



Florida Department of Transportation

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SECRETARY

March 3, 2015

Khoa Nguyen
Director, Office of Technical Services
Federal Highway Administration
545 John Knox Road, Suite 200
Tallahassee, Florida 32303

Re: State Specifications and Estimates Office
Section **709**
Proposed Specification: **7090000 Traffic Stripes And Markings - Two Reactive Components.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Chester Henson of the State Roadway Design Office and Stefanie Maxwell of the State Construction Office to modify the Specification language for consistency with revisions to the Design Standards implemented with the release of Roadway Design Bulletin 15-02, released on January 22, 2015.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to SP965DS or daniel.scheer@dot.state.fl.us.

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Scheer, P.E.
State Specifications Engineer

DS/dt

Attachment

cc: Florida Transportation Builders' Assoc.
State Construction Engineer

TRAFFIC STRIPES AND MARKINGS - TWO REACTIVE COMPONENTS.(REV ~~1-282-24-15~~)

SECTION 709 is deleted and the following substituted:

SECTION 709**~~TRAFFIC STRIPES AND MARKINGS -~~
TWO REACTIVE COMPONENTS *PAVEMENT MARKINGS*****709-1 Description.**

Apply two reactive components ~~s traffic stripes and~~ *pavement* markings in accordance with the Contract Documents.

709-2 Materials.

~~709-2.1 Two Reactive Components:~~ Use only ~~two reactive component~~ materials listed on the Department's Approved Product List (APL) as an approved system and meeting the *following* requirements ~~of 971-1 and 971-8.:~~

Two Reactive Components..... 971-1 and 971-8

*Retroreflective Elements** 971-1.7

*Glass Spheres**..... 971-1 and 971.2

**Use only retroreflective elements or glass spheres recommended by the manufacturer.*

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

~~709-2.2 Reflective elements:~~ Use only ~~reflective elements recommended by the manufacturer that meet the requirements of 971-1.7 and are part of the system listed on the APL.~~

709-3 Equipment.

~~Use equipment capable of applying the two reactive component material to the pavement.~~ Use equipment ~~which that can will~~ produce *continuous uniform dimensions of pavement markings* of varying widths ~~traffic stripes~~ and ~~which~~ meets the following requirements:

(a)1. eCapable of traveling at a uniform, *predetermined* rate of speed, both uphill and downhill, to produce a uniform application of the two reactive components material and capable of following straight lines and making normal curves in true arcs.

(b)2. eCapable of applying *retroreflective elements or glass spheres* to the surface of the completed ~~stripe line~~ by an automatic *retroreflective element* dispenser attached to the ~~striping pavement marking~~ machine such that the *retroreflective elements or glass spheres* are dispensed closely behind the installed line. Use a *retroreflective element or glass sphere* dispenser equipped with an automatic cut-off control that is synchronized with the cut-off of the material and applies the *retroreflective elements or glass spheres* in a manner such that the *retroreflective elements or glass spheres* appear uniform on the entire ~~traffic stripes and pavement~~ markings surface ~~with, 50 to 60% embedment.~~

(e)3. eCapable of providing the manufacturer's recommended mixing ratio between the components in a thorough and consistent manner.

709-4 Application.

709-4.1 General: Remove existing pavement markings, such that scars or traces of removed markings will not conflict with *new stripes and pavement* markings by a method approved by the Engineer.

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

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

Apply *traffic stripes or pavement* markings *only* to dry surfaces *only*, and when the ambient air and surface temperature is at least 40°F and rising.

Do not apply *two reactive components* pavement markings when winds are sufficient to cause spray dust.

Apply *two reactive components striping pavement markings* to the same tolerances in dimensions and in alignment specified in 710-5. When applying *two reactive components traffic stripes and pavement* marking over existing markings, ensure that not more than 2 inches on either end and not more than 1 inch on either side of the existing line is visible.

Apply the two reactive components *product pavement markings* to the pavement in accordance with the manufacturer's instructions or as directed by the Engineer.

Conduct field tests in accordance with FM 5-541. Take test readings representative of the *striping pavement marking* performance. Remove and replace *two reactive components traffic stripes and pavement* markings not meeting the requirements of this Section at no additional cost to the Department.

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

709-4.2 Thickness: Apply *two reactive components traffic stripes and pavement* markings to attain a minimum wet film thickness in accordance with the manufacturer's recommendations as identified on the APL.

Measure, record and certify on a Department approved form and submit to the Engineer, the thickness of white and yellow pavement markings in accordance with FM 5-541.

709-4.3 Retroreflectivity: Apply white and yellow *traffic stripes and two reactive components pavement* markings that will attain an initial retroreflectivity of not less than 450 mcd/lx·m² and not less than 350 mcd/lx·m², respectively for all longitudinal *and transverse* lines.

Measure, record and certify on the Department approved form and submit to the Engineer, the retroreflectivity of white and yellow *two reactive components* pavement markings in accordance with FM 5-541.

709-4.4 Color: Use materials that meet the requirements of 971-1.

709-4.5 Retroreflective Elements or Glass Spheres: Apply *retroreflective elements or glass spheres* to all white and yellow *traffic stripes or two reactive components pavement* markings, at the rates determined by the manufacturer's recommendations as identified on the APL.

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 batch numbers of the materials and *retroreflective elements or glass spheres* to be used. Ensure that the approved batch numbers appear on the materials and *retroreflective elements or glass spheres* packages.

709-6 Protection of Newly Applied ~~Traffic Stripes and~~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.

709-7 Observation Period.

Longitudinal pavement markings are subject to a 180 day observation period under normal traffic. The observation period shall begin with the satisfactory completion and acceptance of the work.

The longitudinal pavement markings shall show no signs of failure due to blistering, excessive cracking, chipping, discoloration, poor adhesion to the pavement, loss of *retro*reflectivity or vehicular damage. The retroreflectivity shall meet the initial requirements of 709-4.3. The Department reserves the right to check the retroreflectivity any time prior to the end of the observation period.

Replace, at no additional expense to the Department, any longitudinal pavement markings that do not perform satisfactorily under traffic during the 180 day observation period.

709-8 Corrections for Deficiencies.

Correct all ~~D~~deficiencies ~~will be corrected~~ by removal and reapplication of a ~~1.0~~*one* mile section centered around the deficiency, *as determined by the Engineer*, at no additional cost to the Department.

709-9 Submittals.

709-9.1 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.

709-9.2 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.

709-10 Method of Measurement.

The quantities, *authorized and acceptably applied, under this Section will be to be paid for under this Section will be* as follows:

~~(a)1.~~ *1.* The length, in ~~gross~~*net* miles, *of solid, 10'-30' skip, and 3'-9' dotted, 6'-10' dotted, and 2'-4' dotted lines* ~~of 6 inch solid traffic stripe, authorized and acceptably applied~~*line.*

~~(b)2.~~ *2.* ~~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 1:3 ratio. This equates to 1,320 feet of marking per mile of single line~~*The area, in square feet, for removal of existing markings acceptably removed. Payment for removal of conflicting markings will be in accordance with 102-5.8. Payment for removal of non-conflicting markings will be paid separately.*

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

~~_____ (d) The area, in square feet, of remove existing pavement markings, acceptably removed.~~

The gross mile measurement will be taken as the distance from the beginning of the two reactive component line to the end of the two reactive component line and will include the unmarked gaps for skip and dotted lines. The gross mile measurement will not include designated unmarked lengths at intersections, turn lanes, etc. Final measurement will be determined by plan dimensions or stations, subject to 9-1.3.1.

709-11 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 | Two Reactive Components |
| | Traffic Stripes, Solid - per netgross mile. |
| | Traffic Stripes, Solid - per foot. |
| | Traffic Stripes, Skip - per gross mile. |
| | Traffic Stripe - Two Reactive Components, |
| | Remove - per square foot. |

**TRAFFIC STRIPES AND MARKINGS - TWO REACTIVE COMPONENTS.
(REV 2-24-15)**

SECTION 709 is deleted and the following substituted:

**SECTION 709
TWO REACTIVE COMPONENTS PAVEMENT MARKINGS**

709-1 Description.

Apply two reactive components pavement markings in accordance with the Contract Documents.

709-2 Materials.

Use only materials listed on the Department's Approved Product List (APL) as an approved system and meeting the following requirements:

| | |
|---------------------------------|-----------------|
| Two Reactive Components | 971-1 and 971-8 |
| Retroreflective Elements* | 971-1.7 |
| Glass Spheres* | 971-1 and 971.2 |

*Use only retroreflective elements or glass spheres recommended by the manufacturer.

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

709-3 Equipment.

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

1. Capable of traveling at a uniform, predetermined rate of speed, both uphill and downhill, to produce a uniform application of the two reactive components material and capable of following straight lines and making normal curves in true arcs.
2. Capable of applying retroreflective elements or glass spheres to the surface of the completed line by an automatic retroreflective element dispenser attached to the pavement marking machine such that the retroreflective elements or glass spheres are dispensed closely behind the installed line. Use a retroreflective element or glass sphere dispenser equipped with an automatic cut-off control that is synchronized with the cut-off of the material and applies the retroreflective elements or glass spheres in a manner such that the retroreflective elements or glass spheres appear uniform on the entire pavement markings surface.
3. Capable of providing the manufacturer's recommended mixing ratio between the components in a thorough and consistent manner.

709-4 Application.

709-4.1 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.

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

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

Apply pavement markings to dry surfaces only, and when the ambient air and surface temperature is at least 40°F and rising.

Do not apply two reactive components pavement markings when winds are sufficient to cause spray dust.

Apply two reactive components pavement markings to the same tolerances in dimensions and in alignment specified in 710-5. When applying two reactive components pavement marking over existing markings, ensure that not more than 2 inches on either end and not more than 1 inch on either side of the existing line is visible.

Apply the two reactive components pavement markings to the pavement in accordance with the manufacturer's instructions or as directed by the Engineer.

Conduct field tests in accordance with FM 5-541. Take test readings representative of the pavement marking performance. Remove and replace two reactive components pavement markings not meeting the requirements of this Section at no additional cost to the Department.

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

709-4.2 Thickness: Apply two reactive components pavement markings to attain a minimum wet film thickness in accordance with the manufacturer's recommendations as identified on the APL.

Measure, record and certify on a Department approved form and submit to the Engineer, the thickness of white and yellow pavement markings in accordance with FM 5-541.

709-4.3 Retroreflectivity: Apply white and yellow two reactive components pavement markings that will attain an initial retroreflectivity of not less than $450 \text{ mcd/lx}\cdot\text{m}^2$ and not less than $350 \text{ mcd/lx}\cdot\text{m}^2$, respectively for all longitudinal lines.

Measure, record and certify on the Department approved form and submit to the Engineer, the retroreflectivity of white and yellow two reactive components pavement markings in accordance with FM 5-541.

709-4.4 Color: Use materials that meet the requirements of 971-1.

709-4.5 Retroreflective Elements or Glass Spheres: Apply retroreflective elements or glass spheres to all white and yellow two reactive components pavement markings, at the rates determined by the manufacturer's recommendations as identified on the APL.

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 batch numbers of the materials and retroreflective elements or glass spheres to be used. Ensure that the approved batch numbers appear on the materials and retroreflective elements or glass spheres packages.

709-6 Protection of Newly Applied 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.

709-7 Observation Period.

Longitudinal pavement markings are subject to a 180 day observation period under normal traffic. The observation period shall begin with the satisfactory completion and acceptance of the work.

The longitudinal pavement markings shall show no signs of failure due to blistering, excessive cracking, chipping, discoloration, poor adhesion to the pavement, loss of retroreflectivity or vehicular damage. The retroreflectivity shall meet the initial requirements of 709-4.3. The Department reserves the right to check the retroreflectivity any time prior to the end of the observation period.

Replace, at no additional expense to the Department, any longitudinal pavement markings that do not perform satisfactorily under traffic during the 180 day observation period.

709-8 Corrections for Deficiencies.

Correct all deficiencies by removal and reapplication of a one mile section centered around the deficiency, as determined by the Engineer, at no additional cost to the Department.

709-9 Submittals.

709-9.1 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.

709-9.2 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.

709-10 Method of Measurement.

The quantities, authorized and acceptably applied, under this Section will be paid as follows:

1. The length, in gross miles, of solid, 10'-30' skip, and 3'-9' dotted, 6'-10' dotted, and 2'-4' dotted lines.

2. The area, in square feet, for removal of existing markings acceptably removed. Payment for removal of conflicting markings will be in accordance with 102-5.8. Payment for removal of non-conflicting markings will be paid separately.

The gross mile measurement will be taken as the distance from the beginning of the two reactive component line to the end of the two reactive component line and will include the unmarked gaps for skip and dotted lines. The gross mile measurement will not include designated unmarked lengths at intersections, turn lanes, etc. Final measurement will be determined by plan dimensions or stations, subject to 9-1.3.1.

709-11 Basis of Payment.

Price and payment 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

Two Reactive Components

Solid - per gross mile.

Skip - per gross mile.

Remove - per square foot.