CITY OF AUSTIN ELECTRIC UTILITY DEPARTMENT
PURCHASE SPECIFICATION
FOR
15 KV, ALUMINUM, SINGLE CONDUCTOR, JACKETED URD CABLE

DATE PREPARED	ISSUANCE/REVISION	PREPARER	APPROVER
11/07/89	Issuance	Peter G. Soosay	Matt Monroe / Herman Millican
02/18/98	Revision	Peter G. Soosay	Matt Monroe / Herman Millican
03/02/98	Revision	Peter G. Soosay	Matt Monroe / Herman Millican
04/27/98	Revision	Peter G. Soosay	Matt Monroe / Herman Millican
08/28/98	Revision	Peter G. Soosay	Gary H. Williams
03/19/01	Revision	Carl A. Nance	Carl A. Nance
04/26/16	Revision	Brantley Gosey	Michael Pittman
05/14/20	Revision	Brantley Gosey	Michael Pittman

REASON FOR REVISION	***AFFECTED PARAGRAPHS***
Changed the length of cable on each reel.	5.8.1
04/26/16: General updates and improvement	2.1, 2.2, 3.3.2, 3.3.3, 3.4.2, 3.5, 3.6.2, 3.6.5, 3.8, 3.9, 3.10, 4.1, 4.2, 5.0, 5.8.1, Attachment 1
05/14/20: Length of cable on each reel	5.7.1

This specification, until rescinded, shall apply to each future purchase and contract for the commodity described herein.
Retain for future reference.

1.0 SCOPE AND CLASSIFICATION

1.1 Scope

The City of Austin Electric Utility Department is hereinafter referred to as Austin Energy (AE). Austin Energy requires a qualified Manufacturer to supply 1/0, 15 kV Aluminum Single Conductor Jacketed URD Cable, 133% Cable Insulation Level.

1.2 Classification

The 1/0, 15 kV Aluminum Single Conductor Jacketed URD Cable (Attachment 1) will be used in either conduit or direct buried installation.

2.0 APPLICABLE STANDARDS

The latest revision of the following standards:

2.1 AEIC CS8 - Specification for Extruded Dielectric Shielded Power Cables Rated 5 through 46kV

2.2 ICEA S-94-649 – Standard for Concentric Neutral Cables Rated 5 Through 46kV

2.3 Federal Standard 209D - Clean Room and Work Station Requirements, Controlled Environment

2.4 ASTM B3 - Soft or Annealed Copper Wire

2.5 ASTM B231 - Concentric-Lay-Stranded Aluminum 1350 Conductors

2.6 ASTM B263 - Determination of Cross-Sectional Area of Stranded Conductors

2.7 ICEA T-31-610 - Guide for Conducting a Longitudinal Water Penetration Resistance Test for Sealed Conductor

2.8 ICEA T-32-645 - Guide for Establishing Compatibility of Sealed Conductor Filler Compounds with Conducting Stress Control Materials

3.0 URD CABLE DESIGN

3.1 Clean Room

THE CABLE MANUFACTURER'S CLEAN ROOMS (INCLUDING CABLE COMPOUND HANDLING, RECEIPT, STORAGE, TRANSFER AND EXTRUSION) SHALL HAVE A CLASS 100,000 PROTECTION (MINIMUM), THAT IS, THERE SHALL BE NO MORE THAN 100,000 PARTICLES OF SIZE 0.5 µM OR LARGER, PER CUBIC FEET, IN ACCORDANCE WITH FEDERAL STANDARD 209D. Manufacturers shall provide a description of their compound handling process, including certified clean room ratings of both clean rooms and conveying air used for both semiconductor shields and the insulation.

3.2 Material

The URD Cable shall be single conductor, concentric neutral, Tree Retardant Cross-linked Polyethylene (TRXLPE), rated for 15 kV grounded neutral operation at maximum conductor temperatures not exceeding 90°C for continuous normal operation, 130°C for emergency overload conditions and 250°C for short circuit conditions as defined by AEIC CS8.

3.3 Aluminum 1350 Center Conductor

3.3.1 The cable shall be configured with center conductor of stranded Aluminum 1350. The Aluminum 1350 conductor, shall be ¾ hard-drawn or hard-drawn, concentric lay, Class B stranded and compressed., in accordance with ASTM B231 and ASTM B263.

3.3.2 DC Resistance

The DC resistance of each conductor shall be measured on each completed cable and corrected to 25°C. The measured resistance, shall not be greater than 2% of the values in Table 2-3 of ICEA S-94-649.

3.3.3 Conductor Water Blocking Components

The conductor interstices shall have water blocking components. The outer most layer of conductors shall be free of water blocking components. The water blocking components shall have a normal and emergency temperature rating of 90°C and 130°C respectively. The water blocking components shall be in compliance with ICEA T-32-645 and ICEA T-31-610

3.4 Conductor Shield

3.4.1 The conductor shall be strand shielded by extruding a semi-conducting compound over the conductor.

3.4.2 Conductor Shield Thickness (as per ICEA S-94-640)

Conductor Size AWG or kcmil	Minimum Point (mils)
1/0	12

3.4.3 The conductor shield shall be free-stripping from the conductor, leaving no residue. The stripping shall be done without the use of heat , wire brushing or chemicals.

3.4.4 The semi-conducting compound shall be compatible with the Aluminum 1350 conductor and shall uniformly and firmly bond to the overlying insulation.

3.5 Insulation

The insulation shall be DOW HFDB 4202 or DOW HFDC 4202 or Borealis LE 4212, tree retardant cross-linked thermosetting polyethylene in compliance with AEIC CS8 and ICEA S-94-649. The nominal insulation thickness shall be 220 mils with a minimum point thickness of 210 mils and a maximum point thickness of 250 mils.

3.6 Insulation Shield

3.6.1 An extruded single layer of semi-conducting thermosetting material shall be applied directly over the insulation. The material shall be compatible with the insulation (§ 3.5) throughout the allowable operating temperatures for which the cable is rated.

3.6.2 The shielding over the insulation shall be a semi-conducting black Cross-linked Polyolefin compound compatible with the insulation and in accordance with AEIC CS8 and ICEA S-94-649. The compound shall be easily strippable, that is, the minimum allowable shield stripping tension shall be 6 3 lbs. and the maximum allowable shield stripping tension shall be 18 lbs.

3.6.3 The insulation shield shall be control-strippable from the insulation surface, leaving no residue. The stripping shall be done without the use of heat, wire brushing, or chemicals.

3.6.4 Insulation Shield Thickness (as per AEIC CS8)

Conductor Size AWG or kcmil	Minimum Point (mils)
1/0	30

3.6.5 Indent of concentric neutral conductors on the insulation shielding, shall be in compliance with ICEA S-94-649 Table 5-1.

3.7 Extrusion

The conductor shield (§ 3.4), insulation (§ 3.5) and insulation shield (§ 3.6) shall be applied by true triple extrusion, dry cure process. During the extrusion process, each layer of shielding and insulation shall be protected from moisture, contaminants, and exposure to the ambient environment.

3.8 Concentric Copper Neutral Conductors

The concentric copper neutral conductors shall be in accordance with ICEA S-94-649. The concentric copper neutral conductors shall be configured of sixteen (16), #14 AWG annealed bare copper wires helically secured over the insulation shielding (§ 3.6). The lay of the concentric copper neutral conductors shall not exceed ten (10) times the calculated diameter of the concentric copper neutral conductor.

3.9 Jacket

The jacket shall be a black polyethylene compound, in accordance with ICEA S-94-649. The jacket shall not be bonded to the insulation shield. The extruded jacket thickness, over the concentric copper neutral conductors shall be as follows:

Conductor Size AWG or kcmil	Jacket Nominal Thickness (mils)	Minimum Thickness at Any Point (mils)
1/0	50	45

3.10 Cable Identification

The cable identification shall be in accordance with AEIC CS8 and ICEA S-94-649.

3.10.1 Cable Jacket

The cable jacket (§ 3.9) shall have, include, but not be limited to, the following permanent distinctive markings:

a) Manufacturer's Name
b) Sequential footage, every 2 ft.

The markings on the cable jacket shall be readily legible throughout the operational life of the cable.

4.0 TEST REQUIREMENTS

4.1 The Manufacturer cable test shall be as per AEIC CS8 and ICEA S-94-649 and shall include:

4.1.1 Partial discharge shall not exceed five (5) pC at 200V/mil. A X-Y recording shall be made of the partial discharge.

4.1.2 AC Withstand Production Test

4.2 Test Reports

The test reports shall encompass all tests in accordance with AEIC CS8 and ICEA S-94-649 and with the exceptions detailed in this specification. The test reports shall also have, include, but not be limited to, the following information:

4.2.1 Type of semiconducting compound and Supplier

4.2.2 Type of insulating compounds and Supplier

4.2.3 Partial Discharge Plot

4.2.4 Stripping tension for insulation shield in pounds (lbs.)

4.2.5 Conductor shield protrusion in mils

5.0 OTHER REQUIREMENTS

5.1 Cable Test Reports

5.1.1 All production tests required by AEIC CS8 and ICEA S-94-649 shall be performed.

5.1.2 Certified cable test reports shall be provided for each shipping reel.

5.1.3 Only certified cable test reports of the shipping reels, will be accepted by the AE Specifications Engineer (§ 5.4).

5.1.4 ALL CERTIFIED TEST REPORTS, SHALL BE SENT TO THE AUSTIN ENERGY SPECIFICATIONS ENGINEER, PRIOR TO SALE OF THE CABLE. FAILURE TO PRODUCE TEST REPORTS PRIOR TO SALE WILL RESULT IN THE AUTOMATIC REJECTION OF THE CABLE.

5.2 Cable Design

5.2.1 The Cable Manufacturer shall send hard copy design drawings of the cable described herein, to the AE Specifications Engineer for approval, upon completion of any revision of the drawings and

when requested by Austin Energy in the month of January each year, regardless, of whether, the cable design has changed.

5.2.2 The cable design drawings, shall indicate detailed dimensions and material properties.

5.2.3 Prior to any changes in cable design, the Cable Manufacturer, shall notify the AE Specifications Engineer. The Cable Manufacturer can make cable design changes, only upon receiving a written approval from the AE Specifications Engineer.

5.3 Cable Inspection & Samples

Austin Energy reserves the right to carry out random testing of cables. The cable samples, will be tested by Austin Energy Quality Assurance (QA) for compliance to this specification.

5.3.1 The Austin Energy QA will contact the Cable Vendor to schedule the cutting of cable samples. Each cable sample shall be a minimum of 30 inches long. The Cable Vendors will be notified five (5) business days, prior to a visit by the Austin Energy QA, to witness the samples cut from the cable reels.

5.3.2 The cable shall be cut by the Cable Vendor's personnel, in the presence of Austin Energy QA personnel.

5.3.3 It is the responsibility of the Cable Vendor's personnel to secure the cable reels for shipment, after the cable samples are cut. The Austin Energy QA personnel will not cut any cable samples.

5.3.4 Notification of Cable Test

a) The Austin Energy QA personnel will require ten (10) business days, to carry out all necessary testing of the cable samples, collected from the Cable Vendor's site.

b) UPON COMPLETION OF THE CABLE TESTS, THE CABLE VENDOR WILL BE NOTIFIED BY EMAIL ONLY CABLES APPROVED BY AUSTIN ENERGY QA WILL BE ACCEPTED FOR SALE TO AUSTIN ENERGY. THE CABLE VENDOR CANNOT SELL TO AUSTIN ENERGY, CABLES NOT APPROVED BY AUSTIN ENERGY QA.

c) If the cables fail the tests conducted Austin Energy QA, the Cable Vendor will be notified by the AE Specifications Engineer, and appropriate actions will be taken, inclusive of "non-acceptance" of the cable by Austin Energy.

5.3.5 The Cable Manufacturer shall have twenty (20) years (minimum) experience in manufacturing 15 kV Aluminum Single Conductor Jacketed URD cable.

5.3.6 Prior to accepting a contract Austin Energy shall receive a full test report from a reputable domestic testing lab on subject product(s). The lab shall not be affiliated directly with the manufacturer of subject product(s). Tests performed on product(s) shall be according to (ANSI STD). Test results shall indicate the exact product number that the tests were performed on. In addition to initial testing prior to accepting contract, Austin Energy reserves the right to require testing at any time during the term of the contract, and maintains the ability to nullify contract if lab results are not received within a reasonable time from or if lab results are determined unsatisfactory by Austin Energy.

5.4 Austin Energy Standards Supervisor

Austin Energy

4411-B Meinardus Drive
Austin, TX 78744

5.5 Material Qualification

The supplier shall either submit with the quotation, or have on file with Austin Energy, certified support date for the qualification tests required by ICEA S-94-649 Part 10.

5.6 Manufacturer Guarantee

The Manufacturer guarantee shall be in accordance with AEIC CS8.

5.7 Packaging

5.7.1 The packaging of the cables shall be in accordance with ICEA S-94-649 and NEMA WC26. **THE LENGTH OF CABLE ON EACH REEL SHALL BE APPROXIMATELY 2500 FT. ± 10.0%.**

5.7.2 The cable shall be supplied on non-returnable reels.

5.7.3 The reels shall be covered with one layer of weather-resistant material such as treated cardboard or fiberboard wrapping secured with tape or plastic straps, to provide physical protection for the cables during transit and during ordinary storage and handling operations.

5.8 AE Item Numbers

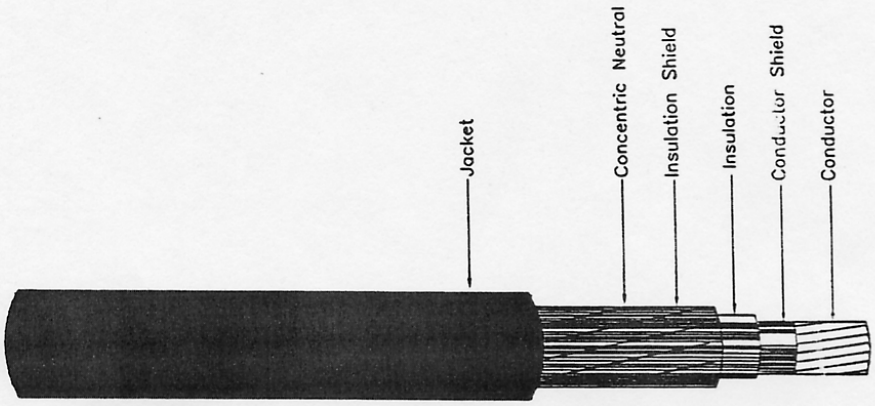
5.8.1 AE item numbers impacted by this specification include, but are not limited to the following:

1207

ATTACHMENT 1

XLPE Insulation Cables

Single Conductor Aluminum Underground Cable Full Neutral



1/0 AWG 1C AL 15 kV XLPE

City of Anaheim Electric Utility	Date:	Single Conductor Aluminum Underground Cable Full Neutral	E-1517
	Approval:	XLPE Insulation Cables	