## 709 TRAFFIC STRIPES AND MARKINGS – TWO REACTIVE COMPONENTS. (REV 8-27-01) (FA 12-19-01) (1-04)

PAGE 748. The following new Section is added after Section 706:

### SECTION 709
### TRAFFIC STRIPES AND MARKINGS - TWO REACTIVE COMPONENTS

**709-1 Description.**

Apply Two Reactive Component traffic stripes and markings in accordance with the details shown in the Contract Documents and remove traffic stripes and markings when required.

**709-2 Materials.**

**709-2.1 Two Reactive Components:** Use only Two Reactive Component materials listed on the Qualified Products List (QPL), and meet the requirements of 971-1 and 971-12. The Engineer will take random samples of the materials in accordance with the Department's Sampling, Testing and Reporting Guide schedule.

**709-2.2 Glass Spheres:** Use only glass spheres listed on the Qualified Products List (QPL), and meet the requirements of 971-1 and 971-14. The Engineer will take random samples of the glass spheres in accordance with ASTM D 1155 and the Department's Sampling, Testing and Reporting Guide schedule.

**709-3 Equipment.**

Apply the Two Reactive Component material to the pavement utilizing equipment that will produce continuously uniform dimensions of the stripe, of varying widths and meet the following requirements:

(a) capable of traveling at a uniform rate of speed, both uphill and downhill, to produce a uniform application of the Two Reactive Component material and capable of following straight lines and making normal curves in true arcs.

(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 synchronized with the cut-off of the thermoplastic material and applies the glass spheres in a manner such that the spheres appear uniform on the entire traffic stripes and markings surface with, 50 to 60% embedment. Provide each nozzle with suitable line guides, either metallic shrouds or air blasts.

(c) capable of providing the manufacture's recommended mixing ratio between the components in a through and consistent manner.

**709-4 Application.**

**709-4.1 General:** Apply the Two Reactive Component product to the pavement in accordance with the manufacturer's instructions or as directed by the Engineer. The Engineer will conduct field tests 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.

Ensure that existing pavement markings are removed, such that scars or traces of removed markings will not conflict with new stripes and markings by a method approved by the Engineer.

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

Apply traffic stripes or markings only to dry surfaces, and when the ambient air and surface temperature is at least 40ºF [5°C] and rising. Follow the manufacturer's recommendations for application temperature. Do not apply pavement markings when winds are sufficient to cause spray dust.

Offset longitudinal lines at least 2 inches [50 mm] from construction joints of portland cement concrete pavement.

Apply traffic stripes or markings, having well defined edges, over existing pavement markings such that not more than 2 inches [50 mm] on either end and not more than 1 inch [25 mm] on either side is visible.

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

Apply striping to the same tolerances in dimensions and in alignment specified in 710-5.

**709-4.2 Corrections for Deficiencies:** Remove and reapply a 1.0 mile [1.0 kilometer] LOT centered around any deficiency, as determined by the Engineer, at no additional cost to the Department.

**709-4.3 Thickness:** Apply traffic stripes or markings such that, after application of drop-on glass spheres (AASHTO M 247 Type I), the stripes or markings will have a thickness above the pavement surface as designated on the Qualified Products List for the particular product used.

**709-4.4 Glass Spheres:** Apply reflective glass spheres to all white and yellow traffic stripes or markings, at the rate of 0.1 lb/ft$^2$ [0.5 kg/m$^2$] of Two Reactive Component material with 50 to 60% embedment.

Apply a mixture consisting of 50% glass spheres and 50% sharp silica sand to all transverse lines, bike lane symbols and longitudinal lines adjacent to or in a proposed bike lane, at a rate of 0.1 lb/ft$^2$ [0.5 kg/m$^2$] of Two Reactive Component material.

**709-4.5 Retroreflectivity:** Apply white and yellow pavement markings that will attain an initial retroreflectance of not less than 300 mcd/lx m$^2$ and not less than 250 mcd/lx m$^2$, respectively. Ensure that the intermittent and final retroreflectance of white and yellow pavement markings are not less than 150 mcd/lx m$^2$. This does not apply to transverse lines, bike lane symbols and longitudinal lines adjacent to or in a proposed bike lane.

**709-4.6 Color:** Use white two reactive component material that is pure white, free from any tint and showing no deviations from magnesium oxide color standard greater than the following:

| Scale Definition | Magnesium Oxide Standard | Sample |
|---|---|---|
| RD | 100 | 75% minimum |
| Reflectance | | |
| a. Red-Green | 0 | -5 to +5 |
| b. Yellow-Blue | 0 | -10 to +10 |

Use yellow Two Reactive Component material which visually matches Federal Test Standard Number 595-color 33538, and meet the following criteria for chromaticity coordinates (x,y):

| | | | | |
|---|---|---|---|---|
| X | 0.455 | 0.510 | 0.472 | 0.530 |
| Y | 0.444 | 0.485 | 0.400 | 0.456 |

**709-4.7 Durability:** Durability is the measured percent of Two Reactive Component material completely removed from the pavement. The Two Reactive Component material line loss must not exceed 5.0%.

**709-5 Contractor's Responsibility for Notification.**

Notify the Engineer prior to the placement of the materials. Furnish the Engineer with the manufacturer's name and LOT numbers of the materials and glass spheres to be used. Ensure that the approved LOT numbers appear on the materials and glass spheres packages. Submit a certified test report to the Engineer indicating that the materials meet all requirements specified.

**709-6 Protection of Newly Applied Traffic Stripes and Markings.**

Do not allow traffic onto newly applied traffic stripes and markings until they are sufficiently dry to permit vehicles to cross them without damage. Remove and replace any portion of the traffic stripes and markings damaged by passing traffic or from any other cause, at no additional cost to the Department.

**709-7 Method of Measurement.**

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

(a) The net length, in feet [meters], of each of the various types of lines, stripes and bands, authorized and acceptably applied.

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

(c) The total traversed distance in gross miles [kilometers] of skip line. The actual applied line is 25% of the traverse distance for 1:3 ratio. This equates to 1,320 feet [250 m] of marking per mile [kilometer] of single line.

(d) The area, in square feet [square meters], of Remove Existing Pavement Markings, acceptably removed.

(e) The length, in net miles [kilometers], of Solid Traffic Stripe, authorized and acceptably applied.

(f) The length, in gross miles [kilometers], of Alternating Skip Traffic Stripe, authorized and acceptable applied.

**709-8 Basis of Payment.**

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.

Payment will be made under:

| | |
|---|---|
| Item No. 709- 11- | Skip Traffic Stripe, Two Reactive Component (White/Black) - per gross mile. |
| Item No. 2709- 11- | Skip Traffic Stripe, Two Reactive Component (White/Black) - per gross kilometer. |
| Item No. 709- 12- | Skip Traffic Stripe, Two Reactive Component (Yellow) - per gross mile. |
| Item No. 2709- 12- | Skip Traffic Stripe, Two Reactive Component (Yellow) - per gross kilometer. |
| Item No. 709- 21- | Solid Traffic Stripe, Two Reactive Component (White/Black) - per foot. |
| Item No. 2709- 21- | Solid Traffic Stripe, Two Reactive Component (White/Black) - per meter. |
| Item No. 709- 22- | Solid Traffic Stripe, Two Reactive Component (Yellow) - per foot. |
| Item No. 2709- 22- | Solid Traffic Stripe, Two Reactive Component (Yellow) - per meter. |
| Item No. 709- 3- | Pavement Messages, Two Reactive Component - each. |
| Item No. 2709- 3- | Pavement Messages, Two Reactive Component - each. |
| Item No. 709- 31- | Solid Traffic Stripe, Two Reactive Component (White/Black) - per net mile. |
| Item No. 2709- 31- | Solid Traffic Stripe, Two Reactive Component (White/Black) - per net kilometer. |
| Item No. 709- 32- | Solid Traffic Stripe, Two Reactive Component (Yellow) - per net mile. |
| Item No. 2709- 32- | Solid Traffic Stripe, Two Reactive Component (Yellow) - per net kilometer. |
| Item No. 709- 4- | Directional Arrows, Two Reactive Component - each. |
| Item No. 2709- 4- | Directional Arrows, Two Reactive Component - each. |
| Item No. 709- 41- | Alternating Skip Traffic Stripe, Two Reactive Component (white/Black) - per gross mile. |
| Item No. 2709- 41- | Alternating Skip Traffic Stripe, Two Reactive Component (white/Black) - per gross kilometer. |
| Item No. 709- 5- | Guide Lines, Two Reactive Component (Dotted) - per foot. |
| Item No. 2709- 5- | Guide Lines, Two Reactive Component (Dotted) - per meter. |
| Item No. 709- 7- | Remove Existing Pavement Markings - per square foot. |
| Item No. 2709- 7- | Remove Existing Pavement Markings - per square meter. |