



Document Title:

Octagonal Concrete Pole for Street Lighting

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Engineering Type
Material Specification

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Distribution

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N/A

Related/Referenced Documents

N/A

Document History

Version	Date	Revision Comments
1	Jan. 27, 2023	Add cover page, modification specification and add drawing.
2	Jun. 20, 2024	Modification Sections and add drawing. Length reduced to 35 ft.
3	Jun. 24, 2024	General format modifications, catalog number correction in Table 1, and document number correction in the drawing page.
4	August 12, 2024	Modification Sections.
5	December 10, 2024	Modification Section 8-b and drawing.



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Lighting
Document No.: 4402.009
Department: Distribution

Item Version History

Warehouse Catalog #	Asset Suite #	Version	Date
026-00146	55936	8	12/10/2024



1. Introduction

This is a general specification covering a 35 ft octagonal concrete pole for street lighting on 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 mechanical characteristics of the 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 the LUMA's general warehouse (011) at Palo Seco, Puerto Rico. Shipping will include transportation and unloading at the indicated warehouse.

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 material, drawings, documented testing, and instructions for use and installation. Failure to submit documents on time will cause bidder disqualification. If required by LUMA, final drawings shall be submitted by the vendor before the manufacturing and shipping process for approval.

4. Markings

- 4.1. Containers shall be marked outside with LUMA Energy's purchase order and item number.
- 4.2. Packaging labels and tags shall be waterproof.

5. 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.

6. Number per Package (Logistics)

Each manufacturer shall define the number of poles per packages depending on the shipping platforms for delivery according to LUMA requirements.

7. Acceptance Criteria

7.1. Product shall be manufactured in accordance with the latest issue below (section 7.2). When conflicts occur between purchaser's specifications and the latest issue below, the purchaser's specification shall prevail.

7.2. Latest applicable codes, standards, and other regulations:

ACI American Concrete Institute

ANSI American National Standards Institute

ASCE American Society of Civil Engineers

ASTM American Society for Testing and Materials

AWS American Welding Society

NESC National Electrical Safety Code

IEEE Institute of Electrical and Electronic Engineers

PCI Prestressed Concrete Institute

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

8. Description

The Technical Specifications will include the material, design, deflection, id plate and markings, drawings, final approval before manufacture, failure to meet the specification, and delivery of material.

a. Material

1. Main structure concrete shall be in accordance to Concrete Prestressed Institute (PCI), American Society for Testing and Material (ASTM), and other Standards and regulations.
2. All material used to fabricate the structure in this specification shall be properly certified by the manufacturers.

b. Design

The supplier is responsible for the design. The bid proposal shall include and comply with the following:

1. The 35 ft poles will have a depth of 6 ft of their total embedment length.

2. Designed for no breaking under a minimum ultimate force of 2,000 pounds. Both forces applied horizontally 1 ft-6 in from top in any directions. Center of gravity, points for handling, holding, ground-level, and erecting shall be properly identified.
3. The minimum bending moment of the pole at ground level shall be 55 ft.-kips.
4. The total weight of the structure shall be no more than 2,600 pounds.
5. The top dimension shall be no less than 6 11/16 in., and the bottom dimension shall be no more than 13 in.
6. Holes patterns and details can be found in Appendix 1.
7. The pole shall withstand winds of 160 mph.

c. Deflection

The poles shall be designed to withstand the specified tip loading without exceeding a pole deflection of 15 % of the pole height above the point of fixity when tested under short term loading conditions in accordance with the horizontal test procedures described in the Guide for the Design of Prestressed Concrete Poles (ACSE/PCI joint Committee on Concrete Poles).

d. ID Plate

1. Each pole shall have an identification plate, legible and waterproof, fabricated from aluminum.
2. Shall be placed at approximately 5 ft-6 in from ground line.
3. The plate shall have dimensions of 4 in x 4 in, stamped with letters not less than 1/16 in high. The plate dimensions may be modified based on pole design. The modification must be submitted before the pole is fabricated.
4. The plate shall contain the following minimum information:
 - a. Owner's name: PREPA
 - b. Fabrication Date: MM/YY
 - c. Code Number
 - d. Ult. Moment Capacity (ft-kips)
 - e. Weight (pounds)
 - f. Pole length (ft)
 - g. Manufacturer

e. Drawings

The bid proposal drawings shall include original documents with the following information:

1. The assembled pole showing all its components and their location.
2. General dimensions of all the structural components.
3. Weight for each Pole.
4. A bill of materials.
5. Pole grounding attachment detail.
6. Details of all accessories.

f. Final Approval before Manufacture

1. Shop drawings shall be submitted for LUMA approval before fabrication begins.
2. After approval, one final set of drawings and design calculations in PDF format plus a digital copy of drawings in AutoCAD 3D (.DWG) shall be sent to our files.
3. All drawings shall include our purchase order number.

g. Failure to Meet the Specification

1. Should any equipment fail to meet the requirements of these specifications within the warranty period, it shall be at the option of LUMA personnel to accept the pole or reject it and to instruct the manufacturer to proceed immediately to make such modifications or supply such new parts as may be necessary to bring it into compliance with the warranty and the requirements.
2. All expenses for furnishing any replacement parts shall be borne by the manufacturer.

h. Delivery of Material

1. The distribution poles will be delivered at the LUMA General Warehouse in Palo Seco (011), Puerto Rico, unless otherwise indicated and coordinated with another area provided by the company.
2. LUMA may take delivery at a designated location with the delivering carrier's equipment.
3. The manufacturer shall coordinate with LUMA to ensure a smooth and efficient delivery of the poles.
4. LUMA shall provide all labor, equipment, and materials for unloading the poles at the project site.
5. A pole is considered delivered when it is lifted from the delivery carrier's trailer or semi-trailer.

9. Concrete Mixes

- 9.1. Shall be proportioned to produce the strength, durability and workability required by the approved mix design. The manufacturer shall submit his proposed mix designs to LUMA for approval at least six weeks before the manufacturer is due to commence. LUMA may direct the manufacturer to undertake trial mixes and strength, durability, and workability tests to prove that the proposed mixes are acceptable. Such trial mixes and tests shall be carried out prior to placement of concrete in the works and their costs shall be borne by the manufacturer. Unless otherwise specified or approved by LUMA, concrete shall have the following properties:
 - a. Maximum Water Cement Ratio by Weight: 0.40
 - b. The minimum characteristic compressive strength for Prestressed F 'c at 28 days shall be equal to 5,000 psi.
- 9.2. The manufacturer shall keep at the mixing site, records showing for each batch of concrete produced, the time and date of water addition, the weight of cement, weight of each grade of aggregate, weight of added water, results of tests made to determine the water contained in the aggregate, the results of any strength tests, and the location of concrete in the works. These records shall be made available to LUMA.
- 9.3. The proportions of aggregate and cement for any concrete shall be such as to produce a mix which will work readily into corners and angles of the forms and around tendons and reinforcement with the method of placing employed on the work, but without permitting the materials to segregate or water to collect on the surface.
- 9.4. Water shall be accurately measured by a calibrated tank or by an approved type of calibrated water meter attached to the mixer. Certification of water meter calibration shall be supplied to LUMA upon request.
- 9.5. The mixing shall be made by an efficient type of batch mixer operated at the speeds recommended by the manufacturer regarding the use of low slump concrete. All concrete shall be mixed for a period of not less than 2 minutes after all materials, including water, are placed in the mixer.
- 9.6. No concrete that has reached its initial set (partially hardened) or that has left the mixer or agitator for more than 30 minutes shall be placed in the structure. Remixing shall not be allowed.
- 9.7. Ready-mixed concrete complying with ASTM C94 - Ready Mixed Concrete and the requirements of this Specification, whether manufactured in a plant operated by the manufacturer or approved Subcontractors, may be used.

10. Formwork

- 10.1. All forms shall be built mortar-tight, of sufficient rigidity and adequately supported to prevent distortion or displacement due to the pressure of the concrete and other loads incidental to the construction operations. Forms shall be constructed and maintained to prevent warping and the opening of joints due to shrinkage of the timber.
- 10.2. Forms shall be built with provision for easy inspection and cleaning out immediately before concrete is placed.
- 10.3. A high standard of finish is required, and surfaces of precast, spun, and prestressed concrete members shall be true, hard, smooth, and free from any defects due to leakage of mortar from the molds.
- 10.4. The molds shall be made, preferably, of steel.
- 10.5. Every care shall be taken to ensure that no marks or fins appear on the finished surface.
- 10.6. The inside of forms shall be thoroughly wet or coated with non-staining form release oil or other approved material. Where oil or surfacing material is used, it shall be applied before the reinforcement is placed.
- 10.7. When forms have become warped, damaged, or burred so that in the opinion of the Superintendent the surface or dimensional tolerances of the concrete will not be satisfactory, the manufacturer shall, when so directed by LUMA, remove such forms and replace them with forms or form panels satisfactory in all respects.
- 10.8. Forms shall be removed so as not to damage the concrete.

11. Placing of Reinforcement

- 11.1. Steel shall be free from all loose rust, grease, tar, paint, oil, mud, mill scale or other coating which would tend to destroy its bond with the concrete. All reinforcing bars shall be bent as shown on the Drawings and shall be placed accurately and be well secured by tie wiring or welding were permitted so that no displacement can occur during concrete placing. The specified clear cover shall be maintained. Tie wire of at least 18 s.w.g. soft iron wire shall be bent inwards or cut off.
- 11.2. Care shall be taken to ensure that the cage is correctly aligned and positioned in relation to the through-bolt holes, ferrules, and the pole axis, and that the cage reinforcement is not spirally deformed or displaced.
- 11.3. Bending and splicing of reinforcing shall be carried out as required by ASTM. Splices shall be of sufficient length to fully develop the capacity of the bars.
- 11.4. All prestressing tendons shall be accurately located and restrained in position. No welding will be permitted near any prestressing tendon without suitable shielding.
- 11.5. Prestressing tendons, where supplied in coils, shall be of enough large diameter to be self-straightening. Kinked or damaged tendons will not be allowed.



11.6. Prestressing steel shall not be welded and shall be flame cut only with LUMA approval.

12. 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.

13. Proposal Information

13.1. Submitted proposals must include:

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

— End of Specification —



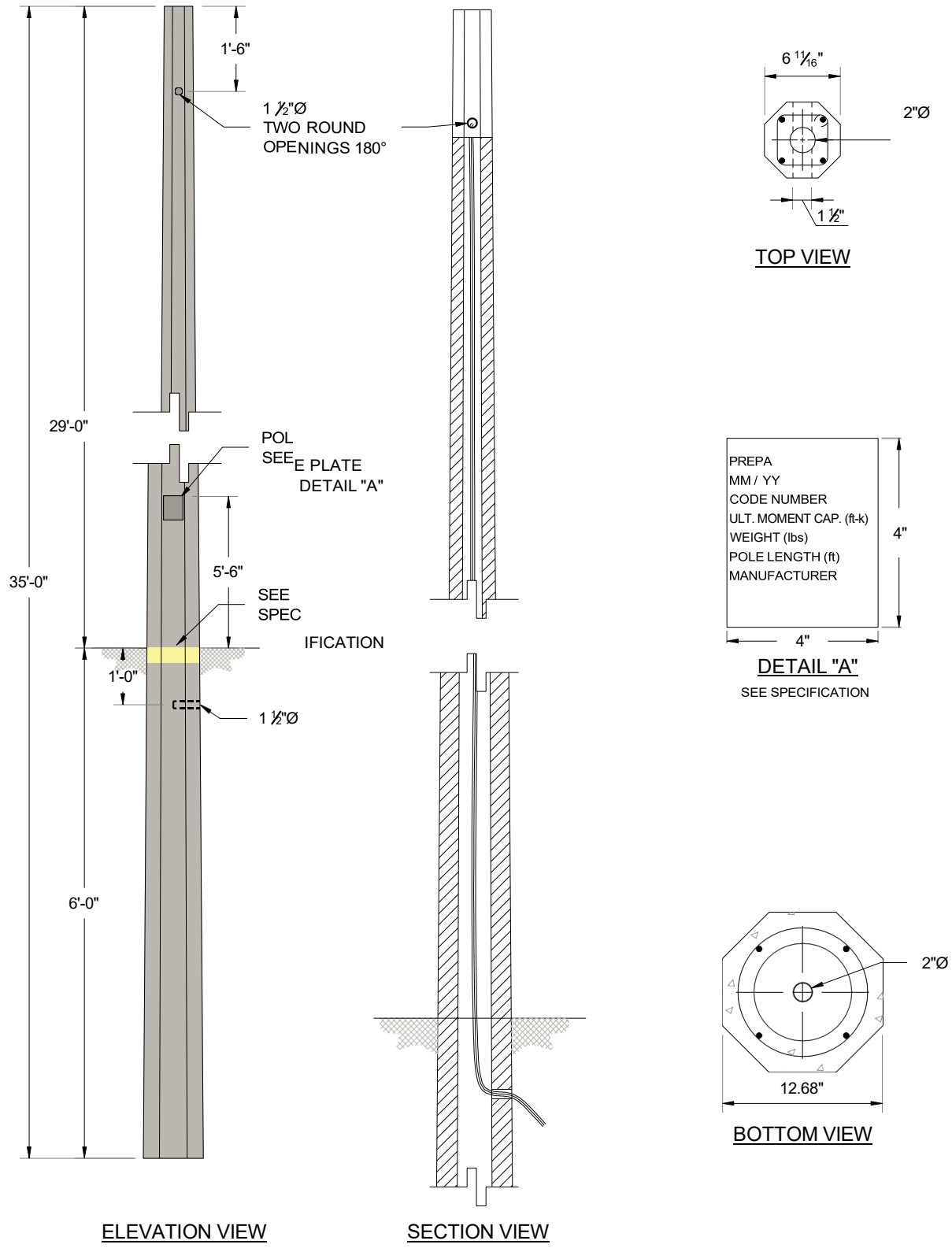
Appendix



Appendix 1: Table of Compliance:

Line	Criteria	Description	Pass/Fail (P/F)	Comments
1	Specification	The Proponent complies with the corresponding specification document (4402.009)		
2	Industry Standards	The Proponent complies with the industry standards established in the specification document. (PCI, ASTM)		
3	Material	All material used to fabricate the structure in this specification shall be properly certified by the manufacturers.		
4	Design	35 ft poles will have a depth of 6 ft of their total embedment length.		
		Designed for no breaking under a minimum ultimate force of 2,000 pounds. Both forces applied horizontally 1 ft-6 in from top in any directions. Center of gravity, points for handling, holding, ground-level and erecting shall be properly identified.		
		The minimum bending moment of the pole a ground level, shall be 55 ft-kips.		
		The top dimension shall be no less than 6 11/16 in. and the bottom dimension shall be no more than 13 in.		
5	Weight	Shall be no more than 2,600 pounds.		
6	Hole	Details holes can be found in the patterns found in Appendix 1. (Attached document).		
7	Id Plate	Each pole shall have an identification plate, legible and waterproof, fabricated from aluminum.		
		At approximately 5 ft-6 in from ground line.		
		Plate shall be 4 in x 4 in dimension, stamped with letters not less than 1/16 in in height.		
		Plate dimensions may be modified based on pole design. The modification must be submitted before the pole is fabricated.		
8	Final Approval before Manufacture	Shop drawings shall be submitted for LUMA approval before fabrication begins.		

NOTE: This table is only a checklist for reference. The compliance shall be with the complete document. Marking a PASS in the table won't be accepted as a compliance without the technical information required to certify it.





PROPOSAL SUMMARY DOCUMENT
MATERIALS DISTRIBUTION DEPARTMENT

Document No.: 4402.009

Revision: Decemberr 2024

MANUFACTURER: _____

FACTORY LOCATION: _____

Page: 1/1

Octagonal Concrete Pole for Street Lighting- 35 ft.

ITEM	DESCRIPTION	UNIT	LUMA SPECIFICATION:	PROPOSAL
1	TOTAL LENGTH	FT	35'-0"	
2	EMBEDMENT LENGTH	FT	6'-0"	
3	# OF POLE SECTION		1	
4	CROSS SECTION		OCTAGONAL	
5	MINIMUM CONCRTE THICKNESS		BY DESIGN	
6	APPRXIMATE TOTAL WEIGHT	POUNDS	2,600	
7	MINIMUM BENDING MOMENT	FT.-KIPS	55	
8	MAXIMUM DEFLECTION	%	15	
9	COMPRESSIVE STRENGTH FOR PREST.		28 DAYS / 5,000 PSI	
10	TOP DIAMETER		IN	
11	BOTTOM DIAMETER		IN	
12	ID PLATE DIMENSIONS		(W X H) / WELDED ALL SIDES (Y OR N)	
13	ROUND OPENING (TOP)		1 FT.-6 IN.	
14	DESIGN CALCULATIONS AND DRAWINGS INCLUDED		YES OR NO	










4402.009 Octagonal Concrete pole for Street- (12-10-2024)


Final Audit Report

2024-12-10


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