

1. Scope

1.1 General

This specification covers the technical requirements for 600 volt cross-linked polyethylene insulated single conductor, duplex, triplex and quadruplex secondary cable as specified in the special provision sheet.

1.2 Cable Type And Size

The stranded aluminum cable, as specified in the special provision sheet, shall be furnished as shown in the following table:

Type	Conductor Size		Code Name	District Material ID
	Phase	Neutral		
Single	500 kcmil	-	Emory	832205
Single	750 kcmil	-	Sewanee	832255
Duplex	8 AWG	-	Bard	833063
Triplex	1/0 AWG	2 AWG	Brenau	833873
Triplex	4/0 AWG	2/0 AWG	Sweetbriar	833881
Triplex	350 kcmil	4/0 AWG	Wesleyan	833857
Triplex	500 kcmil	350 kcmil	Rider	1001365
Quadruplex	4/0 AWG	2/0 AWG	Wake Forest	833906
Quadruplex	350 kcmil	4/0 AWG	Slippery Rock	833914
Quadruplex	500 kcmil	350 kcmil	Wofford	1001366

2. Reference Standards

Unless otherwise stated in this specification, the conductors shall comply with the latest revisions of the following standards:

ANSI/ICEA S-105-692-2011 Standard for 600 Volt Single Layer Thermoset Insulated Utility Underground Distribution Cables

ASTM B 231 Standard Specification for Concentric-Lay Stranded Aluminum 1350 Conductors

ASTM B 400 Standard Specification for Compact Round Concentric-Lay Stranded Aluminum 1350 Conductors

ASTM B 800 Standard Specification for 8000 Series Aluminum Wire for Electrical Purposes - Annealed and Intermediate Tempers

ASTM B 801 Standard Specification for Concentric-Lay-Stranded Conductors of 8000 Series Aluminum Alloy for Subsequent Cover or Insulation

ASTM B 901 Standard Specification for Compressed Round Stranded Aluminum Conductors Using Single Input Wire Construction

NEMA WC 26-2008 Binational Wire and Cable Packaging Standard

3. Service Environment and Operating Requirements

3.1 The cable shall be suitable for aerial, direct burial and conduit installations in wet and dry locations.

3.2 In accordance with ANSI/ICEA S-105-692-2011, Part 1.4., the cable shall be designed and constructed such that it will operate satisfactorily under maximum conductor temperatures as follows:

Normal Service 90°C
Emergency Overload 130°C
Short Circuit 250°C

4. Conductor

4.1 Conductor sizes 8, 2, 1/0, 2/0, 4/0 AWG shall be manufactured of aluminum alloy 1350-H16 (3/4 hard). Conductor sizes 350 AWG and larger may be manufactured of either 1350 or 8000 series aluminum alloy.

4.2 Conductor sizes 8, 2, 1/0, 2/0, 4/0 AWG and 350 kcmil may be of compressed or standard concentric-lay Class B stranding per ASTM B 231. 8000 series aluminum conductor size 350 kcmil may be of compressed or standard concentric-lay Class B stranding per ASTM B 800 and B 801. These conductors may be compressed with a unidirectional lay (Compressed Unilay).

4.3 Conductor sizes 8, 2, 1/0, 2/0, 4/0 AWG, and 350 kcmil may be of compact round concentric-lay Class B stranding per ASTM B 400. 8000 series aluminum conductor size 350 kcmil may be of compact round concentric-lay Class B stranding per ASTM B 800 and B 801.

4.4 Conductor sizes 2, 1/0, 2/0, 4/0 AWG and 350 kcmil may be of SIW (Single Input Wire) compressed stranding per ASTM B 901.

4.5 Conductor sizes 500 and 750 kcmil shall not be compact stranded; they shall be either compressed or standard concentric-lay Class B stranding per ASTM B 231 or per ASTM B 800 and B 801 for 8000 series aluminum.

5. Insulation

5.1 The phase and neutral conductors shall be covered with a layer of thermoset cross-linked polyethylene insulating material in accordance with the requirements of ANSI/ICEA S-105-692-2011, Part 3.

5.2 The minimum thickness of the insulation for the phase and neutral conductors shall not be less than the value specified in ANSI/ICEA S-105-692-2011, Part 3, as shown in the following table:

Conductor Size	Minimum Insulation Thickness (Mils)	Nominal Insulation Thickness (Mils)
8 AWG	54	60
2 AWG	54	60
1/0 AWG	72	80
2/0 AWG	72	80
4/0 AWG	72	80
350 kcmil	86	95
500 kcmil	86	95
750 kcmil	99	110

6. Cable Assembly

6.1 An assembly shall consist of two or more insulated conductors twisted together without an overall covering. The direction of lay shall be left hand. The maximum length of the lay shall not be greater than 60 times the outside diameter of the largest insulated conductor.

6.2 Duplex cable shall consist of one phase conductor with extruded black insulation and one neutral conductor with extruded yellow insulation or three equidistantly spaced continuous extruded yellow insulation material stripes. A painted or printed neutral identification stripe will be unacceptable. Phase conductor identification is not required on Bard duplex cable.

6.3 Triplex cable shall consist of two phase conductors with extruded black insulation and one neutral conductor with extruded yellow insulation or three equidistantly spaced continuous extruded yellow insulation material stripes. Phase identification shall be provided for the entire cable length. A painted or printed neutral identification stripe will be unacceptable.

6.4 Quadruplex cable shall consist of three phase conductors with extruded black insulation and one neutral conductor with extruded yellow insulation or three equidistantly spaced continuous extruded yellow insulation material stripes. Phase identification shall be provided for the entire cable length. A painted or printed neutral identification stripe will be unacceptable.

7. Cable Identification

7.1 The outer surface of each insulated conductor shall be durably and legibly marked throughout its length at regular intervals not exceeding one meter. The print legend shall include, but shall not be limited to:

- 7.1.1** Manufacturer's identification
- 7.1.2** Conductor size
- 7.1.3** Conductor metal
- 7.1.4** Rated voltage
- 7.1.5** Year of manufacture

7.2 One of the conductors in the cable, phase or neutral, shall be permanently imprinted on the outer surface of its insulation with sequential footage numbers at a minimum of 2 foot intervals throughout its length.

8. Tests

The cable shall meet or exceed the pertinent tests specified in ANSI/ICEA S-105-692-2011. The Supplier shall furnish certified copies of test reports on request.

9. Reel Marking

The following information shall be permanently stenciled or tagged on the outside of each reel:

- 9.1 Manufacturer's identification
- 9.2 Cable code name
- 9.3 Size of phase and neutral conductors
- 9.4 Voltage rating of cable
- 9.5 Date of manufacture
- 9.6 Manufacturer's reel number
- 9.7 Length of cable on reel (ft)
- 9.8 Beginning and ending footage number (numbers shall not be repeated on any single reel of cable)
- 9.9 Gross weight, tare weight and net weight (lb)
- 9.10 District's purchase order number

10. Packaging

Cable shall be provided on nonreturnable wooden reels as specified below.

10.1 Reels shall be fabricated of wood per NEMA WC 26-2008 and shall satisfy the dimensions given in the following table unless otherwise specified by the District. Reels shall contain one continuous length of cable. Cable footages per reel shall be as shown in the following table unless otherwise specified by the District. Cable shall be wound on reels of sufficient drum diameter to avoid damage to the cable.

Cable						
Type	Size	Code Name	Max Flange Dia-meter	Max overall width	Minimum Drum Dia-meter	Cable Per Reel ± 10%
Single	500	Emory	45"	37"	14"	2,000'
Single	750	Sewanee	50"	37"	16"	1,000'
Duplex	8	Bard	30"	20"	12"	1,000'
Triplex	1/0-2	Brenau	30"	21.5"	13"	500'
Triplex	4/0-2/0	Sweetbriar	42"	34"	13"	1,000'
Triplex	350-4/0	Wesleyan	50"	37"	16"	1,000'
Triplex	500-350	Rider	66"	38"	24"	1,000'
Quadruplex	4/0-2/0	Wake Forest	50"	37"	16"	1,000'
Quadruplex	350-4/0	Slippery Rock	60"	37"	21"	1,000'
Quadruplex	500-350	Wofford	50"	38"	21"	500'
Quadruplex	500-350	Wofford	66"	44"	24"	1,000'

10.2 Wood reels may be new or recycled.

10.3 Recycled wood reels (when provided) shall be equivalent to new reels in quality and strength. If recycled reels are used, the manufacturer shall employ a quality assurance program to evaluate and maintain the structural integrity of the recycled reels. The manufacturer shall provide the District with written documentation of the details of this program upon request. No reels shall be used that are loose, weak, damaged or dilapidated. In addition, all reels shall be free from protrusions that might damage the conductor, or hit, or catch on workers or equipment while the reels are spinning.

10.4 Each end of the cable(s) shall be firmly and properly secured to the reel. Care shall be taken to prevent looseness of reeled cable.

10.5 Watertight seals shall be applied to all cable ends to prevent entry of moisture during transit and outside storage.

10.6 To provide physical protection for cables during normal transit, storage and handling, reels shall be covered with protective material.

10.6.1 The protective material shall conform to the Level 2 weather protector requirements specified in NEMA WC 26-2008, Section 4.1. Flexible film and coated cardboard wraps conforming to the NEMA requirements are among the acceptable materials.

10.6.2 Unless otherwise specified, cable shall not be delivered to the District on reels protected with wood lagging.

11. Shipping

11.1 Reels of conductor shall be shipped on open flatbed trucks or trailers for ease of removal from each side by forklift, with two exceptions. The exceptions are that reels of No. 8 AWG aluminum duplex cable (Bard) shall be shipped in enclosed vans

and positioned for unloading by forklift and reels of 500 kcmil aluminum quadruplex cable (Wofford) can be shipped in enclosed vans and positioned for unloading by forklift or by rolling off.

11.2 Provisions shall be made to protect the reels of conductor from rocks, dirt and other foreign materials encountered in shipment.

11.3 Reels shall be shipped from the factory to the District upright on their flanges, with one exception. The exception is that reels of Bard shall be shipped flat on their flanges and must not be palletized. Reels of Bard may be stacked to a maximum height of four reels.

12. Warranty

12.1 The Supplier warrants that the cable furnished under this specification is of first class material and workmanship throughout, that it has been tested in accordance with the applicable requirements of this specification, and that the results of the tests comply with the requirements of this specification.

12.2 The Supplier agrees to replace (supply new cable) all cable that is unsuitable for operation or fails in operation due to defective design, material or workmanship during normal and proper use, within 12 months after being energized or 18 months after delivery to the District.

12.3 All replacements by the Supplier under the provisions of this specification shall be made free of charge to the District, f.o.b. the original delivery point.

13. Inspection

The District reserves the right to inspect all cable either at the Manufacturer's plant, upon receipt or at the time of installation. Cable not meeting the specification, or cable that is damaged, will be rejected and returned at the Supplier's expense. Acceptance of delivery does not relieve the Supplier from meeting all of the requirements of this specification.

14. Evaluation of Bids

The following factors will be considered in analysis and subsequent bid award:

- 14.1** Base price
- 14.2** Escalation
- 14.3** Past experience with Bidder
- 14.4** Construction details
- 14.5** Adherence to specification
- 14.6** Delivery schedule

15. General Bidding Conditions

The attached General Bidding Conditions are made part of this specification.