ORIGINATION FORM

THE INFORMATION BELOW IS TO BE PROVIDED BY THE ORIGINATOR
(The person who receives or originates the issue and needs to forward the issue for action.)

☒ Modify Specification _____702_____.
Section/File number

☐ New Section _____.
Section number

Subject: Inverted Profile Markings

Origination date: July 8, 2003

Originator: Chester Henson
Office/Phone: Roadway Design/ 414-4117
Email address/ Userid: chester.henson@dot.state.fl.us

Problem statement: Industry standard method of measurement of retroreflectivity has changed from 15 meter geometry to 30 meter geometry.

Information source: Input was provided from materials lab, construction and maintenance.

Background data: Materials Lab, construction and maintenance currently have the equipment to measure retroreflectivity using the new 30 meter geometry.

Recommended usage uote:

Desired implementation date: **Beginning with the July 2005 letting.**

Florida Department of Transportation

JEB BUSH
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

JOSÉ ABREU
SECRETARY

M E M O R A N D U M

DATE: May 27, 2005

TO: Specification Review Distribution List

FROM: Duane F. Brautigam, P.E., State Specifications Engineer

SUBJECT: **Proposed Specifications Change: 7020000-Inverted Profile, Wet Weather Traffic Stripes**

In accordance with Specification Development Procedures, we are sending you a copy of a proposed specification change to Inverted Profile, Wet Weather Traffic Stripes.

This change was proposed by Chester Henson of the Roadway Design Office, this spec is a complete rewrite.

Please share this proposal with others within your responsibility. Review comments are due within four weeks and should be sent to Mail Station 75 or to my attention via e-mail at SP965DB or duane.brautigam@dot.state.fl.us. Comments received after June 24, 2005 may not be considered. Your input is encouraged.

DFB/sh

Attachment

COMMENTS:

Submitted by: Phone #:

INVERTED PROFILE, WET WEATHER TRAFFIC STRIPS.
(REV 5-2-05)

SECTION 702 (Pages 741-745) is deleted and the following substituted:

SECTION 702
INVERTED PROFILE, WET WEATHER TRAFFIC STRIPES

702-1 Description.

Apply *inverted profile traffic stripes and markings*~~traffic stripes~~, in accordance with the Contract Documents.

702-2 Materials.

702-2.1 ~~Striping Material:~~ ~~Use striping materials listed on the Qualified Products List (QPL). Meet the requirements of 971-1 and 971-23.~~

~~**702-2.2 Glass Spheres (for Reflective Traffic Stripes):** Use glass spheres listed on the QPL. Meet the requirements of 971-1 and 971-23.3.~~

~~**702-2.3 Material Sampling:**~~

~~**702-2.3.1 Thermoplastic:** The Engineer will take random samples in accordance with the Department's Sampling, Testing and Reporting Guide schedule.~~

~~**702-2.3.2 Glass Spheres:** The Engineer will take random samples in accordance with ASTM D 1155 and the Department's Sampling, Testing and Reporting Guide schedule.~~***Thermoplastic:*** *Use only thermoplastic material listed on the Qualified Products List (QPL), meeting the requirements of 971-1 and 971-9. The Engineer will take random samples of the materials in accordance with the Department's Sampling, Testing and Reporting Guide schedule.*

701-2.2 Glass Spheres: *Use only glass spheres listed on the Qualified Products List (QPL), meeting the requirements of 971-1 and 971-2. 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.*

702-3 Equipment.

Use equipment ~~constructed to provide~~ *capable of providing* continuous uniform heating of the striping material to temperatures exceeding 390ºF [200ºC], mixing and agitation of the material reservoir *to provide a homogenous mixture without segregation*~~and the line dispensing devices to prevent accumulation and clogging~~. Use equipment that will maintain the striping material *in*~~at~~ a plastic *state*~~temperature~~, in all mixing and conveying parts, including the line dispensing device *until applied*. Use equipment which can produce varying width traffic stripes and which meets the following requirements:

(a) ~~is mobile and~~ capable of traveling at a uniform~~, predetermined~~ rate of speed, both uphill and downhill, ~~in order~~ to produce a uniform application of striping material and *capable of following*~~maneuverable to the extent that~~ straight lines *and making* ~~can be followed and~~ normal curves ~~can be made~~ in a true arc.

(b) ~~is~~ capable of applying glass spheres to the surface of the completed ~~traffic~~ stripe by an automatic sphere dispenser attached to the striping machine such that the glass spheres are dispensed closely behind the installed *line*~~traffic stripe~~. Use a *glass spheres* dispenser equipped with an automatic cut-off control synchronized with the cut-off of the *thermoplastic*~~striping~~ material and applies the glass spheres uniformly on the entire traffic stripe surface with 50 to 60% embedment. ~~Provide each nozzle with suitable line guides, either metallic shrouds or air blasts.~~

(c) ~~is~~ equipped with a special kettle for uniformly melting and heating the striping material. The kettle must be equipped with an automatic temperature control device and material thermometer for positive temperature control and to prevent overheating or scorching of the *thermoplastic*~~striping~~ material.

(d) meets the requirements of the National Fire Protection Association, state and local authorities.

702-4 Application.

702-4.1 General: *Remove existing pavement markings such that scars or traces of removed markings will not conflict with new traffic stripes and markings by a method approved by the Engineer. Payment for marking removal will be in accordance with Section 102-5.9.*

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

Before applying traffic stripes to any portland cement concrete surface, apply a two-part epoxy primer sealer recommended by the manufacturer. *Offset traffic stripes a minimum of 2 inches [50 mm] from any longitudinal joints of portland cement concrete pavement.*

Apply traffic stripes and markings only to dry surfaces and when the ambient air and surface temperature is at least 50ºF [10ºC] and rising for asphalt surfaces and 60°F [16°C] and rising for concrete surfaces.

Apply striping to the same tolerances in dimensions and in alignment specified in 710-5. When applying traffic stripes and marking over existing markings, not more 2 inches [50 mm] on either end and not more that 1 inch [25 mm] on either side of the existing line shall be visible.

Apply thermoplastic material to the pavement by extrusion.

The Engineer will conduct field tests in accordance with FM 5-541~~ and FM 5-5XX~~. Remove and replace traffic stripes not meeting the requirements of this Section at no additional cost to the Department.

~~Apply striping material to the pavement by extrusion. Remove and replace traffic stripes not meeting the requirements of this Section at no additional cost to the Department.~~

~~Remove existing traffic stripes such that scars or traces of removed markings will not conflict with new traffic stripes by a method approved by the Engineer.~~

~~Apply traffic stripes only to dry surfaces and when the ambient air and surface temperature is at least 55ºF [13ºC] and rising. Follow the manufacturer's recommendations for application temperature.~~

~~Offset traffic stripes a minimum of 2 inches [50 mm] from any longitudinal joints.~~

~~The Engineer will conduct field tests in accordance with Florida Test Method FM 5-541.~~

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

702-4.2 Thickness: *Apply base lines having a thickness of 0.035 to* 0.050 *inch [0.90 mm to* 1.30 *mm], exclusive of the raised profiles, when measured above pavement surface at the edge of the base line.*

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

702-4.~~3~~2 Dimensions: Apply traffic stripes such that, after application of drop-on glass spheres *(AASHTO M 247 Type 1)*, ~~when measured in accordance with Florida Test Method FM 5-541,~~ *the profile shall have*~~the thickness of the traffic stripes is~~ a minimum *height* of 0.140 inch [3.56 mm] *including the base line, when measured above the pavement surface at the edge of the raised rib shoulder warning devices.*

~~. Ensure the thickness of the traffic stripes in the bottom of the profile is from 0.0250.050 inch [0.635-1.270 mm].~~

Locate the individual profiles transversely across the full width of the traffic stripe at approximately 1.0 inch [25 mm] on center, with a bottom width between 0.090-0.310 ~~inch~~*inch* [2.286-7.874 mm].

702-4.~~4~~*3* Retroreflectivity: ~~–~~ *Apply white and yellow traffic stripes and markings that will attain an initial dry retroreflectivity of not less than 300 mcd/lx·m^2 and not less than 250 mcd/lx·m^2, respectively. The white and yellow traffic stripes and markings will also attain an initial wet retroreflectivity of not less than 150 mcd/lx·m^2 and not less than 100 mcd/lx·m^2, respectively. The Engineer will conduct field tests in accordance with FM 5-5~~XX~~41.*

Measure, certify (on Department approved form) and submit to the Engineer, no later than the next working day after the application of pavement markings, the retroreflectivity of white and yellow pavement markings in accordance with Florida Method FM-5-5~~XX~~41.

If the Department retests within 3 days of initial application and reflectivity values measure below values shown above, the striping will be reapplied at the Contractor's expense. Project personnel performing any retesting should take into consideration events beyond the control of the Contractor and not due to material application failures before requiring re-striping at Contractor expense. The retest readings should be representative of the Contractor's striping performance.
~~Apply traffic stripes meeting the following:~~

	~~White~~		~~Yellow~~	
~~Retroreflectance~~	~~Dry~~	~~Wet~~	~~Dry~~	~~Wet~~
~~Initial*~~	~~300 mcd/lx·m^2~~	~~150 mcd/lx·m^2~~	~~250 mcd/lx·m^2~~	~~125 mcd/lx·m^2~~
~~Intermittent and Final**~~	~~150 mcd/lx·m^2~~	~~75 mcd/lx·m^2~~	~~150 mcd/lx·m^2~~	~~75 mcd/lx·m^2~~
~~* Initial retroreflectance is measured within 14 days of exposure to traffic.~~				
~~** Intermittent retroreflectance is measured at the discretion of the Department and final retroreflectance is measured at 3 years ± 2 weeks after exposure to traffic.~~				

702-4.~~5~~*4* *Color:* *Use thermoplastic material that meets the requirements of 971-1.* ~~**Durability:** Durability is the measured percent of striping material completely removed from the pavement. The striping material line loss must not exceed 5.0%.~~

702-4.6 Glass Spheres: *Apply glass spheres to all pavement markings, at the rate of 0.10 lb/ft^2 [0.5 kg/m^2] of material with, 50 to 60% embedment.*

~~**702-4.5 Correction for Deficiencies:** Remove and reapply per this Specification, at no additional cost to the Department any LOT as defined and tested by Florida Test Method FM 5-541, which fails to meet any of the following requirements:~~

~~a. Dimensions~~
~~b. Glass Spheres~~
~~c. Retroreflectivity~~
~~d. Color, and~~
~~e. Durability~~

702-5 Contractor's Responsibility for Notification.

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

702-6 Protection of Newly Applied Traffic Stripes.

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

702-7 Observation Period.

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 pavement markings shall show no signs of failure due to blistering, excessive cracking, chipping, discoloration, poor adhesion to the pavement, loss of reflectivity or vehicular damage. The Department reserves the right to check the color and retroreflectivity within 30 days prior to the end of the observation period.

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

702-8 Corrections for Deficiencies.

Deficiencies will be corrected by removal and reapplication of a 1.0 mile [1.0 kilometer] LOT centered around the deficiency at no additional cost to the Department.

702-~~9~~*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 *and*~~,~~ stripes ~~and bands~~, authorized and acceptably applied.

(b) The total traversed distance in gross miles [gross kilometers], of *10-30* skip line. The actual applied line is 25% of the traverse distance *for*~~from~~ a 1:3 ratio. This equates to 1,320 feet [250 m] of traffic stripes per mile [per kilometer] of single line.

~~(c) The area, in square feet [square meters], of Remove Existing Traffic Stripes, acceptably removed.~~

(*c*~~d~~) The length, in net miles [per kilometers], of Solid Traffic Stripes, authorized and acceptably applied.

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

702-*10*~~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 incidental necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.

Payment will be made under:

Item No. 702- 7-	Remove Existing Pavement Markings – per square foot.
Item No. 2702- 7-	Remove Existing Pavement Markings – per square meter.
Item No. 702- 31-	Skip Traffic Stripe, Inverted Profile (White) – per gross mile.
Item No. 2702- 31-	Skip Traffic Stripe, Inverted Profile (White) – per gross kilometer.
Item No. 702- 32-	Skip Traffic Stripe, Inverted Profile (Yellow) – per gross mile.
Item No. 2702- 32-	Skip Traffic Stripe, Inverted Profile (Yellow) – per gross kilometer.
Item No. 702- 33-	Skip Traffic Stripe, Inverted Profile (White) – per foot.
Item No. 2702- 33-	Skip Traffic Stripe, Inverted Profile (White) – per meter.
Item No. 702- 34-	Skip Traffic Stripe, Inverted Profile (Yellow) – per foot.

Item No. 2702- 34-	Skip Traffic Stripe, Inverted Profile (Yellow) – per meter.
Item No. 702- 35-	Solid Traffic Stripe, Inverted Profile (White) – per foot.
Item No. 2702- 35-	Solid Traffic Stripe, Inverted Profile (White) – per meter.
Item No. 702- 36-	Solid Traffic Stripe, Inverted Profile (Yellow) – per foot.
Item No. 2702- 36-	Solid Traffic Stripe, Inverted Profile (Yellow) – per meter.
Item No. 702- 37-	Solid Traffic Stripe, Inverted Profile (White) – per net mile.
Item No. 2702- 37-	Solid Traffic Stripe, Inverted Profile (White) – per net kilometer.
Item No. 702- 38-	Solid Traffic Stripe, Inverted Profile (Yellow) – per net mile.
Item No. 2702- 38-	Solid Traffic Stripe, Inverted Profile (Yellow) – per net kilometer.

~~*Payment will be made under Item No. 702.*~~