Revision 10
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1. Scope

1.1 General

This specification covers the technical requirements for secondary and service drop cables composed of one or more poly-ethylene insulated aluminum phase conductors and one bare aluminum or ACSR neutral conductor for use as the supporting member. These cables are for use on circuits not exceeding 600 volts phase-to-phase and at a normal service conductor operating temperature not exceeding 90°C.

1.2 Cable Type and Size

The cable type and size, as specified in the special provision sheet, shall be furnished as follows:

1.2.1 Triplex Aluminum Cable

		Conductor Size (AWG)		Conductor Stranding	
District Material ID	**Code Name**	**Phase**	**Neutral**	**Phase**	**Neutral**
831819	Patella	6	6	7	7
831794	Clam	2	2	7	7
831801	Conch	2	2	7	6/1 ACSR
831786	Murex	1/0	1/0	7	7
831752	Portunus	4/0	4/0	19*	19*

*Alternate stranding as specified in ASTM B 901 is acceptable if Single Input Wire (SIW) compressed conductors are used.

1.2.2 Quadruplex Aluminum Cable

		Conductor Size (AWG)		Conductor Stranding	
District Material ID	**Code Name**	**Phase**	**Neutral**	**Phase**	**Neutral**
831728	Mustang	2	2	7	7
831710	Criollo	1/0	1/0	19*	7
831687	Oldenburg	4/0	4/0	19*	19*

*Alternate stranding as specified in ASTM B 901 is acceptable if Single Input Wire (SIW) compressed conductors are used.

2. Reference Standards

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

ASTM B 230 Standard Specification for Aluminum 1350-H19 Wire for Electrical Purposes
ASTM B 231 Standard Specification for Concentric-Lay-Stranded Aluminum 1350 Conductors
ASTM B 232 Standard Specification for Concentric-Lay-Stranded Aluminum Conductors, Coated-Steel Reinforced (ACSR)
ASTM B 498 Standard Specification for Zinc-Coated (Galvanized) Steel Core Wire for Aluminum Conductors, Steel Reinforced (ACSR)
ASTM B 901 Standard Specification for Compressed Round Stranded Aluminum Conductors Using Single Input Wire (SIW) Construction
ICEA S-76-474 Standard for Neutral-Supported Power Cable Assemblies with Weather-Resistant Extruded Insulation Rated 600 Volts
NEMA WC 26-208 Binational Wire and Cable Packaging Standard

3. Service Environment and Operating Requirements

In accordance with ANSI/ICEA S-76-474-2004, Part 1.4., the design and construction of the cable shall be such that it will operate satisfactorily under the normal conditions of overhead line (aerial) service under the maximum conductor temperatures as follows:

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

4. Conductors

Aluminum conductors shall be manufactured of 1350-H19 aluminum in accordance with ASTM B 230. Aluminum conductors, steel reinforced (ACSR) shall meet the requirements of ASTM B 232. The core wire of ACSR conductors shall consist of galvanized steel in accordance with ASTM B 498.

4.1 Insulated Conductors

4.1.1 The stranding shall be in accordance with Class A conductors per ASTM B 231 for sizes 6 - 1/0 AWG and in accordance with Class B conductors per ASTM B 231 for 4/0 AWG conductors, or if SIW conductor is used, the stranding shall be in accordance with ASTM B 901.

4.1.2 The direction of lay of the outer layer of stranded conductors shall be left hand or right hand for insulated conductors in accordance with ICEA S-76-474-2004, Part 2.2.

4.2 Bare Neutral Conductors

4.2.1 All Aluminum

4.2.1.1 The stranding for neutral conductor sizes 6 - 1/0 AWG shall be 7-strand in accordance with ASTM B 231 for Class A stranded conductors. The stranding for neutral conductor 4/0 AWG shall be 19-strand in accordance with ASTM B 231 for Class B conductors or, if SIW conductor is used, stranding shall be in accordance with ASTM B 901.

4.2.1.2 The direction of lay of the outer layer of stranded conductors shall be right hand for bare aluminum conductors.

4.2.2 Aluminum Conductor, Steel Reinforced

4.2.2.1 The ACSR neutral of the 2 AWG Conch triplex cable shall consist of 7 strands (6 aluminum around 1 steel) in accordance with ASTM B 232.

4.2.2.2 The direction of lay of the outer layer of stranded aluminum conductors shall be right hand.

5. Insulation

5.1 Material

Phase conductors shall be covered with one or two layers of extrudable black cross-linked polyethylene insulation rated for 90°C normal service operation and meeting the requirements of ICEA S-76-474, Section 3.

5.2 Thickness

The minimum thickness at any point of the insulation shall be not less than the following values. The nominal thickness given in the following table is for reference only; it is not a requirement.

Conductor Size (AWG)	Minimum Thickness (Mils)	Nominal Thickness (Mils)
6-2	41	45
1/0-4/0	54	60

6. Cable Assembly

Insulated phase conductors shall be twisted around the bare neutral conductor without filler with a lay of 25 to 60 times the diameter of one of the insulated phase conductors. The direction of twist shall be right hand, the same as that of the outer layer of the wires of the neutral conductor.

7. Cable Marking

7.1 At least one insulated phase conductor shall be continuously, permanently phase-identified on all quadruplex cable.
7.2 Sequential footage numbers are acceptable, but not required, on neutral supported secondary and service drop cables.
7.3 The name or trademark of the cable Manufacturer shall be continuously, permanently, legibly printed on one or more of the insulated phase conductors of all cable.

8. Testing

The cable shall be tested in accordance with ICEA S-76-474, Parts 1.5 and 1.6. Also, in accordance with ICEA S-76-474, Part 3.5.1, each phase conductor of each manufactured or finished length of cable shall successfully withstand the test specified in either 3.5.1.1 or 3.5.1.2. The Supplier shall furnish certified copies of test reports on request.

9. Reel and Coil Marking

9.1 The following information shall be tagged on the outside of each reel with a durable, weather-resistant tag:

9.1.1 Manufacturer's identification
9.1.2 Size and type of cable
9.1.3 Cable code name
9.1.4 Date of manufacture
9.1.5 Manufacturer's reel number
9.1.6 Length of cable on reel (ft)
9.1.7 Gross weight, tare weight, net weight (lb)

9.2 The following information shall be tagged on each coil with a durable, weather-resistant tag:

9.2.1 Manufacturer's identification
9.2.2 Size and type of cable
9.2.3 Cable code name
9.2.4 Date of manufacture
9.2.5 Length of cable in coil (ft)
9.2.6 Net weight (lb)

10. Packaging

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

10.1 Coils and reels shall contain one continuous length of cable. Cable shall be wound on reels of sufficient diameter to avoid damage to the insulation and conductor. Drum diameters shall not be less than the minimum diameters specified in NEMA WC 26-2008, Table 3-1.

10.2 Each end of each length of insulated cable shall be durably sealed before shipment to prevent entry of moisture during transit and outside storage.

10.3 Care shall be taken to prevent looseness of reeled cable. The inner (start) end of the cable shall be securely fastened to the reel with steel staples appropriate to the cable size. On the start end of the cable it is acceptable to cut the insulated phase conductors flush with the flange and staple the bare neutral to the outside of the flange.
The outer end of the cable shall be securely fastened to the inner side of the reel flange with steel staples appropriate to the cable size. It is also acceptable to use a wire tie to first secure the end of the cable and then to use a staple or hex head screw to secure the other end of the wire tie to the reel.

10.4 Wood reels may be new or recycled.

10.5 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.

10.6 Reels shall be nonreturnable, shall be fabricated of wood per NEMA WC 26-2008 and shall satisfy the dimensions given in the following table:

Conductor			Nominal Length Per Package +/- 10%	Coil		Reel Dimensions	
Size	Code Name	Pkg.		I.D.	O.D	Flange Diameter (Max.)	Overall Width (Max)
6	Patella	Coil	250'	18" +/- 2"	22"-32"		
2	Clam	Reel	1030'	---	---	30"	21.5"
2	Conch	Reel	1800'	---	---	36"	28.5"
1/0	Murex	Reel	600'	---	---	30"	21.5"
4/0	Portunus	Reel	1000'	---	---	42"	30.5"
2	Mustang	Reel	1800'	---	---	42"	30.5"
1/0	Criollo	Reel	1200'	---	---	50"	38.0"
4/0	Oldenburg	Reel	1100'	---	---	50"	38.0"

11. Reel and Coil Coverings

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

11.1 Reels shall be covered with a protective material conforming to the Level 2 weather protector requirements specified in NEMA WC 26-2008, Section 4.1, except use of flexible films or multi-laminated HDPE film shall not be permitted. A coated cardboard wrap conforming to the NEMA requirements is the preferred protective material.

11.2 Unless otherwise specified, cable shall not be delivered to the District on reels protected with wood lagging or extra layers of Level 2 reel coverings.

11.3 Coils shall be neatly stacked and secured to pallets. It is acceptable to use polyethylene or PVC film stretch-wrap to secure a stack of coils to a pallet as well as to protect them from contamination. The practice of using polyethylene or PVC film stretch-wrapped around each individual coil is acceptable, but is discouraged.

11.4 Patella shall be packaged with a ripcord or a cardboard strip (6" wide minimum) spanning from the pallet to the top of the stack. The ripcord or cardboard strip shall be placed on the outside of the stacked coils before shrinkwrap is applied to ensure that the shrinkwrap is easily removed and does not stick in the individual wraps of the coils.

12. Shipping

12.1 Patella must be delivered in coils stacked on pallets to a maximum height of 60 inches above the pallet surface. Patella must be delivered in an enclosed van.

12.2 Clam and Murex must be delivered on reels in an enclosed van. Reels must not be palleted. Reels must be shipped laying flat on their flanges. For orders of more than 2 reels, the reels must be stacked. Stacks shall be a maximum of 4 reels high. Reels must be positioned in the delivery van suitable for unloading by forklift.

12.3 Conch, Portunus, Mustang, Criollo and Oldenburg must be delivered on reels. These cables shall be delivered either in an enclosed van or on an open flatbed. The reels must be shipped in an upright position on their flange from the Manufacturer to the District. Reels must not be palleted. Reels must be positioned suitable for unloading by forklift.

13. Warranty

13.1 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.

13.2 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.