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**25 kV Line Post Insulator**

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**Author**

Miguel J. Rios Lopez, PE (Lic. 16636)  
General Engineer, Distribution Standards & Materials

Signature and Date

Feb 18, 2025

**Reviewer**

Rodolfo A. Flores Ortiz, PE (Lic. 27131)  
General Engineer, Distribution Standards & Materials

Signature and Date

Feb 18, 2025

**Approver**

Ricardo Castro Gómez, PE (Lic. 12135)  
Manager, Distribution Standards & Materials

Signature and Date

Feb 18, 2025

**Management Approval (If apply)**

**Approver**

Name  
Position

Signature and Date

N/A

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N/A

**Version History**

Version	Date	Revision Comments
1	Ene. 14, 2022	PREPA to LUMA format (Rev. 8)
2	Mar. 10, 2022	Sections 3, 4, and 7 edited (Rev. 9)
3	Abr. 6, 2022	TOC added (Rev. 10)
4	Jun. 9, 2022	Signature Format edited (Rev. 11)
5	Jun. 27, 2022	Section 8.3 eliminated (Rev. 12)
6	Nov. 15, 2022	Cover Page added, Section 9 edited (Rev. 13). Added Vertical Insulator (Rev. 3), Base (Rev. 1), and four Serrated Collar Bolts (Rev. 1 ea).
7	Feb. 17, 2023	Section 9.5.a. modified and new item created (014-84297).
8	Jun. 27, 2024	Format corrections, TOC update, Section 4 modified and sections order rearranged.
9	Jul. 02, 2024	Section 8 updated.
10	Jul. 17, 2024	Engineers license number was added
11	Sep. 06, 2024	TOC, Sections 5 & 9.4, and front picture modified.
12	Feb. 18, 2025	General format modifications. The Base Adapter was moved to 4350.349 and the Serrated Collar Bolts were moved to 4350.350.



## Item Version History

Warehouse Catalog #	Asset Suite #	Version	Date
014-01959	01959	19	02/18/2025
014-83048	83048	9	02/18/2025



## 1. Introduction

This is a general specification that covers the minimum requirements for 25 kV Line Post Insulators 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

Samples shall be furnished as requested by LUMA Energy. Vendors that have supplied this equipment/material to LUMA in previous orders will not have to furnish samples at bid opening. The equipment/material will be received at LUMA's general warehouse (011) at Palo Seco, Puerto Rico. Shipping will include transportation and unloading at the indicated warehouse.

## 3. Literature

- 3.1. Descriptive and technical literature must be supplied by the vendor at time of bidding. This literature must include, but is not limited to, details of material, drawings, documented testing, and instructions for use and installation. **The literature must be an official document from and certified by the manufacturer.** Failure to submit documents on time and duly certified by the manufacturer will cause bidder disqualification.
- 3.2. If required by LUMA, final drawings and documentation shall be submitted by the vendor before the manufacturing and shipping process for approval.

## 4. Compatible with

For compatible manufacturer and model see Table 1. 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.

## 5. Markings

- 5.1. Containers shall be marked outside with LUMA Energy's purchase order and item number.
- 5.2. Individual package(s) shall be clearly marked with manufacturer name and item information (part number, serial number, quantity, etc.).
- 5.3. Packaging labels and tags shall be waterproof.

## 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. A list of all parts included in the container and/or package must be provided at the time of delivery so that the receiving personnel can verify that everything requested is present, avoiding any delay in the receiving process.

## 7. Number Per Package (Logistics)

Standard package as per Table 1 or as required by LUMA.

## 8. Acceptance Criteria

- 8.1. Test required: certified by external qualified laboratories.
- 8.2. Product shall be manufactured in accordance with the latest issue below (section 8.3). When conflicts occur between purchaser's specifications and the latest issue below, the purchaser's specification shall prevail.
- 8.3. Latest applicable codes, standards, and other regulations:
  - a. ASTM A153: For hot dip galvanizing steel components.
  - b. ANSI C29.18: For composite line post insulators made of a fiberglass-reinforced resin matrix core, elastomeric material weather sheds and metal end fittings.
  - c. IEC/TS 60815-3: Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – part 3: polymer insulators for A.C. systems.
  - d. IEC 60529 IP65: Certification for degree of intrusion protection against foreign bodies (tools, dirt, etc.) and moisture by mechanical casings and electrical enclosures.
- 8.4. If any other standard different from the ones indicated in this document is used, the supplier must provide information showing compatibility with the required ones.

## 9. Description

- 9.1. The line post insulator is used for mechanical support and insulation on overhead distribution lines.
- 9.2. Physical requirements:
  - a. It shall be a long rod core made of fiberglass reinforced with resin or wound fiber strength member.
  - b. It shall be gray silicone rubber housing (sheath) with weather sheds.
    1. This material shall be extruded or injection molded.
    2. It shall be high temperature vulcanized to the core to ensure a bonded interface.

- c. At one end, the insulator shall include a clamp-top, aluminum alloy or hot dip galvanized steel in compliance with ASTM A153, suitable to install a trunnion clamp for copper and aluminum conductors. The clamp-top could be horizontal or vertical as required (see Table 1 for warehouse catalog number).
- d. Shall include a trunnion clamp, aluminum alloy, with a stainless steel anti-static spring, and with clamping range for aluminum conductor's overall diameter from 0.50" to 1.06" (1.27 to 2.69 cm). This clamp shall be installed at the factory.
- e. At the other end, shall be a rounded stud type base, with serrated collar underneath, made of aluminum alloy or hot dip galvanized steel (as per ASTM A153) with a 3/4"-10 (1.9 cm -10) threaded center hole of not less than 1.0" (2.54 cm) deep suitable for a hot dip galvanized steel serrated collar bolt with the same measures and threads. Bolt not included.

- f. Total approximate length: 14" ± 2" (35.56 ± 5.08 cm)
- g. Approximate weight: 10 lbs. (4.54 kg)
- h. Rod diameter: 1.5" (3.81 cm)
- i. Minimum working cantilever load (WCL): 1,120 lbf (4.98 kN)
- j. Specified cantilever load (SCL): 2,800 lbf (12.45 kN)
- k. Specified tensile load (STL): 2,500 lbf (11.12 kN)

9.3. Electrical requirements:

- a. Design voltage: 25 kV
- b. Nominal operating voltage: 13.2 kV
- c. Minimum leakage distance: 16" (43.18 cm)
- d. Minimum dry arcing distance: 7.5" (19.05 cm)
- e. Maximum radio influence voltage (RIV) at 1,000 kHz: 10 microvolts
- f. Minimum critical impulse:
  - 1. Positive: 150 kV
  - 2. Negative: 195 kV
- g. Average flashover voltage at 60 Hz:
  - 1. Dry: 95 kV or better
  - 2. Wet: 65 kV or better

9.4. Environmental requirements:

- a. Temperature & Humidity: The equipment supplied shall be adequate for an operating temperature range of 0°C to 50°C (32 to 122 °F), with humidity up to 100%.
- b. Pollution: The equipment shall be designed and constructed for the corrosive environment of a distribution system in a tropical zone close to sea or exposed to strong sea winds and it shall provide reliable performance in environments with high exposure to salt, minerals, chemicals, or wind-borne particulate. The insulator contamination levels for the equipment should be adequate to prevent flashover.

**10. Inspection**

- 10.1. Upon inspection of incoming equipment/material, the purchaser reserves the right to refuse product shipments and to determine the acceptability or rejection of the product received. The supplier shall be liable for all costs incurred for a product that is rejected.
- 10.2. 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. Proposal Information**

- 11.1. Submitted proposals must include:
  - a. Technical information, drawings, and tests.
  - b. Table of Compliance completed by the bidder with reference (see Appendix 1).

**12. Table 1: Warehouse and Asset Suite Identification Number**

Item	Warehouse Catalog #	Asset Suite #	Standard Package	Compatible Manufacturer & Model
Horizontal Line Post Insulator	014-01959	57666	3 pcs. / Carton 60 pcs. / Pallet	MacLean (HO 40 20 006 MX SS 003 + ACTS-118-SL1) Hubbell (80S025-0109 + TSC106) K-Line (KL28SHC)
Vertical Line Post Insulator	014-83048	83048	3 pcs. / Carton 60 pcs. / Pallet	MacLean (HO 40 60 006 MX SS 003 + ACTS-118-SL1) Hubbell (80S025-0209 + TSC106) K-Line (KL28SVC)

— End of Specification —



## Appendix



## Appendix 1: Table of Compliance

Line	Description	Pass/Fail (P / F)	Comments
1	Complies with document 4350.065.		
2	Industry Standards: ANSI C29.18, ASTM A153, IEC/TS 60815-3, and IEC 60529 IP65.		
3	Tech. info., drawings, and tests provided.		
4	Horizontal or Vertical Line Post Insulator		
5	Voltage: 25 kV design, 13.2 kV nominal		
6	Min. Leakage Distance: 16"		
7	Min. Arcing Distance: 7.5"		
8	Max. RIV at 1,000 kHz: 10 $\mu$ V		
9	Min. Critical Impulse: 150 kV (+), 195 kV (-)		
10	Avg. Flashover Dry: 95 kV or better		
11	Avg. Flashover Wet: 65 kV or better		
12	Approx. Length: 14" $\pm$ 2"		
13	Approx. Weight: 10 lbs.		
14	Approx. Rod Diameter: 1.5"		
15	Min. WCL: 1,120 lbf		
16	Specified Cantilever Load (SCL): 2,800 lbf		
17	Specified Torsion Load (STL): 2,500 lbf		
18	Rod: Fiberglass covered by gray silicone rubber with weather sheds.		
19	Clamp-Top: Aluminum Alloy or HDG Steel		
20	Stud Base: Aluminum Alloy or HDG Steel, 3/4"-10 serrated collar type.		
21	Trunnion Clamp: Aluminum Alloy (0.50" – 1.06" conductor diameter range)		
22	Each insulator shall include manufacturer's name & catalog number, manufacturing year, and WCL stamped, cast, or forged in the metal.		

**NOTE: This table is only a checklist for reference. The compliance must be with the complete document. Filling out the table with "PASS" won't be accepted as a compliance without the technical information required to certify it.**













# 4350.065 Line Post Insulator (2-18-25)

Final Audit Report

2025-02-18

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