

## **SECTION 710 PAINTED PAVEMENT MARKINGS**

### **710-1 Description.**

Apply Painted Traffic Stripes and Markings, in accordance with the Contract Documents.

### **710-2 Materials.**

Use only materials listed on the Department's Qualified Products List (QPL) meeting the following requirements:

Raised Retroreflective Pavement Markers and Bituminous  
Adhesive .....Section 970  
Standard Waterborne Fast Dry Traffic Paint  
..... 971-1 and 971-3  
Fast Dry Solvent Paint ..... 971-1 and 971-4  
Glass Spheres ..... 971-1 and 971-2

The Engineer will take random samples of all material in accordance with the Department's Sampling, Testing and Reporting Guide schedule.

### **710-3 Equipment.**

Use equipment that will produce continuous uniform dimensions of pavement markings of varying widths and meet the following requirements:

(a) Capable of traveling at a uniform, predetermined rate of speed, both uphill and downhill, in order to produce a uniform application of paint and capable of following straight lines and making normal curves in a true arc.

(b) Capable of applying glass spheres to the surface of the completed stripe by an automatic sphere dispenser attached to the striping machine such that the glass spheres are dispensed closely behind the installed line. Use a glass spheres dispenser equipped with an automatic cut-off control that is synchronized with the cut-off of the traffic paint and applies the glass spheres in a manner such that the spheres appear uniform on the entire pavement markings surface with, 50 to 60% embedment.

(c) Capable of spraying the paint to the required thickness and width without thinning of the paint. Equip the paint tank with nozzles equipped with cut-off valves, which will apply broken or skip lines automatically.

### **710-4 Application:**

**710-4.1 General:** Remove existing pavement markings, such that scars or traces of removed markings will not conflict with new pavement markings, by a method approved by the Engineer. Payment for marking removal will be in accordance with 102-5.8.

Before applying traffic stripes and markings, remove any material by a method approved by the Engineer that would adversely affect the bond of the traffic stripes.

Apply traffic stripes and markings only to dry surfaces, and when the ambient air and surface temperature is at least 40°F and rising. Do not apply traffic stripes and markings when winds are sufficient to cause spray dust.

Apply traffic stripes and markings, having well defined edges, over existing pavement markings such that not more than 2 inches on either end and not more than 1 inch on either side is visible.

Mix the paint thoroughly prior to pouring into the painting machine. Apply paint to the pavement by spray or other means approved by the Engineer.

Conduct field testing in accordance with FM 5-541. Remove and replace traffic stripes and markings not meeting the requirements of this Section at no additional cost to the Department.

Apply all pavement markings prior to opening the road to traffic.

**710-4.1.1 Final Surface:** Painted pavement markings (final surface) will include two applications of standard painted pavement markings and one application of retroreflective pavement markers applied to the final surface. Wait at least 14 days after the first application to apply the second application of painted pavement markings (final surface). Second application must be applied prior to final acceptance of the project.

Apply all retroreflective pavement markers per the requirements of Section 706.

**710-4.2 Thickness:** Apply paint to attain a minimum wet film thickness in accordance with the manufacturer's recommendations.

**710-4.3 Retroreflectivity:** Apply white and yellow standard pavement markings that will attain an initial retroreflectance of not less than  $300 \text{ mcd/lx} \cdot \text{m}^2$  and not less than  $250 \text{ mcd/lx} \cdot \text{m}^2$ , respectively. Measure, record and certify on a Department approved form and submit to the Engineer, the retroreflectivity of white and yellow pavement markings in accordance with FM 5-541.

The Department reserves the right to test the markings within 3 days of receipt of the Contractor's certification. Failure to afford the Department opportunity to test the markings will result in non-payment. The test readings should be representative of the Contractor's striping performance. If the retroreflectivity values measure below values shown above, reapply the striping at no additional cost to the Department.

For standard pavement markings, ensure that the minimum retroreflectance of white and yellow pavement markings are not less than  $150 \text{ mcd/lx} \cdot \text{m}^2$ . If the retroreflectivity values fall below the  $150 \text{ mcd/lx} \cdot \text{m}^2$  value within six months of initial application, the striping will be reapplied at the Contractor's expense.

**710-4.4 Color:** Use paint material that meets the requirements of 971-1.

**710-4.5 Glass Spheres:** Apply glass spheres on all pavement markings immediately and uniformly following the paint application. The rate of application shall be based on the manufacturer's recommendation.

## **710-5 Tolerances in Dimensions and in Alignment.**

Establish tack points at appropriate intervals for use in aligning stripes, and set a stringline from such points to achieve accuracy.

### **710-5.1 Dimensions:**

**710-5.1.1 Longitudinal Lines:** Apply painted skip line segments with no more than plus or minus 12 inches variance, so that over-tolerance and under-tolerance lengths between skip line and the gap will approximately balance. Apply longitudinal lines at least 2 inches from construction joints of portland cement concrete pavement.

**710-5.1.2 Transverse Markings, Gore Markings, Arrows, and Messages:** Apply paint in multiple passes when the marking cannot be completed in one pass, with an overall line width allowable tolerance of plus or minus 1 inch.

**710-5.1.3 Contrast Lines:** Use black paint to provide contrast on concrete or light asphalt pavement, when specified by the Engineer. Apply black paint in 10 foot segments following each longitudinal skip line.

**710-5.2 Alignment:** Apply painted stripes that will not deviate more than 1 inch from the stringline on tangents and curves one degree or less. Apply painted stripes that will not deviate more than 2 inches from the stringline on curves greater than one degree. Apply painted edge stripes uniformly, not less than 2 inches or more than 4 inches from the edge of pavement, without noticeable breaks or deviations in alignment or width.

Remove and replace at no additional cost to the Department, traffic stripes that deviate more than the above stated requirements.

**710-5.3 Correction Rates:** Make corrections of variations in width at a maximum rate of 10 feet for each 0.5 inches of correction. Make corrections of variations in alignment at a maximum rate of 25 feet for each 1 inch of correction, to return to the stringline.

#### **710-6 Contractor's Responsibility for Notification.**

Notify the Engineer prior to the placement of the materials. Furnish the Engineer with the manufacturer's name and batch numbers of the materials and glass spheres to be used. Ensure that the approved batch numbers appear on the materials and glass spheres packages.

#### **710-7 Protection of Newly Painted Pavement Markings.**

Do not allow traffic onto or permit vehicles to cross newly applied pavement markings until they are sufficiently dry. Remove and replace any portion of the pavement markings damaged by passing traffic or from any other cause, at no additional cost to the Department.

#### **710-8 Corrections for Deficiencies to Applied Painted Pavement Markings.**

Reapply a 1.0 mile section centered around any deficiency, at no additional cost to the Department.

#### **710-9 Submittals.**

**710-9.1 Submittal Instructions:** Prepare a certification of quantities, using the Department's current approved form, for each project in the Contract. Submit the certification of quantities and daily worksheets to the Engineer. The Department will not pay for any disputed items until the Engineer approves the certification of quantities.

**710-9.2 Contractor's Certification of Quantities:** Request payment by submitting a certification of quantities no later than Twelve O'clock noon Monday after the estimate cut-off date or as directed by the Engineer, based on the amount of work done or completed. Ensure the certification of quantities consists of the following:

(a) Contract Number, FPID Number, Certification Number, Certification Date and the period that the certification represents.

(b) The basis for arriving at the amount of the progress certification, less payments previously made and less any amount previously retained or withheld. The basis will include a detailed breakdown provided on the certification of items of payment.

#### **710-10 Method of Measurement.**

The quantities to be paid for under this Section will be as follows:

(a) The length, in net miles, of 6 inch solid traffic stripe, authorized and acceptably applied.

(b) The total traversed distance in gross miles of 10-30 or 3-9 skip line. The actual applied line is 25% of the traverse distance for a 1:3 ratio. This equates to 1,320 feet of marking per mile of single line.

(c) The net length, in feet, of each of all other types of lines and stripes, authorized and acceptably applied.

(d) The number of pavement messages, symbols and directional arrows, authorized and acceptably applied.

(e) Lump Sum, as specified in 710-4.1.1 when the item for painted pavement markings (final surface) is included in the proposal.

The net length, in feet of dotted and skip stripes other than 10-30 and 3-9 will be measured as the distance from the beginning of the first painted stripe to the end of the last painted stripe with proper deductions made for unpainted intervals as determined by plan dimensions or stations, subject to 9-1.3. Unpainted intervals will not be included in pay quantity.

The gross-mile measurement of 10-30 and 3-9 skip traffic stripes will be taken as the distance from the beginning of the first painted stripe to the end of the last painted stripe, and will include the unpainted intervals. It will not include any lengths of unpainted intervals which, by design or by other intent of the Department, are greater than 30 feet. Final measurement will be determined by plan dimensions or stations, subject to 9-1.3.1.

## **710-11 Basis of Payment.**

**710-11.1 General:** Prices and payments will be full compensation for all work specified in this Section, including, all cleaning and preparing of surfaces, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.

**710-11.2 Lump Sum Payment:** When the item for painted pavement markings (final surface) is included in the proposal, prices and payments will be full compensation for two applications of all painted pavement markings applied to the final surface, and one application of retroreflective pavement markers applied to the final surface in accordance with Section 706.

Payment will be made under:

Item No. 710	Painted Pavement Markings. Traffic Stripes, Solid - per net mile. Traffic Stripes, Solid - per foot. Traffic Stripes, Skip - per gross mile. Traffic Stripes, Skip - per foot. Dotted/Guideline - per foot. Messages -each. Arrows - each. Yield Markings - per foot.
Item No. 710-90	Painted Pavement Markings (Final Surface) - lump sum.