



## Florida Department of Transportation

**CHARLIE CRIST**  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

**STEPHANIE KOPELOUSOS**  
SECRETARY

December 30, 2010

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

Re: Office of Design, Specifications  
Section 783  
Proposed Specification: 7830102 Intelligent Transportation Systems – Fiber Optic Cable  
and Interconnect

Dear Ms. Gourdine:

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

The changes are proposed by Gene Glotzbach to remove duplicate text related to buried warning tape and pulling strength of cable. Clarified that cover text requirements apply to both pull and splice boxes.

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,

Signature on File

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

RP/ft

Attachment

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

## INTELLIGENT TRANSPORTATION SYSTEMS-FIBER OPTIC CABLE AND INTERCONNECT.

(REV ~~11-210-1011-23-10~~)-(FA ~~1-27-10~~)-(7-10)

SUBARTICLE 783-1.2.1.4 (of the Supplemental Specifications) is deleted and the following substituted:

**783-1.2.1.4 Strength Member:** Ensure that the fiber optic cable contains a dielectric central strength member and dielectric outside strength member to prevent buckling of the cable and provide tensile strength. Ensure that the fiber optic cable can withstand a pulling tension of 600 ~~lbs. pounds during installation without increasing the fiber attenuation more than 0.8 decibel per mile, without changing other optical fiber characteristics after the tensile load is removed, and~~ without damage to any components of the fiber optic cable.

SUBARTICLE 783-1.2.4 (of the Supplemental Specifications) is deleted and the following substituted:

**783-1.2.4 Patch Panels:** Ensure that the patch panel is compatible with the fiber optic cable being terminated and color-coded to match the optical fiber color scheme. Ensure that the patch panel has a minimum of ~~twelve-12~~ ST-type panel connectors. Ensure that the patch panel dimensions do not exceed 14 x 6 x 4 inches for fiber counts of twelve or less.. Ensure the patch panel is suitable for mounting within an approved cabinet at the field device location. Ensure patch panels are sized to accommodate specified coupler housings and maintain sufficient bend radius for cables to maintain their specified optical performance. Ensure the patch panel is sized to occupy the minimum space required to adequately accommodate fiber capacity.

**783-1.2.4.1 Pre-terminated Patch Panels:** Ensure that the pre-terminated patch panel is a termination panel that includes a factory installed all-dielectric SMF cable stub. Ensure that the panel includes factory-installed and terminated ST-type panel connectors. Ensure that the cable stub is of adequate length to splice the stub and provide a fiber connection between the panel and the backbone fiber cable or as directed by the Engineer.

**783-1.2.4.2 Field Assembled and Terminated Patch Panels:** Ensure that the field-assembled patch panel is a termination panel that includes a connector panel and the hardware required to mount the patch panel within an approved cabinet at the field device location and connect the panel to the backbone fiber cable.

**783-1.2.4.2.1 Connector Panel:** Ensure that the connector panel provides ~~twelve-12~~ ST-type, bulkhead-mount coupling connectors. Ensure that each coupling connector allows connection of a cable terminated on one side of the panel to a cable on the opposite side.

Ensure that each bulkhead-mount coupling connector includes a locknut for mounting the connector in predrilled or punched holes in the connector panel.

SUBARTICLE 783-2.2.2 (of the Supplemental Specifications) is deleted and the following substituted:

**783-2.2.2 Warning Tape:** Ensure that the buried cable warning tape is flexible, elastic material 3 inches wide, 6 mil thick, intended for burial and use as an underground utility warning notice. Ensure that the surface of the warning tape is coated and sealed to prevent deterioration caused by harsh soil elements. Ensure that the tape material and ink colors do not change when exposed to acids, alkalis, and other destructive chemical variances commonly found in Florida soils. Ensure that the warning tape color is orange as required by the American Public Works Association (APWA) Uniform Color Code, and has “CAUTION: FDOT FIBER OPTIC CABLE BURIED BELOW,” or other wording approved by the Engineer, permanently printed on its surface.

Include buried cable warning tape with all conduit.

~~Include buried cable warning tape with all conduit.~~

SUBARTICLE 783-3.1 (of the Supplemental Specifications) is deleted and the following substituted:

**783-3.1 Description:** Furnish and install pull boxes and splice boxes of the type, size, and quantity as shown in the plans. Ensure that pull boxes and splice boxes ~~also conform to meet~~ the requirements of Section 635. Use only equipment and components that ~~meet the requirements of these minimum specifications, and~~ are listed on the Department’s Approved Product List (APL).

Use pull boxes and splice boxes that provide:

1. At-grade access to fiber optic cables housed within conduit systems used for Department ITS communications.
2. At-grade access to aid in the installation of fiber optic cable.
3. Protection for installed fiber optic cable.
4. Adequate space for cable storage and splice enclosures.

Ensure that pull boxes and splice boxes containing fiber optic cable do not contain power cables for ITS devices or other equipment.

SUBARTICLE 783-3.2 (of the Supplemental Specifications) is deleted and the following substituted:

### **783-3.2 Materials:**

**783-3.2.1 General Requirements:** Ensure that all pull boxes and splice boxes are compatible with the fiber optic cable and are approved by the Engineer. ~~Use pull boxes and splice boxes that are stackable and are structurally designed to meet or exceed ANSI Tier 15 loading requirements. Ensure that pull boxes and splice boxes:~~

- ~~1. Are rated as having a minimum compressive strength of 20,000 pounds per square inch, and are suitable for installation and use through a temperature range of -40° to 194°F.~~

- ~~\_\_\_\_\_ 2. Are rated as having a flexural strength of 6,000 pounds per square inch as required in the ASTM D790 standard.~~
  - ~~\_\_\_\_\_ 3. Are rated as having a tensile strength of 800 pounds per square inch as required in the ASTM C496 standard.~~
  - ~~\_\_\_\_\_ 4. Are rated to withstand a minimum vertical load of 20,000 pounds and a lateral load on the pull box wall of 1,200 pounds.~~
  - ~~\_\_\_\_\_ 5. Provide accelerated service as required in Procedure E of the ASTM D756 standard.~~
  - ~~\_\_\_\_\_ 6. Provide water absorption as required in Sections 5, 6.1, and 6.5 of the ASTM D570 standard.~~
  - ~~\_\_\_\_\_ 7. Provide an impact resistance of 72 foot-pounds when using a "C" tup as required in the ASTM D2444 standard.~~
  - ~~\_\_\_\_\_ 8. Include covers that provide skid resistance with a 0.5 friction coefficient as required in the ASTM C1028 standard.~~
  - ~~\_\_\_\_\_ 9. Comply with the flammability testing requirements as detailed in the ASTM D635 standard.~~
  - ~~\_\_\_\_\_ 10. Comply with the ASTM G53 requirements for UV exposure using a 340 nanometer ultraviolet A (UVA) bulb.~~
  - ~~\_\_\_\_\_ 11. Provide chemical resistance as required in Section 7, Procedure 1, of the ASTM D543 standard.~~
- ~~\_\_\_\_\_ Ensure that all pull box and splice box covers are a single piece and provide a 20,000 pound gross vehicle weight capacity with a live load rating of 20,000 pounds as required for ANSI Tier 15 loading conditions. Ensure that pull box and splice box covers comply with the ASTM C857 standard. Ensure that all pull box and splice box covers include bolt holes and stainless steel hex head bolts to secure the cover to the box. Ensure that bolts are 0.375 inch in diameter with 16 unified coarse threads (UNC) for every 1 inch. Ensure that covers and bolts seat flush when installed on the box. Ensure that covers are equipped with a minimum 0.5 inch by 2 inch lifting slot with lift pin. Ensure that the pull box/*splice box* cover is constructed in compliance with the ASTM A48 Class 20 standard requirements.~~
- ~~\_\_\_\_\_ Ensure that the pull box, *splice box* and cover complies with the structural capacity requirements of the FDOT State Materials Office.~~

**783-3.2.2 Pull Box:** ~~Ensure that all pull boxes have an open bottom. and are constructed of polymer concrete consisting of an aggregate matrix bound together with a polymer resin. Ensure that box construction includes internal reinforcement by means of steel or fiberglass, or a combination of the two.~~ Ensure that the pull box is equipped with a nonskid cover secured by hex head bolts and any other miscellaneous hardware required for installation or as shown in the in the plans.

Ensure that the minimum pull box size is approximately 2 feet wide by 3 feet long by 3 feet deep, or as required in the plans. Ensure that the pull box is large enough to house fiber optic cable without subjecting the cable to a bend radius less than 14 times the diameter of the cable.

**783-3.2.3 Splice Box:** Use splice boxes at all fiber optic splice locations, as shown in the plans, and at other locations as approved by the Engineer. Ensure that all splice boxes have an open bottom ~~and are constructed of polymer concrete consisting of an aggregate matrix bound together with a polymer resin. Ensure that box construction~~

~~includes internal reinforcement by means of steel or fiberglass, or a combination of the two.~~ Ensure that the splice box is equipped with a nonskid cover secured by hex head bolts; cable racks and hooks; pulling eyes; and any other miscellaneous hardware required for installation or as shown in the in the plans.

Ensure that the splice box size is approximately 2.5 feet wide by 5 feet long by 4 feet deep or as shown in the plans. Ensure that the splice box is large enough to house fiber optic cable without subjecting the cable to a bend radius less than 14 times the diameter of the cable.

**783-3.2.4 Marking:** Ensure that all pull box and splice box covers include the words “FDOT FIBER OPTIC CABLE” or text shown in plans permanently cast into their top surface. ~~Ensure that the manufacturer’s logo is stamped on each pull box cover, along with the Department’s approval number.~~ Ensure that markings are permanently affixed and clearly visible after installation.

## **INTELLIGENT TRANSPORTATION SYSTEMS-FIBER OPTIC CABLE AND INTERCONNECT.**

**(REV 11-23-10)**

SUBARTICLE 783-1.2.1.4 (of the Supplemental Specifications) is deleted and the following substituted:

**783-1.2.1.4 Strength Member:** Ensure that the fiber optic cable contains a dielectric central strength member and dielectric outside strength member to prevent buckling of the cable and provide tensile strength. Ensure that the fiber optic cable can withstand a pulling tension of 600 lbs. without damage to any components of the fiber optic cable.

SUBARTICLE 783-1.2.4 (of the Supplemental Specifications) is deleted and the following substituted:

**783-1.2.4 Patch Panels:** Ensure that the patch panel is compatible with the fiber optic cable being terminated and color-coded to match the optical fiber color scheme. Ensure that the patch panel has a minimum of 12 ST-type panel connectors. Ensure that the patch panel dimensions do not exceed 14 x 6 x 4 inches for fiber counts of twelve or less.. Ensure the patch panel is suitable for mounting within an approved cabinet at the field device location. Ensure patch panels are sized to accommodate specified coupler housings and maintain sufficient bend radius for cables to maintain their specified optical performance. Ensure the patch panel is sized to occupy the minimum space required to adequately accommodate fiber capacity.

**783-1.2.4.1 Pre-terminated Patch Panels:** Ensure that the pre-terminated patch panel is a termination panel that includes a factory installed all-dielectric SMF cable stub. Ensure that the panel includes factory-installed and terminated ST-type panel connectors. Ensure that the cable stub is of adequate length to splice the stub and provide a fiber connection between the panel and the backbone fiber cable or as directed by the Engineer.

**783-1.2.4.2 Field Assembled and Terminated Patch Panels:** Ensure that the field-assembled patch panel is a termination panel that includes a connector panel and the hardware required to mount the patch panel within an approved cabinet at the field device location and connect the panel to the backbone fiber cable.

**783-1.2.4.2.1 Connector Panel:** Ensure that the connector panel provides 12 ST-type, bulkhead-mount coupling connectors. Ensure that each coupling connector allows connection of a cable terminated on one side of the panel to a cable on the opposite side.

Ensure that each bulkhead-mount coupling connector includes a locknut for mounting the connector in predrilled or punched holes in the connector panel.

SUBARTICLE 783-2.2.2 (of the Supplemental Specifications) is deleted and the following substituted:

**783-2.2.2 Warning Tape:** Ensure that the buried cable warning tape is flexible, elastic material 3 inches wide, 6 mil thick, intended for burial and use as an underground utility warning notice. Ensure that the surface of the warning tape is coated and sealed to prevent deterioration caused by harsh soil elements. Ensure that the tape material and ink colors do not change when exposed to acids, alkalis, and other destructive chemical variances commonly found in Florida soils. Ensure that the warning tape color is orange as required by the American Public Works Association (APWA) Uniform Color Code, and has “CAUTION: FDOT FIBER OPTIC CABLE BURIED BELOW,” or other wording approved by the Engineer, permanently printed on its surface.

Include buried cable warning tape with all conduit.

SUBARTICLE 783-3.1 (of the Supplemental Specifications) is deleted and the following substituted:

**783-3.1 Description:** Furnish and install pull boxes and splice boxes of the type, size, and quantity as shown in the plans. Ensure that pull boxes and splice boxes meet the requirements of Section 635. Use only equipment and components that are listed on the Department’s Approved Product List (APL).

Use pull boxes and splice boxes that provide:

1. At-grade access to fiber optic cables housed within conduit systems used for Department ITS communications.
2. At-grade access to aid in the installation of fiber optic cable.
3. Protection for installed fiber optic cable.
4. Adequate space for cable storage and splice enclosures.

Ensure that pull boxes and splice boxes containing fiber optic cable do not contain power cables for ITS devices or other equipment.

SUBARTICLE 783-3.2 (of the Supplemental Specifications) is deleted and the following substituted:

**783-3.2 Materials:**

**783-3.2.1 General Requirements:** Ensure that all pull boxes and splice boxes are compatible with the fiber optic cable and are approved by the Engineer.

**783-3.2.2 Pull Box:** Ensure that all pull boxes have an open bottom. Ensure that the pull box is equipped with a nonskid cover secured by hex head bolts and any other miscellaneous hardware required for installation or as shown in the in the plans.

Ensure that the minimum pull box size is approximately 2 feet wide by 3 feet long by 3 feet deep, or as required in the plans. Ensure that the pull box is large enough to house fiber optic cable without subjecting the cable to a bend radius less than 14 times the diameter of the cable.

**783-3.2.3 Splice Box:** Use splice boxes at all fiber optic splice locations, as shown in the plans, and at other locations as approved by the Engineer. Ensure that all splice boxes have an open bottom. Ensure that the splice box is equipped with a nonskid cover secured by hex head bolts; cable racks and hooks; pulling eyes; and any other miscellaneous hardware required for installation or as shown in the in the plans.

Ensure that the splice box size is approximately 2.5 feet wide by 5 feet long by 4 feet deep or as shown in the plans. Ensure that the splice box is large enough to house fiber optic cable without subjecting the cable to a bend radius less than 14 times the diameter of the cable.

**783-3.2.4 Marking:** Ensure that all pull box and splice box covers include the words “FDOT FIBER OPTIC CABLE” or text shown in plans permanently cast into their top surface. Ensure that markings are permanently affixed and clearly visible after installation.