SP-156063
(New)

SPECIAL PROVISIONS
FOR
PAINTED PAVEMENT MARKING, THERMOPLASTIC

Scott County
STP-U-1872(672)--70-82

Effective Date
June 20, 2017

THE STANDARD SPECIFICATIONS, SERIES OF 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

1. DESCRIPTION. This work shall consist of furnishing materials and placing molten permanent thermoplastic pavement marking materials with drop-on glass beads for permanent longitudinal markings on the pavement at selected locations and of the dimensions shown on the plans, and maintenance as required elsewhere by this specification.

   This work may also include transverse lines, symbol, and legends, when shown on the plans, and removal of markings, when necessary.

2. QUALIFYING A CONTRACTOR. In order for an installer of thermoplastic pavement marking material to be approved, the following documents must be submitted:

   A. A certificate from a thermoplastic manufacturer, certifying that such a contractor has functional, appropriate equipment to install thermoplastic pavement marking materials.

   B. Proof of successful installation at least two years old, covering a minimum of 50,000 lineal feet with the thermoplastic material to be used on this project.

3. MATERIALS:

   A. THERMOPLASTIC COMPOUND. The Thermoplastic material shall comply with AASHTO M 249-79 except as herein specified. Thermoplastic marking material for use on new bituminous surfaces shall be alkyd type thermoplastic. Material for use on surfaces other than new bituminous may be alkyd, hydrocarbon thermoplastic.

   The specific gravity for the alkyd type thermoplastic shall not exceed 2.20. The specific gravity for the hydrocarbon and epoxy thermoplastic shall not exceed 2.15.

   Granular hydrocarbon thermoplastic material may be packaged in thermally degradable bags which are designed to melt with the material, and which do not adversely affect the application or performance of the thermoplastic material. The bag or packaging for alkyd thermoplastic

material shall not be melted with the thermoplastic.

Each package shall be labeled or marked with the color of the material, name of the manufacturer, date of manufacture, batch number, type of material (alkyd, hydrocarbon, or epoxy), net weight of contents, and the temperature to which the material shall be heated for application.

B. PRIMER. Primer, if required, shall be recommended by the manufacturer.

C. DROP ON GLASS BEADS. The glass beads shall comply with the requirements of Section 4184 of the Standard Specifications.

4. EQUIPMENT. All equipment shall be of such design and maintained in such condition as to properly heat, mix, and apply the material.

A. Melting Kettle. The melting kettle shall be capable of heating the thermoplastic material to its recommended application temperature without scorching and shall be capable of maintaining that temperature. The heating kettle shall have a heat transfer medium and the flame shall not come in direct contact with the material container surface. A temperature gauge shall be visible on the outside of the kettle to indicate the temperature of the thermoplastic material. The melting kettle shall have a continuous mixer or agitator capable of thoroughly mixing the material at such a rate as to maintain homogeneity of material and uniformity of temperature throughout.

B. Thermoplastic Dispensing Devices. The equipment shall be capable of applying molten thermoplastic material at the temperature recommended by the thermoplastic manufacturer in lines from 4 inches to 12 inches wide at a 125 mils minimum thickness. Dispensing devices shall be of the extrusion type which deposits a mass of molten thermoplastic on the pavement surface where it is immediately shaped to the specified width and thickness. The dispensing device shall have a visible temperature gauge to allow monitoring of the thermoplastic material near the point of deposition.

C. Glass Beads Dispenser. All thermoplastic dispensers shall be equipped with a drop-on glass bead dispenser. The glass bead dispenser shall be located so as to drop the glass beads immediately after the molten thermoplastic material is applied. The glass bead dispenser shall be adjustable to regulate flow of the beads and shall uniformly dispense the glass beads.

5. SURFACE PREPARATION. The pavement surface on which the thermoplastic material s to be placed shall be clean and dry. Even if the pavement is visibly dry, subsurface moisture may be present in amounts sufficient to affect bonding. To test for dryness, a 3 to 6 foot section of tar paper shall be laid on the pavement and molten thermoplastic applied on top. After 30 seconds, lift the paper and check for moisture on the bottom of the paper. If the paper is dripping wet, wat until the pavement has dried before applying the thermoplastic. If the paper shows only a damp spot, proceed with the thermoplastic application.

Pavement surfaces shall be inspected for cleanliness and any dirt, debris, or other contaminants on the surface to be marked shall be removed. Existing pavement markings, whether permanent or temporary, that would prevent a mechanical bond between the thermoplastic and the pavement shall be removed by sand blasting or other methods approved by the Engineer. Any curing compound on new concrete pavements shall be removed.

6. APPLICATION:

A. Thermoplastic. The thermoplastic marking material shall be extruded onto the pavement surface. Finished marking shall have well defined edges and be free of waviness. The minimum thickness of thermoplastic markings shall be 90 mils if extruded and 60 mils if hot sprayed. The

thickness will be measured as a wet film, except the Engineer may measure cured film by placing a tape or other bond breaker prior to placing the thermoplastic material then removing a section of cured line and measuring thickness.

B. Temperature Limitations. The pavement surface where the thermoplastic is to be placed shall have a minimum temperature of 50°F. The air temperature shall be at least 50°F during marking operations. The pavement surface temperature and air temperature shall be determined before the start of each day of marking operation and at any other time deemed necessary by the Engineer.

The temperature of the thermoplastic at the time of application shall be 400°F to 425°F for all alkyd or hydrocarbon materials, and 450°F to 500°F for epoxy materials. The temperature of the thermoplastic material shall be checked at the point of deposition with a calibrated thermometer at the beginning of each day's marking, after material is added to the dispensing device, after delays in the marking operation, and any time deemed necessary by the Engineer.

Alkyd thermoplastic material shall not be heated above 435°F. Hydrocarbon thermoplastic material shall not be heated above 450°F. Only the quantity of thermoplastic that can be used within 4 hours should be heated. In no case shall any thermoplastic material be heated for more than 4 hours at the maximum application temperature, including initial heating. No material shall be reheated more than two times. Materials subjected to these conditions will be rejected.

C. Primer Application. A primer shall be applied to bituminous surfaces over 2 months old and all concrete surfaces. Primer is not required on bituminous surfaces less than 2 months old unless recommended by the manufacturer of the thermoplastic material. Primer shall be applied and cured in accordance with the recommendations of the manufacturer of the thermoplastic material.

D. Glass Bead Application. The drop on glass bead shall be mechanically deposited on the molten thermoplastic line immediately after placement of the thermoplastic at the rate of at least 8 pounds per 100 square feet of line. The bead dispenser shall utilize pressure type spray guns which will embed the beads into the strip surface to at least 1/2 the bead diameter. The glass beads shall not be dropped at the point of deposition of the thermoplastic or ahead of that point. The beads shall adhere to the cured thermoplastic or all marking operations shall cease until corrections are made.

7. GENERAL REQUIREMENTS. The applied thermoplastic markings will be inspected continually for overall workmanship. Markings shall have clean cut edges and the color shall be distinctive. The glass beads will appear uniform on the entire marking surface. Adhesion to the pavement surface will be checked with a stiff putty knife or similar instrument. The marking should not be removable from a concrete surface. The marking may be removed from a bituminous surface, however, the bituminous substrate shall be stuck to the marking material.

If the thermoplastic line does not provide initial nighttime reflectivity, or if the marking does not have the required minimum thickness, the Contractor shall grind away the surface of the deficient portion of the marking to reduce the average thickness to 50 mils or less. The Contractor shall then apply additional thermoplastic material to a thickness of at least 125 mils and provide a uniformly reflective surface. If the markings do not comply with the specifications for any other reason, the Engineer may require complete removal or correction at the Contractor's expense. Corrective work will be at Contractor's expense.

8. SAMPLING AND TESTING. The Engineer shall have free access to the material and be extended every facility for the purpose of inspection. The Engineer reserves the right to sample at the point of manufacture, at intermediate points of storage, or at destination.

A. Thermoplastic. A sample will be taken from each lot of the thermoplastic marking material

presented for inspection. A lot is defined as 22,000 pounds, or less, presented for inspection at one time regardless of the number of composition batches in the lot. A sample will consist of one 50 pound sample of material packaged in accordance with these specifications.

The thermoplastic material shall be tested in accordance with AASHTO M 249-79 and T 250-77, as applicable.

B. Glass beads. The glass beads shall be tested in accordance with the procedures listed in Article 4184.03 of the Standard Specifications. The Engineer will determine the location and frequency of sampling.

9. CERTIFICATION. The Contractor shall furnish a manufacturer's certification in triplicate for each inspection lot.

A. Thermoplastic. This certification shall include or have attached typical results of tests for all specified requirements.

B. Glass Beads. This certification shall include or have attached typical results of tests performed for roundness, retractive index, flow characteristics, and gradation. The certifications shall show the quantity and lot number.

10. ACCEPTANCE. Acceptance of material will be based on the manufacturer's certification and upon the results of such tests as may be performed by the Engineer.

11. MAINTENANCE. Permanent pavement markings shall be maintained in good condition, and shall be reconstructed, if necessary, prior to the completion of the project, and for 90 calendar days after placement. The condition of the marking will be evaluated by the Engineer at that time.

If more than 10% of any 2000 foot section of marking fails during this 90 day period for any reason except abrasion at private entrances or within intersections, those sections shall be repaired or replaced, at the Contractor's expense, prior to final acceptance. Transverse lines and symbols will be evaluated individually.

Failure of the marking will be rated on the basis of the percentage of material remaining on the pavement at the end of the 90 day period. This will be the percentage of the area in which the substrate is not exposed.

12. METHOD OF MEASUREMENT. Thermoplastic pavement marking, satisfactorily applied, will be measured as follows:

A. Longitudinal Lines. The number of stations of longitudinal lines placed will be calculated by the Engineer, using the beginning and ending points for each type of line placed, based on a single 4 inch width as outlined in plans. The types are as shown in the plans. The calculations for broken or dotted lines are adjusted in the table to exclude skips as specified. The calculation for solid lines will be adjusted to exclude breaks. The quantities for several types of lines will be totaled to a single quantity of thermoplastic longitudinal 4 inch lines in stations.

B. Transverse Marking. The number of stations of thermoplastic transverse marking placed will be calculated by the Engineer by measuring the transverse length of the markings and totaling the lengths for each width. These are usually stop lines and crosswalk lines. Transverse markings will be included with the number of stations of longitudinal lines by an appropriate ratio for lines wider than 4 inches.

C. Symbols and Legends. Each precut symbol or legend is indicated on the plans, and the units will be counted. Each of the following is a complete unit: each STOP; each SCHOOL legend (one lane or two lane); each RxR marking for railroad and highway grade crossing; each ONLY;

each AHEAD; each freeway, expressway, and ramp arrow; each straight, curve, or combined arrow.

13. BASIS OF PAYMENT. For the quantities of pavement marking placed, the Contractor will be paid as follows:

    A. Longitudinal Lines and Transverse Markings. For the number of stations of thermoplastic longitudinal lines and transverse markings placed, the Contractor will be paid the contract price per station.

    B. Symbols and Legends. For each unit of precut symbol and legend placed, the Contractor will be paid the contract price.

    This compensation will be full payment for all work involved in cleaning and preparing the surface and furnishing, applying, and maintaining the pavement marking, and for furnishing all equipment, tools, and labor necessary to complete the work. Removal of existing markings is included as a bid item in the plans and paid for at the contract unit price. The accepted quantity of thermoplastic pavement marking will be paid for at the contract unit price.