

337000 Electric Utilities

Sections Included In This Standard:

- 1.1 Identification of Underground Utilities and Piping
- 1.2 Manholes and Structures

1.1 IDENTIFICATION OF UNDERGROUND UTILITIES AND PIPING

- A. **WARNING TAPE:** All underground piping and utilities shall have non-detectable warning tape that conforms to the following requirements to identify the specific system buried below. Warning tape shall meet OSHA regulation 1926-956 (C) (I). Tape shall be 6" wide with black lettering imprinted on a color coded background that conforms to APWA color code specifications. Tape shall be installed between 18" to 30" above the top of the pipe and a minimum of 6" below grade.

- B. **TRACER WIRE:** All non- metallic pipes installed underground (except pipe containing electric wires and traceable communication lines) and all piping installed 6 feet or more below grade shall have a tracer wire installed along the length of the pipe. The tracer wire shall be taped to the pipe and not allowed to "float freely" within the backfill. The tracer wire shall be continuous without splicing from access point to access point along the length of the pipe. The tracer wire shall be accessible at all structures (valve boxes, meter pits, manholes, pull boxes, lift stations) along the length of the pipe. The tracer wire shall have an access point at the beginning and ending points of the pipe run with no distance between access points to exceed 400 feet within the pipe run. The tracer wire shall have a color coded jacket as follows:

Electrical distribution – Red
Communication – Orange

Tracer wire for piping less than 12" diameter shall be a #12 AWG and for piping greater than 12" diameter or 6 feet or more below grade shall be a #10 AWG and HS-CCS high-strength copper clad steel conductor (HS-CCS), insulated with a 30 mil, high-density, high molecular weight polyethylene (HDPE) insulation, rated for direct burial use at 30 volts. HS-CCS conductor must be 21% conductivity for locating purposes, Break load 380# minimum. HDPE insulation shall be RoHS compliant and utilize virgin grade material. Insulation color shall meet the APWA color code standard for identification of buried utilities. Tracer wire shall be *Copperhead*TM HS-CCS HDPE 30 mil insulation or *pre-approved* equal and made in the USA. Any disturbance of this tape requires replacement after work is completed.

1.2 MANHOLES AND STRUCTURES

- A. **GENERAL**
 - 1. All manholes and underground utility structures shall either be constructed with precast concrete units or reinforced cast-in-place concrete.
 - 2. All manhole openings shall be installed so as to minimize surface water intrusion through the lid.
 - (a) In grassed areas, the opening shall be 3" above surrounding grade with a continuous gradual slope down from the opening; maximum slope is 1" per foot.

(b) In paved areas, the opening shall be 1" above the surrounding grade with a continuous gradual slope down from the opening; maximum slope is 1/3" per foot.

B. STRUCTURAL REQUIREMENTS

1. Manholes and underground utility structures shall be designed by an engineer registered in the State of Florida based on ASTM C857 Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures with A-16 (AASHTO HS20) wheel loads. An additional load case consisting of A-12 (AASHTO HS15) wheel loads with 1/3 of the ASTM C857 impact and with Live Load Spacing of 32 inches rather than 4 feet shown in ASTM C857 Figure 1 shall also be considered.
2. As an alternate, precast, and reinforced cast-in-place, concrete manholes and underground utility structures with top slabs not longer than 48 inches maximum inside dimension conforming to the 2008 Florida Department of Transportation Design Standards Index No. 200 and Index No. 201 may be utilized without design by an engineer registered in the state of Florida.
3. Joints between precast units shall be made using "Ram-Nek" sealant.

C. ELECTRICAL MANHOLES, SWITCH VAULTS, AND PULL BOXES

1. Minimum Size: Electrical manholes shall be a minimum size of 10'x10' with a standard height of 96-inches minimum ceiling height. For shallow installations and only when avoiding conflicting conditions or utilities, a 78-inches minimum ceiling height is acceptable. Switch vault sizes shall be coordinated with the actual switchgear intended for proper clearance for cabling and operation of the switchgear. The minimum size for pull boxes shall be 6'x6'x6' deep. Larger size may be required for installed conductors.
2. Waterproofing: Specify exterior bituminous coating on electrical manholes to prevent infiltration.
3. Sump: Electrical manholes shall have a 12"x12"x12" sump with grate located directly beneath inner concentric cover (pumping ring) or below one of the double doors.
4. Hatches: Provide square or rectangular, checker plate, hinged, spring assisted for ease of opening hatches with frames of aluminum or steel galvanized in accordance with ASTM A123. All hatches shall be secured with stainless steel penta-head bolts. Hatches shall be welded or brass marked "ELECTRIC," with permanent marking of manhole or switch vault identification with ID number. Hatches for switch vaults shall be sized to accommodate replacement of the switch and the function of the structure. Hatches shall be designed by an engineer registered in the State of Florida utilizing the design loads from ASTM C857 Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures with A-16 (HS20) wheel loads. An additional load case consisting of A-12 (HS-15) wheel loads with 1/3 of the ASTM C857 impact and Live Load Spacing of 1 foot rather than 4 feet shown in ASTM C857 Figure 1 shall also be considered.
5. Electrical Manhole Throats: Throats for new or modified manholes shall be no more than 18" tall when the manhole is located under hardscape and no more than 24" tall when the manhole is located under landscaping.

END OF SECTION