

CITY OF AUSTIN, ELECTRIC UTILITY DEPARTMENT

PURCHASE SPECIFICATION

FOR

CABLE, DIST, URD, 600V, CROSS-LINKED, POLYETHYLENE, INSULATED, SECONDARY

<u>Date</u>	<u>Prepared by</u>	<u>Issuance/ Revision</u>	<u>Department Approval Division Manager/Standards Manager</u>
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1.0 Scope and Classification

1.1 Scope

1.1.1 This specification covers single conductor, 600 volt, cross-linked polyethylene insulated, secondary urd cables. This cable shall be capable of meeting Underwriters Laboratories type RHH or RHW or USE.

1.1.2 No deviation from this specification will be permitted.

1.1.3 Only manufacturers products approved by the City of Austin Electric Department Materials and Standards Committee will be considered for use in the City of Austin electric system.

1.2 Classification

1.2.1 Voltage shall be 600.

1.2.2 Conductor sizes shall be #4AWG through 1000 MCM.

2.0 Applicable Specifications

2.1 Unless otherwise stated in these specifications, cable shall be manufactured, tested and made ready for shipment in accordance with the latest edition of applicable ASTM and IPCEA standards.

3.0 Functional Requirements

3.1 Cable furnished under these specifications shall be designed for installation in underground distribution systems, in underground conduit, duct, or direct burial.

4.0 Physical Requirements

4.1 General Construction - Cable shall be single conductor, #4AWG through #1000 MCM inclusive, and shall be insulated with heat and moisture resistant cross-linked polyethylene compound.

4.2 Wires

4.2.1 Aluminum: Three-quarter hard or hard drawn aluminum meeting the requirements of ASTM B262, "specification of aluminum wire, EC-H16 or EC-H26, for electrical purposes" latest edition or ASTM B230, "specification for aluminum wire, EC-H19, for electrical purposes", latest edition.

4.3 Stranding

4.3.1 Aluminum: Stranding will be Class B in accordance with ASTM B 231, "specification for aluminum conductors, concentric-lay-stranded", latest edition.

#### 4.4 Insulation

4.4.1 General: Insulation shall be heat and moisture resisting cross-linked polyethylene compound. The insulation shall be homogenous in character, tough, applied concentrically about the conductor, and shall fit tightly thereto. The insulation shall be guaranteed for use at conductor temperatures not exceeding 90 degrees C (194 degrees F). A separator tape shall be used between the conductor and insulation.

4.4.2 Thickness: The average thickness shall be not less than that specified in Table I. The minimum thickness at any point shall be not less than 90 percent of the specified thickness.

4.4.3 Insulation Tests: The insulation shall be capable of meeting the requirements shown below. Test methods shall comply with IPCEA S-66-524, "Cross-linked-thermosetting insulated wire and cable for the transmission and distribution of electrical energy", latest edition, unless otherwise specified.

(a) Initial Physical properties

Tensile strength, minimum PSI 1800

Elongation at rupture, minimum, % 250

(b) Physical requirements after accelerated aging air oven test (168 hours @ 121 degrees C)

Tensile strength, minimum, percentage of original 75

Elongation at rupture, minimum, percentage of original 75

(c) Solvent extraction test extractable after 20-hour drying time, maximum percent

30

(d) Heat distortion test at 121 degrees C 4/0 AWG and smaller (insulation on cable) maximum, percentage of original

30

(e) Moisture absorption test electrical method: (immersed at 75 degrees C, tested at an average stress of 80 volts/mil, 60 Hertz)

Dielectric constant after 24 hours immersion, maximum 6.0

Increase in capacitance, 1 to 14

days, maximum, percent	3.0
Increase in capacitance, 7 to 14 days, maximum, percent	1.5
Stability factor after 14 days, maximum alternate, stability factor difference, 1 to 14 days, maximum	0.5

5.0 Electrical Tests

5.1 High Voltage AC - Each length of completed cable shall withstand for five minutes the alternating-current test voltage shown in Table I.

5.2 Insulation Resistance - Each length of completed cable, following the alternating-current test, shall show an insulation resistance corrected to 15.6 degrees C (60 degrees F), of not less than the value R as calculated from the formula given below. Temperature coefficients for correcting readings taken at other than 15.6 degrees C (60 degrees F) to equivalent values at 15.6 degrees C (60 degrees F) are given in Table II.

$$R = K \text{ LOG}_{10} \frac{D}{d}$$

Where R = insulation resistance in megohms-1000 ft.

K = 10,000

D = diameter over insulation, and

d = diameter under insulation

6.0 Identification

6.1 All cables shall carry, throughout their length, marker threads between the insulation and conductor identifying manufacturer by color of thread, or shall have some other identification mark as specifically approved by the Superintendent of Engineering Design of the City of Austin Electric Department.

6.2 Surface Legend - All cables shall be surfaced printed with manufacturer's name, cable type, cable size, and place made.

7.0 Test Reports - Manufacturer shall furnish three (3) copies of certificate of compliance on each size cable manufactured under these specifications.

TABLE I

INSULATION THICKNESS AND TEST VOLTAGE

<u>Conductor Size Awg or Mcm</u>	<u>Insulation Thickness Mils</u>	<u>Alternating Current Test Voltage Kv</u>
4-2	80	7.0
1-4/0	95	8.0
225-500	110	9.5
525-1000	120	11.5

TABLE II

TEMPERATURE COEFFICIENTS

<u>Temperature F</u>	<u>Temperature C</u>	<u>Temperature Coefficient</u>	<u>Temperature F</u>	<u>Temperature C</u>	<u>Temperature Coefficient</u>
50	10.0	0.75	70	21.1	1.35
51	10.6	.77	71	21.7	1.39
52	11.1	.79	72	22.2	1.43
53	11.7	.82	73	22.8	1.47
54	12.2	.84	74	23.3	1.52
55	12.8	.87	75	23.9	1.56
56	13.3	.89	76	24.4	1.61
57	13.9	.92	77	25.0	1.66
58	14.4	.94	78	25.6	1.71
59	15.0	.97	79	26.1	1.76
60	15.6	1.00	80	26.7	1.81
61	16.1	1.03	81	27.2	1.87
62	16.7	1.06	82	27.8	1.92
63	17.2	1.09	83	28.3	1.98
64	17.8	1.13	84	28.9	2.04
65	18.3	1.16	85	29.4	2.10
66	18.9	1.20			
67	19.4	1.23			
68	20.0	1.27			
69	20.6	1.31			