**Special Note for Installation of Ennis Flint HPS-8 Multipolymer Pavement Marking Materials**

1. **Description**

Except as specified herein, perform all work in accordance with the Department’s Standard Specifications, Supplemental Specifications, applicable Special Notes and Special Provisions, and applicable Standard and Sepia Drawings, current editions. Furnish all materials, labor, equipment, and incidentals for the following work:

(1) Maintaining and Controlling Traffic; (2) Layout and staking of proposed pavement markings; (3) Installation of Ennis Flint HPS-8 Pavement Markings, installed according to Section 714 of the Standard Specifications and manufacturer’s specifications, including but not limited to any required surface preparation; and (4) Any other work as specified by this contract.

1. **Materials**

Contrary to Section 714 the following shall be the material requirements:

1. **Drop on Beads.** Use beads/elements that will ensure the pavement marking material will meet retroreflectivity requirements. The Department will evaluate the beads as part of the marking system through retroreflectivity readings. All HPS-8 markings for this project shall utilize Missouri blend beads.
2. **Composition.** Ensure the pigment, pre-mix beads, and filler are uniformly dispersed in the resin. Use material that is free from all dirt and foreign material. Annually provide independent analysis data and certification for each formulation stating the total concentration of each heavy metal present, the test method used for each determination, and compliance to 40 CFR 261 for leachable heavy metals content.

|  |
| --- |
| **COMPOSITION**(Percentage by Weight) |
| Component | White | Yellow |
| Binder | 21.0 min. | 21.0 min. |
| Glass Beads (Premixed) | 48.0 | 48.0 |
| Titanium Dioxide (Rutile, Type II) | 10.0 min. | — |
| Calcium Carbonate & Inert Fillers | 21 max. | 31 max. |
| Heavy Metals Content | Comply with 40 CFR 261 | Comply with 40 CFR 261 |

1. **Approval.** Select materials that conform to the composition and physical characteristic requirements below when evaluated in accordance with KM-64-268 or other test methods as cited. The Department will sample and evaluate for approval each lot of HPS-8 material delivered for use per contract prior to installation of the material. Do not allow the installation of this material until it has been approved by the Division of Materials. Allow the Department a minimum of 10 working days to evaluate and approve this material from the date sampled.
2. **Physical Characteristics.** For HPS-8 material heated for 4 hours at 425ºF under agitation, conform to the following requirements:
3. **Color*.*** As determined with a spectrophotometer using D65 illuminant with a 45 degree entrance angle and 0 degree observation angle geometry.

|  |
| --- |
| **CIELAB Color Coordinates** |
|  | Yellow | White |
| Daytime Color (CIELAB) Spectrophotometer using illuminant D65 at 45º illumination and 0º viewing with a 2º observer | L\* 81.76a\* 19.79b\* 89.89Maximum allowable variation 6.0∆E\* | L\* 93.51a\* -1.01b\* 0.70Maximum allowable variation 6.0∆E\* |
| Nighttime Color (CIELAB) Spectrophotometer using illuminant A at 45º illumination and 0º viewing with a 2º observer | L\* 86.90a\* 24.80b\* 95.45Maximum allowable variation 6.0∆E\* | L\* 93.45a\* -0.79b\* 0.43Maximum allowable variation 6.0∆E\* |

1. **Set Time.**  Use material that, when applied at a temperature range of 412.5 ± 12.5 oF and thickness of 90 ± 5 mils, sets to bear traffic in not more than 2 minutes when the air and road surface temperature is approximately ≥ 50 oF, and not more than 10 minutes when the air and road surface temperature is approximately < 50 oF.
2. **Bond Strength*.*** Ensure that the bond strength of the material to concrete exceeds 300 psi.
3. **Cracking Resistance at Low Temperature.** Ensure that the material shows no cracks when observed from a distance exceeding one foot.
4. **Impact Resistance.** Ensure the impact resistance of the material is a minimum of 60 inch-pounds.
5. **Flash Point.** Use material that has a flash point not less than 500 °F.
6. **Packaging.** Package HPS-8 material in suitable 50 pound containers to which the material shall not adhere during shipment or storage. Include a label stating that the HPS-8 material is to be maintained with a temperature range of 400oF – 425oF during application. Provide the HPS-8 material in granular form.
7. **Shelf Life.** Ensure that the HPS-8 material conforms to this section for a period of one year. Replace any material not conforming to the above requirements.
8. **Manufacturer’s Testing.** Perform testing in accordance with KM 64-268 on a minimum of one composite sample per 10,000 pounds, or portion thereof, per lot of HPS-8 produced.
9. **Certification.** Submit manufacturer’s certification stating conformance to the requirements of this section for each lot of extruded HPS-8 delivered for use on projects. Clearly state the manufacture, formulation identification, product name, color, date of manufacturer, total quantity of lot produced, actual quantity of HPS-8 material represented, sampling method utilized to obtain the samples, and required manufacturer’s testing data for each composite sample tested to represent each lot produced.
10. **Construction**
	1. **Application.** In addition to the requirements within Section 714.03, furnish and apply 6” Ennis Flint HPS-8 striping to the sections of roadway provided in this Contract. When applying HPS stripes over existing stripes, the centerline of the newly applied stripes shall be within one inch of the centerline of the existing stripes. All lines shall have distinct, clean edges with proper bead distribution across the entire width and length of the line.

The Contractor shall be responsible for protecting the painted line from traffic until dry in order to eliminate tracking. Retroreflectivity readings will be taken on zones with substantial amounts of tracking and the readings will be used in the calculation of payment. If the Contractor elects to use additional traffic control devices beyond what is specified in the TRAFFIC CONTROL PLAN, the additional cost shall be incidental to the bid item “Maintain and Control Traffic”.

If the Engineer determines that the quality of the striping applied by the Contractor is unsatisfactory with regard to retroreflectivity, bead distribution, paint thickness, overspray, accuracy of retracing (if applicable), line width, consistency, tracking, etc., the Engineer may stop the striping operation immediately until the Contractor can demonstrate that the problem has been corrected. If it is determined by the Engineer that the striping is not applied at the specified application rate, restriping will be required

* 1. **Marking Removal.** The Contractor shall be responsible for all necessary cleanup of any paint or other material that is spilled onto the pavement or elsewhere as a result of his operations and for correcting any striping error (including tracking and rain damage) that the Engineer determines removal to be required. Upon notification of a striping error or paint spill by the Engineer, the Contractor shall be required to begin the process of correcting the striping error or paint spill within five (5) working days and shall work continuously to complete the corrective work prior to striping any other section of roadway included in this Contract.
	2. **Paint on Vehicles.** The Contractor shall be responsible for addressing disputes with the public regarding paint on vehicles that occur as a result of his/her operations. All complaints from the public shall be addressed in a timely manner and the Contractor must demonstrate a “good faith” attempt to resolve disputes to the satisfaction of the citizen. However, the Contractor shall have the right to dispute fault and refuse settlement in cases where the Contractor feels that paint on the vehicle was a result of negligence on the part of the citizen. Unresolved disputes involving paint on vehicles shall be handled through the legal system. The Department shall not be held responsible for paint on vehicles under any circumstances.
1. **Acceptance**

The Department will accept HPS-8 material based on compliance of the manufacturer’s certification and conformance of test results obtained by the Department to the requirements of this Special Note.

Contrary to Section 714.03.08, Acceptance of Non-Specification Thermoplastic Markings, the Department will not accept markings that do not meet the retroreflectivity requirement of Section 714.03.06. Remove non-specification compliant markings by water blasting. The Department will perform random thickness tests on applied markings to determine compliance to thickness requirements

The Department may accept HPS-8 found to be in non-conformance to the composition requirements at a reduction in pay. HPS-8 with analytical test results not in conformation to the Specification Acceptance Range but within the Acceptance with Deduction may be accepted for incorporation into the project with applicable reduction in pay. Deductions are cumulative to a maximum of 60% reduction in pay applied to the contract unit bid price for the material. Samples with three (3) or more analytical tests results in non-conformance to the Specification Acceptance Range or any analytical test result exceeding the Acceptance Range with Deduction will be rejected and removed from the project. Do not allow transfer of HPS-8 materials between projects that have analytical test results in the Acceptance Range with Deduction.

|  |
| --- |
| **PRICE ADJUSTMENT SCHEDULE** |
| Analytical Test | Specification Acceptance Range | Acceptance Range with Deduction | Deduction Applied to Unit Cost |
| Binder, % | 21.0 | 19.0-20.9 | 50% |
| Glass Beads % (Premixed) | 48.0 min | 47.0-47.9 | 20% |
| Titanium Dioxide, % for white | 10.0 min. | 9.0 -9.9 | 20% |
| Calcium Carbonate and Inert Fillers for white, %  | 21 max. |  |  |
| Calcium Carbonate and Inert Fillers for Yellow, %  | 31 max. |  |  |
| Heavy Metals Content | Comply with40 CFR 261 |  |  |
| Color | 6.0 ∆E\* | 6.0 ∆E\*- 8.0 ∆E\* | 10% |

1. **Measurement and Payment**

The Department will measure and make payment for the completed and accepted quantities under the following:

Code Pay Item Pay Unit

25067EC PAVE STRIPING-THERMO POLYMER MOD-6 IN W LF

25068EC PAVE STRIPING-THERMO POLYMER MOD-6 IN Y LF

26125EC PAVE STRIPING-THERMO POLYMER MOD W SQFT

26126EC PAVE STRIPING-THERMO POLYMER MOD Y SQFT

26147EC PAVE MARK-THERMO POLYMER MOD XWALK-24 IN LF

26148EC PAVE MARK-THERMO POLYMER MOD XWALK-12 IN LF

26149EC PAVE MARK-THERMO POLYMER MOD XWALK-6 IN LF

26150EC PAVE MARK-THERMO POLY MOD STOP BAR-24 IN LF

26151EC PAVE MARK-THERMO POLY MOD YIELD BAR-36 IN LF

26152EC PAVE MARK-THERMO POLYMER MOD CURVE ARROW EACH

26153EC PAVE MARK-THERMO POLYMER MOD COMBO ARROW EACH

26154EC PAVE MARK-THERMO POLY MOD LANE REDUC ARR EACH

26155EC PAVE MARK-THERMO POLY MOD LANE USE ARROW EACH

26156EC PAVE MARK-THERMO POLY MOD LANE COMBO ARR EACH

26157EC PAVE MARK-THERMO POLYMER MOD LETTERS EACH

26158EC PAVE MARK-THERMO POLYMER MOD CHEVRON SQFT

26159EC PAVE MARK-THERMO POLYMER MOD CROSS-HATCH SQFT