

MTEMC

Underground Installation Guide

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Duct System Installation Specifications

SCOPE

The project consists of the installation of the complete underground duct system for both primary and secondary voltages, including conduit, pull boxes, sectors ground sleeves, equipment pads, riser poles, etc., necessary for the installation of MTEMC's underground primary and secondary cables and other associated MTEMC equipment and apparatus.

1. The developer shall be responsible for furnishing all labor, materials, and equipment necessary for:
 - A. Excavation, backfill, concrete and/or gravel encasement required for all ditches.
 - B. Duct banks and conduit installation.
 - C. Pad mounted equipment concrete pads.
 - D. Secondary junction boxes
 - E. Manholes
 - F. Transformer Box Pads
 - G. Sector Ground Sleeves
 - H. Primary pull boxes

2. In addition to the above, the developer shall be responsible for all surveying for the placement of MTEMC's lines and equipment, and for all electrical easements required at no cost to MTEMC.

3. MTEMC shall furnish drawings showing specific locations, quantities, sizes, encasement, and/or other requirements. Said drawings are a part of these specifications and are equally important to the success of the project.

4. Specific Material/Equipment Specifications:
 - A. Manholes:
 - a. Manhole excavation and backfill requirements are shown on drawing s "MH-3 sh 2" and "OMH-3 sh2" ". Strict adherence to these requirements is critical.
 - b. The developer should give MTEMC a minimum of 24-hours notice prior to setting manholes in order for MTEMC to schedule a crew to install manhole grounding and sump wells prior to backfill and to schedule an inspector to be present during the setting of the manholes.
 - c. Elevations for manholes are critical. The maximum throat allowed is 24". The minimum is 6". See throat detail on drawing PM-2L.
 - d. The developer shall follow manufacturer's recommendations when setting manholes. Proper slings and attachments are vital to the integrity of the manhole. Damaged manholes will not be accepted.
 - e. See drawing "MH-3" or "OMH-3" for manufacturing details on manholes.

f. Care shall be taken when placing manholes to align parallel to the street, thereby facilitating conduit installation.

B. Duct Banks:

- a. Primary duct bank details are included in the drawings. See Primary Ditch Details "2C", "3C", "4C", "6C-2", "9C", "12C", or "2G" for ditch details. MTEMC Engineering will specify the duct bank to be used. All No. 1 aluminum primary cable in conduit serving single-phase transformers in residential developments shall be encased in gravel per Ditch Detail drawing "2G". All other primary cable shall be in conduit, including primary lines to apartment buildings served by three-phase transformers, all commercial installations (whether single-phase or three-phase), and all feeders larger than No. 1 aluminum, shall be encased in concrete per Ditch Details Drawing that is specified. Any exceptions to this policy must be approved by the Vice President of Engineering. Ditch Detail "2C" shows how to install a communications conduit is in the same ditch with MTEMC's primary cable.
- b. The secondary conduit ditch details are shown on Secondary Ditch Details "1S" and "2S". Cover required is shown on details.
- c. The duct bank must be inspected by MTEMC prior to concrete or gravel encasement and also prior to backfill. Call 1-800-886-8362 at least 24 hours prior to needing inspection.
- d. All completely underground primary conduit to be schedule 40 if encased in gravel or if encased in concrete. See MTEMC Engineering for size conduit and encasement requirements. See Secondary Ditch Details for secondary conduit requirements.
- e. The primary duct bank should be straight and as level as practical. No sharp bends or dips will be allowed. Conduit banks shall be supported a minimum of every seven (7) feet. Ducts should drain into manholes.
- f. Caps of the proper size and type shall be installed on all conduits not terminating in manholes, switches, or other such equipment. Conduit shall be clean, dirt and rock free.
- g. In some instances, excavation at specific apparatus must be deeper than the typical ditch detail drawings show. In such cases, the developer should begin sloping the ditch deeper a minimum distance of 20' away from the apparatus in question. No sharp bends will be accepted.
- h. Conduit bank should enter rectangular manholes as shown on "MH-3 sh 3".
- i. Conduit must be installed to enter manhole perpendicular to manhole. (Note that manhole may not be parallel with the street in all cases; therefore, care must be taken to align conduit for perpendicular entrance to manholes.) Misaligned conduit banks will not be accepted.
- j. Secondary or service lateral conduit ditch details are shown on Secondary Ditch Detail "1S" or "2S". No sharp bends will be allowed. Horizontal bending radius must be no less than 6' and limited to one (1) per run. Conduit road crossings must be planned to avoid sharp bends for conduit serving building

sites. MTEMC inspectors will disapprove road crossings not taking this into account.

C. Concrete Equipment Pads:

- a. Concrete equipment pads (such as switch, transformer, etc.) must be inspected by MTEMC prior to concrete pouring. Call MTEMC at 1-877-886-8362 to request pad inspection.
- b. Concrete pads shall rest on undisturbed earth or on gravels installed on undisturbed earth according to the details found elsewhere in the drawings.
- c. Detailed drawings of required concrete pads will be furnished by MTEMC to the developer as a part of the plans and specifications. (See "PAD NO. 8-440B" and "PAD NO. 10" for switch pad details, and "PAD NO. 1" or "PAD NO. 5" for transformer pad details.)

D. Riser Poles

- a. At riser poles (see drawing RP-1), the developer shall furnish and install all conduit, conduit ells, and conduit mounting brackets required from the ditch up to and including the first stick of conduit. MTEMC will install additional conduit sections and necessary mounting brackets for each riser required. Prior to any digging within three (3) feet of MTEMC's poles, MTEMC shall be contacted 24 hours in advance to arrange for an MTEMC inspector to be present during excavation and backfill closer than three (3) feet from poles.
- b. Where only 2" or 3" risers and ells are required, the developer may elect to have MTEMC furnish and install said risers and ells. In this case, the developer shall pay \$125.00 to MTEMC for each 2" riser and el required and \$185.00 for each 3" riser and el required.
- c. Where customer or MTEMC owned secondary cables are contained in schedule 80 PVC conduit (non-metallic rigid), conduit supports shall be as shown on Table 1, on drawing RP-1.

E. Secondary Box Pedestals:

- a. Overhead primary/underground secondary developments:
 - (i) When required by MTEMC engineers, a secondary box pedestal shall be installed near the base of each transformer pole and additional secondary box, pedestals shall be installed on property lines on both sides of the street as specified by MTEMC Engineering. (See drawing SBP-1,-2). These pedestals shall have schedule 40 PVC conduits (number and size as required by MTEMC) running under the street between them, with 90 degree, 24" radius PVC elbows turning up into the pedestals. The developer shall install one (1) 90 degree, 24" radius PVC elbow for each lot to be served from the appropriate pedestal. The elbows shall be connected to a 10' section of schedule 40 PVC and turned in the direction of their respective building sites. Secondary box size will be designated by the MTEMC engineer. A list of approved boxes is found in Appendix "B".

(ii) Refer to section 5D for riser installations.

b. Completely underground developments:

In developments with padmounted transformers (PMT), secondary box pedestals shall be installed across the street from the PMT as specified by MTEMC Engineering, and secondary box pedestals will be required on the same side of the road as required by MTEMC Engineering(See drawings SBP-2,-3). Schedule 40 PVC conduits (number and size as required by MTEMC engineers) shall extend from the PMT secondary compartment area to the pedestal. In addition, the developer shall install one (1) 90 degree, 24" radius schedule 40 PVC elbow for each lot to be served from the PMT secondary compartment or the pedestal. These elbows shall be turned in the direction of their respective building sites. Secondary box size will be designated by the MTEMC engineer. A list of approved boxes is found in Appendix "B".

5. Miscellaneous Requirements:

A. Any changes to these plans and specifications must have the approval of MTEMC's Development Engineer.

B. Inspections by MTEMC are vital to the acceptability of the duct system by MTEMC prior to MTEMC's installation of cable and other electrical apparatus. MTEMC operations' inspectors must be assured that the duct system is installed to MTEMC's Duct specifications before such apparatus can be installed. It is therefore, extremely important for all installations to be inspected in a timely manner, as outlined elsewhere in these specifications.

C. Particular attention should be given (for safety reasons) to the sloping of banks in ditches or other excavation deeper than five feet. Detailed drawings may not show OSHA and/or other local, state, and/or federal regulations due to variations in soil types, etc.; however, the developer is responsible for compliance with such requirements. The fact that MTEMC inspectors may fail to point out code or regulation violations does not relieve the developer or owner from compliance with applicable codes and regulations, and in no way places blame on MTEMC for failing to point out such violations.

Request for Location of Underground Facilities

1. Before beginning any excavation operation, each person responsible for such excavation shall serve written or telephonic notice of intent to excavate to Tennessee One Call (800-351-1111) at least three (3) working days prior to the actual date of excavation, but not more than fifteen (15) full working days prior to such time.
2. Should a period of time of fifteen (15) working days from the actual date specified to start excavation expire without the excavation begin completed, the person responsible for such excavation shall notify Tennessee One Call of intent for additional excavation. Such notification must take place a minimum of three (3) working days prior to the expiration of original fifteen- (15) working-day period.
3. The written or telephone notice required shall contain the name, address, and telephone number of the person responsible for excavation; and the starting date, type of excavation to be done, specific location of excavation, and whether or not explosives are to be used.
4. The location of proposed area of excavation should be designated by marking such area with “Safety Orange” color-coded stakes and “Safety White” identifications on the roadway, or other marking devices.
5. The appropriate location of MTEMC underground facilities does not include a designation of location as to depth below the surface of the ground. Excavators must use reasonable care to ascertain for themselves the exact depth of the underground facilities. If after so ascertaining, the excavator learns that the excavation is likely to interfere with the operation of MTEMC facilities, he/she must contact MTEMC to make other arrangements.
6. In the event of an emergency, MTEMC may be contacted at any time. “Emergency” means an imminent danger to life, health, or property.
7. MTEMC will use “Safety Red” to mark its facilities.

Current Transformer Enclosure Specifications

The developer shall be responsible for supplying a NEMA 3R enclosure that adheres to the following specifications.

1. The enclosure shall be constructed of aluminum. The aluminum shall be a minimum thickness of nine hundredth (0.090) inches. All bolts, nuts, and washers shall be stainless steel, or aluminum. The backboard shall be 3/4 inch treated, exterior, BB grade plywood.
2. All joining edges shall have a minimum of one (1) inch overlap. The front of the enclosure shall have a minimum of one (1) inch flange on all sides. The door panel shall be removable with a minimum of one (1) inch flanges on the sides and bottom. The door shall be fastened with two (2) locking hasps. The plywood backboard shall be mounted on the inside back of the unit with four stainless steel bolts, nuts, and washers and maintain a minimum of 1/4 inch spacing between the board and cabinet. The enclosure shall be provided with one (1) ground lug.
3. The minimum dimensional requirements for the enclosure are given in the following table.

DIMENSIONS FOR CURRENT TRANSFORMER ENCLOSURES

TABLE 1

<u>SERVICE</u>	<u>LENGTH</u>	<u>WIDTH</u>	<u>DEPTH</u>
3 phase	36 inches	36 inches	12 inches
1 phase	24 inches	24 inches	10 inches

If these measurements can not be met, the length and width may be altered provided the volume of the enclosure is maintained. In no way is the depth of the enclosure to be less than twelve (12) inches for three phase and ten (10) inches for single phase.

