

SECTION 16102

BASIC MATERIALS AND METHODS - EXTERIOR

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplemental Conditions and Division 1 Specification Sections, shall apply to this Section.

1.02 WORK INCLUDED

- A. Furnish all labor, materials, equipment, and incidentals required, and install, complete, and ready for operations all exterior electrical work, as shown on the Drawings and as specified herein.

1.03 RELATED WORK

- A. Applicable requirements of other Sections of Division 16 shall apply to this Section.

1.04 SUBMITTALS

- A. Shop Drawings for equipment specially manufactured or modified for this project.
- B. Product Data for:
 - 1. Raceways and fittings.
- C. Manufacturer's installation instructions.

1.05 PROJECT RECORD DOCUMENTS

- A. Accurately record actual locations of underground feeders, structures, etc.
- B. Submit record documents under provisions in Division 1.

PART 2 - PRODUCTS

2.01 RIGID GALVANIZED STEEL CONDUIT

- A. Rigid galvanized steel conduit shall conform to the requirements of Section 16100.
- B. Non metallic PVC conduit shall conform to the requirements of Section 16100.

2.02 BURIED WARNING AND IDENTIFICATION TAPE

- A. Provide detectable aluminum foil plastic-backed tape or detectable magnetic plastic tape manufactured specifically for warning and identification of buried cable and conduit. Tape shall be detectable by an electronic detection instrument. Provide tape in rolls, 2 inches minimum width, color coded for the utility involved with warning and identification imprinted in bold black letters continuously and repeatedly over entire tape length. Warning and identification shall be CAUTION BURIED ELECTRIC, CABLE BELOW, or similar. Use permanent code and letter coloring unaffected by moisture and other substances contained in trench backfill material.

2.03 WIRE AND CABLE

- A. Wire and cable conform to the requirements of Section 16100.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Underground electrical work shall conform to NFPA 70, "National Electrical Code," ANSI C 2, "National Electrical Safety Code," and the requirements of the Utility Company, where applicable.

3.02 CONTRACTOR DAMAGE

- A. The Contractor shall promptly repair any surfaces damaged by Contractor operations. The Contractor shall immediately notify the Owner/Engineer of any such damage.

3.03 CONDUIT INSTALLATION

- A. Verify requirements before proceeding with work.
- B. Underground conduits shall be non-metallic PVC for all underground feeders and branch wiring.
- C. Sweep bends may be made up of a combination of one or more curved or straight sections. Manufactured bends shall have a minimum radius of 18 inches for use with conduits of less than 3 inches in diameter and a minimum radius of 36 inches for ducts of 3 inches in diameter and larger.
- D. Conduits shall be rigid steel exposed to the equipment, and at the transition from underground to exposed. Where underground conduits enter equipment, they shall be sealed with compound bushings. Compound bushings shall be of malleable iron, hot dipped galvanized finished manufactured by O.Z. Gedney Type "FR," "KR," "CSBG," or approved equal.

3.04 CABLE INSTALLATION

- A. Install cable in accordance with the cable manufacturer's recommendations.
- B. Test conduits with a mandrel and thoroughly swab out to remove foreign material before pulling cables. Pull cables down grade with the feed-in point at the structures of the highest elevation. Use flexible cable feeds to convey cables into the duct runs. Cable slack shall be accumulated where space permits. Minimum allowable bending radii shall be maintained in forming such loops.
- C. Lubricants for assisting in the pulling of jacketed cables shall be those specifically recommended by the cable manufacturer. Cable lubricants shall be soapstone, graphite, or talc for rubber or plastic jacketed cables. The lubricant shall not be deleterious to the cable sheath, jacket, or outer coverings.
- D. Cable pulling tension shall not exceed the maximum pulling tension recommended by the cable manufacturer. Cable shall be pulled with an attached dynamometer. Pulling tension results shall be submitted to the Engineer.
- B. Bends in cables shall have an inner radius not less than recommended by the cable manufacturer and NFPA 70, "National Electrical Code."
- F. Protect terminations of cables from accidental contact, deterioration of coverings and moisture by providing terminating devices and materials. Install terminations in accordance with the manufacturer's requirements. Make terminations with materials and methods as indicated or specified herein or as designated by the written instructions of the cable manufacturer and termination kit manufacturer.
- G. When cutting cable, use heat shrink adhesive coated caps on cable ends or tape cable ends immediately after cutting to prevent moisture from entering the cable. Varnish the tape when cable is not expected to be connected for at least 72 hours.

3.05 GROUNDING SYSTEMS

- A. Noncurrent-carrying metallic parts associated with electrical equipment shall have a maximum resistance to solid earth ground not exceeding 5 ohms.

END OF SECTION 16102