

CITY OF PALO ALTO
UTILITIES DEPARTMENT
SPECIFICATIONS FOR
ABRASION RESISTANT 600 V CABLE
CPA Inventory numbers 35204, 35210, 35216,
35217,35219,35370,35376,35379,35382,35384,35386,35390,35391,35394, &
35397

1. **SCOPE**

- a. This specification covers the physical and electrical requirements for 600 Volt rated, polyethylene (XLP) insulated single conductor, duplex, and multi conductor cables.
- b. The cable will be used for underground distribution circuits. The cable shall be suitable for installation in conduit or direct earth burial in wet or dry locations as well as outdoor locations exposed to weather and direct sunlight.
- c. The cable shall be rated to operate electrically and mechanically without damage to any part with conductor temperature as follows:
 - Operating (continuous) - 90° C
 - Emergency Overload - 130° C

2. **GENERAL**

- a. The cable shall be manufactured and tested in accordance with ICEA Publication S-61-402 or S-66-524, specifications, latest revision, with all exceptions, additions and modifications as required by this specification.
- b. The manufacturer shall be responsible for ensuring compatibility of all components of the completed cable.
- c. All phases of cable manufacturing and testing shall be accomplished with care and good workmanship.

3. **MAKEUP AND MATERIALS**

- a. PHASE CONDUCTOR:
 - 1) Copper conductors shall be Class "B" stranding per ASTM B8 and the metal shall be 100% IACS coated or uncoated copper conforming to ASTM B3.
 - 2) Aluminum conductors shall be Class "B" stranding per ASTM B231 and the metal shall be either hard drawn conforming to ASTM B230 or three quarters hard drawn conforming to ASTM B609.

4. **INSULATION:**

- 1) The insulation shall be black thermoplastic or thermosetting polyethylene conforming to ICEA S-61-402 or S-66-524, with the following additions for thermoplastic material.
 - a. Two layer construction:
 - (i) Inner Layer – the insulation shall be Type I Class C, category 4 or 5, Grade E5 polyethylene per ASTM D 1248-78.
 - (ii) Outer Layer – the insulation shall be Type III Class C, category 5, Grade E11 polyethylene per ASTM D 1248-78.
 - b. Single layer construction:
 - (i) The insulation shall be Type II or III, Class C, category 4 or 5, Grade E11 polyethylene per ASTM D 1248-78.
- 2) The insulation shall be free stripping form the conductor.
- 3) A polyester film or similar thin separator may be used between conductor and insulation. It be colored and clearly recognizable.
- 4) The minimum insulation thickness at any point of the total (inner and outer layer) shall not be less than 90 percent of the specified minimum average “MIL” thickness.
- 5) The cable shall be tested at the voltages shown in Table I.
- 6) Single conductor cables shall be immersed in water for at least six hours and multiple conductor cables at least one hour prior to insulation resistance testing. Cables shall be tested in accordance with paragraph 6.14.2 and 6.15.3 of ICEA S-66-524.

TABLE I

Conductor Size AWG or kcmil	Insulation Thickness “mils”			AC Test Voltage kV	DC Test Voltage kV
	Inner	Outer	Total		
1-4/0	30	50	80	7.0	21.0
250-500	45	50	95	8.0	24.0
501-1,000	45	65	110	10.0	30.0

5. **MULTIPLE CONDUCTOR CONSTRUCTION:**

- 1) Triplex cables consist of two phase conductors and one neutral conductor. The cables are twisted together to form a triplex assembly.
- 2) Quadruplex cables consist of three phase conductors and one neutral conductor. The cables are twisted together to form a quadruplex assembly.
- 3) The shipping length of multiple conductor cables shall be measured length of completed cable assembly.

6. **CABLE IDENTIFICATION:**

- 1) The outer surface of each cable jacket shall be durably marked at one foot intervals throughout its length with the manufacturer's name, type of insulation (not a manufacturer's trade name), size of conductor, rated voltage, and month and year of manufacture
- 2) The manufacturer shall also mark the cable throughout its length with sequential footage markings at 2 foot intervals. These numbers will be marked on the outer surface of the cable jacket. The length indicator number shall have the unit of measure (ft) directly after the number.
- 3) The outer surface of each individual cable of multi-conductor cables (triplex, or quadruplex) shall have phase markings at a maximum of one foot intervals throughout its length to differentiate each cable from the others.
- 4) The lettering size used for such markings will be 1/8 inch minimum.

7. **TESTS**

- a. All cable furnished under this specification shall be tested at the factory to verify compliance with the latest edition of ICEA publication S-61-402 or S-66-524.
- b. Qualification tests shall be made in accordance with ICEA latest revisions
- c. Production Sampling Tests shall be made in accordance with ICEA latest revisions

- e. The manufacturer shall furnish the City a minimum three copies of certified test reports of all tests specified for each purchase order under this material standard. These reports shall be approved before the cable is shipped. Send this certified test reports to:

**Electrical Engineering Manager
Utilities-Engineering, Elwell Court
P.O. Box 10250
Palo Alto, CA 94303**

8. **REEL**

Reel size and requirements and standards shipping lengths shall conform to those shown in WUC Guide 1.4.