Florida Department of Transportation

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GOVERNOR

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Tallahassee, FL 32399-0450

ANANTH PRASAD, P.E.
SECRETARY

January 25, 2013

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

Re: Office of Design, Specifications
Section **632**
Proposed Specification: **6320000 Signal Cable**

Dear Ms. Gourdine:

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

The changes are proposed by Jeff Morgan of the State Traffic Engineering and Operations Office to consolidate material requirements from the Minimum Specifications for Traffic Control Signals and Devices (MSTCSD) and the Standard Specifications for Road and Bridge Construction (SSRBC). Content regarding interconnect cable has been moved into a new section for Communication Cable (633). This activity is a planned part of an ongoing specification consolidation effort.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to SP965TT or trey.tillander@dot.state.fl.us.

If you have any questions relating to this specification change, please call me at 414-4140.

Sincerely,

Signature on File

V. Y. “Trey” Tillander, III, P.E.
State Specifications Engineer

TT/ft
Attachment
cc: Florida Transportation Builders' Assoc.
State Construction Engineer

SIGNAL CABLE.
(REV ~~11-26-12~~*1-23-13*)

SECTION 632 (Pages 785 – 787) is deleted and the following substituted:

SECTION 632
SIGNAL ~~AND INTERCONNECT~~ CABLE

632-1 Description.

Furnish and ~~I~~*i*nstall underground and aerial signal ~~and interconnect~~ cable *as shown in the plans and in accordance with Design Standards, Index No. 17727*.

632-2 Materials.

~~Use materials meeting the requirements of Section A632 of the current Minimum Specifications for Traffic Control Signal Devices (MSTCSD), except as provided in 603-2.2.~~

~~*This section specifies the minimum requirements for cables used to supply electrical power to vehicle and pedestrian signal heads, lane control signals, and electrically powered signs.*~~ *Use only new materials meeting the requirements of this section.*

632-2.1 Signal Cable: *Use either polyethylene insulated, polyvinyl chloride jacketed signal cable conforming to the requirements of the International Municipal Signal Association, Inc. (IMSA) Specification No. 19-1 or polyethylene insulated, polyethylene jacketed signal cable conforming to the requirements of IMSA Specification No. 20-1. Use signal cable conductors of stranded copper, No. 14 AWG or larger.*

632-2.2 Signal Cable Attachment Hardware: *Ensure that all bolts and nuts less than 5/8 inch in diameter are passivated stainless steel, Type 316 or Type 304 and meet the requirements of ASTM F593 and ASTM F594 for corrosion resistance. Ensure that all bolts and nuts 5/8 inch and over in diameter are galvanized and meet the requirements of ASTM A307. Use attachment hardware with sufficient tensile strength for the application. Use stainless steel lashing wire, galvanized or stainless steel lashing rod, cable rings or self-locking cable ties of U.V. stabilized black plastic having a minimum tensile strength of 100 pounds.*

632-3 Installation Requirements.

Except for mast arm assemblies, install signal cable in continuous lengths between the traffic signal controller cabinet~~s~~, and the first disconnect hanger~~s~~ (or traffic signal head~~s for non-span wire installations~~) on the span and between the traffic signal controller cabinet and each~~,~~ pedestrian signal head~~s,~~ and pedestrian detector~~s~~.

Do not use the neutral return conductor for pedestrian detectors as a neutral return for any other device. Conductors for the pedestrian signal head and the push button must be separated at the base of the pedestal and routed to the detection panel using separate raceways.

632-3.1 Number of Conductors: Determine the number of conductors required for each signal ~~and interconnect~~ cable unless specified in the Contract Documents.

~~Provide two spare conductors within the interconnect cable. Terminate conductors within controller cabinets as specified below.~~

Provide three spare conductors for each signal cable used at all signal installations. Install the three spare conductors from the controller cabinet through each ~~signal head~~ disconnect hanger *(or traffic signal head)* to the furthermost disconnect hanger *(or traffic signal head)*.

~~For non-span wire installations, install the three spare conductors from the controller cabinet through each signal to the furthermost signal.~~

~~Ground spare signal cable conductors in the controller cabinet. In the disconnect hanger, terminate spare wires at the terminal strip. Individually cap or tape any additional spares in the disconnect hanger.~~

Identify all spare conductors in a controller cabinet ~~as spare signal conductors or spare interconnect conductors,~~ and ground them to the controller cabinet ground bus bar. Provide spare conductors within the controller cabinet of sufficient length to reach the furthermost field wiring terminals in the cabinet.

~~**632-3.2 Number of Cables:** Do not install more than four separate cables at any point on a single support wire.~~

632-3.3 Protection of Cable: Ensure cable drawn through conduit, ducts, drilled holes protected by a rubber grommet, or support structures is installed in such a manner as to prevent damage to conductors or insulation.

632-3.4 Cabling for Mast Arm Assembly: Continuous lengths of cable between the traffic signal controller cabinet, signal heads (or disconnect hangers), pedestrian signal heads and pedestrian detectors will be allowed only when specified in Contract Documents.

~~Attach strain relief approved by the Engineer to the "J" hook inside the mast arm pole.~~

632-3.5 Cable Terminations: Terminate signal cable in the terminal by inserting the bared conductors into a compression type terminal block ~~and tightening the appropriate screws~~.

When barrier terminal blocks are specified in the Contract Documents, crimp insulated fork~~s~~ or ring terminals to the bared conductors using a calibrated ratchet-crimping tool and connect the forks or ring terminals to the barrier terminal block ~~by tightening the appropriate screws~~.

Neatly form and tie wrap all cable terminations.

~~Ground spare signal cable conductors in the controller cabinet.~~ If disconnect hangers are specified in the Contract Documents, terminate spare wires at the terminal strip located inside the disconnect hangers. Individually cap or tape any additional spares in the disconnect hanger.

~~Ensure all cable terminations~~ *Connect signal cables* for a mast arm assembly ~~are terminated~~ in the terminal compartment *when provided* ~~at the base of the mast arm pole~~.

~~**632-4 Signal Cable.**~~

~~Install underground and aerial signal cable in accordance with the Design Standards, Index No. 17727.~~

~~Except for mast arm assemblies, install signal cable in continuous lengths between the traffic signal controller cabinets, disconnect hangers (or signal heads for non-span wire installations), pedestrian signal heads, and pedestrian detectors.~~

~~Do not use the neutral return conductor for pedestrian detectors as a neutral return for any other device.~~

~~**632-5 Interconnect Cable.**~~

~~Install underground and aerial interconnect cable in accordance with the Design Standards, Index Nos. 17733 and 17841.~~

~~Install aerial interconnect cable in continuous lengths to and between traffic signal controller cabinets and aerial junction boxes.~~

~~Except for mast arm assemblies, install underground interconnect cable in continuous lengths to and between traffic signal controller cabinets and above-ground junction boxes.~~

~~Install terminations between controller cabinets at above-ground interconnect junction boxes. The Contractor may install terminations at intervals less than shown in the Plans; however, the Contractor must provide the above-ground junction box, materials, and labor for these terminations at no expense to the Department. Obtain the Engineer's approval of the location of additional junction boxes.~~

632-6 Method of Measurement.

632-6.1 General: Measurement for payment will be in accordance with the following work tasks.

632-6.2 Furnish and Install: The Contract unit price per intersection for *signal* cable ~~(signal) and per foot for cable (interconnect)~~, furnished and installed, will include furnishing all material, hardware, support wire, cable ties, cable clamps, lashing wire, terminal connectors, cable grounding and labor necessary for a complete and accepted installation.

Payment for *signal* cable ~~(signal)~~ will be based on the number of intersections at which signal cable is furnished and installed.

~~Payment for cable (interconnect) will be based upon the length installed between cable terminations, as determined by the manufacturer's sequential markings printed on the cable jacket, recorded to the nearest foot.~~

632-6.3 Furnish: The Contract unit price of cable, furnished, will include the cost of the required cable as specified in the Contract Documents, plus all shipping and handling costs involved in delivery as specified in the Contract Documents.

632-6.4 Install: The Contract unit price per intersection for *signal* cable ~~(signal) and per foot for cable (interconnect)~~, installed, will include all labor, cable ties, cable clamps, lashing wire, and cable grounding necessary for a complete and accepted installation. The Engineer will supply all cable.

Payment for *signal* cable ~~(signal)~~ will be based on the number of intersections at which signal cable is installed.

~~Payment for cable (interconnect) will be based upon the length installed between cable terminations, as determined by the manufacturer's sequential markings printed on the cable jacket, recorded to the nearest foot.~~

632-7 Basis of Payment.

Prices and payments will be full compensation for all work specified in this Section.

Payment will be made under:

Item No. 632- 7- *Signal* Cable ~~(Signal)~~ - per intersection.

~~Item No. 632- 8- Cable (Interconnect) - per foot.~~

SIGNAL CABLE.
(REV 1-23-13)

SECTION 632 (Pages 785 – 787) is deleted and the following substituted:

SECTION 632
SIGNAL CABLE

632-1 Description.

Furnish and install underground and aerial signal cable as shown in the plans and in accordance with Design Standards, Index No. 17727.

632-2 Materials.

Use only new materials meeting the requirements of this section.

632-2.1 Signal Cable: Use either polyethylene insulated, polyvinyl chloride jacketed signal cable conforming to the requirements of the International Municipal Signal Association, Inc. (IMSA) Specification No. 19-1 or polyethylene insulated, polyethylene jacketed signal cable conforming to the requirements of IMSA Specification No. 20-1. Use signal cable conductors of stranded copper, No. 14 AWG or larger.

632-2.2 Signal Cable Attachment Hardware: Ensure that all bolts and nuts less than 5/8 inch in diameter are passivated stainless steel, Type 316 or Type 304 and meet the requirements of ASTM F593 and ASTM F594 for corrosion resistance. Ensure that all bolts and nuts 5/8 inch and over in diameter are galvanized and meet the requirements of ASTM A307. Use attachment hardware with sufficient tensile strength for the application. Use stainless steel lashing wire, galvanized or stainless steel lashing rod, cable rings or self-locking cable ties of U.V. stabilized black plastic having a minimum tensile strength of 100 pounds.

632-3 Installation Requirements.

Except for mast arm assemblies, install signal cable in continuous lengths between the traffic signal controller cabinet and the first disconnect hanger (or traffic signal head) on the span and between the traffic signal controller cabinet and each pedestrian signal head and pedestrian detector.

Do not use the neutral return conductor for pedestrian detectors as a neutral return for any other device. Conductors for the pedestrian signal head and the push button must be separated at the base of the pedestal and routed to the detection panel using separate raceways.

632-3.1 Number of Conductors: Determine the number of conductors required for each signal cable unless specified in the Contract Documents.

Provide three spare conductors for each signal cable used at all signal installations. Install the three spare conductors from the controller cabinet through each disconnect hanger (or traffic signal head) to the furthermost disconnect hanger (or traffic signal head).

Identify all spare conductors in a controller cabinet and ground them to the controller cabinet ground bus bar. Provide spare conductors within the controller cabinet of sufficient length to reach the furthermost field wiring terminals in the cabinet.

632-3.3 Protection of Cable: Ensure cable drawn through conduit, ducts, drilled holes protected by a rubber grommet, or support structures is installed in such a manner as to prevent damage to conductors or insulation.

632-3.4 Cabling for Mast Arm Assembly: Continuous lengths of cable between the traffic signal controller cabinet, signal heads (or disconnect hangers), pedestrian signal heads and pedestrian detectors will be allowed only when specified in Contract Documents.

632-3.5 Cable Terminations: Terminate signal cable in the terminal by inserting the bared conductors into a compression type terminal block.

When barrier terminal blocks are specified in the Contract Documents, crimp insulated fork or ring terminals to the bared conductors using a calibrated ratchet-crimping tool and connect the forks or ring terminals to the barrier terminal block.

Neatly form and tie wrap all cable terminations.

If disconnect hangers are specified in the Contract Documents, terminate spare wires at the terminal strip located inside the disconnect hangers. Individually cap or tape any additional spares in the disconnect hanger.

Connect signal cables for a mast arm assembly in the terminal compartment when provided.

632-6 Method of Measurement.

632-6.1 General: Measurement for payment will be in accordance with the following work tasks.

632-6.2 Furnish and Install: The Contract unit price per intersection for signal cable, furnished and installed, will include furnishing all material, hardware, support wire, cable ties, cable clamps, lashing wire, terminal connectors, cable grounding and labor necessary for a complete and accepted installation.

Payment for signal cable will be based on the number of intersections at which signal cable is furnished and installed.

632-6.3 Furnish: The Contract unit price of cable, furnished, will include the cost of the required cable as specified in the Contract Documents, plus all shipping and handling costs involved in delivery as specified in the Contract Documents.

632-6.4 Install: The Contract unit price per intersection for signal cable, installed, will include all labor, cable ties, cable clamps, lashing wire, and cable grounding necessary for a complete and accepted installation. The Engineer will supply all cable.

Payment for signal cable will be based on the number of intersections at which signal cable is installed.

632-7 Basis of Payment.

Prices and payments will be full compensation for all work specified in this Section.

Payment will be made under:

Item No. 632- 7- Signal Cable - per intersection.