LUMA	Document Title: **Suspension Insulator, 25 kV, SML Composite, Distribution System**		
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Management Approval (If apply)

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Related/Referenced Documents

N/A

Version History

Version	Date	Revision Comments
01	Jan. 14, 2022	PREPA to LUMA format for Item 014-01942.
02	Mar. 10, 2022	New requirements in section 8 and general modifications in section 9.
03	Apr. 13, 2022	Table of compliance (TOC) added.
04	May. 13, 2022	New signature format added.
05	Jun. 27, 2022	Requirements in section 8.3 (IEEE C37.41) were removed.
06	Nov. 26, 2024	General format modifications, TOC updated, Sections 3, 4 & 8 modified, and sections order rearranged.

Item Version History

Warehouse Catalog #	Asset Suite #	Version	Date
014-01942	57665	9	11/26/2024

1. Introduction

This is a general specification that covers the minimum requirements for a 25 kV suspension insulator 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 on 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 or pallets shall be marked outside with LUMA Energy's purchase order and warehouse catalog 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

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.

7. Number Per Package (Logistics)

Standard package: Twelve (12) units per box or as requested by LUMA Energy.

8. Acceptance Criteria

8.1. Test required: certified by external 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. ANSI C29.1: Test methods for electrical power insulators.

b. ANSI C29.11: Test for composite insulators for overhead transmission lines

c. ANSI C29.13: For composite insulators distribution dead-end type.

d. IEC 60529 IP65: Certification for degree of intrusion protection against foreign bodies (tools, dirt, etc.) and moisture by mechanical casings and electrical enclosures.

e. 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.

8.4. If any other standards different from the ones indicated in this document are used, the supplier must provide information showing compatibility with the required ones.

9. Description

9.1. The suspension insulator is used for mechanical support and insulation on overhead distribution lines.

9.2. Physical requirements:

a. Shall be a long rod core made of fiberglass reinforced with resin or wound fiber strength member.

b. Shall be covered with gray silicone rubber housing (sheath) with weather sheds. Sheds shall have alternated or offset design.

1. This material shall be extruded, or injection molded.

2. Shall be high temperature vulcanized to the core, to ensure a bonded interface that prevents moisture penetration to the interior in compliance with IEC 60529.

c. The end fittings consist of a clevis at one end and a tongue at the other end.
   1. Both shall be made of aluminum alloy (6061-T6) or stainless-steel (304 or 316).
   2. Both shall be suitable for 5/8" (1.6 cm) diameter pins (11/16" holes).
   3. The clevis pin shall be 5/8" (1.6 cm) diameter and fixed with cotter pin (bolt and nut is not allowed).
   4. The clevis pin and cotter pin shall be made of stainless-steel (304 or 316).
   5. The clevis opening shall be not less than 0.75" (1.9 cm) wide.
   6. The end fittings shall have the strength to withstand the specified load with the applicable safety factors.

d. Approximate Length: 17" (43.18 cm).

e. Maximum Weight: 5 lbs (2.27 kg).

f. Approximate Rod Diameter: 0.625" (16 mm).

g. Minimum Specified Mechanical Load (SML): 15,000 lbf (66.72 kN).

9.3. Electrical requirements:

a. Voltage Class: 25 kV.

b. Operating Voltage: 13.2 kV.

c. Minimum Leakage Distance: 20" (50.80 cm).

d. Minimum Dry Arcing Distance: 11" (27.94 cm).

e. Maximum Radio Influence Voltage (RIV) at 1 MHz: 10 microvolts

f. Minimum Critical Impulse Flashover: 190 kV.

g. Average Flashover Voltage at 60 Hz:
   1. Dry: 130 kV or better.
   2. Wet: 100 kV or better.

9.4. Manufacturer's name & catalog number, manufacturing year, and SML shall be stamped, cast, or forged in the end fittings.

9.5. 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. Wind conditions: The equipment and all the assembly shall be designed and constructed to withstand sustained hurricane-force according to LUMA wind load requirements (160 mi/hr = 257.5 km/hr).

c. 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

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, tests, and drawings.

b. Table of Compliance completed by the bidder with reference (see Appendix 1).

12. Table 1: Warehouse and Asset Suite Identification Number

Warehouse Catalog #	Asset Suite #	Voltage Class	Min. SML	Compatible Supplier & Model
014-01942	57665	25 kV	15,000 lbf	K-Line (KL28ASCTMS)

— End of Specification —

Appendix

Appendix 1: Table of Compliance

Line	Description		Pass/Fail (P/F)	Comments
1	Complies with the specification document 4350.066.			
2	Industry Standards: ANSI C.29. (1, 11, 13), IEC 60529 IP65, IEC/TS 60815-3.			
3	Tech. info. and drawings provided.			
4	Suspension Insulator, 25 kV			
5	Fiberglass rod covered by gray silicone robber with alternate weather sheeds.			
6	End Fittings (Clevis and Tongue): Aluminum Alloy (6061-T6) or SS (304 or 316).			
7	Clevis Pin & Cotter Pin: SS (304 or 316)			
8	End Fittings characteristics as per 9.2.c.			
9	Min. SML: 15,000 lbf			
10	Aprox. Length: 17”			
11	Max. Weight: 5 lbs			
12	Electrical Requirements	25 kV		
		Min. Leakage Distance: 20”		
		Min. Arcing Distance: 11”		
		Max. RIV at 1 MHz: 10µV		
		Min. Critical Impulse (+): 190 kV		
		Avg. Flash Over: 130 kV (Dry), 100 kV (Wet)		
13	Markings: Manufacturer’s name & catalog number, manufacturing year, and SML shall be stamped, cast, or forged in the end fittings.			

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.

4350.066 Suspension Insulator 25kV (11-26-24)

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