

**TRENCHLESS INSTALLATION**  
**1 ½" CABLE-IN-DUCT**

I. Quantity

The base bid shall include the indicated number of feet of 1 ½" cable- in-duct, installed by the trenchless method, located as shown on the drawings.

II. Material

This item description covers installation of two (2) insulated copper conductors factory assembled in a continuous annealed flexible 1 ½" polyethylene duct. This cable-in-duct system should be suitable for installation directly in the earth for operation of maximum conductor temperature of 90°C.

A. Conductor 5KV

The conductor shall be FAA Specification L-824c, single conductor suitable for direct burial installation.

The insulation shall be rated at 90 degrees Celsius continuous operation, 130 degrees Celsius emergency and 250 degrees Celsius short circuit.

The cable shall consist of No. 4 AWG soft annealed 7 strand copper conductor.

The insulation shall not be less than 0.110 inches of light and heat stabilized chemically cross-linked polyethylene and shall meet ICEA S-96-659 specifications for cable voltages 5000 volts. The minimum at point wall thickness shall not be less than .099 inches

The IPCEA (3 cables per conduit, 40 degrees Celsius ambient, 90 degrees Celsius conductor temperature) ampacity shall not be less than 107 amperes.

The outside diameter of the cable shall be no less than 0.445 inches.

The cable shall be 5KV 4 AWG - Draka Cableteq USA-(tamaqua)part # 389181 (single conductor) or part#388927(2 conductor paralleled & striped), CME# AIRPTFAA42LPYK77 MT50 cable, Nehring xlp insulated, or approved equal. Identification of conductors shall be accomplished by longitudinally color striping black conductors. Neutral cable shall be identified with white stripe. Date of manufacture shall be included on all cable.

**B. Duct**

The duct shall be constructed from black polyethylene, NEMA TC-7, complying with ASTM Designation D1248 as Type III, High Density, Class C, Grade P34, category 5, certified to meet or exceed the following values.

<b>PROPERTY</b>	<b>VALUE</b>	<b>ASTM TEST</b>
Tensil Strength @ yield, psi	3200 min.	D 638
Ultimate Elongation, %	400 min.	D 638
Melt Index, gms/10 min.	0.5 max.	D 1238
Density of Base Resin, gms/cc	0.941-0.959	D 1505
Brittleness Temperature, F20, C	-75C max.	D 746
Environmental Stress Crack Resistance, F20	48 hrs. ft. lb./in.	D 1693
Impact Resistance-per In of notch	3.4/in.	D 256

The duct shall be permanently marked on the outside at regular 5' intervals with the manufacturer's name, trademark, nominal duct diameter, Type III, and year of manufacture.

The 1 ½" cable-in-duct system shall be manufactured by Arnco Corporation or approved equal.

**C. Connectors**

The inline and "C" tap connectors shall be compression type, Burndy or approved equal.

**D. Splicing Kits**

The tap & inline splicing kit shall be designed for use in direct burial or submerged locations. The kit shall be Scotchcast Product No. 82-BF1 or approved equal.

## E. Cable End Caps

The exposed cable ends shall be protected with a protective cap to protect the cable from moisture. At no time shall the exposed cable ends be left unprotected.

The cable end caps shall be cross-linked heat shrinkable polyolefin caps supplied with a factory-applied sealant that recovers to a predetermined diameter upon the application of heat. The cable end caps shall have an expanded/recovery ID of 0.80/0.36 in. The end caps shall be 3-M products # ICEC-201-A or approved equal.

## III. Method of Installation

### A. Directional Drilling Device

Trenchless installation of cable-in-duct shall be accomplished by use of a guided directional drilling device equipped with and capable of the following:

- 1) A continuous bore hold of at least 1000'.
- 2) Minimum actual thrust 17,500 lbs.
- 3) A locating system with receiver and transmitter that provides pitch, roll, and depth read out of the drilling head.
- 4) Direct surface penetration to eliminate the need for excavating an approach pit.
- 5) Tanks and mixing system for polymer or bentonite.
- 6) Safety equipment for protection of operator if underground powerline is encountered. Strike alert with test device on fiberglass panel with insulated control handles and automatic shutdown.

The contractor shall supply evidence that their drilling device has the capacity perform as specified.

## B. Installation

The cable-in-duct shall be installed, in a straight line, at a minimum depth of 30" inches (.7500 mm).

Cable-in-duct shall be installed in sufficient length to allow for splicing loops at light pole foundations, pull boxes, splice boxes and other locations indicated by the Engineer.

The cable-in-duct shall be pushed through excavation for pull boxes and foundations and shall be in place prior to the installation of pull boxes and pouring of concrete foundations unless otherwise directed by the Engineer.

Cable-in-duct shall not be installed when the temperature of the duct is below 32°F (0°C), except with permission of the Engineer.

Terminal points and splice locations of duct-cable shall be completely sealed by the application of heat shrinkable tubing or pre-molded boots. Sealing shall be performed promptly upon completion of installation.

## IV. Quotation

The 1 ½" cable-in-duct furnished and trenchless installed as specified herein shall be quoted on as a unit price per foot in the appropriate place in the appropriate section of this document.