

SECTION 802

ELECTRICAL CONDUIT

802.01. DESCRIPTION.

This work shall consist of furnishing and installing all the electrical conduit, junction boxes, fittings, expansion devices, and miscellaneous hardware necessary to complete the electrical conduit system in accordance with these Specifications and the Plans. The location of the conduit, junction boxes, etc., as shown on the Plans, is diagrammatic and may be subject to adjustment as the Engineer may direct in order to conform to existing field conditions.

802.02. MATERIALS.

- (a) **Conduits and Fittings.** Conduits and fittings shall meet the requirements of Section 709.
- (b) **Junction Boxes.** Junction boxes shall be of the size and type shown on the Plans and shall be furnished with gasket and cover.

Oversized condulets may be used in lieu of junction boxes when installed in conjunction with exposed conduit systems if an adequate splicing chamber can be provided and when approved by the Engineer.

Condulets may NOT be used when the branch circuit is shown to be fused.

All materials furnished shall be new and of approved quality and workmanship.

802.04. CONSTRUCTION METHODS.

- (a) **General.** Install conduit in accordance with the codes and regulations listed in Section 801 and these Specifications, unless they are in conflict; in that case, carry out the installation in compliance with 1) the requirements herein stated and 2) the details shown on the Plans. Make conduit runs as direct as possible, using conduit of the minimum sizes shown on the Plans.

NOTE: You may, at your option and expense, use conduit of a larger size provided the larger size is used for the entire length of the run from outlet to outlet. Do not use slip joints or running threads for coupling conduit. When a standard coupling cannot be used for coupling metal-type conduit, use an approved threaded union coupling.

Ream the ends of all conduits—whether shop or field cut—to remove burrs and rough edges. Make cuts square and true so that the ends will butt together for the full circumference.

For metal-type conduit, tighten couplings until the ends of the conduits are brought together. Do not leave exposed threads.

For nonmetallic-type conduit connections, use the solvent weld type.

When galvanized conduit surfaces have been damaged to the extent that bare metal is exposed, regalvanize, metalize, or paint them with an approved zinc dust-oxide paint.

Thread and cap all metal-type and nonmetallic-type conduit ends with standard pipe caps until wiring is started. When caps are removed, provide the threaded ends with conduit bushings. Also

cap all conduit installed for future use, unless it terminates in a junction box or other electrical enclosure.

Factory conduit bends shall be in accordance with requirements of the NEC. Where factory bends are not used, bend conduit, without crimping or flattening it, using the longest centerline radius practicable but not less than six times the inside diameter of the conduit.

Conduit installed in concrete pole bases, structures, or pedestals shall extend not more than 2 inches (50mm) vertically above the footing.

Conduit entering through the side of pull boxes shall extend not more than 2 inches (50 mm) inside the box wall and not be less than 4 inches (100 mm) above the bottom, and shall be sloped toward the top of the box to facilitate pulling of conductors.

Conduit entering through the bottom of a pull box shall extend a minimum of 4 inches (100 mm) above the bottom and shall be located near the end walls to leave the major portion of the box clear.

Use nipples to eliminate cutting and threading where short lengths of conduit are required.

NOTE: No conductor shall be installed in the conduit system until all other work that might damage the conductors has been completed.

When existing underground conduit is to be incorporated into a new system, clean it and blow it out with compressed air.

- (b) **Pushed or Bored Conduit.** Place the conduit under existing pavement by approved pushing or boring methods. Do not disturb the pavement without permission from the Engineer. Keep pushing or boring pits at least 2 feet (0.60 m) clear of the edge of any type of surfaced area whenever possible.

NOTE: Excessive use of water, such that the pavement might be undermined or the subgrade softened, will not be permitted. If pits are to be left overnight, cover them with substantial planking, and mark them in a manner approved by the Engineer.

All pushed conduits shall be rigid metal. Bored conduit may be rigid metal or nonmetallic. For rigid, nonmetallic type conduit, predrill a hole larger than the conduit and install it by hand.

Unless otherwise shown, install bored or pushed conduits a minimum depth of 30 inches (0.80 m) below top of ground line.

Where conduit passes under a surfaced area, cut an "X" in the curb and/or surfacing above the conduit crossings for future relocating purposes.

- (c) **Trenched Conduit and Backfilling.** Conduit installed in a trench shall be of the type specified on the Plans. Excavate trenches deep enough to provide for 30 inches (0.80 m) minimum cover over the conduit, unless otherwise specified. Do not use cinders, broken concrete, or other hard or abrasive materials in backfilling. Also, clear the trench of such materials before the conduit is placed.

NOTE: Conduit shall not be placed prior to inspection of the trench by the Engineer.

Excavate immediately before installing the conduit, placing the material in a position where there is the least damage and obstruction to vehicular and pedestrian traffic and the least interference with the surface drainage. Be careful not to excavate the trenches wider than necessary for the proper installation of the electrical conduits or cables.

Dispose of all surplus excavated material in a manner approved by the Engineer.

When rock is encountered during trenching and the required trench depth cannot be attained, alter the trench depth or location at the discretion of the Engineer. The minimum trench depth shall be 1 foot (0.30 m).

Backfill all trenches with acceptable material as soon as possible after installation of conduit; deposit the backfill material in the trench in layers not to exceed 6 inches (150 mm) in depth.

NOTE: The first layer shall be free of rocks and compacted, and each successive layer shall be compacted before the next layer is placed

Compact backfill to not less than 95 percent standard density in accordance with Subsection 106.03.

Reconstruct all disturbed surfaced areas, base materials, and sodded areas using replacement materials of equal or better quality; this is to be done at the expense of the Contractor and to the satisfaction of the Engineer.

Whenever a part of an existing concrete sidewalk or driveway is broken or damaged, remove the entire square or slab unless otherwise specified by the Engineer, and reconstruct the concrete as specified above. Remove pavement in accordance with Section 619.

- (d) **Exposed Conduit.** When conduit is to be installed on the surface of structures, poles, or other exposed locations, use rigid metal-type unless otherwise specified.

Run surface-mounted conduit straight and true, so that it's horizontal or vertical on the surface of the structure or pole. Support it at intervals of not more than 5 feet (1.50 m), unless otherwise specified, using galvanized malleable iron conduit clamps and bolts with expansion shield anchor devices approved by the Engineer.

NOTE: Lag or machine bolt shields and percussion driven anchors in concrete or masonry will not be accepted.

Use only approved supporting devices for conduit that's attached to structural steel members.

- (e) **Conduit in Concrete Structures.** For concrete structures, use rigid metal- type conduit, unless otherwise specified. When the conduit crosses an expansion joint in the structure, install an expansion device of the type and size shown on the Plans.

Junction boxes installed in or on structures shall be of the size and type shown on the Plans.

802.05. METHOD OF MEASUREMENT.

Electrical conduit of the size and type specified will be measured by the linear foot (meter) along the centerline of the installed conduit from end to end, and shall include all flexible steel conduit, fittings, outlets, entrance caps, pull wires, condulets, expansion devices, and other miscellaneous hardware necessary to complete the conduit system. Each size and type of conduit shall constitute a separate pay item, unless otherwise provided. Unless otherwise provided, trenching and backfilling will not be measured for payment. *Junction boxes* installed in structures shall be measured by each unit installed, if so specified in the Plans.

802.06. BASIS OF PAYMENT.

Accepted quantities of electrical conduit, measured as provided above, will be paid for at the contract unit price as follows:

- | | | |
|-----|---|---------------------|
| (A) | GALVANIZED STEEL ELECTRICAL CONDUIT | LINEAR FOOT (METER) |
| (B) | PLASTIC CONDUIT | LINEAR FOOT (METER) |
| (C) | ALUMINUM CONDUIT | LINEAR FOOT (METER) |
| (D) | JUNCTION BOX | EACH |

Such payment shall be full compensation for furnishing all materials, equipment, labor, and incidentals to complete the work as specified.

SECTION 803 PULL BOXES

803.01. DESCRIPTION.

This work shall consist of furnishing materials and installing the pull boxes in accordance with these Specifications and in reasonably close conformity with the locations and dimensions shown on the Plans or established by the Engineer.

803.02. MATERIALS.

Materials used shall meet the requirements specified in the following Subsections of Section 700 - Materials:

| | |
|---------------------|--------|
| Concrete Pull Boxes | 739.01 |
| Plastic Pull Boxes | 739.02 |

803.04. CONSTRUCTION METHODS.

Pull boxes shall be of the sizes shown on the Plans and as herein specified. The pull box locations may be revised to fit existing field conditions or to better facilitate the installation of the conduit system with approval of the Engineer.

- (a) **Installation.** Install all pull boxes on a bed of crushed rock as shown on the Plans.

When installing pull boxes in sidewalks or other surfaced areas, make the tops of pull boxes flush with the finished surface. When practical, place pull boxes shown in the vicinity of curbs adjacent to the back of the curb and flush with the top of the curb.

When installing pull boxes in the ground, make the tops of the pull boxes flush with the top of the ground or no greater than 1 inch (25 mm) above the ground. Provide all pull boxes not installed in surfaced areas with concrete aprons, unless otherwise specified by the Engineer. Include aprons in the cost of pull boxes.

Install conduits entering pull boxes as shown on the Plans and in accordance with Section 802. When called for on the Plans, provide pull box extensions of the same material as the pull box and attach it to the pull box so that it will maintain the required depth without separation of the assembly.