



Florida Department of Transportation

CHARLIE CRIST
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

STEPHANIE KOPELOUSOS
SECRETARY

July 20, 2007

Dr. Leslie McCarthy, PhD, P.E.
Program Operations Engineer
Federal Highway Administration
545 John Knox Road, Suite 200
Tallahassee, Florida 32303

Re: Office of Design, Specifications
Section 972
Proposed Specification: 9720000.D01 Recycled Plastic Products

Dear Dr. McCarthy:

We are submitting, for your approval, two copies of a proposed Supplemental Specification for Recycled Plastic Products.

This change was proposed by Chester Henson of the State Design Office to address differences between object markers and delineators and to eliminate inconsistencies between the current specifications and the Manual on Uniform Traffic Control Devices.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via Email to SP965DB or duane.brautigam@dot.state.fl.us.

If you have any questions relating to this specification change, please call Duane F. Brautigam, State Specifications Engineer at 414-4110.

Sincerely,

Signature on File

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

DFB/ft

Attachment

cc: General Counsel
Florida Transportation Builders' Assoc.
State Construction Engineer

RECYCLED PLASTIC PRODUCTS**(REV ~~6-4-07~~-17-07)**

SECTION 972 (Pages 875 – 878) is deleted and the following substituted:

**SECTION 972
RECYCLED PLASTIC PRODUCTS****972-1 Description.**

Recycled plastic products used shall be included on the Qualified Products List. For initial approval and annually thereafter, the producer shall furnish to the State Materials Engineer a certified test report from an approved independent test laboratory that shows the material meets all specifications herein. ~~In addition, a one-year exposure test in Florida will be required.~~

972-2 Definitions.

972-2.1 Recycled Plastic: Those plastics composed of post-consumer material or recovered industrial material only, or both, that may or may not have been subjected to additional processing steps designed to afford products such as regrind or reprocessed or reconstituted plastics.

972-2.2 Post-Consumer Materials: Those products generated by a business or consumer that have served their intended end use and that have since been separated or diverted from solid waste for the purpose of collection, recycling, and re-disposition.

972-2.3 Recovered Material: Materials and by-products that have been recovered or diverted from solid waste, but not including those materials and by-products generated from, and commonly used within, an original manufacturing process.

972-3 Materials.

The materials used for recycled plastic products shall consist of a minimum of 70% by weight of recycled plastic ~~and shall be uniform in composition throughout the product.~~ The products shall exhibit good workmanship and shall be free of burns, discoloration, contamination, and other objectionable marks or defects which affect appearance or serviceability. Only chemicals, including fillers and colorants, designed to inhibit photo degradation, biological/biochemical decomposition, insect infestation, or burning will be permitted to enhance durability. The use of sufficient additives to inhibit photo degradation over the lifetime of the product ~~are~~ *is* required.

972-3.1 Fence Posts: The posts shall be brown, approximating tree bark, to blend with the surroundings. They shall have no cracking, chipping, flaking, peeling or splintering in the final product. The product shall contain no more than 20% voids, by weight, over its length.

972-3.2 Delineator Posts: The product shall contain no more than 51% voids, by weight, over its length.

972-4 Physical Requirements.**972-4.1 Line Post Physical Requirements:****972-4.1.1 Minimum dimensions for line posts:**

Length: 8 feet.

Cross-section (Round post): 4 inch diameter;

Cross section (Square post): 4 by 4 inch minimum.

972-4.1.2 Straightness: The straightness of the post shall comply with 954-5 for timber fence posts.

972-4.1.3 Flexural Strength: The post shall meet the requirements of the latest edition of the Southern Pine Inspection Bureau's Standard Grading Rules for Southern Pine Lumber for No. 2SR Stress Rated Grade Timber.

972-4.1.4 Surface Finish: The post shall exhibit a homogeneous and smooth surface finish and be relatively free of indents or other surface imperfections.

972-4.2 Delineator Post Physical Requirements:

972-4.2.1 Marking: The top of the post on the side away from traffic shall be date stamped showing the month and year of fabrication. The numerals shall be at least 1/2 inch in height and shall be either die stamped or legibly stamped with permanent ink.

972-4.2.2 Dimensions: The post shall have a minimum width of 3 inches facing traffic and of such length to generally provide a height of 48 inches above the pavement surface.

972-4.2.3 Color: The post shall be opaque white. The yellowness index shall not exceed 12 when tested in accordance with ASTM D 1925 or ASTM E 313. The daylight 45 degree, 0 degree luminous directional reflectance shall be a minimum of 70 when tested in accordance with ASTM E 1347.

972-4.2.4 Retroreflective Sheeting: *The reflective sheeting shall be Types III, IV, V or VII and meet the requirements of Section 994. The reflective sheeting shall have a minimum width of 3 inches and have a minimum area of 30 inch².*

972-4.2.5 Heat Resistance: The post shall be conditioned a minimum of two hours in an oven at $140 \pm 30^{\circ}\text{F}$. The conditioned post shall be capable of straightening itself within 30 seconds when bent 180 degrees at the midpoint for each of four bends. The test on each post shall be completed within two minutes of removal from oven.

972-4.2.6 Cold Resistance: The post shall be conditioned a minimum of two hours at $-5 \pm 3^{\circ}\text{F}$ in an environmentally controlled test chamber. Testing shall be performed in the environmental chamber.

972-4.2.7 Impact Resistance:

(1) The post shall not be adversely affected when a device approximately at the center of the post, bends the free half of the post to a 90 degree angle with the remaining section being held stationary. The post shall return to its original shape within 60 seconds for each of four separate bends.

(2) A steel ball weighing 2 pounds shall be dropped a distance of 5 feet through a virtually frictionless vertical guide to impact the surface of the post. The surface of the post being struck by the steel ball shall be in a horizontal position with the post supported and held in position at both ends. The post shall be subjected to five

impact tests concentrated near the middle of the post. Fracturing, cracking or splitting of the post shall constitute failure.

972-4.2.87 Impact Performance: The post, installed according to manufacturer's recommendations, shall be capable of returning to a vertical position ± 5 degrees and remain serviceable after receiving ten vehicle impacts at 55 mph at a 20 degree angle. The ambient temperature must be no less than 40°F.

972-4.2.98 Resistance to Herbicides: The posts shall be sprayed or receive a coating of the herbicide(s) currently being used by the Department, and this coating shall remain on the posts for a minimum of 48 hours and then thoroughly rinsed. The posts shall show no significant change in color, flexibility, nor integrity when subjected to this herbicide exposure.

972-5 Predicted Service Life.

In-service line posts shall provide a minimum acceptable performance life of 35 years. Conditions to be considered in establishing the minimum acceptable performance life shall include, but are not limited to, the following:

- a. Insect infestations, especially by fire ants and termites causing a weight reduction resulting in a loss in strength exceeding 10% of its original strength.
- b. Rotting or erosion due to soil micro-organisms.
- c. Any cracks, breaks or stress cracks.
- d. Water uptake exceeding 10% by weight of its original weight over its predicted lifetime.
- e. Non-flammability-retarded susceptibility to burning via appropriate additives.
- f. Straightness as noted in 972-4.2.

The test methods to comply with the above shall be in accordance with FM 5-557.

972-6 Sampling.

One additional product per 1,000, or a minimum of one per order shall be included in the order for Department testing.

972-7 Certification.

The manufacturer shall certify that such products have been tested in accordance with this specification and found to meet the requirements. A certification shall be provided for each LOT of a shipment. The manufacturer shall also certify the following:

- a. The source of the recycled plastic waste, including the state (FL, GA, etc.) from which the recycled plastic was obtained, and type of waste (consumer or industrial).
- b. The total percent of recycled plastic in the final product.

Any marked property variations from the original test values for a material or evidence of inadequate field performance of a material will be considered as sufficient proof to remove the material from the Department's Qualified Products Lists.

RECYCLED PLASTIC PRODUCTS**(REV 7-17-07)**

SECTION 972 (Pages 875 – 878) is deleted and the following substituted:

**SECTION 972
RECYCLED PLASTIC PRODUCTS****972-1 Description.**

Recycled plastic products used shall be included on the Qualified Products List. For initial approval and annually thereafter, the producer shall furnish to the State Materials Engineer a certified test report from an approved independent test laboratory that shows the material meets all specifications herein.

972-2 Definitions.

972-2.1 Recycled Plastic: Those plastics composed of post-consumer material or recovered industrial material only, or both, that may or may not have been subjected to additional processing steps designed to afford products such as regrind or reprocessed or reconstituted plastics.

972-2.2 Post-Consumer Materials: Those products generated by a business or consumer that have served their intended end use and that have since been separated or diverted from solid waste for the purpose of collection, recycling, and re-disposition.

972-2.3 Recovered Material: Materials and by-products that have been recovered or diverted from solid waste, but not including those materials and by-products generated from, and commonly used within, an original manufacturing process.

972-3 Materials.

The materials used for recycled plastic products shall consist of a minimum of 70% by weight of recycled plastic. The products shall exhibit good workmanship and shall be free of burns, discoloration, contamination, and other objectionable marks or defects which affect appearance or serviceability. Only chemicals, including fillers and colorants, designed to inhibit photo degradation, biological/biochemical decomposition, insect infestation, or burning will be permitted to enhance durability. The use of sufficient additives to inhibit photo degradation over the lifetime of the product is required.

972-3.1 Fence Posts: The posts shall be brown, approximating tree bark, to blend with the surroundings. They shall have no cracking, chipping, flaking, peeling or splintering in the final product. The product shall contain no more than 20% voids, by weight, over its length.

972-3.2 Delineator Posts: The product shall contain no more than 51% voids, by weight, over its length.

972-4 Physical Requirements.**972-4.1 Line Post Physical Requirements:****972-4.1.1 Minimum dimensions for line posts:**

Length: 8 feet.

Cross-section (Round post): 4 inch diameter;

Cross section (Square post): 4 by 4 inch minimum.

972-4.1.2 Straightness: The straightness of the post shall comply with 954-5 for timber fence posts.

972-4.1.3 Flexural Strength: The post shall meet the requirements of the latest edition of the Southern Pine Inspection Bureau's Standard Grading Rules for Southern Pine Lumber for No. 2SR Stress Rated Grade Timber.

972-4.1.4 Surface Finish: The post shall exhibit a homogeneous and smooth surface finish and be relatively free of indents or other surface imperfections.

972-4.2 Delineator Post Physical Requirements:

972-4.2.1 Marking: The top of the post on the side away from traffic shall be date stamped showing the month and year of fabrication. The numerals shall be at least 1/2 inch in height and shall be either die stamped or legibly stamped with permanent ink.

972-4.2.2 Dimensions: The post shall have a minimum width of 3 inches facing traffic and of such length to generally provide a height of 48 inches above the pavement surface.

972-4.2.3 Color: The post shall be opaque white. The yellowness index shall not exceed 12 when tested in accordance with ASTM D 1925 or ASTM E 313. The daylight 45 degree, 0 degree luminous directional reflectance shall be a minimum of 70 when tested in accordance with ASTM E 1347.

972-4.2.4 Retroreflective Sheeting: The reflective sheeting shall be Types III, IV, V or VII and meet the requirements of Section 994. The reflective sheeting shall have a minimum width of 3 inches and have a minimum area of 30 inch².

972-4.2.5 Heat Resistance: The post shall be conditioned a minimum of two hours in an oven at 140 ± 30°F. The conditioned post shall be capable of straightening itself within 30 seconds when bent 180 degrees at the midpoint for each of four bends. The test on each post shall be completed within two minutes of removal from oven.

972-4.2.6 Cold Resistance: The post shall be conditioned a minimum of two hours at -5 ± 3°F in an environmentally controlled test chamber. Testing shall be performed in the environmental chamber.

972-4.2.7 Impact Resistance:

(1) The post shall not be adversely affected when a device approximately at the center of the post, bends the free half of the post to a 90 degree angle with the remaining section being held stationary. The post shall return to its original shape within 60 seconds for each of four separate bends.

(2) A steel ball weighing 2 pounds shall be dropped a distance of 5 feet through a virtually frictionless vertical guide to impact the surface of the post. The surface of the post being struck by the steel ball shall be in a horizontal position with the post supported and held in position at both ends. The post shall be subjected to five impact tests concentrated near the middle of the post. Fracturing, cracking or splitting of the post shall constitute failure.

972-4.2.8 Impact Performance: The post, installed according to manufacturer's recommendations, shall be capable of returning to a vertical position

±5 degrees and remain serviceable after receiving ten vehicle impacts at 55 mph at a 20 degree angle. The ambient temperature must be no less than 40°F.

972-4.2.9 Resistance to Herbicides: The posts shall be sprayed or receive a coating of the herbicide(s) currently being used by the Department, and this coating shall remain on the posts for a minimum of 48 hours and then thoroughly rinsed. The posts shall show no significant change in color, flexibility, nor integrity when subjected to this herbicide exposure.

972-5 Predicted Service Life.

In-service line posts shall provide a minimum acceptable performance life of 35 years. Conditions to be considered in establishing the minimum acceptable performance life shall include, but are not limited to, the following:

- a. Insect infestations, especially by fire ants and termites causing a weight reduction resulting in a loss in strength exceeding 10% of its original strength.
- b. Rotting or erosion due to soil micro-organisms.
- c. Any cracks, breaks or stress cracks.
- d. Water uptake exceeding 10% by weight of its original weight over its predicted lifetime.
- e. Non-flammability-retarded susceptibility to burning via appropriate additives.
- f. Straightness as noted in 972-4.2.

The test methods to comply with the above shall be in accordance with FM 5-557.

972-6 Sampling.

One additional product per 1,000, or a minimum of one per order shall be included in the order for Department testing.

972-7 Certification.

The manufacturer shall certify that such products have been tested in accordance with this specification and found to meet the requirements. A certification shall be provided for each LOT of a shipment. The manufacturer shall also certify the following:

- a. The source of the recycled plastic waste, including the state (FL, GA, etc.) from which the recycled plastic was obtained, and type of waste (consumer or industrial).
- b. The total percent of recycled plastic in the final product.

Any marked property variations from the original test values for a material or evidence of inadequate field performance of a material will be considered as sufficient proof to remove the material from the Department's Qualified Products Lists.