



*Florida Department of Transportation*

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SECRETARY

December 21, 2015

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section **971**  
Proposed Specification: **9710605 Pavement Marking Materials.**

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 to add a specification for the black material used in contrast markings and add high skid thermoplastic to the specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.scheer@dot.state.fl.us](mailto: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/ot

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PAVEMENT MARKING MATERIALS.**(REV ~~11-212-21~~-15)

SUBARTICLE 971-6.5.1 is deleted and the following substituted:

**971-6.5.1 Retroreflectivity:** The white pavement markings other than crosswalks and bicycle markings shall attain an initial retroreflectance of not less than 300 mcd/lx·m<sup>2</sup>. Crosswalks and bicycle markings shall attain initial retroreflectivity of not less than 275 mcd/lx·m<sup>2</sup>. ~~Black pavement markings must~~ shall have a retroreflectance of less than 5 mcd/lx m<sup>2</sup>. The retroreflectance of the white pavement markings at the end of the three year period shall not be less than 150 mcd/lx·m<sup>2</sup>.

The following new Subarticle is added after Subarticle 971-9:

**971-10 High Skid Friction Thermoplastic Material.**

**971-10.1 General:** The manufacturer shall utilize alkyd based materials only and shall have the option of formulating the material according to his own specifications. However, the requirements delineated in of this Specification shall apply regardless of the type of formulation used. The pigment, reflective elements, and filler shall be well dispersed in the resin.

**971-10.2 Composition:**

Component	Test Method	White
Binder		18.0% minimum
TiO <sub>2</sub> , Type Rutile	ASTM- D476	10.0% minimum
Reflective Elements	AASHTO- T250	30% minimum per manufacturer
Skid Resistant Elements		10% minimum per manufacturer

Note: Percentages are by weight.

The alkyd/maleic binder must shall consist of a mixture of synthetic resins (at least one synthetic resin must be solid at room temperature) and high boiling point plasticizers. At least one-half of the binder composition must be 100% maleic-modified glycerol of rosin and be no less than 15% by weight of the entire material formulation.

**971-10.3 Retroreflective Elements:** The reflective elements in the intermix shall be determined by the manufacturer and identified for on on the APL.

**971-10.4 Physical Requirements:** Laboratory samples shall be tested in accordance with ASTM- D4960 and shall meet the following criteria:

Property	Test Method	Minimum	Maximum
Softening Point	ASTM- D36	195°F	-
Hardness of Skid Resistance Elements	Moh's Scale	9	-
Indentation Resistance	ASTM -D7735* Type A Durometer	65	85
Impact Resistance	ASTM- D256, Method A	1.0 N·m	-
Flash Point	ASTM- D92	475°F	-

*\*The durometer and panel shall be at 80°F, with a 1000 g load applied. Instrument measurement shall be taken after 15 seconds.*

**971-10.4.1 Set To Bear Traffic Time:** *When applied at the temperatures and thicknesses specified by Section- 711, the material shall set to bear traffic in not more than two minutes.*

**971-10.4.2 Retroreflectivity:** *The white pavement markings shall attain an initial retroreflectance of not less than 275- mcd/lx·m<sup>2</sup>. The retroreflectance of the white pavement markings at the end of the three year period shall not be less than 150- mcd/lx·m<sup>2</sup>.*

**971-10.4.3 Skid Resistance:** *The surface of the pavement markings shall provide a minimum initial skid resistance value of 55- BPN (~~British Pendulum Number~~) when tested in accordance to ASTM -E303.*

**971-10.5 Application Properties:** *Application properties shall meet the requirements of Section- 711.*

**971-10.6 Packaging and Labeling:** *The thermoplastic material shall be packaged in suitable biodegradable or thermo-degradable containers which will not adhere to the product during shipment and storage. The container of thermoplastic material shall weigh approximately 50- pounds. The label shall warn the user that the material ~~shall~~ is to be heated in the range as recommended by the manufacturer.*

**PAVEMENT MARKING MATERIALS.**  
**(REV 12-21-15)**

SUBARTICLE 971-6.5.1 is deleted and the following substituted:

**971-6.5.1 Retroreflectivity:** The white pavement markings other than crosswalks and bicycle markings shall attain an initial retroreflectance of not less than 300 mcd/lx·m<sup>2</sup>. Crosswalks and bicycle markings shall attain initial retroreflectivity of not less than 275 mcd/lx·m<sup>2</sup>. Black pavement markings shall have a retroreflectance of less than 5 mcd/lx m<sup>2</sup>. The retroreflectance of the white pavement markings at the end of the three year period shall not be less than 150 mcd/lx·m<sup>2</sup>.

The following new Subarticle is added after Subarticle 971-9:

**971-10 High Friction Thermoplastic Material.**

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**971-10.2 Composition:**

Component	Test Method	White
Binder		18.0% minimum
TiO <sub>2</sub> , Type Rutile	ASTM D476	10.0% minimum
Reflective Elements	AASHTO T250	30% minimum per manufacturer
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Note: Percentages are by weight.

The alkyd/maleic binder shall consist of a mixture of synthetic resins (at least one synthetic resin must be solid at room temperature) and high boiling point plasticizers. At least one-half of the binder composition must be 100% maleic-modified glycerol of rosin and be no less than 15% by weight of the entire material formulation.

**971-10.3 Retroreflective Elements:** The reflective elements in the intermix shall be determined by the manufacturer and identified on the APL.

**971-10.4 Physical Requirements:** Laboratory samples shall be tested in accordance with ASTM D4960 and shall meet the following criteria:

Property	Test Method	Minimum	Maximum
Softening Point	ASTM D36	195°F	-
Hardness of Skid Resistance Elements	Moh's Scale	9	-
Indentation Resistance	ASTM D7735* Type A Durometer	65	85
Impact Resistance	ASTM D256, Method A	1.0 N·m	-
Flash Point	ASTM D92	475°F	-

\*The durometer and panel shall be at 80°F, with a 1000 g load applied. Instrument measurement shall be taken after 15 seconds.

**971-10.4.1 Set To Bear Traffic Time:** When applied at the temperatures and thicknesses specified by Section 711, the material shall set to bear traffic in not more than two minutes.

**971-10.4.2 Retroreflectivity:** The white pavement markings shall attain an initial retroreflectance of not less than  $275 \text{ mcd/lx}\cdot\text{m}^2$ . The retroreflectance of the white pavement markings at the end of the three year period shall not be less than  $150 \text{ mcd/lx}\cdot\text{m}^2$ .

**971-10.4.3 Skid Resistance:** The surface of the pavement markings shall provide a minimum initial skid resistance value of 55 BPN when tested in accordance to ASTM E303.

**971-10.5 Application Properties:** Application properties shall meet the requirements of Section 711.

**971-10.6 Packaging and Labeling:** The thermoplastic material shall be packaged in suitable biodegradable or thermo-degradable containers which will not adhere to the product during shipment and storage. The container of thermoplastic material shall weigh approximately 50 pounds. The label shall warn the user that the material is to be heated in the range as recommended by the manufacturer.