



Document Title:
Copper Cable, 3-C, Service-Drop

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Department
Distribution

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Related/Referenced Documents

N/A

Version History

| Version | Date | Revision Comments |
|---------|---------------|---|
| 1 | Feb. 23, 2022 | Initial Release |
| 2 | Feb. 15, 2024 | General format modifications. Table of Compliance and Cover Page added. Models on Table 12 updated. Adding requirement to include "Property of PREPA" and SFM as part of the jacket markings of all Items. Weight and amp rating modified on Table 1 for all Items. |



Item Version History

| Warehouse Catalog # | Asset Suite # | Version | Date |
|---------------------|---------------|---------|-----------|
| 006-00056 | 54016 | 6 | 2/15/2024 |
| 006-00031 | 54015 | 7 | 2/15/2024 |
| 006-00635 | 54023 | 9 | 2/15/2024 |
| 006-01435 | 56079 | 6 | 2/15/2024 |



1. Introduction

This is a general specification that covers the minimum requirements for copper triplex cable, 3-C, 600 V, to be used in the distribution system in Puerto Rico. Further information will be provided by LUMA Energy at the time of order placement and will provide information on site specific conditions, quantity, and other requirements. This document includes the general electrical and mechanical characteristics of the equipment/material.

2. Special Requirements

- 2.1. Samples shall be furnished as requested by LUMA Energy. All documented testing required by applicable specifications and standards shall be submitted with product samples, including mechanical and electrical drawings, prior to approval. Vendors that have supplied this equipment/material to LUMA Energy on previous orders will not have to furnish samples at bid opening. If any material or design changes were made to an approved product, it must be re-submitted to the material specification engineer for approval before shipping.
- 2.2. Upon inspection of incoming equipment/material, the purchaser reserves the right to refuse product shipments and to determine the acceptability or rejection of product received. The Supplier shall be liable for all costs incurred for products that are refused/rejected.
- 2.3. The equipment/material will be received at the LUMA's general warehouse (011) at Palo Seco, Puerto Rico. Shipping will include transportation and unloading at the indicated warehouse.
- 2.4. Vendor shall submit two (2) quotes: one for conductor on steel reel and another for conductor on wood reel. See detail of reels in section 6.

3. Literature

Descriptive and technical literature must be supplied by the vendor at time of bidding. This literature may include, but is not limited to details of equipment, drawings, documented testing, and instructions for use and installation. Failure to submit documents on time will cause bidder disqualification.

4. Markings

- 4.1. Reels shall be marked outside with LUMA Energy's purchase order, item number, description of wire & specification date, code name, net length & size, gross & tare weights, and manufacturer's name & lot/production number.
- 4.2. Packaging labels and tags shall be waterproof.

5. Compatible with

- 5.1. For compatible supplier and model see Table 1.
- 5.2. These models are examples of the equipment/material described in this document and do not represent a preference. LUMA will evaluate equally any model not listed here during any acquisition event.

6. Packaging

- 6.1. All equipment/material shall be packaged and marked in such a way as to facilitate handling and protection from damage and that the receiving warehouse can readily identify it and send it, in one complete unit, to a field location without opening crates or boxes to sort items and/or parts.
- 6.2. Cables shall be shipped continuously in a non-returnable new reel (for cable length see Table 1). Cables won't be accepted by sections less than specified on table 1.
- 6.3. Wood reels shall be made of treated wood conforming with AWPA (U1 & T1-17), with a retention of 0.3 lbs./cu ft (4.81 kg/cu m) of pentachlorophenol or chromated-copper-arsenate (CCA).
- 6.4. Treatment material shall comply with AWPA P9.
- 6.5. Steel reel shall consist of a finishing high pressure hot phosphate wash and bonding agent, zinc chromate-iron oxide primer, and a final enamel coat to provide the necessary extra durability.
- 6.6. Reels shall have a minimum arbor hole diameter of 2.5" (6.35 cm).
- 6.7. Each end of the conductor shall be firmly and properly secured to reel.
- 6.8. Reels shall be protected against damage in ordinary handling and shipping.
 - a. Manufacturer shall protect the upper layers with pieces of wood along the transverse section of reel for conductor protection NEMA level 2 wrapping of protective material.
 - b. Manufacturer shall protect conductor ends from water entrance or damage by means of an adequate seal.
- 6.9. Other types of reels will be evaluated by Luma Energy.

7. Number Per Package (Logistics)

Standard package: one thousand feet (304.8 m) per reel or as requested by LUMA.

8. Acceptance Criteria

- 8.1. Test required: certified by external laboratories.
- 8.2. Product shall be manufactured in accordance with the latest issue ANSI/ASTM, APWA, ICEA, and NEMA specifications. When conflicts occur between purchaser's specifications and the ANSI/ASTM, APWA, ICEA, or NEMA specifications, the purchaser's specification shall prevail.
- 8.3. Latest applicable codes, standards, and other regulations:
 - a. ANSI/ASTM B1: For hard-drawn round copper wire for electrical purposes.
 - b. ANSI/ASTM B3: For soft or annealed copper wire. This specification covers drawn and annealed or soft round bare copper wire for electrical purposes.
 - c. ANSI/ASTM B8: For concentric-lay-stranded copper conductors, hard, medium-hard, or soft.
 - d. AWPA P9: For solvents and formulations for organic preservative systems.
 - e. AWPA U1 & T1: For wood treatment.
 - f. ICEA S-95-658, NEMA WC70: Applies to materials, constructions, and testing of 2000 volts and less thermoplastic and thermoset insulated wires and cables that are used for the transmission and distribution of electrical energy for normal conditions of installation and service, either indoors, outdoors, aerial, underground, or submarine.
 - g. ICEA S-76-474: Applies to the materials, constructions, and testing of assemblies or single conductors intended for field lashing, of extruded dielectric insulated electric current carrying phase conductors and bare or covered neutral electrical conductors used as weather resistant wires and cables suspended from supporting structures for the overhead distribution of electrical energy.
 - h. NEMA Standard Publication No. WC 26 – Binational Wire and Cable Packaging Standard.

9. Description

- 9.1. These cables are used for service-drop installations near coastal areas.
- 9.2. The service-drop cable shall consist of three (triplex), stranded copper conductors, same size each, (2 insulated (I) and 1 neutral (N)). See Table 1 for the strands.
 - a. The insulated conductors shall be soft annealed as per ASTM B3 and individually insulated with weatherproof black cross-linked polyethylene (XLP) (see Table 1 for approximate thickness) as per ICEA S-95-658 and S-76-474.
 - b. The neutral conductor shall be hard-drawn, bare copper conductor as per ASTM B1.
 - c. The two black insulated conductors shall be twisted around the neutral conductor.
- 9.3. The cable shall be rated at 600V and a maximum temperature of 90°C (194°F).

- 9.4. The outside cable jacket markings shall include “Property of PREPA”, sequential footage marks (SFM), and all required markings as per the applicable standards and regulations. The supplier shall provide an example of the final legend at bid opening.
- 9.5. For package, neutral ultimate strength, insulation thickness, rated amps, and weight see Table 1.

10. Inspection

The acceptance of any equipment/material shall in no way relieve the vendor from his responsibility to meet all the requirements of this specification, and it would not prevent subsequent rejection if such equipment/materials were found later to be defective.

11. Warranty

The cable shall be designed and manufactured to provide a minimum life expectancy of 40 years. Replacement costs associated with premature conductor failure due to inadequate design of faulty manufacturing is to be the responsibility of the supplier/manufacturer. The supplier/manufacturer shall guarantee that each part of the finished cable has been manufactured in accordance with the requirements of the referenced specifications and standards. The supplier/manufacturer shall agree to replace any length of cable for two years after the date of delivery if defective material or workmanship is found during installation or if the cable fails from normal use during its first year of service. In either case, the supplier/manufacturer shall be given a reasonable opportunity to inspect such defect or failure. A technical report detailing the cause(s) of the defect and the corrective measures implemented to prevent recurrence shall be provided upon request of the purchaser.

12. Table 1: Warehouse and Asset Suite Identification Number

| Item | Warehouse Catalog # | Asset Suite # | Package/reel | Strands Each I / N | Neutral Approx. Breaking Strength | Insulation Approx. Thickness | Rated Amps | Weight/ 1000 ft | Compatible Manufacturer & Model |
|----------------------|---------------------|---------------|--------------------|--------------------|-----------------------------------|------------------------------|------------|-------------------------|---|
| Cable 6 AWG | 006-00056 | 54016 | 1,000 ft (304.8 m) | 7 / 7 | 1,300 lbf (5.78 kN) | 45 mils (1.14 mm) | 110 | 277 lbs (413 kg/km) | Viakon (Gothic) AWG (Gothic/XLP) |
| Cable 4 AWG | 006-00031 | 54015 | 1,000 ft (304.8 m) | 7 / 7 | 1,900 lbf (8.45 kN) | 45 mils (1.14 mm) | 145 | 430 lbs (641 kg/km) | Viakon (Casion) AWG (Caslon/XLP) |
| Cable 2 AWG | 006-00635 | 54023 | 1,000 ft (304.8 m) | 7 / 7 | 3,000 lbf (13.34 kN) | 45 mils (1.14 mm) | 195 | 671 lbs (1000 kg/km) | Viakon (Century) AWG (Century/XLP) |
| Cable 1/0 AWG | 006-01435 | 56079 | 1,000 ft (304.8 m) | 19 / 7 | 4,750 lbf (21.13 kN) | 60 mils (1.52 mm) | 265 | 1,069 lbs (1,594 kg/km) | Viakon (Corintian) AWG (Corinthian/XLP) |

— End of Specification —



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Drop

Document No.: 4350.051

Department: Distribution

Appendix

Appendix 1: Table of Compliance

| Line | Criteria | Description | Pass/Fail (P / F) | Comments |
|---|---------------------|---|-------------------|----------|
| 1 | Specification | The Proponent complies with the corresponding specification document (4350.051). | | |
| 2 | Industry Standards | The Proponent complies with the industry standards established in the specification document (ANSI/ASTM, AWWA, ICEA). | | |
| 3 | Type | Triplex for service drop. | | |
| 4 | Material | Two soft copper conductors with insulating jacket. | | |
| | | One hard drawn bare copper conductor. | | |
| | | Jacket: XLP | | |
| 5 | Product Requirement | The two insulated cables twisted around the bare one. | | |
| | | Concentric Lay Stranded. | | |
| | | Rated for 600V and 90°C. | | |
| | | Ampacity Rating as per Table 1. | | |
| | | Ultimate Strength as per Table 1. | | |
| | | Insulation thickness as per Table 1. | | |
| | | Strands as per Table 1. | | |
| Jacket markings including "Property of PREPA", SFM, and all required as per the applicable standards and regulations. | | | | |











4350.051 Copper Cable 3C Service Drop (2-15-24)

Final Audit Report

2024-02-15

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