



## Florida Department of Transportation

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GOVERNOR

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**ANANTH PRASAD, P.E.**  
SECRETARY

May 11, 2011

Monica Gourdine  
Program Operations Engineer  
Federal Highway Administration  
545 John Knox Road, Suite 200  
Tallahassee, Florida 32303

Re: Office of Design, Specifications  
Section 471  
Proposed Specification: 4710000 Polymeric Fender Systems.

Dear Ms. Gourdine:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

These changes were proposed by Gevin McDaniel of the Structures Design Office to add requirements for polymeric piles.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via Email to SP965RP or rudy.powell@dot.state.fl.us.

If you have any questions relating to this specification change, please call Rudy Powell, State Specifications Engineer at 414-4280.

Sincerely,

Rudy Powell, Jr., P.E.  
State Specifications Engineer

RP/cah

Attachment

cc: Gregory Jones, Chief Civil Litigation  
Florida Transportation Builders' Assoc.  
State Construction Engineer

**POLYMERIC FENDER SYSTEMS.  
(REV ~~45-119~~10-11)**

SECTION 471 (Pages 633-634) is deleted and the following substituted:

**SECTION 471  
~~PLASTIC~~ **POLYMERIC** FENDER SYSTEMS ~~COMPONENTS~~**

**471-1 Description.**

Construct fender systems using ~~plastic~~ *polymeric* components in accordance with *this Section*, the ~~Contract Plans~~, ~~and~~ *Design Standards* and *the Qualified Products List (QPL) Drawings*.

**471-2 Materials.**

Meet the following requirements:

- Fiberglass fiber reinforced lumber (Dimensional Lumber)*  
.....*Section 973*
- Fiberglass structurally reinforced composite lumber* ~~Structural Plastics~~  
*(Wales)*.....*Section 973*
- Concrete used to fill hollow piles*.....*Section 347*

***471-3 Polymeric Pile Product Acceptance.***

~~Wales and Dimensional Lumber: For fiberglass fiber reinforced lumber and fiberglass structurally reinforced composite lumber see Section 973 for requirements.~~  
~~Polymeric Piles: Use only polymeric pile systems configurations listed on the Department's Qualified Products List (QPL).~~

~~**471-3.1 QPL Acceptance Criteria for Polymeric Piles.**~~

~~Manufacturers seeking evaluation of products for inclusion on the QPL must submit an application in accordance with Section 6, independently certified test reports, written certification that the ~~system~~ piling configuration meets the requirements of this Section, ~~applicable Design Standards~~, and the following ~~Evaluation Criteria~~:~~

- ~~1. Design:~~
  - ~~a. Design ~~fender systems~~ fender piling configurations and connections in accordance with the latest edition of the FDOT Structures Design Guidelines and applicable Structures Design Bulletins based on the ~~Vendor's~~ desired ~~Energy absorption~~ capacity rating.~~
  - ~~b. All ~~D~~ design ~~C~~ calculations and ~~D~~ design ~~D~~ details must be signed and sealed by a Professional Engineer licensed in the State of Florida.~~
- ~~2. Submittals:~~
  - ~~a. ~~Submit a completed Product Evaluation Application.~~~~
  - ~~b. ~~Submit~~ Signed and sealed design calculations. Design calculations may be either by hand or by a computer program with hand calculations verifying the program output.~~

~~3. Durability data from an independent lab verifying a minimum maintenance free design life of 50 years with strength losses not exceeding 25% at year 50.~~

~~4b. Report from an ~~accredited (AMRL or A2LA?)~~ independent lab verifying the flexural ~~mechanical~~ properties of the piling as derived from ASTM D 6109 with the following modification. Supports shall be located to provide a minimum span to depth ratio of 20:1.~~

~~5c. For pile sections remaining hollow under service conditions, a report from an ~~accredited (AMRL or A2LA?)~~ independent lab verifying a minimum bolt pull-through and crushing resistance of ~~25~~10 kip when equipped with ~~vendor's~~ manufacturer's detailed connection hardware at a maximum distance of two feet four inches (4") from the end of a pile with a minimum length of ~~eight~~four feet (8'-0").~~

~~6d. Submit ~~s~~Signed and sealed pile configuration drawings in design details in 11" x 17" MicroStation, AutoCAD or PDF format depicting information required by the latest edition of the FDOT Structures Design Guidelines and applicable Structures. Show all details specific to the how the pile configuration fits within the fender system. These details supplement Design Bulletins Standards Index No. 21900. the Polymeric Fender System Design Standards. Include the following:~~

- ~~a. Notes specific to the piling used in fender system~~
- ~~b. Pile properties, sizes and spacing~~
- ~~c. Energy Capacity of the fender system~~
- ~~d. Connections details if different from those shown on Design Standards Index No. 21900.~~

~~7e. Detailed material specifications showing material type, quality, certifications, acceptance and rejection criteria and placement procedures.~~

~~8f. Other information pertinent to the design and performance of the ~~fender system~~ pile configuration as necessary.~~

~~9g. A ~~well-documented~~ field construction manual describing in detail, with illustrations, construction requirements and the step-by-step construction sequence for the pile handling and installation. Submit manual in 8.5" x 11" format in either pdf PDF or MS Word format.~~

#### **471-43 Construction Details.**

*Unless otherwise shown in the ~~vendor's~~ manufacturer's approved field construction manual, use the following construction details.*

Protect materials at all times against exposure to extreme heat or impact. Transport ~~Structural Plastic~~ **products** in a manner that will minimize scratching or damage to the outer surfaces, stack on dunnage above ground so that it may be easily inspected and store in a manner that will avoid damage. Handle and lift ~~Structural Plastic~~ **products** with nylon slings. Do not use sharp instruments in handling the product. ~~Structural Plastic~~ **Products** damaged in shipping or handling will be rejected.

~~Structural Plastic~~ **Products** sections containing cracks in the reinforcing rods or cracks, partial or full depth, across the section or splits will be rejected.

Cut, bevel, drill, countersink and otherwise install ~~Structural Plastic~~ **products** in accordance with the manufacturer's recommendations. Set all material accurately to required levels and lines, with members plumb and true and accurately cut and fitted.

Securely attach all materials to substrate by anchoring and fastening as shown on the plans. Perform all cutting and drilling in a manner that allows for the collection of all debris and dispose of properly.

Install piles in accordance with Section 455. ~~After driving, cut off piles at the elevation shown on the plans to a tolerance of  $\pm 0.0''/ 2.0''$  using sawing or other means as approved by the Engineer to provide a smooth level cut.~~

#### **471-54 Method of Measurement.**

The quantity of dimensional fiberglass fiber reinforced lumber, *and* fiberglass structurally reinforced composite lumber to be paid for will be the plan quantity, in feet board measure, computed based upon the dimensions shown in the ~~p~~*P*Plans.

~~The quantity of fiberglass structurally reinforced composite~~ *polymeric* piles to be paid will be *lump sum* ~~the length in feet furnished and driven to the authorized lengths, as approved by the Engineer.~~

#### **471-65 Basis of Payment.**

Price and payment *for plastic marine lumber* will be full compensation for the work specified in this Section including all material, storage costs, disposal of unused material and waste, transportation costs, labor, equipment, fasteners and other necessary items required for completing the work. No separate payment will be made for plates, bolts, screws or other hardware necessary to complete the work.

~~Price and payment for Plastic *Polymeric piles* Fender System Components including fiberglass structurally reinforced composite piles will be full compensation for all labor, equipment and materials required to furnish and install the piles to the *pile cut-off* elevations shown in the ~~p~~*P*Plans. No separate payment will be made for pile cut-offs. Plastic *Polymeric* Fender System Components including fiberglass structurally reinforced composite piles to be paid for under Section 455.~~

Payment will be made under:

Item No. 471-1	<i>Fender System</i> , Plastic Marine Lumber – MB.
<i>Item No. 471-2</i>	<i>Fender System, Polymeric Piles – LS</i>

**POLYMERIC FENDER SYSTEMS.**

**(REV 5-10-11)**

SECTION 471 (Pages 633-634) is deleted and the following substituted:

**SECTION 471  
POLYMERIC FENDER SYSTEMS**

**471-1 Description.**

Construct fender systems using components in accordance with this Section, the Plans, Design Standards and the Qualified Products List (QPL) Drawings.

**471-2 Materials.**

Meet the following requirements:

- Fiberglass fiber reinforced lumber (Dimensional Lumber)  
.....Section 973
- Fiberglass structurally reinforced composite lumber (Wales)  
.....Section 973
- Concrete used to fill hollow piles .....Section 347

**471-3 Polymeric Pile Product Acceptance.**

Use polymeric pile configurations listed on the Department’s QPL.

Manufacturers seeking evaluation of products for inclusion on the QPL must submit an application in accordance with Section 6, independently certified test reports, written certification that the piling configuration meets the requirements of this Section, and the following:

1. Design:
  - a. Design fender piling configurations and connections in accordance with the latest edition of the FDOT Structures Design Guidelines and applicable Structures Design Bulletins based on the desired energy capacity rating.
  - b. All design calculations and design details must be signed and sealed by a Professional Engineer licensed in the State of Florida.
2. Submittals:
  - a. Signed and sealed design calculations. Design calculations may be either by hand or by a computer program with hand calculations verifying the program output.
  - b. Report from an independent lab verifying the flexural properties of the piling as derived from ASTM D 6109 with the following modification. Supports shall be located to provide a minimum span to depth ratio of 20:1.
  - c. For pile sections remaining hollow under service conditions, a report from an independent lab verifying a minimum bolt pull-through and crushing resistance of 10 kip when equipped with manufacturer’s detailed connection hardware at a maximum distance of two feet from the end of a pile with a minimum length of four feet.

d. Signed and sealed pile configuration drawings in 11" x 17" PDF format depicting information required by the latest edition of the FDOT Structures Design Guidelines and applicable Structures Design Bulletins.

e. Detailed material specifications showing material type, quality, certifications, acceptance and rejection criteria and placement procedures.

f. Other information pertinent to the design and performance of the pile configuration as necessary.

g. A field construction manual describing in detail, with illustrations, construction requirements and the step-by-step construction sequence for the pile handling and installation. Submit manual in 8.5" x 11" in PDF format.

#### **471-4 Construction Details.**

Unless otherwise shown in the manufacturer's approved field construction manual, use the following construction details.

Protect materials at all times against exposure to extreme heat or impact. Transport products in a manner that will minimize scratching or damage to the outer surfaces, stack on dunnage above ground so that it may be easily inspected and store in a manner that will avoid damage. Handle and lift products with nylon slings. Do not use sharp instruments in handling the product. Products damaged in shipping or handling will be rejected.

Products containing cracks in the reinforcing rods or cracks, partial or full depth, across the section or splits will be rejected.

Cut, bevel, drill, countersink and otherwise install products in accordance with the manufacturer's recommendations. Set all material accurately to required levels and lines, with members plumb and true and accurately cut and fitted. Securely attach all materials to substrate by anchoring and fastening as shown on the plans. Perform all cutting and drilling in a manner that allows for the collection of all debris and dispose of properly.

Install piles in accordance with Section 455.

#### **471-5 Method of Measurement.**

The quantity of dimensional fiberglass fiber reinforced lumber and fiberglass structurally reinforced composite lumber to be paid for will be the plan quantity, in feet board measure, computed based upon the dimensions shown in the Plans.

The quantity of polymeric piles to be paid will be lump sum.

#### **471-6 Basis of Payment.**

Price and payment for plastic marine lumber will be full compensation for the work specified in this Section including all material, storage costs, disposal of unused material and waste, transportation costs, labor, equipment, fasteners and other necessary items required for completing the work. No separate payment will be made for plates, bolts, screws or other hardware necessary to complete the work.

Price and payment for polymeric piles will be full compensation for all labor, equipment and materials required to furnish and install the piles to the pile cut-off elevations shown in the Plans.

Payment will be made under:

Item No. 471-1          Fender System, Plastic Marine Lumber – MB.

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All Jobs

Item No. 471-2

Fender System, Polymeric Piles - LS