

6350000 PULL, SPLICE, AND JUNCTION BOXES
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

Stefanie Maxwell

Comment: (10-26-12, Internal)

1. 635-2.2.1.2, third paragraph: Should this be “long” to be consistent with the aerial junction boxes?

*For pole and cabinet mounted installations, provide junction boxes with minimum inside dimensions of 13 inches **high** by 10 inches wide and at least 3 inches deep.*

Response: This will be changed to “long”. Change made.

2. 635-2.2.1.2, fourth paragraph: Should this be “long” to be consistent with the aerial junction boxes?

*For base mounted installations, provide junction boxes with minimum inside dimensions of 21 inches **high** by 10 inches wide and at least 8 inches deep.*

Response: This will be changed to “long”. Change made.

3. 635-3.2:

→ **635-3.2-Pull-and-Splice-Boxes:**
→ Install pull and splice boxes in accordance with the Design Standards, Index No. 17700.
Ensure pull and splice boxes are adequately sized for the amount of cable to be placed inside.
Ensure that the pull and splice box cover is flush with the finished grade or sidewalk. Do not

install pull and splice boxes in roadways, driveways, parking areas, ditches or public sidewalk curb ramps. *Avoid placing pull boxes and splice boxes on steep slopes where the cover cannot be leveled within a tolerance of 1 inch of drop to 1 foot of grade or in low-lying locations with poor drainage. Ensure that pull and splice boxes are large enough to house fiber optic cable without subjecting the cable to a bend radius less than 14 times the diameter of the cable.*

→ → **635-3.2.1-Placement and Spacing:** Place pull boxes and splice boxes as shown in

Comment [sm3]: Shouldn't this be for both pull and splice?

Comment [sm4]: Shouldn't this be for both pull and splice?

Comment [sm5]: Pull and Splice?

Response: These changes will be made. Changes made.

Chester Henson
414-4117

Comment: (10-29-12, Internal)

1. 635-2.1.3: The term “nominal cover dimension” is confusing. This is not talking about the cover but the inside dimensions of the box. Also this section does not address circular boxes.

Response: Manufacturers of these boxes typically market them a “standard dimension” box based upon the nominal dimension of the cover. We agree that using this dimension as a descriptor is somewhat confusing, but that is an accepted practice. The opening of the box and interior dimension may vary slightly, but should be similar to that of the cover. We included the term “nominal” to allow for minor variations in the dimensions of the covers, the opening below the cover, and the box interior. No changes made.

2. 635-2.2.1.3: I am not sure that all embedded junction boxes will meet all NEC requirements.

635-2.2.1.3 Embedded Junction Boxes: Provide weatherproof embedded junction boxes for use in concrete substructures or superstructures **in accordance with NEC requirements.** Include gasketed weatherproof covers.....

Response: The language “in accordance with NEC requirements” will be deleted. Change made.

3. 635-3.2: “Avoid placing pull and splice boxes on steep slopes where cover cannot be leveled”, this cannot be avoided when pull boxes are placed at light poles on slopes.

Response: This language will be deleted from the spec. Change made

4. 635-3.2.1: The placement and spacing shown is for ITS. This might cause confusion with the spacing for lighting and signal.

Response: Spec language has been changed to clarify that certain placement and spacing guidelines are intended to cover only boxes containing fiber optic cable. Revised language is as follows:

635-3.2.1 Placement and Spacing: Place pull and splice boxes as shown in the Plans and at the following locations, unless directed otherwise by the Engineer:

1. At all major fiber optic cable and conduit junctions.
2. Approximately every 2,500 feet **for fiber optic cable applications** in rural areas with any continuous section of straight conduit if no fiber optic cable splice is required.
3. At a maximum of 1,760 feet **for fiber optic cable applications** in metropolitan areas.
4. At each end of a tunnel, and on each side of a river or lake crossing.
5. On each side of an aboveground conduit installation, such as an attachment to a bridge or wall.
6. At all turns in the conduit system.
7. Near the base of a service pole or communication cabinet

to provide:

- a. A transition point between the fiber optic conduits extending from the fiber backbone and the conduit feeding the communication cabinet.
- b. An assist point for the installation of fiber optic drop cable.
- c. Storage of slack fiber optic drop cable.

Changes made.

Carl Morse
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Comment: (1-2-12)

635-2.1.1 General: Manufacturers seeking inclusion on the APL shall meet the requirements of 105-3 and this Section and being a plant listed on the Department’s list of Incidental Precast

Concrete Producers with Accepted Quality Control Programs. should be: Incidental Precast Producers with Accepted Quality Control Plans.

Response: The language is correct as written, with the exception of “Incidental Precast/**Prestressed** Producers.....”. The Quality Control Plan is part of the Quality Control (QC) Program. The list SMO maintains for qualified producers is called the “Producers with Accepted Quality Control Programs”. (reference: Materials Manual Volume I, Section 5.6 Quality Control Program).

“Prestressed” will be added as noted above.

Changes made.

Larry Josephson
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Comment: (11-5-12)

Below talks about embedment in substructure or superstructure. Many times these boxes are in sidewalk. Should that also be addressed in this section? Do the sidewalk boxes also need to be built to this waterproof level even though they will be in dirt and may drain if they have good soils or may not drain if bad soils? If they do not need to be built to this level then they should be called out to some other standard so that others don't assume embedded means embedded into any type of concrete.

→ → → → *635-2.2.1.3 Embedded Junction Boxes: Provide weatherproof embedded junction boxes for use in concrete substructures or superstructures in accordance with NEC requirements. Include gasketed weatherproof covers made of the same material as the box and Type 316 or 304, stainless steel, tamper-resistant screws for securing the cover. Fabricate galvanized steel boxes and their covers from steel meeting the requirements of ASTM A36 and galvanized in accordance with ASTM A123. ¶*

→ → → → *For embedded junction boxes not exposed to vehicular impacts, provide the following types of junction boxes. Where the structure's environmental classification is slightly or moderately aggressive, provide a galvanized steel or NEMA 4X (non-metallic) box, as approved by the Engineer. Where the structure's environmental classification is extremely aggressive, provide a NEMA 4X (non-metallic) box, unless otherwise directed by the Engineer. ¶*

→ → → → *For embedded junction boxes exposed to vehicular impacts, provide a galvanized steel box regardless of the structure's environmental classification. ¶*

Response: Subarticle 635-2.2.1.3 was drafted specifically to cover material requirements for embedded junction boxes cast into retaining walls as shown in Design Standard Index No. 21210 and similar structures. It does not apply to in-ground pull or splice boxes surrounded by sidewalk. No change made.

Jeremy McGookin
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Comment: (11-9-12)

Good afternoon. I have reviewed the proposed developmental Section 635 specification for Pull, Splice and Junction Boxes and feel that everything revised and amended is a good change for this spec section. I have no objections or anything further to add to the proposed specification. I would like to ask that if an additional non-approved size underground enclosure was to be used,

could it be approved per project or would it need to be approved thru the APL process prior to construction?

Response: All pull and splice boxes installed on Department projects must be listed on the APL. Junction boxes are not required to be listed on the APL, but must meet the requirements of Section 635.

The minimum dimensions provided in the specification are default minimum dimensions in the event that a specific size is not detailed in the Plans. The default minimum dimensions given for each application are typical and common, but designers can detail and require other sizes of approved boxes in the Plans based upon project needs.

Trey Tillander
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Comment: (11-9-12)

1. Please add the highlighted words shown below to 635-2.1.3:

*For signalized intersection **and lighting** applications, provide pull boxes with a nominal cover dimension of no less than 13 inches wide by 24 inches long and no less than 12 inches deep.*

Response: Agree. Text will be added to language. Change made.

2.and change 992-1.8 to:

992-1.8 Pull Boxes: *Pull boxes shall meet the requirements of Section 635.*

Response: Comment will be included in 992 comments.

Neil Monkman
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Comment: (11-13-12)

Overall, I feel that the changes give a more clear perspective. The only question I have is that you are requiring a one year warranty on the boxes from FA. Does the Department have plans to revise section 783-4 which requires a two year warranty? This may create issues on projects with electrical or traffic boxes as well as ITS work in the scope.

Response: Concurrent with these revisions, language from Section 783 will be moved to applicable sections and Section 783 will be deleted in its entirety. Specifications, pay items, etc., for ITS work will be included in Section 635.

Ed Shea
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Comment: (11-13-12)

Is it possible to “strike” the “unless directed by the Engineer” clause from specification 635-2.2.1.3 Embedded Junction Boxes? All too often it seems the EOR of any project wants to change the dimension, type of metallurgical alloy (Stainless Steel, Galvanized, Aluminum, PVC.....etc). Elimination of this comment will detour delays and confusion.

Response: The EOR must have this authority to adjust for unanticipated field situations. No change made.

Eric Slater
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Comment: (11-13-12)

1. 635-2.1.3 Dimensions: The use of “nominal” and “no less than” to describe dimensions is confusing. Removing the words “no less than” is proposed as highlighted below.

Please note that some of the dimensions of our products on your APL do not meet the proposed requirements. The covers for the PG1324BA12 and A24132412A boxes have lengths of 23.25 inches, which is less than the required dimension of 24 inches. The inside opening area of the PG1324BA12 is 236 square inches, which is less than the required minimum of 240 square inches. The inside dimension of the PG1324BA12 is 11.75 inches, which is less than the required 12 inches. The covers for the PG2436BA36 and A24243624A boxes have lengths of 35.625 inches, which is less than the required dimension of 36 inches. The dimensions are tabulated below. Changing the wording of the proposed specification will allow for boxes such as these with slight dimensional differences.

Part Number	Cover Dimension		Bearing Ledge Opening		
	Length (in)	Width (in)	Length (in)	Width (in)	Area (in ²)
PG1324BA12	23.25	13.75	21.25	11.75	236
A24132412A	23.25	13.75	21.5	12	240
PG2436BA36	24	35.625			
A24243624A	24	35.625			

635-2.1.3 Dimensions: Unless otherwise shown in the Plans, provide pull and splice boxes with the following dimensions.

For signalized intersection applications, provide pull boxes with a nominal cover dimension of 13 inches wide by 24 inches long and no less than 12 inches deep. Ensure the inside opening area is a minimum of 235 square inches and no one inside dimension is less than 11-1/2 inches.

For fiber optic cable applications, provide pull boxes with a nominal cover dimension of 24 inches wide by 36 inches long and no less than 24 inches deep. Deviations from these minimum dimensions may be approved by the Engineer as long as the bending radius required by the fiber optic cable manufacturer is not exceeded.

Provide rectangular splice boxes with a nominal cover dimension of than 30 inches wide by 60 inches long and no less than 36 inches deep. Provide round splice boxes with a nominal cover diameter of 36 inches and no less than 36 inches deep.

Response: Language will be revised for clarification. Document has been edited for clarification and the phrase “no less than” has been removed where unnecessary. The phrase remains for depths that are not nominal dimensions and must be at least that dimension. Changes made.

2. 635-2.1.4 Fabrication: The lag bolt with its coarser thread does not seize due to sand in the threads. This can be a problem with UNC threads, particularly the finer 3/8-16 UNC thread. Penta-head lag bolts are available in 18-8 or 302 stainless steel. Proposed changes are highlighted below:

Provide box covers with lifting slots and a flush-seating lockdown mechanism. Use penta-head lockdown bolts with 3/8-7 or 1/2-6 lag thread. Ensure lockdown bolts and lifting slots are Type 316, 304, or 302 passivated stainless steel or brass. Ensure lockdown bolt assembly is designed to prevent seizing and can be removed without damaging the cover or box body. Ensure the lockdown bolt threaded insert/nut assembly is field replaceable. Ensure at least one alternative vandal-resistant option is provided for securing the cover to the box body

Response: Document modified as suggested to clarify that 302 is acceptable. Existing language addresses seizing.

Provide box covers with lifting slots and a flush-seating lockdown mechanism. Use penta-head lockdown lag bolts. Ensure lockdown bolts and lifting slots are Type 316, 304, or 302 passivated stainless steel or brass. Ensure lockdown bolt assembly is designed to prevent seizing and can be removed without damaging the cover or box body. Ensure the lockdown bolt threaded insert/nut assembly is field replaceable.

Changes made.

3. 635-2.1.5 Testing Requirements: 635-2.1.4 allows “box covers construction of concrete, polymer concrete, cast iron or other materials meeting the requirements of this Section.” The purpose of the flexural testing in Section 6 of the ANSI/SCTE 77 2010 Specification for Underground Enclosure Integrity is to compare the strength of the exposed specimens to that of the control specimens, not for establishing material properties or for design purposes or for comparing materials from different manufacturers. Since different test methods apply to different materials, the test methods are not specified in ANSI/SCTE 77. The test method used to obtain the data should be the one relevant to the material. If one standard is listed for a particular material in 635-2.1.5, they should all be listed, which is not practical. A statement such as “all flexural testing must be conducted in accordance with an appropriate ASTM standard and clearly stated in the report” could be included. Proposed changes are highlighted below:

635-2.1.5 Testing Requirements: Ensure pull and splice boxes meet the American National Standard /Society of Cable Telecommunications Engineers (ANSI/SCTE) 77 2010 Specification for Underground Enclosure Integrity for TIER 15 loading with the following additional clarifications and requirements:

1. Apply all environmental tests to the box and its cover.
3. Use ASTM D790, ASTM C580, or ASTM C78, etc. in all environmental tests, except the simulated sunlight exposure test, to compare the flexural strength of exposed specimens to control specimens.

OR

3. All flexural testing must be conducted in accordance with an appropriate ASTM standard and clearly stated in the report.

Response: Language will be revised to incorporate these suggestions.
Changes made.

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Comment: (11-19-12)

Are we sure that we only want to ground metal pull box covers when there is a 120v or greater of power present?

Response: The current draft reflects past and current standard practice. There have been many metal pull box covers installed in the past on boxes that house loop lead-in cables, etc. without issue. We do not believe that they must be grounded in all cases at this time.
No changes made.

Barry Smith
414-4776

Comment: (11-20-12)

1. 635-2.1.1 General:

635-2.1.1 General: Use pull and splice boxes listed on the Department's Approved Product List (APL). Manufacturers seeking inclusion on the APL shall meet the requirements of 105-3 and this Section and be listed on the Department's list of Incidental Precast/Prestressed Concrete Producers with Accepted Quality Control Programs.

Ensure box bodies and covers are free of flaws such as cracks, sharp, broken, or uneven edges, and voids.

Ensure boxes have an open bottom design.

Should any other QC programs be referenced? There are other materials mentioned (galvanize, cast).

Response: All pull and splice box manufacturers listed on the APL, who use other materials, undergo a detailed quality system evaluation performed by the TERL before the box can be listed on the APL.

No changes made.

2. 635-2.1.2 Marking:

635-2.1.2 Marking: Ensure the following information is permanently cast into the top surface of all pull and splice box covers:

1. Unless otherwise shown in the Plans, mark application as follows:

FDOT TRAFFIC SIGNAL for signalized intersections

monitoring
applications

FDOT FIBER OPTIC CABLE for fiber optic cable
FDOT LIGHTING for highway lighting
FDOT TRAFFIC MONITORING for traffic
FDOT ELECTRICAL for other electrical

2. Manufacturer's name or logo
3. FDOT approval number
4. TIER rating

Ensure the date of manufacture (month/day/year, or date code) is permanently located on the top or bottom of the cover. Ensure the interior of the box body has a permanent marking that includes the manufacturer part/model number and date of manufacture near the top of box and is visible after installation when the cover is removed.

Suggested #3. FDOT APL approval number

Response: Language will be revised to incorporate this suggestion.
Changes made.

3. 635-2.2.1.1 Aerial Junction Boxes:

635-2.2.1.1 Aerial Junction Boxes: Unless otherwise shown in the Plans, provide aerial junction boxes with minimum inside dimensions of 8 inches wide by 8 inches long and at least 3 inches deep. Ensure aerial junction boxes attached to cable support wire are the type used by the American telephone industry.

What is the American telephone industry? If this is an entity, shouldn't all first letters be capitalized? American Telephone Industry.

Response: Last sentence of 635-2.2.1.1 will be deleted. This statement is a legacy requirement that likely predates telephone industry deregulation. Changes made.

John Pickrell
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Comment: (11-20-12) In response to your request, I can provide the following comments on behalf of Oldcastle Enclosure Solutions.

1. **635-2.1.1 General:** ...*Manufacturers seeking inclusion on the APL shall meet the requirements of 105-3 and this Section and be listed on the Department's list of Incidental Precast Concrete Producers with Accepted Quality Control Programs.*

I have been aware of the requirement to have the Manufacturer's Quality System pre-approved (A602). Using the Florida DOT website, I found it very difficult to navigate to information clarifying the *requirements for compliance* with "105-3". How do these requirements (compliance with "105-3" and "listing in Incidental Precast Concrete Producers") differ?

Response: The document has been edited to clarify that this requirement only applies to manufacturers of concrete boxes (not polymer concrete, etc.).

Change made.

2. 635-2.1.3 Dimensions: The minimum box size would be specified more clearly by stating:
*...For signalized intersection applications, provide pull boxes with a nominal ~~cover dimension~~ of no less **smaller** than 13 inches wide by 24 inches long and no less than...*

The minimum overall length of a 13" x 24" cover is actually 23 ½"

Response: This subarticle has been edited as follows for clarity:

For signalized intersection and lighting applications, provide pull boxes with nominal dimensions of 13 inches wide by 24 inches long (cover) and no less than 12 inches deep. Ensure the inside opening area is a minimum of 240 square inches and no inside dimension is less than 12 inches.

3. 635-2.1.3: Dimensions: You may wish to confirm that products already listed on the QPL are compliant with the following new requirement:

.....Ensure that the inside opening area is a minimum of 240 square inches and no one inside dimension is less than 12 inches.....

Response: This will be verified. No change made.

4. 635-2.1.3: Dimensions: Again, the minimum box size would be specified more clearly by stating:

*...For fiber optic cable applications, provide pull boxes with a nominal ~~cover dimension~~ of no less **smaller** than 24 inches wide by 36 inches long and no less than...*

The minimum overall length of a 24" x 36" cover is actually 35-1/8".

Response: This subarticle has been edited as follows for clarity:

For fiber optic cable applications, provide pull boxes with a nominal dimensions of 24 inches wide by 36 inches long (cover) and no less than 24 inches deep. Deviations from minimum dimensions may be approved by the Engineer as long as the bending radius required by the fiber optic cable manufacturer is not exceeded.

5. You may wish to include a reference to the dimensional requirements (cover and lid seat only) of the Western Underground Committee, Guide 3.6. Their specification (Rev 05/88) has been adopted by many utilities and DOT's as the de facto standard for assuring cover interchangeability. I am not suggesting Guide 3.6 to replace ANSI/ SCTE 77 but rather to supplement the spec with cover dimensional guidance.

Response: We feel that the existing language and APL approval process is able to sufficiently address covers interchangeability at this time but will consider this input for future revisions. No change made.

6 635-2.1.4 Fabrication: The section provides an extensive list of a wide variety of “acceptable” materials ending with a rather vague reference to “*other materials*”. Does this list intentionally exclude *sheet molding compound (SMC) in combination with a polymer concrete collar*

Provide box bodies constructed of concrete, polymer concrete, high-density polyethylene (HDPE), a combination of hand lay-up fiberglass and polymer concrete collar or other materials meeting the requirements of this Section.

Response: The list did not intentionally exclude SMC. The list of various specific materials, as referred to in your comment, has been deleted as it is not needed. Any materials that meet requirements are acceptable. Change made.

7.635-2.1.5 Testing Requirements: On a recommendation from a listed lab (FDOT-TERL, List of Acceptable Test Labs as of 2/13/2012), it has been identified that for unreinforced materials such as polymer concrete ASTM C580, with its’ larger dimension beam, produces more reliable results than D790 which is more appropriate for reinforced plastics. If not D790, what process shall be acceptable for measure ultimate flexural strength of unreinforced or reinforced plastics?

2. Use ASTM D790 in all environmental tests, except the simulated sunlight exposure test, to measure ultimate flexural strength of unreinforced or reinforced plastics.

Response: Document edited as follows to allow appropriate ASTM standard to be used for testing various materials.

3. All flexural testing must be conducted in accordance with an appropriate ASTM standard and clearly stated in the report.

8. 635-3.2 Pull and Splice Boxes: FDOT Design Standards FY 2012/ 2013, Index No. 18204 seems more appropriate.

Install pull and splice boxes in accordance with the Design Standards, Index No. 17700.

Response: For the 2013 Design Standards eBooklet release (effective 1-1-2013), Index No. 18204 was deleted and replaced by Index 177000. No change made.

Missy Hollis
414-4182

Comment: (11-21-12)
635-2.1.3 Dimensions (4th paragraph): What applications are the rectangular and round splice boxes used for?

Response: These are larger boxes used for pulling and splicing fiber optic cable applications.

Birosak, Chris R

Comments: (11-27-12)
The District One ITS Office has reviewed the subject specification changes and we have the following comments:

1) Section 635-2.1.4:

Please clarify the sentence shown below in this section. Is the manufacturer or contractor responsible for providing an alternative vandal-resistant device if one is desired or is the box just to be fabricated to allow this option? If it is just to be fabricated to allow this option, how do we know what the optional device is and how do we obtain the optional vandal-resistant device if desired?

635-2.1.4 Fabrication

Ensure at least one alternative vandal-resistant option is provided for securing the cover to the box body.

Response: All boxes must now be provided with penta-head bolts, which we consider a default vandal-resistant option. Because additional alternative methods vary greatly between manufacturers, we have determined it is best to remove this as a minimum requirement. (We continue to encourage APL pull box manufacturers to offer different types of vandal-resistant options. To obtain information on these options, we recommend contacting approved vendors to learn what optional devices they offer and, if needed, specify the desired option in the project contract documents. However, the optional device must have APL approval also.)
Change made.

2) Section 635-3.1:

Although fiber optic cable may be considered “interconnect cable” we suggest you specifically include the words “fiber optic” as shown in blue below:

635-3.1 General: *Do not pull signal, fiber optic, or interconnect cable through a pull box used for loop termination. Use separate pull boxes for signal, fiber optic, and interconnect cables.*

Response: Interconnect and fiber optic cable are now included in a new specification, Section 633 Communication Cable. We have edited the document (as follows) to use the term communication cable, with the intent of covering both copper and fiber optic interconnect cable.

635-3.1 General: Do not pull signal or **communication** cable through a pull box used for loop termination. Use separate pull boxes for signal and **communication** cables.

When signal or 120V (or greater) power is present, ground all metal covers in accordance with Section 620.

Change made.

3) Section 635-3.2:

This section is under 635-3, Installation, we suggest the following sentences (also shown highlighted in paragraph below) be moved to Section 635-2.1.3 Dimensions; “*Ensure pull and splice boxes are adequately sized for the amount of cable to be placed inside*” and “*Ensure that splice boxes are large enough to house fiber optic cable without subjecting the cable to a bend radius less than 14 times the diameter of the cable.*”

635-3.2 Pull and Splice Boxes: Install pull *and splice* boxes in accordance with the Design Standards, Index No. 17700. *Ensure pull and splice boxes are adequately sized for the amount of cable to be placed inside.* Ensure that the pull box cover is flush with the finished grade or sidewalk. Do not install pull boxes in roadways, driveways, parking areas, ditches or public sidewalk curb ramps. *Avoid placing pull boxes and splice boxes on steep slopes where the cover cannot be leveled within a tolerance of 1 inch of drop to 1 foot of grade or in low-lying locations with poor drainage.* *Ensure that splice boxes are large enough to house fiber optic cable without subjecting the cable to a bend radius less than 14 times the diameter of the cable.*

Response: 635-2 Materials is directed to the manufacturer/fabricator. 635-3 is directed to the designer and the Contractor; it is their responsibility to ensure the boxes are adequately sized for the need. Minor edits have been made to the language for clarity.
Changes made.

4) Section 635-3.2.1: Portions of this section appear to only apply to fiber optic cable (numbers 2 and 3). We suggest you include placement and spacing requirements for signal, 120V power, and copper interconnect cables.

635-3.2.1 Placement and Spacing: *Place pull boxes and splice boxes as shown in the plans and at the following locations, unless directed otherwise by the Engineer:*

1. *At all major fiber optic cable and conduit junctions.*
2. *Approximately every 2,500 feet in rural areas with any continuous section of straight conduit if no fiber optic cable splice is required.*
3. *At a maximum of 1,760 feet in metropolitan areas.*
4. *At each end of a tunnel, and on each side of a river or lake crossing.*
5. *On each side of an aboveground conduit installation, such as an attachment to a bridge or wall.*
6. *At all 90 degree turns in the conduit system.*

Response: Document edited to clarify which portions apply to fiber optic cable. Any that are not restricted to fiber optic applications are intended to apply to all.

635-3.2.1 Placement and Spacing: Place pull and splice boxes as shown in the Plans and at the following locations, unless directed otherwise by the Engineer:

1. At all major fiber optic cable and conduit junctions.
2. Approximately every 2,500 feet for **fiber optic cable applications** in rural areas with any continuous section of straight conduit if no fiber optic cable splice is required.
3. At a maximum of 1,760 feet for **fiber optic cable applications** in metropolitan areas.
4. At each end of a tunnel, and on each side of a river or lake crossing.
5. On each side of an aboveground conduit installation, such as an attachment to a bridge or wall.
6. At all turns in the conduit system.

Ensure that all Near the base of a service pole or communication cabinet to provide:

1. A transition point between the fiber optic conduits extending from the fiber backbone and the conduit feeding the communication cabinet.
2. An assist point for the installation of fiber optic drop cable.
3. Storage of slack fiber optic drop cable.

Changes made.

McCann, Patrick

Comment: (11-27-12)

Although I agree with the proposed changes, The Department may want to consider verbiage regarding pull box lid dimensions inclusive of length, width, and THICKNESS. From a maintenance perspective often existing pull box lids are damaged and are in need of replacement. Because many of the current APL pull boxes do not require consistent lid dimensions, these areas are often left in an unsafe condition due to the maintaining agency/Contractor not stocking the exact brand of lid therefore having to procure what is required, leaving a potential hazard to the general public.

Response: Noted. However, interchanging and using lids that were not designed for a particular box should only be a temporary solution to resolve unsafe conditions. The boxes and lids are only approved as a matched pair due to the fact that load testing and other criteria rely on both components.

No change made.

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Comment: (11-27-12)

1. You have listed 4 allowed sizes; 13"x24"x 12", 24"x36"x24", 30"x60"x36", 36" diameterx36" deep. How about other sizes that FDOT has used such as 12"x20", 17"x30" and 30"x48"?

Response: The specification is intended to allow designers a degree of latitude when selecting sizes, hence the phrase "unless otherwise shown in the Plans..." in 635-2.1.3. The 4 sizes listed are the minimum sizes the contractor must provide in the event that the Plans do not detail otherwise.

No change made.

2. You specified one cycle of cycle 1 in Table X2.1 of ASTM G154 for the simulated sunlight exposure test. The specified one cycle of 8 hours exposure is not sufficient exposure to get any effect on the material. The industry uses a minimum of 1000 hours exposure with the majority specifies 2000 hours exposure. We recommend a minimum of 2000 hours of UV exposure.

Response: 635-2.15(4) has been modified to reflect the industry minimum of 1000 hours. Change made.

3. The proposed technical specifications implies that a complete technical submittal package is required on each job. Since the products are approved and listed on the FDOT APL, this would be duplication of work, approval and handling. A statement to the effect that no submittal is required on FDOT approved products will be helpful.

Response: A complete technical submittal package is NOT required on each job. The purpose of APL evaluation and approval is to verify that products meet or exceed FDOT minimum requirements. Therefore, evidence of an APL approval and a product datasheet should be sufficient for submittal and acceptance of APL-listed products on a project.

Bravo, Sergio
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Comment: (11-29-12)

1) 635-2.1.2 Marking: Request to add FDOT ITS LOOPS along with other pull box lid markings under section 635-2.1.2.

Response: The markings listed in 635-2.1.2 are required markings for pull and splice boxes installed on Department projects – they do not exclude additional information. For design flexibility and to accommodate a wide variety of agencies and applications, the current draft allows alternate marking or other descriptive text to be required on a project-by-project basis. Recommend that you require any specific text in the plans.
No change required.

2) 635-2.1.2 Marking: Request to add "ITS" for ITS related pull box lid markings as the word "ITS" is more recognized and mainstreamed. Any field related questions, regarding the ownership of these pull boxes can come directly to the District ITS office, if "ITS" is listed on the boxes.

Response: See response above.

3) 635-3.2.2 Electronic Box Marker: Typo in section number for electronic box markers, use 635-3.2.2.

Response: 630-3.2.2 will be changed to 635-3.2.2. Change made.

4) 635-3.2.2 Electronic Box Marker: Add electronic box markers for buried "Electric" pull boxes and request to use different set of electronic markers for electric boxes. Also, the spec needs to include the ability to purchase or obtain a hand-held scanner that can be used by the utility locators to identify these locations after they are buried.

Response: Section expanded to allow for other types of markers using colors and frequencies appropriate for various applications. (Hand-held scanners for the Contractor during the construction project are incidental to the work. Hand-held scanners for the Department or Maintenance Contractor after construction should be procured through other means.)

5) 635-4 Relocation of Pull, Splice, and Junction Boxes: Under relocation of pull, splice and junction boxes, would suggest adding language to ensure the integrity of the boxes is maintained

during the relocation. The boxes may get damaged, and the spec needs to address repairs or replacement with a new box when boxes are damaged during relocation.

Response: 635-4 modified as follows:

635-4 Relocation of Pull, Splice, and Junction Boxes.

Relocation of pull, splice, and junction boxes shall consist of removing an existing box and installing the box at the location shown in the Plans. Restore the area of the box removal and relocation to the condition of the adjacent area. The costs for restoration will be included in the Contract unit price of the relocation.

Boxes damaged due to the Contractor's operations will be replaced by the Contractor at no cost to the Department. Replacement boxes must be of the same material and size of the existing box, unless directed otherwise by the Engineer.

6) 635-2.1.4 Fabrication: The last sentence states "Ensure that at least one alternative vandal-resistant option is provided for securing the cover to the box body" – in District 6 when metallic vandal proof inserts are used for securing the cover, in such cases, the metallic inserts will need to be grounded. Would suggest strengthening this section more.

Response: Because additional alternative methods vary greatly between manufacturers, we have determined it is best to remove this as a minimum requirement. (We continue to encourage APL pull box manufacturers to offer different types of vandal-resistant options. To obtain information on these options, we recommend contacting approved vendors to learn what optional devices they offer and, if needed, specify the desired option in the project contract documents. However, the optional device must have APL approval also.)

Change made.

7) 635-2.2.1.1 Aerial Junction Boxes: Text "Ensure aerial junction boxes attached to cable support wire are the type used by the American telephone industry" this seems little open ended, this section may need to be expanded to suggest the various types needed.

It is very rewarding to see Standard Specifications are being developed to deter vandalism and theft; such as, buried boxes, electronic markers, or "[ensuring] that at least one alternative vandal-resistant option is provided for securing the cover to the box body".

Response: Language will be revised to incorporate this suggestion. This statement is a legacy requirement that likely predates telephone industry deregulation. It has been removed as it is now ambiguous and adds no value to the document.

Changes made.

Jeff Kipfinger, PE
407-264-3433

Comment: (11-29-12)

1. Title: In order to minimize the use of ambiguous words and prevent future confusion about applicable codes and standards, the reviewer recommends the Title should show the same terminology as the NEC Article 314, i.e. 635 - OUTLET, DEVICE, PULL, AND JUNCTION BOXES; CONDUIT BODIES, FITTINGS, AND HANDHOLES.

Response: Noted. However, we do not believe the scope and content of Section 635 and Article 314 align to the point that such a title change is warranted at this time.

No change made.

2. General Comment: Electrical Supply stores carry Pull Boxes, and Junction Boxes but they do not carry a product called a “Splice Box” for electrical distribution wiring. Junction Boxes, device boxes, and hand holes are UL Listed for making splices, therefore the reviewer suggests removing all references to “Splice Boxes”.

Response: This specification covers various in-ground boxes and conduit for outside plant applications as well as some specialized outdoor junction boxes that can also be used in commercial electrical applications.

Pull and splice boxes are underground boxes used for signal cable, electrical cable, and fiber optic cable junctions. These are not the typical UL boxes used for structures.

No change made.

3. 635-1 Description: The sentence indicates these items should be provided as shown on the plans however many times maintenance activities to replace such items do not have construction plans.

Response: The FDOT Standard Specifications for Road and Bridge Construction are included as an element of the Contract Documents and are applicable to all Department Contracts. If a project does not include a set of plans, other elements of the Contract Documents must describe the work to be done.

No change made.

4. 635-1 Description: Many times the construction plans call for the pull and junction boxes to be provided and installed in accordance with Section 635 of the Standard Specifications for Road and Bridge Construction, and the FDOT Standard Index 17700, Pull Splice and Junction Boxes. Consultants show as little as possible on their plans but make many references to FDOT documents and standards that should be followed by the installing contractor.

Recommend revising this sentence to read: “These devices shall be provided and installed as specified herein and in accordance with Standard Index 17700 - Pull Splice and Junction Boxes, and in accordance with NEC 314.

Response: All the elements included in a set of Contract Documents work together to provide the information necessary to perform the work. When information is standard and accepted practice, the plans do not repeat this information as it can be found in the Specifications and the Design Standards. In order for an item to be accepted and listed on the Department’s QPL or APL, the manufacturer must meet all Department and industry requirements. It is imperative for the Contractor to be familiar with the specs, the standards and the plans and how they all work together. The Department has avenues for Contractors who are bidding on contracts to ask questions and get answers for those questions prior to submitting bids.

No change made.

5. 635-2.1.1 General: The general information indicates that the products satisfying these specifications must also listed in the APL, and must be manufactured at a facility on the Department’s list of Incidental Precast Concrete Producers with Accepted Quality Control Programs. This suggests that these products must be manufactured from precast concrete, however some of the products listed in the APL under pull & junction boxes are made from plastic or high density polyethylene. Do these specifications require that pull boxes must be made from precast concrete?

Response: No. All boxes are not required to be concrete. However, if they are, then the manufacturer must be on the Department's list of Incidental Precast Concrete Producers with Accepted Quality Control Programs.

Boxes constructed of other materials must meet the requirements of Section 635 and standards referenced in Section 635.

6. 635-2.1.1 General: The specifications require the boxes to have an "Open Bottom" design. Most electrical pull boxes and junction boxes do not have an open bottom because UL and the NEC require all openings in electrical equipment to be "closed to afford protection substantially equivalent to the wall of the equipment". How will the contractors get their above ground raceways completed if they cannot use pull boxes with closed bottoms?

Response: Only in-ground boxes are required to have an open bottom design.
No change made.

7. 635-2.1.3 Dimensions: NEC 314 provides the methods and formulas for determining the minimum acceptable size for these boxes. Recommend requiring the engineer of record to size the enclosures in accordance with NEC 314 and then indicate the enclosures may not be smaller than ...

Response: Please see response to your comment #4.

8. 635-2.1.3 Dimensions:

Since there are two very different bending radii provided by many cable manufacturers, consider rewording this paragraph as follows: Ensure the pull & junction boxes are sized such that during cable installation when the cable is subject to tensile pulling loads, the minimum loaded cable bending radius is not violated. Also ensure that pull and junction boxes are sized such that after the cable is installed and there are no tensile loads on the cable(s), the minimum unloaded cable bending radius is not violated.

Response: 635-2.1.3 and 635-3.2 both address this. In addition, installation requirements for cable (in other sections) also require installers to respect cable limits with regard to pulling loads, bending radius, etc. No change made.

9. 635-2.1.4 Fabrication:

The section describes in-grade pull boxes but does not include above grade pull boxes or boxes used within buildings, gantries, sign structures, and ITS equipment. Recommend including fabrication specifications for galvanized steel and PVC pull boxes that may be used above grade.

Response: The scope of Section 635 is intended to cover furnishing and installing pull, splice and junction boxes for Department roadway and bridge construction projects. Consideration for expanding content to cover other above grade boxes or applications are outside the scope of this effort.

No change made.

10. 635-2.2.1 Fabrication:

This paragraph describes attachment hardware requirements however attachment hardware is normally is an entire specification section.

Response: Noted. No change made.

11. 635-2.2.1 Fabrication: Stainless steel attachment hardware may be too heavy duty (over specified) for junction boxes used indoors or inside ITS cabinets. Many times hot dip galvanized hardware is adequate.

Response: Please see response to your comment #9. No change made.

12. 635-2.2.1.1 Aerial Junction Box:

Please provide a definition of an aerial junction box.

Response: Please see Design Standards, Index No. 17733.

13. 635-2.2.1.1 Aerial Junction Box:

Recommend providing the specifications for American Telephone Company type boxes.

Response: Sentence regarding American telephone industry box has been deleted. Change made.

14. 635-2.2.1.1 Aerial Junction Box:

Recommend using the words “metal support cable” instead of “cable support wire”.

Response: Sentence with text “cable support wire” has been deleted.

15. 635-2.2.1.2 Mounted Junction Box:

Mounted junction boxes will be used in many places within the public right of ways and within toll buildings and ITS Hub Buildings, and on sign structures. Requiring all mounted junction boxes to have hinged doors with keyed locks may drastically increase the price of many smaller jobs or require ITS hub buildings to be very large to accommodate these large junction boxes.

Response: Noted. No change.

16. 635-3 Installation:

The first sentence mentions loop termination. Are these the IDRIS traffic detection loops for open road tolling applications?

Response: Yes; includes similar loops.

17. 635-3 Installation: The requirement for grounding the metal covers should not have to be mentioned in these specifications because it is already a requirement in NEC 314.

Response: Noted. No change.

18. 635-3.2.1 Placement and Spacing:

This paragraph seems to focus on fiber installations but does not seem applicable to power distribution systems. Installing an in-grade hand hole for power wiring at the base of each utility pole, service pole, ITS pole, CCTV pole, communication cabinets, at all 90 degree turns in the conduit system does not seem prudent or cost effective. Providing access points to the copper power wiring within the public right of way may not be good engineering practice.

Response: Language edited to clarify which portions apply to fiber optic cable. Any that are not restricted to fiber optic applications are intended to apply to all.

Change made.

Bert Woerner
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Comment: (11-30-12)

1. 635-2.1.3 Dimensions

a. The description for the signalized intersection application states the dimensions for the nominal cover as 13-inches wide by 24-inches long and no less than 12-inches deep. This seems to imply that the cover (lid) is 12-inches deep. I believe the intent is for the box dimensions to be 13-inches wide by 24-inches long by 12 -inches deep. The specification change wording should address the cover (lid) and box sizes separately to avoid confusion.

Response: Language revised for clarification.

Change made.

b. The dimensions for the fiber optic cable applications appear to imply the nominal cover (lid) is 24-inches deep. I believe the intent is for the box dimensions to be 24-inches wide by 36-inches long by 24 -inches deep.

Response: Language revised for clarification.

Change made.

c. The dimensions for the rectangular splice box applications appear to imply the nominal cover (lid) is 36-inches deep. I believe the intent is for the box dimensions to be 30-inches wide by 60-inches long by 36 -inches deep.

Response: Language revised for clarification.

Change made.

d. The dimensions for the round splice box applications also appear to imply the nominal cover (lid) is 36-inches deep. I believe the intent is for the round box dimensions to be 36-inches in diameter and no less than 36 -inches deep.

Response: Language revised for clarification.

Change made.

e. The descriptive text for all of the box applications should address the nominal cover and box sizes separately to avoid confusion.

Response: Language revised for clarification.

Change made.

f. Remove the word ‘one’ in the section given below.

635-2.1.3 Dimensions: Unless otherwise shown in the Plans, provide pull and splice boxes with the following dimensions.

~~Provide pull boxes for~~ *For signalized intersection applications, provide pull boxes with a nominal cover dimension of no less than 13 inches wide by 24 inches long and no less than 12 inches deep unless otherwise shown in the plans. Ensure the inside opening area is a minimum of 240 square inches and no **one** inside dimension is less than 12 inches.*

Response: Language revised as suggested.
Change made.

2. 635-2.2.1.1 Aerial Junction Boxes:

All the other junction boxes were very specific in what is required, but this section just says the “type used by the American telephone industry”. Should there be more specifics on what type of aerial junction box is required? What type? And what if the type used by the industry changes to a type of box that we would not approve of in the future?

635-2.2.1.1 Aerial Junction Boxes: Unless otherwise shown in the Plans, provide aerial junction boxes with minimum inside dimensions of 8 inches wide by 8 inches long and at least 3 inches deep. Ensure aerial junction boxes attached to cable support wire are the type used by the American telephone industry.

Response: Language regarding American telephone industry box has been deleted.
Change made.

3. 630-3.2.2 Electronic Box Marker:

This is a typo. It should be 635-3.2.2

Response: This has been corrected. Change made.
