

I. MATERIALS

A. THE CABLE FOR PHASE CONDUCTORS SHALL BE AS FOLLOWS:

- 1) THE CABLE SHALL BE SPECIFICATION FAA-L-824 TYPE C, SINGLE CONDUCTOR AND SUITABLE FOR OVERHEAD OR DIRECT BURIAL INSTALLATION.
- 2) THE INSULATION SHALL BE RATED AT 90 DEGREES CELSIUS CONTINUOUS OPERATION, 130 DEGREES CELSIUS EMERGENCY AND 250 DEGREES CELSIUS SHORT CIRCUIT.
- 3) THE CABLE SHALL CONSIST OF NO. 4 AWG SOFT ANNEALED 7 STRAND INSULATED COPPER CONDUCTOR.
- 4) 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 0.099 INCHES
- 5) THE ICEA (3 CABLES PER CONDUIT, 40 DEGREES CELSIUS AMBIENT, 90 DEGREES CELSIUS CONDUCTOR TEMPERATURE) AMPACITY SHALL NOT BE LESS THAN 107 AMPERES.
- 6) THE OUTSIDE DIAMETER OF THE CABLE SHALL BE NO LESS THAN 0.445 INCHES.

THE CABLE SHALL BE 5KV 4 AWG-PRYSMIAN DRAKA PART #389181 (SINGLE CONDUCTOR) OR PART #389181-31 (2 CONDUCTOR PARALLELED & STRIPED + #8AWG GREEN), 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. THE CABLE FOR THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE AS FOLLOWS:

- 1) THE CABLE SHALL BE #8AWG, XHHW-2, 600V, COPPER, GREEN INSULATION COLOR, STRANDED, SINGLE CONDUCTOR AND SUITABLE FOR WET LOCATION OR DIRECT BURIAL INSTALLATION.
- 2) THE INSULATION SHALL BE GREEN COLOR AND RATED AT 90 DEGREES CELSIUS CONTINUOUS OPERATION.
- 3) UL LISTED COPPER COMPRESSION CRIMP CONNECTORS SHALL BE USED FOR CONNECTIONS BETWEEN CONDUCTORS. USE COMPRESSION CONNECTORS SIMILAR TO BURNDY YC4C8 AND YC8C8 FOR CONNECTIONS. BRUSH THE CONDUCTORS WITH STEEL WOOL AND COAT CONDUCTORS WITH OXIDE INHIBITOR PRIOR TO CONNECTION/TERMINATION.

C. 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, CATEGORY5, CERTIFIED TO MEET OR EXCEED THE FOLLOWING VALUES:

PROPERTY	VALUE	ASTM TEST
TENSILE 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
BRITTLNESS TEMPERATURE, F20	-75C MAX	D 746
ENVIRONMENTAL STRESS CRACK		
CRACK RESISTANCE, F20	48 HRS. TF. LB/IN	D 1693
IMPACT RESISTANCE PER IN. OF NOTCH	3.4/IN.	D 256

THE 1-1/2" CABLE-IN-DUCT SYSTEM SHALL BE MANUFACTURED BY ARNCO CORPORATION OR APPROVED EQUAL.

- D. THE INLINE AND "C" TAP CONNECTORS SHALL BE COMPRESSION TYPE, BURNDY OR APPROVED EQUAL.
- E. THE TAP & INLINE SPLICING KIT SHALL BE DESIGNED FOR USE IN DIRECT BURIAL OR SUBMERGED LOCATIONS. THE KIT SHALL BE 3M SCOTCHCAST PRODUCT NO. 82-A1(SINGLE SPLICES), 3M SCOTCHCAST PRODUCT NO. 82-B1(3-WAY SPLICES) OR APPROVED EQUAL.
- F. 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.

II. INSTALLATION

A. 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 HOLE 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.
- 4) A MINIMUM OF 10 FT OF SLACK CONDUIT SHALL BE REQUIRED PER POLE AND PULL BOX (5' IN +5' OUT).
- 5) THE CONTRACTOR SHALL SUPPLY EVIDENCE THAT THEIR DRILLING DEVICE HAS THE CAPACITY TO PERFORM AS SPECIFIED.

MIS-705	DEPARTMENT OF PUBLIC UTILITIES - DIVISION OF POWER CITY OF COLUMBUS, OHIO		
	CABLE-IN-DUCT, 1-1/2", TRENCHLESS INSTALLATION, 3 WIRE		
	DRAWN BY: BEN	DATE: 1/1/2018	
	APPROVED: <i>Amy R. Wick</i>		
SCALE: NONE	SHEET: 1 OF 2	705	

II. INSTALLATION CONTINUED...

B. THE CABLE-IN-DUCT SHALL BE INSTALLED AS STRAIGHT AS PRACTICAL, AT A MINIMUM DEPTH OF 30" INCHES (0.7620 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 DEGREES F (0 DEGREES CELSIUS) 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.

III. BASIS OF PAYMENT

ITEM	UNIT	DESCRIPTION
MIS-705	LINEAR FOOT	CABLE-IN-DUCT, 1-1/2", TRENCHLESS INSTALLATION, 3 WIRE

MIS-705	DEPARTMENT OF PUBLIC UTILITIES - DIVISION OF POWER CITY OF COLUMBUS, OHIO		
	CABLE-IN-DUCT, 1-1/2", TRENCHLESS INSTALLATION, 3 WIRE		
	DRAWN BY: BEN	DATE: 1/1/2018	
	APPROVED: <i>Amy R. Wilfong</i>		
SCALE: NONE	SHEET: 2 OF 2	705	