

**SECTION 02735**  
**ELECTRICAL CABLE**

**02735.01 GENERAL**

**A. Description**

Electrical cable installation shall include, but not necessarily be limited to, furnishing and placing electrical cable as shown on the Plans and in accordance with the Contract Documents or as directed by the Engineer.

**B. Related Work Included Elsewhere**

1. Trench excavation, backfill, and compaction; Section 02250.
2. General electrical work; Section 02730.
3. Concrete foundations; Section 02734.
4. Loop detectors; Section 02743.
5. Traffic Signal Electrical Conduit; Section 02741

**C. Quality Assurance**

The Engineer will inspect all materials and work to ensure compliance with the Contract Documents.

**D. Submittals**

1. Shop Drawings

Shop drawings shall be submitted as specified in the "General Provisions" for all electrical cable. The shop drawings shall include the number and size of conductor and general material information.

2. Certificates of Compliance

Certificates of compliance shall be submitted as specified in the "General Provisions" for all electrical cable stating that the cable meets the requirements specified in Section 02735.02.

**02735.02 MATERIALS****A. Materials Furnished by the County**

The County will not furnish any materials for electrical cable.

**B. Contractor's Options**

Not applicable.

**C. Detailed Material Requirements****1. Traffic Signal Cable**

Traffic signal cable shall meet the requirements of the International Municipal Signal Association (IMSA) specification No. 19-1. Cable shall consist of seven stranded copper conductor No. 14 AWG unless indicated otherwise on the Plans, and shall have the appropriate number of conductors as indicated on the wiring diagram. All conductors shall be color coded to meet the requirements of the IMSA specification No. 19-1, Table 2.

**2. Traffic Signal Service Cable**

Service cable used to provide electrical service to the traffic signal controller shall be 1 conductor No. 4 AWG, solid or seven stranded cable, 600 volt, with a PVC jacket of not less than 0.063 inches and shall meet the requirements of Underwriter's Laboratories Type THW or THN. Cables are to be colored black, red, and white.

**3. Aluminum Shielded Cable for Loop Detector**

Aluminum shielded cable is to be used for detector runs.

The cable shall be No. 14 AWG 19 stranded 2 wire conductor cable, 0.032 inch color coded, low density, polyethylene, polyester film bonded aluminum foil shielding 100% coverage wrapped with aluminum foil facing outward and drain wire between foil and jacket for maximum grounding contact with a chrome gray PVC jacket. The identification of the pair shall be black for the first color and clear for the second color.

The cable shall be twisted two or three turns per foot. The thickness of the polyester film jackets shall be 0.035 inch.

**4. Direct Burial Cable for Traffic Signals**

Direct burial cable shall meet the requirements of the IMSA specification No. 19-5. The cable shall consist of seven stranded copper conductor No. 14 AWG unless indicated otherwise on the Plans and shall have the appropriate number of conductors as indicated on the wiring diagrams to each controller or sampling

station. All conductors shall be color coded in accordance with IMSA specification No. 19-5, Table 2.

5. **Building Wire**

Building wire size 2 and smaller shall be 600 volt, THWN insulation, size 1 and larger shall be 90°C Type XHHW. Conductors shall be soft drawn copper of not less than 98% conductivity.

All wires number 8 AWG and larger shall be stranded. No wire smaller than number 12 AWG shall be used.

Wires and cables number 1 AWG and smaller shall be numbered and coded.

6. **Tracer Wire**

Tracer wire (14 AWG stranded thermoplastic high-heat-resistant nylon-coated [THHN]). Insulation color shall meet the APWA color code standard for identification of buried utilities.

7. **Color Coding**

All wire used solely for grounding purposes shall have green color if insulated. All control wiring shall be color coded with colors different from those used to designate phase wires.

### **02735.03 EXECUTION**

**A. General**

Direct burial cable, unless otherwise stated, shall be placed in a trench at a minimum depth of 30 inches below finished grade to the top of the cable.

**B. Trench**

The trench may be hand dug or plowed.

The trench shall be backfilled and compacted as specified in Sections 02250.03 and 02734.03.

**C. Wires and Cables**

A complete system of conductors shall be provided. Conductors shall be continuous from outlet to outlet and from terminal board to point of final connection, and no splices shall be made except within outlet, junction, or pull type as indicated on the Plans. The Contractor shall make wiring connections of all electrical equipment requiring electrical service.

**D. Splices**

Splices of Aluminum Shielded Cable will be permitted only at handboxes and pole bases and only as approved by the Engineer.

Splice wires only at handboxes, poles, pole bases, handholes and manholes as approved by the Engineer.

The joints of number 10 AWG and smaller wire shall be made with insulated solderless type pressure connectors. The joints of number 8 AWG and larger wire shall be of the type indented into the conductor by means of a hand or hydraulic pressure tool.

All splices in poles, bases, handholes, pull boxes, and manholes shall be waterproofed as follows:

- a. Butt ends of wire shall be fastened by indented butt splice connectors or soldered. Prior to jointing wire together, install a section of heat shrinkable tubing on one wire and of sufficient length to extend 1 inch past each end of splices.
- b. After wire is joined, apply a coat of thermosetting epoxy resin glue or compound to each end of splice, and slide heat shrinkable tubing over entire splice covering both ends. Apply heat to shrink tubing tightly and begin curing of epoxy sealer.
- c. After splice has cooled, apply three layers of waterproof plastic electrical tape, making sure no air voids exist between layers.
- d. Apply two coats of liquid weatherproof coating to splice.
- e. After coating has cured and all splices are complete, wires and cables shall be neatly coiled in junction box, after which the entire box shall be filled with expanding type, polyurethane foam, flush to the top of the box.

**02735.04 METHOD OF MEASUREMENT****A. Traffic Signal Electrical Cable**

Measurement for traffic signal electrical cable will be made of the length of each size specified satisfactorily installed where shown on the Plans.

**B. Miscellaneous Electrical Cable**

Miscellaneous cable will not be measured.

**02735.05 BASIS OF PAYMENT****A. General**

Payment will be made for contingent items when ordered by the Engineer. Payment will be as specified in Sections 02951, 02952, 02953, 02954, 02955, 02956, and 02957.

**B. Traffic Signal Electrical Cable**

Payment for traffic signal electrical cable will be made at the price bid per linear foot for each size specified. The price bid shall include furnishing and installing all traffic signal electrical cable, including materials, labor, trenching, backfilling, and equipment necessary to complete this item of work as shown and specified in strict accordance with the Contract Documents.

**C. Miscellaneous Electrical Cable**

Miscellaneous electrical cable will not be paid for as a separate item but is considered incidental to other items of work. Payment will be included in other related items of work and will constitute full compensation for all labor, equipment, tools and incidentals necessary to complete the required work.

END OF SECTION