



Document Title:

Elbow Connector, Dead Break, 15/25 kV, 200, 600 & 900 A

Document Type:

Specification

Engineering Type

Material Specification

Document No.:

4350.184

Department

Distribution

Version:

03

Effective Date:

Oct 31, 2024

Shared document with: N/A

**Select the Departments impacted by the document*

For others, specify here

Author

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

Signature and Date

Oct 31, 2024

Reviewer

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

Signature and Date

Oct 31, 2024

Approver

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

Signature and Date

Oct 31, 2024

Management Approval (If apply)

Approver

Name
Position

Signature and Date

N/A

Related/Referenced Documents

N/A

Version History

Version	Date	Revision Comments
01	May. 11, 2022	PREPA to LUMA format and Table of compliance (TOC) added.
02	Aug. 18, 2022	General format revision and item 038-83335 added.
03	Oct. 31, 2024	General format modifications, TOC updated, Section 4, 8, and 9 modified, and sections order rearranged. Removed 038-00927 from specification.



Item Version History

Warehouse Catalog #	Asset Suite #	Version	Date
038-00836	54680	7	10/31/2024
038-00869	54683	5	10/31/2024
038-00893	55164	9	10/31/2024
038-00901	55165	7	10/31/2024
038-00919	55166	7	10/31/2024
038-83335	83335	2	10/31/2024



1. Introduction

This is a general specification that covers the minimum requirements for dead break elbow connector to be used in the electrical 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 manufacturers and models, see Table 2. These models are examples of the equipment/materials described in this document and do not represent a preference. LUMA will evaluate equally any models 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. Package(s) to be delivered to the warehouse shall be clearly marked with manufacturer 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)

One (1) unit per box 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 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. IEEE 386-2016 for separable insulated connector systems for power distribution systems rated 2.5 kV through 35 kV.
- 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. This equipment is used for dead break single-phase cable connection in primary fully submersible connection box on deenergized 15/25 kV class system.
- 9.2. Shall provide a fully shielded, submersible connection, assuring proper stress relief for terminating cable.
- 9.3. Shall be hot-stick operable at deenergized circuits.
- 9.4. Shall be suitable to be installed in manhole.
- 9.5. Housing shall be made of rubber or ethylene propylene diene terpolymer (EPDM), watertight, resistant to chemicals.
- 9.6. Shall be suitable for copper and aluminum conductors. For 900 A model all internal components shall be copper.
- 9.7. Shall have a cable shield adapter or a grounding kit, and a test point.
- 9.8. The elbow shall be designed to ensure a reliable mechanical lock with the mating product.

9.9. Table 1: Electrical Characteristics

Current Rating	Voltage Class	Minimum AC Withstand Voltage (1 min)	Minimum AIC RMS Symmetrical @ 10 Cycles	Minimum Basic Insulated Level	Minimum Corona Extinction
200 A	15 kV	34 kV	10 kA	95 kVBIL	11 kV
600 & 900 A	15/25 kV	40 kV	25 kA	125 kVBIL	19 kV

9.10. Cable description:

- a. Copper or Aluminum conductor, Tape Shield model and Concentric Neutral model (see Table 2 for rating amps and dimensions).
- b. Conductive strand shielding: 0.020" (0.51mm)
- c. Semiconductive tape shield: 0.010" (0.25mm)
- d. Insulating thickness: 0.175" (4.45mm)
- e. Copper tape-shield thickness: 0.003" (0.08mm)
- f. PVC jacket thickness: 0.080" (2.03mm)

9.11. Grounding kit description:

- a. Suitable for tape shield cable and concentric neutral cable.
- b. Shall be for cables sizes shown in Table 2.
- c. Shall provide fully shield watertight ground take off.
- d. Shall be suitable to be installed in a manhole with elbow connectors, in-line splice switching units, stress cones, etc.
- e. Shall be used in conductors 15 kV and up 600 A capacity.
- f. Shall eliminate the need of soldering or taping and shall be made of rubber or EPDM.
- g. Shall be furnished with the metallic tape shield contact and a copper ground lead of adequate size for the intended use.

10. Inspection

The acceptance of any material or equipment shall in no way relieve the vendor from their responsibility to meet all the requirements of this specification, and it would not prevent subsequent rejection if such 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 2: Warehouse and Asset Suite Identification Number

Item (Cable Size & Amps)	Warehouse Catalog #	Asset Suite #	Conductor Diameter	Diameter Overall Insulation		Overall Diameter (T.S. - C.N.)	Compatible Manufacturer & Model Including Shield Adapter or Grounding Kit
				Tape Shield	Concentric Neutral		
2 AWG (200 Amps)	038-00836	54680	0.283" (7.19 mm)	0.670" (17.02 mm)	0.735" (18.67 mm)	0.880" - 1.068" (22.4 - 27.1 mm)	Elastimold (156LR-F5220-SG3) EATON DE225DA04A1TSA2
2/0 AWG (600 Amps)	038-00869	54683	0.405" (10.29 mm)	0.792" (20.12 mm)	0.882" (22.40 mm)	1.032" - 1.190" (26.8 - 30.2 mm)	Elastimold (K656LR-G5250-SG3) EATON (BT625CC14A1TSA2)
4/0 AWG (600 Amps)	038-00893	55164	0.512" (13.00 mm)	0.899" (22.83 mm)	0.989" (25.12 mm)	1.139" - 1.297" (28.9 - 32.9 mm)	Elastimold (K656LR-H5270-SG3) EATON (BT625CC16A1TSA2)
500 MCM (600 Amps)	038-00901	55165	0.789" (20.04 mm)	1.185" (30.10 mm)	1.275" (32.38 mm)	1.425" - 1.739" (36.2 - 44.2 mm)	Elastimold (K656LR-K5330-SG3) EATON (BT625DD22A1TSA3)
750 MCM (600 Amps)	038-00919	55166	0.968" (24.59 mm)	1.373" (34.87 mm)	1.463" (37.16" mm)	1.613" - 1.952" (41.0 - 49.6 mm)	Elastimold (K656LR-M5380)/(600EC3G3) EATON (BT625FF25A1TSA3)
750 MCM (900 Amps)	038-83335	83335	0.968" (24.59 mm)	1.373" (34.87 mm)	1.463" (37.16" mm)	1.613" - 1.952" (41.0 - 49.6 mm)	Elastimold (K676LR-M5380)/(600EC3G3) EATON (BT625FF25C1TSA3)

— End of Specification —



Appendix

Appendix 1: Table of Compliance

Line	Description	Pass/Fail	Comments
1	The Proponent complies with the corresponding specification document (4350.184).		
2	The Proponent complies with the industry standards established in the specification document. (IEEE 386)		
3	Tech. info., tests & drawings provided.		
4	Type: Dead Break		
5	Housing Material <ul style="list-style-type: none"> • Rubber or EPDM • Fully shielded & watertight 		
6	Internal Components <ul style="list-style-type: none"> • Suitable for copper & aluminum conductors. • Copper for 900 A model. 		
7	Hot-Stick operable at de-energized circuits.		
8	Cable Shield Adapter or Grounding Kit for the corresponding conductor size (table 2)		
9	Test Point		
10	Suitable for conductors described in section 9.10		
11	Electrical Characteristics (200 A Type) <ul style="list-style-type: none"> • Voltage Class: 15 kV • Current Rating: 200 A • Basic Ins. Level: 95 kVBIL minimum • 60 Hz 1 min. withstand: 34 kV minimum • Symmetrical Current: 10 kA @ 10 cycles 		
12	Electrical Characteristics (600/900 A Types) <ul style="list-style-type: none"> • Voltage Class: 15/25 kV • Current Rating: 600 & 900 A • Basic Ins. Level: 125 kVBIL minimum • 60 Hz 1 min. withstand: 40 kV minimum • Symmetrical Current: 25 kA @ 10 cycles 		

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.











4350.184 Elbow Connector - Dead Break (10-31-2024)

Final Audit Report

2024-10-31

Created:	2024-10-31
By:	Rodolfo Flores (rodolfo.floresortiz@lumapr.com)
Status:	Signed
Transaction ID:	CBJCHBCAABAA8PM0D-SyBsIrKL5DNvzboVETFLKSeFiu

"4350.184 Elbow Connector - Dead Break (10-31-2024)" History

-  Document created by Rodolfo Flores (rodolfo.floresortiz@lumapr.com)
2024-10-31 - 7:53:23 PM GMT
-  Document emailed to Rodolfo Flores (rodolfo.floresortiz@lumapr.com) for signature
2024-10-31 - 7:53:33 PM GMT
-  Document e-signed by Rodolfo Flores (rodolfo.floresortiz@lumapr.com)
E-signature obtained using URL retrieved through the Adobe Acrobat Sign API
Signature Date: 2024-10-31 - 7:55:09 PM GMT - Time Source: server
-  Document emailed to Miguel Rios (miguel.rioslopez@lumapr.com) for signature
2024-10-31 - 7:55:11 PM GMT
-  Email viewed by Miguel Rios (miguel.rioslopez@lumapr.com)
2024-10-31 - 7:55:54 PM GMT
-  Document e-signed by Miguel Rios (miguel.rioslopez@lumapr.com)
Signature Date: 2024-10-31 - 7:59:58 PM GMT - Time Source: server
-  Document emailed to Ricardo Castro (ricardo.castro@lumapr.com) for signature
2024-10-31 - 7:59:59 PM GMT
-  Email viewed by Ricardo Castro (ricardo.castro@lumapr.com)
2024-10-31 - 8:12:18 PM GMT
-  Document e-signed by Ricardo Castro (ricardo.castro@lumapr.com)
Signature Date: 2024-10-31 - 8:14:25 PM GMT - Time Source: server
-  Agreement completed.
2024-10-31 - 8:14:25 PM GMT