damage.

Paver and Equipment Cleaning: The requirement of § 402-3.12, Paver and Equipment Cleaning apply.

Coring: The Engineer will require four cores from each section of compacted paver placed surface treatment applied below the appropriate minimum application rate listed in Table 3. The Engineer will randomly locate the four core locations. The Engineer will determine the thickness of the paver placed surface treatment and reject sections not meeting the required minimum thickness.

The Engineer may require four cores from each section of compacted paver placed surface treatment exceeding the appropriate maximum application rate, listed in Table 3, to determine the thickness of the paver placed surface treatment. The Engineer may stop paving operations immediately if the over application of the paver placed surface treatment will create problems.
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such as, but not limited to, reducing overhead clearance, curb reveal or guiderail height. The
Engineer and Contractor will agree upon and document a maximum application rate and
maximum thickness to prevent problems created by over applying the paver placed surface
treatment. The Engineer will reject any additional paver placed surface treatment sections
determined to exceed the maximum agreed upon application rate and thickness.

Coring is not required for sections paved within the appropriate application range, listed in Table
3 - Wearing Course Application Ranges.

All labor, materials and equipment associated with required pavement coring, including
maintenance and protection of traffic and filling core holes, will be done at the Contractor's
expense.

METHOD OF MEASUREMENT
This work will be measured as the number of tons of Item 415.01XXYY03 - Paver Placed
Surface Treatment satisfactorily placed.

BASIS OF PAYMENT
The unit price bid shall include the cost of furnishing all labor, materials, and equipment
necessary to satisfactorily complete the work. All necessary pavement repairs, joint sealing,
crack filling, pavement markings removal, milling of rebates and utility grade adjustments will
be paid for under their appropriate items.

Payment will be made under:

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>415.01010103</td>
<td>Paver Placed Surface Treatment Type A, F1</td>
<td>Tons</td>
</tr>
<tr>
<td>415.01010203</td>
<td>Paver Placed Surface Treatment Type A, F2</td>
<td>Tons</td>
</tr>
<tr>
<td>415.01010303</td>
<td>Paver Placed Surface Treatment Type A, F3</td>
<td>Tons</td>
</tr>
<tr>
<td>415.01020103</td>
<td>Paver Placed Surface Treatment Type B, F1</td>
<td>Tons</td>
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<td>415.01020203</td>
<td>Paver Placed Surface Treatment Type B, F2</td>
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<td>415.01020303</td>
<td>Paver Placed Surface Treatment Type B, F3</td>
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<tr>
<td>415.01030303</td>
<td>Paver Placed Surface Treatment Type C, F3</td>
<td>Tons</td>
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</table>