

**Transmission & Distribution
Material & Installation Specification**

Overhead Conductor, Copper

I. Quantity

The base bid shall include the indicated quantity of overhead conductor, Copper furnished and installed as hereinafter specified.

II. Material

A. Copper 600V Cable THW - Wire shall be designed for use up to 600-volts and be able to be installed in conduit or other approved raceways, in wet or dry locations where conductor temperatures do not exceed 75 degree C for normal operation. Wire shall be annealed stranded uncoated copper conductor insulated with a polyvinyl chloride (PVC) jacket, providing an abrasion, flame retardant, moisture, and oil resistant insulation. The insulation jacket shall be a premium quality abrasion, flame retardant, moisture, and oil resistant, Underwriters Laboratories (UL) approved, thermoplastic insulation jacket. The insulation jacket shall be marked in accordance with UL Standard 83 and NEC Article 310. Wire shall be sized per schedule in TDMIS-1502, sheet 3 and shall meet and/or exceed all requirements of the latest edition of the standards listed below.

ASTM B-3	Copper wire, soft or annealed
ASTM B-8	Copper conductors, concentric-lay-stranded, hard, medium-hard, or soft
NEC ARTICLE 310	Conductors for General Wiring
UL Standard 83	Thermoplastic-Insulated Wires and Cables

B. Copper 600V Cable XHHW - Cable shall be designed for use up to 600-volts and be able to be installed in conduit, cable tray or other recognized raceways for service, feeders and branch circuits, in wet or dry locations at temperatures not to exceed 90 degree C for normal operation. Cable shall be annealed (soft), stranded, uncoated

copper conductor insulated with a cross-linked polyethylene (XLP) jacket, providing an abrasion, moisture, heat, and sunlight resistant, flame retardant insulation. The insulation jacket shall be of premium quality abrasion, flame retardant, moisture, heat, and sunlight resistant, Underwriters Laboratories (UL) approved cross-linked polyethylene (XLP) insulation jacket. The insulation jacket shall be marked with a sequential footage marking at two foot (2') intervals and shall be identified by surface printing. Wire shall be sized per schedule in TDMIS-1502, sheet 3 and shall meet and/or exceed all requirements of the latest edition of the standards listed below.

ASTM B-3	Copper wire, soft or annealed
ASTM B-8	Copper conductors, concentric-lay-stranded, hard, medium-hard, or soft
NEC ARTICLE 310	Conductors for General Wiring
UL Standard 44	Thermosetting-Insulated Wires and Cables
UL Standard 1685	UL Flame Expose Test
ICEA S-66-524	Cross-linked-Thermosetting-Polyethylene Insulated Wire and Cable

C. Copper 5KV Cable Non-shielded XLP - Cable shall be designed for use up to 5kV and be able to be installed in conduit, duct, direct burial and aerial applications where conductor temperatures do not exceed 90 degree C for continuous normal operation, 130 degrees C emergency and 250 degrees C short circuit. Cable shall be a soft drawn, uncoated, stranded copper with a cross-linked polyethylene (XLPE) insulation providing a FAA-L-824 Type C rating. The insulation jacket shall be a cross-linked polyethylene (XLPE) compound, and shall meet ICEA 5-96-659 specifications for cable voltage 50KV. The cable shall be surface printed with "FAA-L-324 TYPE C, SIZE 5KV, NON-SHIELDED, XLP". The cable shall also have a sequential footage marking at 2-foot intervals and shall contain a minimum of one (1) white stripe surface printed continuously on the cable for the entire length of the reel size as per the table above. Date of manufacturer shall be included on all cable. Wire shall be sized per schedule in TDMIS-1502, sheet 3 and shall meet and/or exceed all requirements of the latest edition of the standards listed below.

CITY OF COLUMBUS DEPT. OF PUBLIC UTILITIES – DIVISION OF POWER OVERHEAD CONDUCTOR, COPPER		
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ASTM B-3	Copper wire, soft or annealed
ASTM B-8	Copper conductors, concentric-lay-stranded, hard, medium-hard, or soft
ICEA S-69-659	Nonshielded Cables Rated 2001-5000V for Use in the Distribution of Electric Energy

- D. Copper Cable BARE - The wire and cable shall be tempered solid or annealed stranded copper in accordance with the appropriate standards listed in Part II (E) of this specification and sized per schedule in TDMIS-1502, sheet 3.
- E. Copper Cable Overhead XLP - The wire shall be a medium-hard drawn tempered solid copper in accordance with the appropriate standards below and sized per schedule in TDMIS-1502, sheet 3.

ASTM B-1	Hard-Drawn Copper Wire
ASTM B-2	Medium-Hard-Drawn Copper Wire
ASTM B-3	Copper wire, soft or annealed
ASTM B-8	Copper conductors, concentric-lay-stranded, hard, medium-hard, or soft
ASTM D-1248	Polyethylene Plastics, Molding, and Extrusion Materials
ASTM C-8.35	Specifications for Weather-Resistant Polyethylene-Covered Wire and Cable

III. Installation

- A. The installation shall be as required by the manufacturers recommendations. Use recommended rollers and pulling grips. Sag shall be according to the manufacture provided charts and the initial tension documented along with temperature read on a certified thermometer. This data shall be provided to DOP for approval before energizing conductors.
- B. Conductors shall be payed out from reels or hand coils. Dragging conductors shall not be permitted.

- C. Conductors must be handled with care. Conductors shall neither be trampled on nor run over by vehicles. Each reel shall be examined and the conductor shall be inspected for cuts, kinks, or other injuries. Injured portions shall be cut out.
- D. Conductors shall be pulled over suitable rollers or stringing blocks designed for the purpose, properly mounted on poles or crossarm as necessary to prevent binding while stringing.
- E. All conductors shall be cleaned thoroughly by wire brushing before splicing or installing connectors or clamps. A suitable oxide inhibitor shall be used before splicing or applying connectors over conductors.
- F. Connectors - Copper H-Tap compression type sized as appropriate for line and tap conductors.
- G. Tape Insulation - shall be 1.5% insulation thickness 3M #130C high voltage rubber tape with 5 minimum wraps of 3M 88 vinyl outer tape seal.
- H. Finished installation shall not include more than one splice in any one span and splices shall not be located within 20 feet of a conductor support. No splices shall be permitted over road or highway crossings, rail road crossings, or water crossings.

IV. Method of measurement

Shall be based on a completed conductor installation including sag, tension, guy adjustments, spacers, ties, dead end grips, connections, labor, equipment, tools, and supervision required for a complete and operational system.

Measurement shall be from pole to pole, or pole to structure with no additional adders for sag or jumpers.

V. Basis of payment

Items	Unit	Description
TDMIS-1502	1000 linear foot	Overhead conductor, copper

Example:
1,248 LF = 1.284 * unit price per thousand LF

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COPPER 600V THW

DOP PART #	WIRE SIZE (AWG)	STRANDS	INSULATION COLOR	SPOOL DIMENSION (DIAMETER / WIDTH) 500 FT/SPOOL
20069	12	7	GRAY	6-1/2" / 5-1/2"
20070	12	7	PURPLE	6-1/2" / 5-1/2"
20071	12	7	YELLOW	6-1/2" / 5-1/2"
20072	12	7	GREEN	6-1/2" / 5-1/2"
20073	12	7	ORANGE	6-1/2" / 5-1/2"
20074	12	7	BROWN	6-1/2" / 5-1/2"
20075	12	7	WHITE	6-1/2" / 5-1/2"
20076	12	7	BLACK	6-1/2" / 5-1/2"
20077	12	7	BLUE	6-1/2" / 5-1/2"
20078	12	7	RED	6-1/2" / 5-1/2"
20079	10	7	BLACK	11-1/2" / 7-5/8"
20080	10	7	WHITE	11-1/2" / 7-5/8"
20089	4	7	WHITE	11-1/2" / 7-5/8"
20090	4	7	BLACK	11-1/2" / 7-5/8"

COPPER 5KV NON-SHIELDED XLP

DOP PART #	WIRE SIZE (AWG)	STRANDS	SURFACE MARKING	INSULATION THICKNESS IN (MM)	MINIMUM OUTER DIAMETER IN (MM)
20091	4	7	NO STRIPPING	.110	.445
20092	4	7	MIN, ONE WHITE STRIPE	.110	.445

BARE COPPER SOLID

DOP PART #	CONDUCTOR SIZE (AWG)	TEMPER
20068	14	TINNED SOFT
20082	6	SOFT DRAWN
20083	6	MEDIUM-HARD DRAWN
20087	4	HARD DRAWN

BARE COPPER STRANDED

DOP PART #	CONDUCTOR SIZE (AWG)	STRANDS
20095	2	7

COPPER 600V XHHW

DOP PART #	CONDUCTOR SIZE (AWG)	STRANDS
20096	#2	7
19952	2/0	19
19959	4/0	19
19962	250	37
19966	350	37
19969	500	37
19976	600	61
19977	750	61
19982	1000	61

COPPER OVERHEAD XLP

DOP PART #	WIRE SIZE (AWG)	TEMPER
20084	6	MEDIUM-HARD DRAWN
20088	4	MEDIUM-HARD DRAWN
20097	2	MEDIUM-HARD DRAWN
19945	1	MEDIUM-HARD DRAWN

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OVERHEAD CONDUCTOR, COPPER

MCC

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SCALE: NONE SHEET: 3 OF 3

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