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Single-Phase Oil Immersed Distribution Transformers (PM)

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Related/Referenced Documents

N/A

Version History

Version	Date	Revision Comments
01	Dec. 30, 2021	Initial Release.
02	Jul. 22, 2022	Maximum required dimensions for transformers were modified. General format corrections.
03	Nov. 21, 2022	Modified required maximum dimensions again, low volage bushings requirements, tap changer requirements, and general format including cover page.
04	Oct. 18, 2024	General format modifications, TOC added, Sections 3, 4, 8, and 9 modified, and sections order rearranged. Item 012-09303 removed.



Item Version History

Warehouse Catalog #	Asset Suite #	Version	Date
012-09147	59247	10	10/18/2024
012-09162	59249	10	10/18/2024
012-09170	59250	10	10/18/2024
012-09295	59255	10	10/18/2024
012-09139	59246	10	10/18/2024
012-07943	60376	10	10/18/2024
012-08065	60379	10	10/18/2024
012-08180	60383	10	10/18/2024
012-08305	59083	10	10/18/2024
012-07968	60377	10	10/18/2024
012-08081	60381	10	10/18/2024
012-08206	59079	10	10/18/2024
012-08321	59085	10	10/18/2024
012-07984	60378	10	10/18/2024
012-08107	60382	10	10/18/2024
012-08222	59081	10	10/18/2024
012-08347	59087	10	10/18/2024



1. Introduction

This is a general specification that covers the minimum requirements for the single-phase pad-mounted transformers 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 on previous orders will not have to furnish samples at bid opening. The equipment/material must be shipped to 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

- 4.1. MEGA-TRAN and Eaton.
- 4.2. 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.

5. Markings

- 5.1. Containers shall be marked outside with LUMA Energy purchase order and item number.

5.2. Transformers shall be marked on the cover with the point of delivery (district) and purchase order number using a label.

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. Each unit shall be banded to a two-way entry, disposable pallet of the manufacturer's own design. The pallet shall be of such dimensions as to provide a minimum of one inch (1") clearance at the transformers widest outside measurements, on all four sides. It shall provide a minimum of two and a half inches (2-1/2") of fork under clearance.

6.3. The transformer shall be banded to the pallet, using non-metallic banding, to prevent rust and shifting of the unit during transit, while allowing the unit to be handed by sling or fork truck without removing the banding.

6.4. LUMA shall allow the use of metallic banding ONLY if such banding is protected in the places in which the band is in direct contact with the transformer tank.

6.5. The banding method to be used shall be submitted by the awarded bidder for LUMA's approval.

7. Number Per Package (Logistics)

One (1) unit per package or as required by LUMA Energy.

8. Acceptance Criteria

8.1. Product shall be manufactured in accordance with the latest issue below (section 8.2). When conflicts occur between purchaser's specifications and the latest issue below, the purchaser's specification shall prevail.

8.2. All characteristics, definitions, and terminology, except as specifically covered in this specification, shall be in accordance the following ANSI/IEEE standards:

a. C57.12.00: General requirements for liquid- immersed distribution, power, and regulating transformers.

b. C57.12.29: Pad-Mounted Equipment-Enclosure Integrity for Coastal Environments.

c. C57.12.38: For pad-mounted, self-cooled, single-phase distribution transformers 250 kVA and smaller with high-voltage bushings: High Voltage (34 500 GrdY/19 920 V and below) and Low Voltage (480/240 V and below).

d. C57.12.70: For standard terminal marking and connections for distribution and power transformers.

- e. C57.12.80: IEEE Standard Terminology for Power and Distribution Transformers.
 - f. C57.12.90: Test code for liquid-immersed distribution, power, and regulating transformers and guide for short-circuit testing of distribution and power transformers.
 - g. C57.91: Guide for loading mineral-oil-immersed transformers with insulating system rated for 500 kVA and less with 65°C or 55°C average winding temperature rise at rated load.
 - h. C57.125: Guide for failure investigation, documentation, analysis, and reporting for power transformers and shunt reactors.
 - i. 386: For separable insulated connectors on power distribution systems rated 2.5 kV through 35 kV.
- 8.3. Also, it shall comply, but shall not be limited to, with the latest revision of applicable codes, standards, and other regulations such as ASTM, NEMA, etc.
- 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.**
- 8.5. The routine and design tests shall be as per ANSI C57.12.00. The routine test samples performed on the units shall be submitted at the bid opening. The design test samples will be submitted only when the supplier requires approval of the equipment. The bidder shall submit a written certification stating that all tests shall be performed according to the latest codes, standards, and regulations to provide a product of high quality.
- 8.6. The following routine tests shall be performed on each unit:
- a. Voltage ratio
 - b. Polarity
 - c. Phase relationship
 - d. Core losses (no-load losses)
 - e. Exciting current
 - f. Winding losses (load losses)
 - g. Tank leaks
 - h. Impedance
 - i. Applied potential
 - j. Induced potential
 - k. Impulse tests
- 8.7. Typical design tests data shall include the following:
- a. Insulation resistance

- b. Power factor
 - c. Temperature rise
 - d. Over excitation
 - e. Radio interference
 - f. Oil tests
 - g. Noise tests as per NEMA Standard TR 1, latest revision.
 - h. Tank pressure withstand.
- 8.8. The temperature at which the tests were performed shall be included in the document.
- 8.9. Parameters of resistance (%R), reactance (%X), and impedance (%Z) for each transformer shall be included in the document.
- 8.10. The tests mentioned at 8.5 shall be performed on the fully assembled unit at the manufacturer's location. **TESTS SHALL BE PERFORMED IN THE UNITS WITH ALL ITS ACCESSORIES AND/OR PARTS INSTALLED.**
- 8.11. Any exceptions to the tests mentioned in 8.5 shall be specified at bid opening.

9. Description

- 9.1. Distribution transformers, 60 Hz, pad-mounted type, single-phase, 65°C average winding rise, oil immerse, are used to provide the final voltage transformation in the electric power distribution system and to step down the voltage used in the distribution lines to the level used by the customer in their home, businesses, and commercial buildings.
- 9.2. The transformer shall consist of a tank, core, bushings, insulating oil, tap changer, etc.
- 9.3. Transformers shall be supplied with a high-power factor and low core and winding losses.
- 9.4. Construction and testing as per ANSI C57.12.00 and C57.12.38.
- 9.5. Painting
- a. The tank and the cover shall be protected against environmental conditions and corrosion by means of an adequate process of painting. The paint shall be green and suitable for tropical and coastal climate conditions as per ANSI C57.12.29.
 - b. The paint shall have a great retention of brightness and color in surfaces like aluminum and ferrous and non-ferrous materials. It shall be resistant, during long term, to ultraviolet rays, humidity, corrosion due to acids, salts, organic solvents, gases, and others. It shall comply with federal regulations on temperature and environment.
 - c. Technical and descriptive literature shall be supplied at the bid opening. This literature shall include, but shall not be limited to, the process, type of painting and description, material safety data sheet, etc.

9.6. Nameplate

- a. Must have no sharp edges and shall be mounted where the bushings are located so it can be easily visible once the cover is opened. The material (aluminum or copper) used in each winding, date of manufacture, total weight, serial number, non-PCB compliance, among all the other information as per ANSI C57.12.00 (Nameplate A), shall be shown on the nameplate.
- b. The information on the nameplate shall be engraved or stamped. Any of the two processes shall ensure legibility for the life of the transformer.
- c. Nameplate shall be made of stainless steel or aluminum.
- d. A sample of the nameplate, as requested in this section, shall be submitted by the awarded bidder.

9.7. Welding

- a. Welds to be made shall be in accordance with the material that will be welded and as per American Welding Society (AWS) 1.1 or latest revision.
- b. All welds at the exterior of the tank shall be continuous. It shall include the welding, **ON ALL SIDES**, of lifting lugs, locking system, grounding provisions, etc., to prevent accumulation of humidity.

9.8. Core and Winding

- a. Cores
 1. Shall be made from high quality grain-oriented silicon steel with flat, rolled, and low loss permeability laminations.
 2. Shall be made free of buckles and wave surface defects.
- b. Winding
 1. Shall be made of aluminum or copper.
 2. Shall be non-telescoping with high and lower tension windings assembly forming and integral unit.
 3. The winding polarization index shall be 2.0 or more as per ANSI C57.125 latest issue.
- c. Sound Levels: The design and assembly of the transformer shall be such that the noise from the energized unit and its accessories shall not exceed the following limits:

kVA Rating	Maximum Sound Level Decibels (dBA)
1 – 50	48
75 – 100	51
112.5 – 300	55
333 – 500	56

9.9. Transformer Losses and Bidding Procedure

- a. The bidder shall submit the no load losses at 20°C, load losses at 85°C full load and load losses at 55°C at 50% of load to calculate the efficiency and life cycle cost.
- b. The bidder shall specify the winding material of the primary and secondary at the bid opening.
- c. All losses information will be used to evaluate the life cycle cost (LCC) of each bidder according to the following formula,

$$LCC = (UC) + (\$8.95) * NLL + (\$4.73) * LL, \text{ where}$$

UC = unit cost (\$)

NLL = No load losses (W) at 20°C

LL = Load losses (W) at 85°C full load

- d. Shall be complying with Chapter II - Department of Energy (latest issue) 10 CFR PART 431 minimum requirements.
 1. The efficiency shall be no less than that required for their kVA rating in the table below defined at 50% of load with no load losses at 20°C and load losses at 55°C.

Energy Conservation Standards for 1Ø Liquid-Immersed Distribution Transformers	
kVA	Efficiency (%)
15	98.82
25	98.95
37.5	99.05
50	99.11
75	99.19
100	99.25
167	99.33
250	99.39
333	99.43

9.10. Tap Changer

- a. Shall be of the no load rotating type with an externally operated handle designed for de-energized operation.
- b. Shall be located under oil level with five (5) taps, including nominal voltage, each of two and a half percent (2.5%) of rated primary voltage.
- c. The tap arrangement must be two taps above (+2) and two taps below (-2) of the rated primary voltage.
- d. The tap changer shall have stops at each position to set desired voltage.
- e. A label shall be placed below the tap changer indicating that the transformer must be de-energized prior to the operation of the tap changer. A sample of this label shall be submitted if requested by LUMA.

- f. The tap changer shall be fixed in a place not exposed to possible damage due to the handling of the transformer.
- g. The tap changer shall be compatible with:
 - 1. Central Moloney Part Number 70-333-153 or,
 - 2. RTE tap changer with level handle and index plate or,
 - 3. RTE tap changer with cap/wrench and terminal posts.

9.11. Insulating Oil

- a. Each transformer shall be furnished with its tank filled with oil with a polychlorinated biphenyl (PCB) concentration of less than 1 PPM (NO-PCB). The nameplate shall indicate this compliance. A label indicating NO-PCB shall be affixed to the transformer in a visible place. The label shall have the same duration as the transformer under normal operating conditions. The NO-PCB statement could be included in the Property Number label as shown in Appendix 1.
- b. The insulating oil shall comply with ANSI/ASTM D3487 and LUMA requirements.
The oil shall have, in addition, the following:
 - 1. 30 kV minimum breakdown voltage.
 - 2. Neutralization number of 0.25.
 - 3. Viscosity:
 - a. 81.25 centistokes at 25°C as per ASTM D445-86.
 - b. 15.00 centistokes at 100°C as per ASTM D445-86.
- c. The awarded bidder shall submit the following documents:
 - 1. A certificate stating that, at all moments, the transformers supplied to LUMA shall have a concentration of less than 1 PPM of PCB.
 - 2. Safety Data Sheet (SDS) of the oil.

9.12. Pressure Relief Valve

- a. The body of the pressure relief valve shall be an internal fault detector type compatible with IFD Corporation and in accordance with ANSI C57.12.38.
- b. The relief valve shall allow the pressure inside the tank to be released but not allow air to enter when the unit is cool or lightly loaded.
- c. Venting on rising pressure shall occur between eight (8) and twelve (12) psi. Resealing on falling pressure shall occur between five (5) and eight (8) psi.
- d. The valve shall be threaded into a smaller boss welded to the tank above the 140°C top oil level.

9.13. Insulation

- a. Shall be made with, at least, Class A (105°C) insulation system as per ANSI C57.12.80.
- b. The insulation power factor shall be as per ANSI C57.12.90.10.9 (60 Hz).
- c. Technical information about the insulation shall be submitted by the awarded supplier.

9.14. Additional Labels

- a. The labels shall have a margin of approximately 1/2" on each side.
- b. Each number and letter shall have a width between 0.75" and 1". The height shall be 2".
- c. The transformer shall have the following labels made as per section 9.15 below:

1. kVA Rating:

This label shall be placed, whenever possible, below the secondary voltage bushings. Dimensions as per section 9.14.d.

2. STAINLESS STEEL:

This label shall be placed directly under the kVA rating label. Dimensions as per section 9.14.d.

3. LUMA's Property Number

This label shall be placed in a visible place. The supplier must ask for the sequence of property numbers to the LUMA's Distribution Material Section before shipment. The transformers shall get to LUMA with those labels affixed to them. See Appendix 1 for label details.

- d. The following table summarizes the dimensions of the required labels:

SECTION	LABEL DESCRIPTION	WIDTH (IN.)		HEIGHT (IN.)	
		MIN.	MAX.	MIN.	MAX.
9.10.e.	TAP CHANGER	INDUSTRY STANDARD			
9.11.a.	NO-PCB				
9.14.c.1	kVA RATING	7	8	3	4
9.14.c.2.	STAINLESS STEEL	12	13	3	
9.14.c.3.	PROPERTY NUMBERS	12 (approx.)		4 (approx.)	
FOR DETAILS ON THESE LABELS REFERS TO THE MENTIONED SECTIONS.					

9.15. Thermal Transfer Polyester Label Characteristics

- a. Substrate specifications
 - 1. Material: Polyester
 - 2. Shall resist heat, UV rays, oil, abrasion, acids, chemicals, solvent, moisture and humidity, cold, and tearing.

3. Temperature range: 0°C to 50°C (32°F to 122°F)
- b. Adhesive specifications
 1. The adhesive type shall be acrylic.
 2. Shall be compatible with dirt, high-energy and low-energy plastics, painted metal, polyethylene, metals and untreated metals, and irregular surfaces.
- c. Color: The numbers will be black over a white base to assure legibility from about 35 ft.
- d. The label shall last a minimum of 20 years when installed on the transformer under normal operating conditions.

9.16. kVA Rating

- a. The transformer shall be designed in accordance with this specification and shall have one of the following kVA ratings:

kVA RATINGS				
25	37.5	50	75	100

- b. The kVA Ratings are continuous and shall be based on 65°C average winding temperature rise or 80°C hot spot conductor temperature rise.
- c. LUMA reserves the right to specify units with different capacities in KVA.

9.17. Voltages Ratings and Basic Insulation Level (BIL)

- a. The primary voltage, secondary voltage, and the basic insulation level (BIL) shall be as per the following table:

PRIMARY VOLTAGE (V)	BIL (kV)
4160 GRDY/2400	60
7200 GRDY/4160	75
8320 GRDY/4800	75
13200 GRDY/7620	95
SECONDARY VOLTAGE	BIL (kV)
240/120	30

- b. Refer to ANSI C57.12.38 for further information.

9.18. Tank

- a. The entire unit (tank, sill, lifting lugs and cover) shall be made of Stainless Steel 304 gauge 14. The exterior surfaces of the transformer and compartment shall be designed to restrict or prevent unauthorized entry into the cable terminating compartment.

- b. A padlock carrier, with no sharp edges, is required and shall be suitable for the installation of a standard padlock with the following dimensions:
1. Body Width 2-1/2" (6.35 cm)
 2. Shackle Diameter 7/16" (1.11 cm)
 3. Vertical Clearance 2" (5.08 cm)
 4. Horizontal Clearance 1" (2.54 cm)

c. Tank Characteristics

1. Constructed as per latest revisions of ANSI C57.12.38. Coating treatment and paint (green color) as per ANSI C57.12.29.
2. Suitable for outdoor use.
3. Rectangular shape, tamperproof, weatherproof, and with no openings to prevent that foreign object can be inserted or thrown inside the equipment.
4. Transformer dimensions as per table below. Shall be suitable to be installed on a flat concrete base. See Appendix 2 for the base details.

Transformer Dimension	Maximum
Width	46 inches
Depth	54 inches

5. Fitted with lifting lugs and ground provisions permanently affixed. Grounding facilities shall consist of a tin-plated copper connector suitable for 2/0 AWG conductor welded to the tank.
6. Grounding pads/boss for both the high voltage (HV) and low voltage (LV) sides and below the LV-X2 bushing with removable ground strap. Each pad/boss shall be supplied with an approved connector.
7. Shall have an internal mark, which indicates the proper oil level as per ANSI C57.12.38.
8. No wood materials shall be used inside the tank.
9. Pressure relief valve with bottom above the 140°C oil level.
10. Oil level plug/cap located at the 25°C oil level.
11. Oil drain plug.
12. Handle for the no load-tap changer.
13. Handle for the voltage selector switch on multi-ratio transformers if applicable.
14. Provision for a 5/8" diameter hole on the secondary (LV) side of the compartment for the installation of a fault detector. It shall be sealed with a tamper proof plug.

15. An appropriate sidewall mounted bayonet fuse holder assembly, with flapper valve and drip cup, in series with an isolation link, shall be installed according to the transformer size and primary voltage connections.

9.19. Cover

- a. The cover shall be of the vertical lift hinge type with the same characteristics and material of the tank.
- b. Shall be coated with a 10 kV dielectric finish.

9.20. Bushings

- a. Shall be high and low tension insulated and as per NEMA standards.
- b. The number of bushings shall be two at the primary side and three at the secondary, as per ANSI C57.12.38.
- c. The transformer shall be provided, in the high voltage side, with removable bushing inserts and bushing wells. Such bushings inserts and wells shall be as per IEEE 386.
- d. The high and low voltage sides connectors shall be suitable for aluminum and copper conductors as per ANSI C57.12.38.
- e. The transformer shall be provided with low voltage bushings suitable for removable threaded stud connections. For transformers with capacity of 75 kVA or less, the stud shall be 5/8" diameter. For transformers of 100 kVA or more, the stud shall be 1" diameter. The transformer must be provided with three (3) stud-mount connectors, one (1) for each low voltage bushing. These connectors must have the following characteristics:



1. Shall be able to be installed in the corresponding threaded stud diameter, 5/8" or 1" diameter, depending on the transformer capacity (refer to Section 9.20.e.).
2. Must have six (6) outlets each, suitable for a minimum cable range of #12 AWG to 350 MCM.
3. Shall be suitable for both aluminum and copper conductors.
4. They shall be furnished with ball-bottom screws for securing each connection.
5. The connectors shall be provided with the appropriate insulating cover. The cover material shall be EPDM or similar. LUMA prefers the cover to be clear to facilitate visual inspection of the connections; other colors will be evaluated.
- f. The LV-X2 terminal shall have a removable strap installed to a ground pad/boss and attached to the bushing to facilitate isolation if required.

- g. Provision for lubrication of the bushings insert and well interface at the time of assembly.
- h. Provision for insulated covers for the LV-X1 & X2 terminals.

9.21. Loop Feed

- a. The transformer shall be equipped for loop feed connection on the high voltage compartment.
- b. Shall include incoming and outgoing load-break 200A bushing inserts.

9.22. Protection

- a. The transformer shall be provided with current sensing bayonet type fuses in series with internal fault sensing isolation links.
- b. The fuse shall be already installed in the fuse holder.
- c. An oil drip shield shall be mounted on the bayonet fuse holder.

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 3).



12. Warehouse and Asset Suite Identification Number

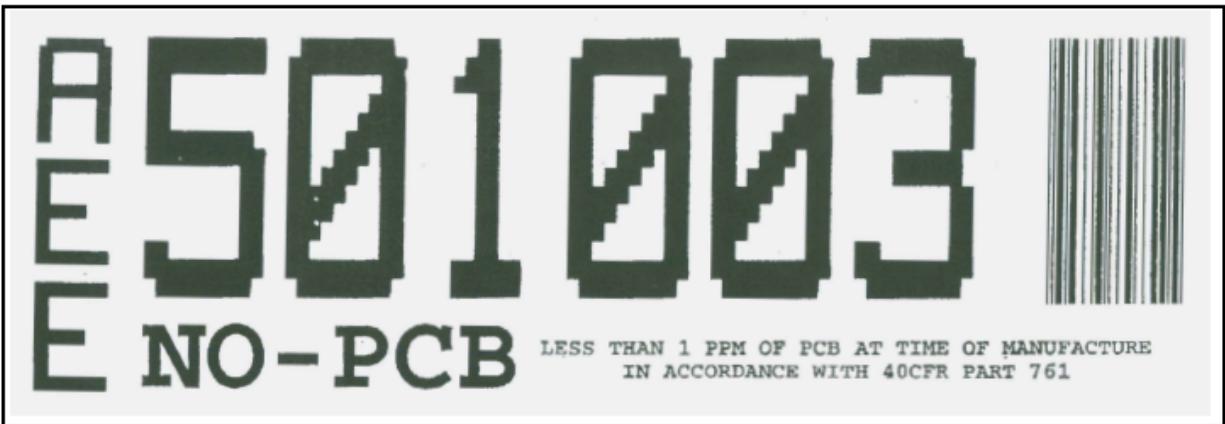
Warehouse Catalog #	Asset Suite #	Rating (kVA)	High Voltage (kV)	Low Voltage (V)
012-09147	59247	25	4.16/2.4	120/240
012-09162	59249	25	8.32/4.8	120/240
012-09170	59250	25	13.2/7.62	120/240
012-09295	59255	37.5	4.16/2.4	120/240
012-09139	59246	37.5	13.2/7.62	120/240
012-07943	60376	50	4.16/2.4	120/240
012-08065	60379	50	7.2/4.16	120/240
012-08180	60383	50	8.32/4.8	120/240
012-08305	59083	50	13.2/7.62	120/240
012-07968	60377	75	4.16/2.4	120/240
012-08081	60381	75	7.2/4.16	120/240
012-08206	59079	75	8.32/4.8	120/240
012-08321	59085	75	13.2/7.62	120/240
012-07984	60378	100	4.16/2.4	120/240
012-08107	60382	100	7.2/4.16	120/240
012-08222	59081	100	8.32/4.8	120/240
012-08347	59087	100	13.2/7.62	120/240

— End of Specification —



Appendix

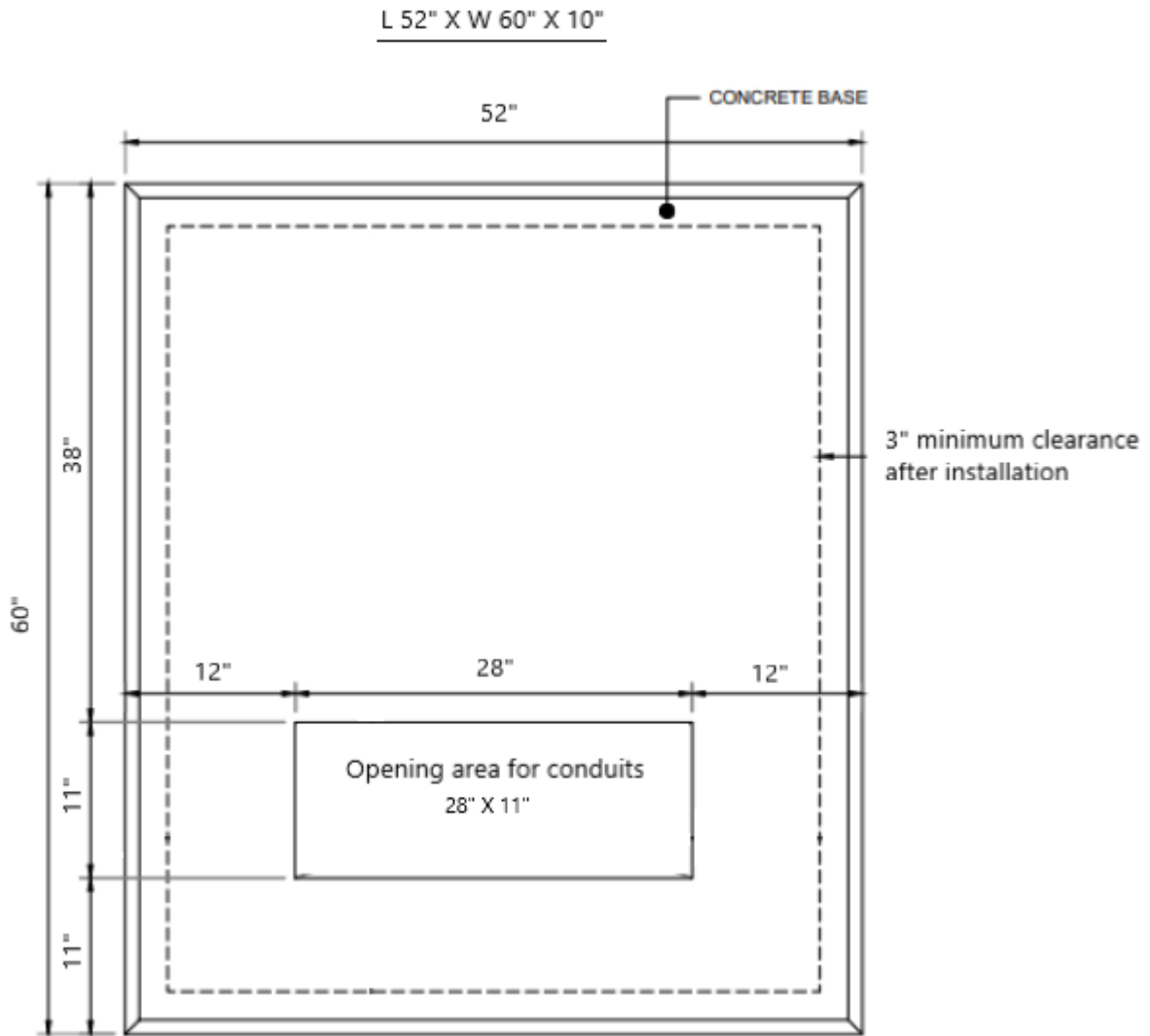
Appendix 1: LUMA's Property Number Label



This label is an example and is not made to scale. The dimensions shown in the table of section 9.14.d. for this label are approximate. The dimensions could be adjusted to accommodate the actual information.

1. The property numbers shall have a 0.25" thickness, 1.125" width, and 2.125" height.
2. The letters "AEE" shall have a 0.25" thickness, 0.75" width, and 0.075" height.
3. The label shall have 0.5" margins at right, left, top, and bottom.
4. The bar code shall have a 2.125" height.
5. The word "NO-PCB" shall be written below the property number. This word shall begin under the first digit of such number. The letters shall have a 0.125" thickness, 0.5" width, and 0.5" height. This word shall have a separation of 0.125" from the property number. A separation between 0.0625" and 0.125" shall be provided between each letter.
6. The phrase "LESS THAN 1 PPM AT TIME OF MANUFACTURE IN ACCORDANCE WITH 40CFR PART 761" shall be placed as per the drawing. The letters shall have a 0.125" height and the thickness shall be according to their size. This phrase shall be placed in the space remaining between the word "NO-PCB" and the last line of the bar code, beginning at 0.25" from the word "NO-PCB" as shown in the drawing.
7. Label Approximate Final Size: 12" long X 4" high
8. Color: Black numbers over a white base.

Appendix 2: Concrete Base Dimensions – Top View





Appendix 3: Table of Compliance

Line	Description	Pass/Fail (P / F)	Comments
1	Compliance with the document 4350.013.		
2	Industry standards: ANSI/IEEE C57. (12.00, 12.29, 12.38, 12.70, 12.80, 12.90, 91, 125), IEEE 386.		
3	Tech. info., drawings, and tests provided.		
4	Pad-Mounted Transformer, Rectangular Shape. Construction & testing as per ANSI C57.12.20 & C57.12.38.		
5	kVA, HV GRDY - 120/240V, (H & L kVBIL), 60Hz		
6	No load losses at 20°C, load losses at 85°C full load, and load losses at 55°C at 50% of load provided.		
7	DOE (latest edition) compliance (efficiency as per table in section 9.9).		
8	The entire unit (tank, sill, lifting lugs and cover) shall be made of stainless steel, 304 gauge 14.		
9	Tank and cover shall be painted green and suitable for tropical climate conditions as per ANSI C57.12.28 & 29. Shall comply with section 9.5.		
10	Winding material, among all the other information as per ANSI C57.12.00, shall be shown on the nameplate.		
11	SS or AL Nameplate		
12	5-positions Tap Changer (2 + and 2 - rated primary voltage). Each tap shall be 2.5% of rated primary voltage. As per Section 9.10.		
13	Tank filled with oil, complying with ANSI/ASTM D3487 and LUMA requirements, with a PCB concentration of less than 1 PPM (NO-PCB).		
14	CU or AL Windings		
15	Meet the requirements for the core and windings as stated in section 9.8.		
16	Sound levels as per Section 9.8.c.		
17	Internal fault detector type pressure relief valve.		
18	Insulation system: at least, Class A (105 °C) as per ANSI C57.12.80.		
19	Labels as per sections 9.14 & 9.15.		
20	Meet max. dimensions requirement (46" width X 54" depth).		
21	Cover shall be of the vertical lift hinge type.		
22	Tin-plated CU connector suitable for 2/0 AWG conductor welded to the tank for grounding.		
23	High (x 2) removable bushing inserts and bushing wells for separable connectors and Low (x 3) removable stud-mount connectors with cover. All tin-plated, for CU and AL conductors. See section 9.20.		
24	Suitable for loop feed connection on the high voltage compartment.		
25	Provided with current sensing bayonet type fuses in series with internal fault sensing isolation links as per Section 9.22.		

NOTE: This table is only a checklist for reference. The compliance shall 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.










4350.013 Distribution Transformer Pad-Mounted (10-18-24)

Final Audit Report

2024-10-18

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By:	Miguel Rios (miguel.rioslopez@lumapr.com)
Status:	Signed
Transaction ID:	CBJCHBCAABAAQSKIYwyTewfXjwC3ukF8-kJ3b0-1elfU

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