

7110401 THERMOPLASTIC TRAFFIC STRIPES AND MARKINGS  
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

Eddy Scott  
386-961-7831  
[eddy.scott@dot.state.fl.us](mailto:eddy.scott@dot.state.fl.us)

Comments: (10-31-14)

One minor suggested change highlighted below. Also are you processing a similar change in 701-4.1? If so please consider this same suggestion there.

requirements of this Section at no additional cost to the Department. ]  
→ → ~~Apply all final pavement markings prior to opening the road to traffic~~ *Do not place thermoplastic traffic stripes and markings on newly constructed final surface courses prior to 14 calendar days after placement of the final asphalt surface course. Provide temporary pavement markings during the interim period prior to opening the road to traffic.* ]

Response: Agree. Will add word “asphalt” to the sentence.  
Change made.

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Tim Parker  
[tparker@oglesby-fl.com](mailto:tparker@oglesby-fl.com)

Comments: (11-5-14)

The 14 days for the paint is fine. Most projects require that now.

The thermoplastic spec changes might be more difficult. Other states use this moisture test, North Carolina is one state, but other states don't have our afternoon showers or humidity. We have seen on projects where it has not rained in 2 days but doing this test shows moisture. Not a fan of this specification. The department already have the language in place that if the thermoplastic line fails the contractor has to come back and repair it. This specification is just going to add cost and time to the projects.

The thermoplastic manufacturers would have to respond to the change to a 14 day cure time. I don't have an issue as an installer, I just know that the white thermoplastic has a tendency to change colors if placed too soon after asphalt has been layed.

Response: The moisture test will be deleted until we have had an opportunity to use it in the field before adding it to the specification.  
Change made.

Tracking of residual asphalt onto a white thermoplastic longitudinal marking has been discussed for many years and is dependent on many combinations of variables such as ambient air temperature, asphalt mix, traffic type and volume, and roadway geometry. If tracking does occur, the white longitudinal marking would become dirty creating a gray appearance. The impact to the road user would be a temporary reduction in contrast between the longitudinal marking and

the background surface of the asphalt which will never be darker. This reduction of contrast would be temporary until traffic cleans the residual asphalt off the thermoplastic. This cleaning or removal is dependent on the same variables that causes the tracking. Tracking has not been shown to substantially affect our thermoplastic retroreflectivity with the large beads.

There is no contract measurement of dirtiness, white color, or contrast in the specifications. To achieve the level of white color desired for daytime visibility, the Department specifies the minimum amount of titanium dioxide in white thermoplastic in subarticle 971-5.2.

There is a 180 day observation period for longitudinal pavement markings. Subarticle 711-7 states in part, "The longitudinal 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." Discoloration is the thermoplastic material itself changing color; not a dirty or tracked markings. The predominant factor in determining the condition of a longitudinal marking is retroreflectivity. The Department specifies the minimum levels of initial and final retroreflectivity to be provided and these levels must be satisfied regardless of how dirty or tracked the marking may be. A contractor may choose to wait more than 14 days to place a longitudinal marking if the contractor feels retroreflectivity may be impacted by tracking.

State Construction Office does not feel this will be an issue, but will monitor the situation and make adjustments accordingly, if needed.  
No change made related to cure time.

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Rafiq Darji  
850-553-2242  
[rafiq.darji@dot.gov](mailto:rafiq.darji@dot.gov)

Comments: (11-4-14)

To be consistent, modify the proposed last sentence to read....If moisture is present on the underside, do not apply thermoplastic stripes and markings.

Response: The moisture test will be deleted until we have had an opportunity to use it in the field before adding it to the specification.  
Change made.

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Debbie Toole  
414-4114  
[deborah.toole@dot.state.fl.us](mailto:deborah.toole@dot.state.fl.us)

Comments: (11-5-14)

711-4.1 - Suggest the following formatting:

→ **711-4.1 General:** Remove existing pavement markings such that scars or traces of removed markings will not conflict with new stripes and markings by a method approved by the Engineer. Cost for removing conflicting pavement markings during maintenance of traffic operations to be included in Maintenance of Traffic, Lump Sum.¶

→ → *Apply traffic stripes or markings only to dry surfaces, and when the ambient air and surface temperature is at least 50°F and rising for asphalt surfaces and 60°F and rising for concrete surfaces. All pavement types must be more than visibly dry. Check for moisture by placing an 18 inch by 18 inch piece of tar paper on the pavement and apply thermoplastic heated to 420°F to the top of the paper. Wait two minutes and lift the tar paper. If moisture is present on the underside, do not apply thermoplastic markings.¶*

→ → Before applying traffic stripes and markings, remove any material *that would adversely affect the bond of the traffic stripes* by a method approved by the Engineer *that would adversely affect the bond of the traffic stripes. All pavement should must be more than visibly dry. Check for moisture by placing an 18 inch by 18 inch piece of tar paper on the pavement and apply thermoplastic heated to 420°F to the top of the paper. Wait two minutes and lift the tar paper. If moisture is present on the underside, do not apply thermoplastic markings.¶*

→ → Before applying traffic stripes to any portland cement concrete surface, apply a primer, sealer or surface preparation adhesive of the type recommended by the manufacturer. Offset longitudinal lines at least 2 inches from any longitudinal joints of portland cement concrete pavement.¶

→ → *Apply traffic stripes or markings only to dry surfaces, and when the ambient air and surface temperature is at least 50°F and rising for asphalt surfaces and 60°F 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 markings over existing markings, ensure that no more than 2 inches on either end and not more than 1 inch on either side of the existing line is visible.¶

→ → Apply thermoplastic material to the pavement either by spray, extrusion or other means approved by the Engineer.¶

→ → Conduct field tests in accordance with FM5-541. Take test readings representative of the striping performance. Remove and replace traffic stripes and 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. Do not place thermoplastic traffic stripes and markings on newly constructed final surface courses prior to 30 14 calendar days after placement of the final surface course. Provide temporary pavement markings during the interim period prior to opening the road to traffic.¶*

Response: The moisture test will be deleted until we have had an opportunity to use it in the field before adding it to the specification.

The rewording of the sentence on the removal of anything that could affect the bonding is fine. Appropriate changes made.

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Scott Walls  
813-477-5678  
[swalls@akcainc.com](mailto:swalls@akcainc.com)

Comments: (11-10-14)

1. It is our experience that 14 days is not enough of a cure time to prevent tracking on the thermoplastic, especially when open grade asphalt is involved. As a striping who is responsible for reflectivity, this is a major concern. If this reduction in days is due to a concern of meeting schedule, why not just suspend time during the 30 day cure period? If this cure time is reduced and tracking does occur as a result, stripers should be relieved of reflectivity requirements.

Response: Please see response to comment from Tim Parker. Additionally, when the Department sets the maximum number of contract days, this time for the minimum durations between final surface and applications of markings so there is no need to suspend time. More and more, the Contractor or design-build firm will establish contract time as part of its proposal.

2. Performing a moisture check per the method proposed will pose a significant problem to thermoplastic striping in Florida. Due to our high humidity and high water table here in Florida, the tar paper method described will almost always return a moisture positive result. Even when there is not enough moisture to cause thermo adhesion problems. A much better common sense approach would be what is currently being practiced by most stripers: 1. Check surface for dryness by look and touch, 2. Install a few feet of thermo and check for bubbling, if bubbling exists stop application and wait for further drying.

Response: The moisture test will be deleted until we have had an opportunity to use it in the field before adding it to the specification.

Change made.

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Kirt Guidry  
407-455-1561  
[kguidry@crownthermo.com](mailto:kguidry@crownthermo.com)

Comments: (11-17-14)

Crown Technology LLC recommends a 30 cure period before applying thermoplastic markings to new asphalt due to tracking. If the contractor is encouraged to apply thermoplastic before 30 days they should be held harmless and not be responsible for reduced reflectivity or discoloration of the markings due to tracking.

Moisture testing using tar paper/roofing felt paper is not a consistent method. The paper itself holds moisture. What amount of moisture would be considered too much? The contractor should begin the installation and observe the line for the appearance of moisture bubbles. If none are present continue the application. Some small moisture bubbles are common and do not always impact the adhesion of the material to surface. It is incumbent upon the contractor to determine whether or not the surface is dry and suitable for the installation.

Response: Please see response to Tim Parker comment.

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D5 Construction

Comments: (11-17-14)

Section 711-4.1 - The language in the first sentence of the second paragraph can be interpreted to have an incorrect meaning. This can be remedied by adding two commas (highlighted) as follows: Before applying traffic stripes and markings, remove any material, by a method approved by the Engineer, that would adversely affect the bond.....

Response: Sentence revised.

Change made.

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Lynn Richards  
713-621-8484

Comments: (11-18-14)

Traffic Control Products has completed 3 projects with thermoplastic on concrete. All 3 jobs Traffic Control Products performed two moisture tests. One test with the tar paper the other test with Black Plastic taped down for 15 minutes in sun light a check for moisture on the underside of the black plastic a 3M method. All moisture tests did not produce any moisture. The thermoplastic after time less then 180 days started to get bubbles on the thermoplastic some as big as 3" in diameter when the thermoplastic bubble was removed water was present. A concrete sealer was used on all projects and Traffic Control Products was forced to remove and replace all 3 projects. The three projects were 1. Polk County parkway main toll plazas and toll booths for ramps Contractor Nelson Construction 2. I-4 weight and motion East Bound & West Bound Contractor John Carlo #. I-75 Rest areas Hillsborough co Contractor Cone & Graham. If you wish to discuss this please give me a call. I have explained this to several people including Mr. Hensen and others to no avail.

Response: The moisture test will be deleted until we have had an opportunity to use it in the field before adding it to the specification.

Change made.

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Deborah Ihsan  
954-777-4387  
[deborah.ihsan@dot.state.fl.us](mailto:deborah.ihsan@dot.state.fl.us)

Comments: (11-19-14)

1. The primer, sealer or surface preparation adhesive needs to be on APL. What methods are acceptable to remove and replace traffic stripes?

Response: The manufacturer is responsible for his product and should be the one to make the recommendation on what product to use. The method of removal depends on what is being done afterward.

No changes made.

2. SUBARTICLE 711-4.1 is deleted and the following substituted: If the thickness falls in short, when measured using Traffic Marking Thickness gauge as described in FM-5-541, Section 4.1.1, recap conforming to spec 711-4.2.

Response: This was not part of the proposed revision and changing it without review cannot be done.

No changes made.

3. The second red text area mentions only one application of paint when permanent markings are included in the Contract. Depending on how long it takes to apply thermo, the reflectivity may not meet Specification.

Response: Section 710 requires the MOT Contractor to maintain the proper reflectivity for six months, see last paragraph of Section 710-4.3.  
No changes made.

4. Suggest rewording the first red sentence to read “For all Contracts with new asphalt and permanent pavement markings” Whether included in the Contract or not, two applications will yield better results. Suggest deleting the second red text paragraph.

Response: One application of paint is sufficient and the Contractor is responsible for it meeting specific requirements. No change made on number of applications of paint. As to deletion of the section on cure time, please see response to comment from Tim Parker.  
No changes made.

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