

- B. Equipment and materials shall consist of the quality and manufacturer indicated in the contract. The equipment specified is based on the acceptable manufactures listed in the contract.
- C. Materials and work specified herein shall conform with the applicable requirements of:
 - 1) ANSI/NFPA 70
 - 2) IEEE/NESC
 - 3) NEMA
 - a) NEMA, RN1, PVC Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
 - b) NEMA, TC3, PVC Fittings for use with Rigid PVC Conduit and Tubing.
 - c) NEMA, TC6, PVC and ABS Plastic Utilities Duct for Underground Installation.
 - d) NEMA, TC8, Extra Strength PVC Plastic Utilities Duct for Underground Installation.
 - e) NEMA, TC9, Fitting for ABS and OVC Plastic Communications Duct and Fittings for Underground Installation.
 - f) NEMA, TC10, PVC and ABS Plastic Communications Duct and Fittings for Underground Installation.
 - 4) UL Standards
 - a) UL 6 Rigid Metal Electrical Conduit
 - b) UL 651 Schedule 40 and 80 PVC Conduit
 - 5) ANSI-C80.2 Specification for Rigid Steel Conduit, Enameled.
 - 6) ANSI/TIA-569-B Commercial Building Standard for Telecommunications Pathway and Spaces.

- 7) ANSI/TIA-607 Commercial Building Grounding and Bonding Requirements for Telecommunications.
- 8) ANSI/TIA-758-A Customer Owned Outside Plant Telecommunications Cabling Standard.
- 9) BICSI TDMM
- 10) BICSI Outside Plant Design Reference Manual

D. For horizontal drilling, the Contractor shall follow all safeguards necessary to ensure that crucial aspects of proper directional bore installation are controlled.

E. Personnel for horizontal directional drilling shall be fully trained in their particular duties as part of the drilling team.

PART 2- PRODUCTS

2.1 TRENCH/BACKFILL MATERIALS

- A. Trenching and Excavation Backfill: Select fill materials as specified in Section 02221
- B. Concrete Slurry: Select Flow Fill as specified in Section 02221
- C. Concrete Pavement: Select concrete paving materials as specified in Section 02520
- D. Asphalt Pavement: Select asphaltic paving materials as specified in Section 02513

2.2 CONDUIT SYSTEM

- A. Non-Metallic Conduit:
 - 1) PVC plastic pipe, ASTM D1785, Schedule 40 or 80, Type PVC 1120
 - 2) 4" 45 Degree Fiberglass Bend: FRE Composite Inc., 30-4032 Elbow IPS
 - 3) 4" 90 Degree Fiberglass Bend: FRE Composite Inc., 30-4030 elbow IPS
- B. Metallic Conduit: GRC with PVC coating (for building entrances, offsets and sweep bends) within 50 feet of the building protection.

C. Conduit Joint Couplings:

- 1) PVC non-metallic fittings must be installed with solvent applied couplings.
- 2) Approved transition couplings shall be used to connect metal to plastic (PVC) conduits.
- 3) Couplings shall be threaded and or glued to provide a watertight seal at conduit junctions.

- D. Outside Pull-Box: Minimum 14 gauge galvanized steel with weatherproof locking cover and hardware surface mounting as specified in the contract. Dimensions as specified in the contract.

2.3 CABLE ROUTING HARDWARE

- A. Cable Rack with Support Hardware as Required

- B. Cable Rack Steps/Hooks

2.4 HORIZONTAL DRILLING EQUIPMENT

- A. The horizontal directional drilling equipment shall have a drilling device of appropriate capacity to perform the bore; it shall have a guidance system to precisely guide boring operations, and trained personnel to operate said system.
- B. All equipment shall be in good, safe operating condition with appropriate supplies, materials and spare hardware on hand to preserve the systems integrity during the project.
- C. The directional drilling apparatus shall consist of hydraulically powered system to drill into the earth at a variable angle.
- 1) The apparatus shall be anchored to the ground in order to withstand any pressures required to complete boring.
 - 2) The hydraulic system shall be free of leaks.
 - 3) The hydraulic power system shall be self-contained with necessary pressure and volume to power the drilling operation.
- D. The Guidance System shall be a proven type and shall be assembled and operated by personnel certified and experienced with this system.