Florida Department of Transportation

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SECRETARY

December 11, 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 948
Proposed Specification: **9480200.D01**

Dear Dr. McCarthy:

We are submitting, for your approval, two copies of a proposed Supplemental Specification for Miscellaneous Types of Pipe – Corrugated Poly ethylene Pipe.

This change was proposed by Tom Malerk of the State Materials Office to update Table 1 information due to research and changes to AASHTO M294..

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,

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

DFB/dr
Attachment
cc: Gregory Jones, General Counsel
Florida Transportation Builders' Assoc.
State Construction Engineer

MISCELLANEOUS TYPES OF PIPE – CORRUGATED POLYETHYLENE PIPE.

(REV 10-16-07)

SUBARTICLE 948-2.3.1 (of the Supplemental Specification) is deleted and the following substituted:

948-2.3.1 General: Class I corrugated Polyethylene Pipe used for side drain, ~~cross drain,~~ storm *and cross* drain or french drain shall meet the requirements of AASHTO M 294. Class II Corrugated Pipe shall meet the requirements of AASHTO M 294 and ~~948-2.3.1~~ *the additional requirements as specified herein.* Corrugations may only be annular.~~;~~ *Ensure that* pipe *resin* conform~~s ing~~ to *ASTM D3350* ~~the~~ minimum cell classification ~~3~~*4*35400*C except that cell class cell class 435400E*~~E~~ may be used if the combination of color and UV stabilizer provides the same or better UV protection *than that of resin cell class* ~~as 3~~*4*35400C. Mitered end sections are not to be constructed of polyethylene. Use only concrete or metal mitered end sections as indicated in the Design Standards.

Provide certification of the actual mean diameter of pipe shipped to the project. Include in the certification the minimum and maximum diameters used to certify the actual mean diameter. The certification shall be attested to by a person having legal authority to bind the manufacturing company.

Ensure that the pipe joints have been tested at the plant hydrostatically at the specified pressure using test methods in ASTM D 3212 and witnessed by the Engineer.

~~Obtain pipe products from producers listed on the Department's List of Qualified Flexible Pipe Manufacturing Plants, which may be viewed at the following:~~
~~www.dot.state.fl.us/statematerialsoffice/quality/programs/qualitycontrol/materialslistings/sources/drainagesource.pdf .~~

Ensure that each shipment of products to the job site includes a list of products and each product has an affixed legible stamp mark of the plant, indicating its compliance with the requirements of the plant's Department approved Quality Control Plan and Contract Documents.

~~Accept responsibility of either obtaining products from another approved plant, or await re-approval of the plant, when the plant is removed from the Department's list of Flexible Pipe Manufacturing Plants.~~

~~The Engineer will not allow changes in Contract Time or completion dates as a result of the plant's loss of qualification. Accept responsibility for all delay costs or other costs associated with the loss of plant's qualification.~~

SUBARTICLE 948-2.3.2 (Pages 846 and 847) is deleted and the following substituted:

948-2.3.2 Additional Requirements for Class II Polyethylene Pipe: Meet the following requirements:

Table 1 Stress Crack Resistance of Pipes			
Pipe Location	Test Method	Test Conditions	Requirement
Pipe Liner	FM 5-572, Procedure A	10% Igepal solution at 50°C and 600 psi applied stress 5 replicates	Average failure time of the pipe liner shall be ≥17~~2~~*8* hours, no single value shall be less than 1*3*~~2~~ hours..
Pipe Corrugation (molded plaque)	ASTM F 2136	10% Igepal solution at 50°C *and* 600 psi applied stress*, 5 replicates*	Average failure time shall be ≥24 hours, no single value shall be less than 17 hours.
Junction*	FM 5-572, Procedure B and FM 5-573 ASTM D 2837	Test temperature 80°C and applied stresses of 650 and 450 psi. Test temperature 70°C and applied stress of 650 psi; 5 replicates at each ~~stress level~~*test condition*	*Condition A:* ~~Calculate three constants~~ ~~F~~*Determine f*ailure time at 500 psi at 23°C ≥ 100 years (95% ~~statistical~~ *lower* confidence) *using 15 failure time values.* *Condition B:* *The average failure times must be equal to or greater than the following criteria;* *110 hr at 80°C 650psi* *430 hr at 80°C 450 psi* *500 hr at 70°C 650 psi*
		Single Test: Test temperature 80°C and applied stress of 650 psi.; 5 replicates	The *average* failure time must be equal *to* or greater than ~~the calculated value using the three constants from the three points test~~*110 hr*
Longitudinal Profile*	FM 5-572, Procedure C, and FM 5-573 ASTM 2837	Test temperature 80°C and applied stresses of 650 and 450 psi. Test temperature 70°C at applied stress of 650 psi; 5 replicates at each ~~stress level~~*test condition*	*Condition A:* *Determine failure time at 500 psi at 23°C ≥ 100 years (95% lower confidence) using 15 failure time values.* *Condition B:* *The average failure times must be equal to or greater than the following criteria;* *110 hr at 80°C 650psi* *430 hr at 80°C 450 psi* *500 hr at 70°C 650 psi* ~~Calculate three constants Failure time at 500 psi at 23°C ≥ 100 years (95% statistical confidence)~~

Table 1			
		Single Test: Test temperature 80°C and applied stress of 650 psi.; 5 replicates	*The average failure time must be equal to or greater than 110 hr* ~~The failure time must be equal or greater than the calculated value using the three constants from the three points test~~
Oxidation Resistance of Pipes			
Pipe Location	Test Method	Test Conditions	Requirement
Liner and/or Crown	OIT Test (ASTM D 3895)	2 replicates (to determine initial OIT value)	25 minutes, minimum
Liner and/or Crown	Incubation test FM 5 574 and OIT test ASTM D 3895	Three samples for incubation of 195 days at 80°C and applied stress of 250 psi. One OIT test per each sample	Average of 3 ± 1 minutes (no values shall be less than 2 minutes)
Note: FM = Florida Method of Test. * Required only when corrugation resin is different than liner resin. * A higher test temperature (90° C) may be used if supporting test data acceptable to the State Materials Engineer is submitted and approved in writing.			

SUBARTICLE 948-2.3.3 (Page 847) is deleted and the following substituted:

948-2.3.3 Certification: Furnish to the Engineer certification from the manufacturer for each pipe diameter *manufacturers LOT* to be incorporated into the project that the pipe meets the requirements of these Specifications.

Manufacturers seeking evaluation of a product in accordance with Departmental procedures must submit test reports conducted by a laboratory deemed to be appropriately qualified by the Plastics Pipe Institute and acceptable to the State Materials Engineer. Submit this information to the Director, State Materials Office.

948-2.3.4 Verification Samples: *Furnish verification samples as directed by the Engineer.*

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Provide certification of the actual mean diameter of pipe shipped to the project. Include in the certification the minimum and maximum diameters used to certify the actual mean diameter. The certification shall be attested to by a person having legal authority to bind the manufacturing company.

Ensure that the pipe joints have been tested at the plant hydrostatically at the specified pressure using test methods in ASTM D 3212 and witnessed by the Engineer.

Ensure that each shipment of products to the job site includes a list of products and each product has an affixed legible stamp mark of the plant, indicating its compliance with the requirements of the plant's Department approved Quality Control Plan and Contract Documents.

SUBARTICLE 948-2.3.2 (Pages 846 and 847) is deleted and the following substituted:

948-2.3.2 Additional Requirements for Class II Polyethylene Pipe: Meet the following requirements:

Table 1			
Stress Crack Resistance of Pipes			
Pipe Location	Test Method	Test Conditions	Requirement
Pipe Liner	FM 5-572, Procedure A	10% Igepal solution at 50^{o}C and 600 psi applied stress 5 replicates	Average failure time of the pipe liner shall be ≥18 hours, no single value shall be less than 13 hours..

Table 1			
Pipe Corrugation (molded plaque)	ASTM F 2136	10% Igepal solution at 50°C and 600 psi applied stress, 5 replicates	Average failure time shall be ≥24 hours, no single value shall be less than 17 hours.
Junction*	FM 5-572, Procedure B and FM 5-573 ASTM D 2837	Test temperature 80°C and applied stresses of 650 and 450 psi. Test temperature 70°C and applied stress of 650 psi; 5 replicates at each test condition	Condition A: Determine failure time at 500 psi at 23°C ≥ 100 years (95% lower confidence) using 15 failure time values. Condition B: The average failure times must be equal to or greater than the following criteria; 110 hr at 80°C 650psi 430 hr at 80°C 450 psi 500 hr at 70°C 650 psi
		Single Test: Test temperature 80°C and applied stress of 650 psi.; 5 replicates	The average failure time must be equal to or greater than 110 hr
Longitudinal Profile*	FM 5-572, Procedure C, and FM 5-573 ASTM 2837	Test temperature 80°C and applied stresses of 650 and 450 psi. Test temperature 70°C at applied stress of 650 psi; 5 replicates at each test condition	Condition A: Determine failure time at 500 psi at 23°C ≥ 100 years (95% lower confidence) using 15 failure time values. Condition B: The average failure times must be equal to or greater than the following criteria; 110 hr at 80°C 650psi 430 hr at 80°C 450 psi 500 hr at 70°C 650 psi
		Single Test: Test temperature 80°C and applied stress of 650 psi.; 5 replicates	The average failure time must be equal to or greater than 110 hr
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Pipe Location	Test Method	Test Conditions	Requirement
Liner and/or Crown	OIT Test (ASTM D 3895)	2 replicates (to determine initial OIT value)	25 minutes, minimum
Liner and/or Crown	Incubation test FM 5 574 and OIT test ASTM D 3895	Three samples for incubation of 195 days at 80°C and applied stress of 250 psi. One OIT test per each sample	Average of 3 ± 1 minutes (no values shall be less than 2 minutes)

Table 1
Note: FM = Florida Method of Test.* Required only when corrugation resin is different than liner resin.* A higher test temperature (90º C) may be used if supporting test data acceptable to the State Materials Engineer is submitted and approved in writing.

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