JEA Fulton Cut Replacement

Project No. 8007890

SPECIFICATION FOR FIBER OPTIC GROUND WIRE (OPGW)
FC-TLN-OPG-SP

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Revision History

Rev	Date	Description
0	2024-10-03	Issued for 60% Review
1	2024-11-18	Added Project Specific Criteria
2	2025-01-24	Added specific reel lengths

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1. SCOPE

This specification covers the construction, performance, acceptance criteria, test requirements, and shipping for Fiber Optic Ground Wire (OPGW). The OPGW has the dual performance functions of a standard ground wire with telecommunications capabilities.

2. APPLICABLE STANDARDS

2.1 ASTM B398 - Standard Specification for Aluminum-Alloy 6201-T81 Wire for Electrical Purposes

2.2 ASTM B415 - Standard Specification for Hard-Drawn Aluminum-Clad Steel Wire

2.3 ASTM A240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

2.4 TIA-598-C - Optical Fiber Cable Color Coding

2.5 IEEE 1138-2021 - Standard for Testing and Performance of Optical Ground Wire (OPGW) for use on Electric Utility Power Lines

3. GENERAL REQUIREMENTS

3.1 Lay

3.1.1 The direction of lay of the outside layer of aluminum wire shall be right-hand. The direction of lay of the aluminum and core wires shall be reversed in successive layers.

3.1.2 The makeup and lay of the outside layer of aluminum wire strands shall be such as to not have the tendency to untwist or spring apart when cut.

4. DETAILED REQUIREMENTS

4.1 Fiber Requirements

4.1.1 Individual fiber attenuation limits shall be no greater than 0.35dB/km @ 1310 nm and not greater than 0.22 dB/km @ 1550 nm.

4.1.2 No fiber splices are allowed in a continuous reel of cable.

4.1.3 The maximum point discontinuity shall be no greater than 0.1 dB and only one is allowed per cable.

4.1.4 The fibers shall be protected by a 304 grade stainless steel, gel-filled, loose tube (SSLT) or aluminum pipe. The gel shall prohibit any moisture ingress and be fully compatible with all components that it comes in contact.

4.2 Wire Requirements

4.2.1 All wire shall conform to the specifications referenced above.

4.2.2 All loose tubes used to house fiber shall conform to the specifications referenced above.

4.2.3 The wires shall be 6201-T81 aluminum alloy and 20.3% IACS aluminum-clad steel in conformance with the above specifications.

4.3 Non-Specular OPGW:

4.3.1 When requested, the OPGW shall be non-specular and conform to ASTM B979.

4.3.2 The outer surface of the OPGW is to be treated to give a uniform non-reflecting, non-lustrous, smooth surface finish with an average maximum diffuse reflectivity of not more than 32%.

5. PROJECT SPECIFIC REQUIREMENTS

The requirements listed below are specific to the JEA Fulton Cut Rebuild Project No. 8007890.

5.1 Minimum fiber count shall be 72.

5.2 Mechanical and electrical criteria:

Climatic condition	250B: Light	NESC level
	250C: 145 MPH	(or ice thickness, wind stress, and safety factors)
	1926 ft	Maximum span
	60.5' @ 60 deg. F	Initial sag (if necessary)
	74.2' @ 120 deg. F	Maximum sag (if necessary)
Acceptable range of breaking strength	34,882	Ultimate Tension (lbs.)
Short-circuit rating	155	$kA^2 \cdot s$

6. CABLE CONSTRUCTION

6.1 The OPGW must feature fiber protected by hermetically sealed, gel-filled stainless steel loose tubes (SSLT).

6.2 The tubes or pipe will be integrated with aluminum alloy and/or aluminum-clad steel wires to form the cable.

6.3 The fibers shall be distinguished in groups of twelve based on the latest version of TIA/EIA – 598A, Color Coding of Fiber Optic Cable. If there are 24 fibers in a buffer tube fibers 13-24 shall follow the same color code except be distinguished by a series of black bands. The cable manufacturer is required to provide this color scheme to the user in a specification sheet prior to purchase.

6.4 The surface of the OPGW shall be free from points, sharp edges, abrasions, or other departures from smoothness or uniformity of surface contour. The cable shall also be free of excessive amounts of die grease, metal particles, dirt, or other foreign matter.

Inspections and tests required by this specification shall be made by the Supplier or his sub-supplier prior to shipment.

7. INSPECTION, TEST, AND DOCUMENTATION

7.1 Inspection:

7.1.1 Inspections and tests required by this specification shall be made by the Supplier or his sub-supplier prior to shipment.

7.1.2 The timing, sample sizes, and frequency of inspections and tests shall be in accordance with industry standards unless otherwise specified.

7.1.3 If requested, electronic certified inspection and test reports containing the data needed to show conformance and other required documentation shall be emailed to material shipment to:

One set sent to:

JEA Standards Supervisor

225 North Pearl Street

Jacksonville, Florida 32202

7.1.4 Suppliers-certified documents and reports shall include, as a minimum:

7.1.4.1.1 Cross sectional diagram of the cable.

7.1.4.1.2 Individual wire size and type

7.1.4.1.3 Fiber tube housing size

7.1.4.1.4 Overall cable diameter

7.1.4.1.5 Total wire area

7.1.4.1.6 Rated breaking strength (RBS)

7.1.4.1.7 Unit weight

7.1.4.1.8 Coefficient of thermal expansion

7.1.4.1.9 Modulus of elasticity

7.1.4.1.10 DC resistance at 20 degrees C

7.1.4.1.11 Rated fault current including both initial ambient and final maximum temperatures (kA2 t)

7.1.4.1.12 Minimum bending radius

7.1.4.1.13 Sag chart number

7.2 Testing:

7.2.1 Optical Acceptance Testing: Attenuation testing shall be performed on each fiber on each individual reel to verify compliance with the attenuation limits given at paragraph 2b above. The testing shall be bi-directional and each test recorded for a given fiber. For each reel, a certified test report giving the

results of this testing shall be supplied by the manufacturer. A copy shall be attached to each reel. An electronic copy in PDF format shall be sent by email to the project engineer as specified in the Task Order.

7.2.2 Fiber Strain Margin: The successful bidder shall provide test data showing that the cable (or one of similar design) meets the requirements of section 4.1.10 of IEEE std 1138, IEEE Standard Construction of Composite Fiber Optic Overhead Ground Wire for Use on Electric Utility Power Lines.

7.2.3 Galvanic Corrosion: If the cable is manufactured of dissimilar metals, such as aluminum and steel, manufacturer must provide documented test results that no galvanic corrosion will occur when the cable is exposed to a seawater environment for an extended period of time.

7.3 Documentation

The manufacturer shall also supply drawings and specifications for all suspension and termination hardware required for installation on an overhead electric transmission line. The specifications shall include but not be limited to the following:

- Detail drawings showing front and side view of each item.
- Dimensions of hardware including but not limited to bolts, bolt holes, clevis pins, or other devices used to attach the cable to the structure.
- Rated strength of the fitting.
- Type of material for the hardware, bolt or other device.
- Weight of the hardware assembly.

8. PACKAGING, MARKING AND SHIPPING

8.1 OPGW shall be shipped on steel reels meeting the requirements of the Aluminum Association and NEMA WC26.

8.1.1 Reels shall be supplied with nominal wire lengths within a plus or minus tolerance of 5%.

8.1.2 If specified at time of order, matched sets of reels can be supplied with a maximum variation between lengths not to exceed 100 feet. The reels shall be identified by the manufacturer as matched sets.

8.1.3 Returnable reels are to be metal only. Minimum Arbor hole of 5.25" shall be supplied. Reels in excess of 10,000 pounds gross weight shall have their arbor holes reinforced to prevent them from going out of round. Reels that do not meet “Reel Designation” for individual OPGW will be rejected. OPGW shall be furnished in one continuous length per reel.

8.1.4 Reels are to conform to the Aluminum Association packaging recommendations and JEA regulations.

8.2 Each reel shall be marked clearly in weatherproof marking ink with the following information:

8.2.1 Shipping address and purchase order number

8.2.2 Supplier's name

8.2.3 Size, measured length in feet, and description of OPGW

8.2.4 Net, gross, and tare weights in pounds

8.3 Each reel of OPGW shall be protected against physical damage such as nicks, scars, or abrasions during handling and movement.

8.3.1 The OPGW shall be tightly and uniformly spooled on the reel.

8.3.2 Any portion of the reel that comes in contact with the OPGW's surface shall be suitably covered with a moisture-resistant material.

8.3.3 OPGW shall be layer wound on the reel to prevent excessive OPGW movement.

8.3.4 OPGW ends shall be suitably secured to the reel flange.

8.3.5 The outer OPGW layer shall be wrapped with a solid weather resistant material. Acceptable materials include:

8.3.5.1 Shrink wrap plastic covering that does not contain PVC.

8.3.5.2 Paper board cover to protect OPGW during shipment. The paper board shall be bound with weather-resistant non-corrosive straps or tape.

8.3.6 Upon request, wood lagging shall be supplied.

9. APPENDING A: REEL LENGTHS

The following project-specific OPGW reel lengths shall be provided:
Project Name: JEA Fulton Cut Replacement
Project Number: 8007890

A total of 60,700 linear feet of OPGW shall be ordered using (7) seven reels:
Reel 1, circuit 918: 9,400 feet
Reel 2, circuit 840: 9,500 feet
Reel 3, circuit 926: 9,250 feet
Reel 4, circuit 938: 9,250 feet
Reel 5, circuit 934: 9,100 feet
Reel 6, circuit 935: 9,200 feet
Surplus: 5,000 feet