



1. APPLICATION

- A. Single-phase oil-filled self-cooled, pad mounted distribution transformers are installed outdoors on pads in the EWEB distribution system.

2. REFERENCE STANDARDS

- A. The transformers supplied shall be manufactured and tested according to the latest editions, revisions, and amendments to IEEE C57.12.25, Department of Energy 10 CFR, Part 431, and all other applicable standards of NEMA, ANSI, and IEEE, except as modified herein.

3. PRODUCTS

A. Voltage Ratings

- 1) The high voltage rating shall be one of the following:
 - a) 12470 Grounded Y/7200 volts
 - b) 12470 Delta volts.
- 2) The low voltage ratings shall be one of the following:
 - a) 240/120 volts.
 - b) 240/480 volts.
 - c) 277 volts.

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SINGLE PHASE PADMOUNTED TRANSFORMERS	FEB 5, 2016	REV.
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- B. KVA Rating: EWEB standard ratings are 15, 25, 37.5, 50, 75, 100, and 167 KVA. This rating is based on not exceeding either a 65°C average winding temperature rise or an 80°C hot-spot conductor temperature rise above a 30°C ambient temperature.
- C. BIL Rating: All transformers shall have at least a 95 kV BIL on the high voltage side and a 30 kV BIL on the low voltage side.
- D. Construction: Shall conform to items in IEEE C57.12.28 and Paragraph 6 of IEEE C57.12.25 and the requirements listed below.

1) Enclosure

- a) The transformer shall be weather and tamper resistant.
- b) Drip shield shall be provided.
- c) Each compartment door shall be tamper resistant in accordance with the latest ANSI and IEEE standards and hinged with stainless steel pins that cannot be removed when the compartment doors are closed. The doors shall have a latch or hasp that will allow for locking the cover(s) with a padlock. Minimum one captive and recessed pentahead bolt shall be provided for additional security of the compartment door.
- d) The tank finish shall be resistant to chipping and shall be powder coated with a high corrosion resistant material. The color shall be Munsel 7GY 3.29/1.5 Bell Green or equal.

2) High Voltage Terminals.

- a) All 12470 Delta volt transformers shall be supplied for radial feed only.
- b) The transformers shall be supplied with bushing wells. The primary bushing wells shall be secured with studs or bolts on the outside of the transformer tank. No welded or internally fastened bushing wells shall be accepted.
- c) Provide factory installed 200 ampere load break bushing well inserts in all bushing wells, Elastimold catalog # 1601A4, or equal. Bushing inserts shall be covered with dust caps prior to shipment.

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3) Low Voltage Terminals.

- a) No tank-welded bushings. Bushings shall be bolted or stud connected to the tank.
- b) Terminations shall be bare or tinned copper studs.
- c) Neutral bushing shall be insulated, bare or tinned copper stud with external ground strap.

4) Grounding:

- a) Provide tapped hole per IEEE C57.12.25 with bronze vise-type grounding stud with stainless steel hardware, Hubbell Power Systems GC 207, or approved equal.
- b) Exposed surfaces of the primary terminals shall be grounded.

5) Arresters: Not required.

6) Dimensions and configuration

Size (kVA)	HV Terminals	Parking Stands	Max Height	Max Width	Max Depth	Min Cable Entry	Bushing Config.
15-50	1	1	33"	36"	38"	N/A	N/A
15-100	2	1	33"	36"	38"	26"	Type 2
167	2	1	37"	48"	48"	26"	Type 2
15-75	3	2	37"	42"	38"	26"	Type 1
100-167	3	2	N/A	N/A	N/A	26"	Type 1

E. Accessory Equipment

1) High Voltage Tap Changer.

- a) Provide primary winding taps of $\pm 5\%$ in four 2 1/2% steps.
- b) Tap changer handle shall be mounted in the terminal compartment and operable from outside the transformer tank.
- c) Provide tap changer on all transformers unless otherwise specified on the request for quotation or purchase order.

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- 2) High Voltage Overload Device: Oil cutout, "Bay-O-Net," type fusing shall be provided. These overcurrent devices shall be capable of interrupting not less than 3500 AMPS asymmetrical fault current up to 8.3 kV.
- a) Provide Cooper Power Systems isolation link shall be used with the Bay-O-Net oil fuse cutouts as specified below, or equal.
 - b) Provide Cooper Power Systems dual sensing link for protection of the transformer against excessive overload, secondary faults and for the protection of the system against transformer fault as specified below, or equal.

KVA	12470 Grd. Y/7200 V		12470 V Delta	
	358C Series Dual Sensing Fuse Link	Isolation Link	358C Series Dual Sensing Fuse Link	Isolation Link
15	C03	A01	C03	A01
25	C05	A02	C03	A01
37.5	C08	A03	C05	A02
50	C08	A03	C05	A02
75	C10	A05	C08	A03
100	C10	A05	C08	A03
167	C12	A06	C010	A05

- 3) Pressure Relief: A pressure relief device shall be provided on all units.
- 4) Oil Drain: In one of the compartments, the transformers shall have a one-half (1/2) inch NPT draining plug.
- 5) The manufacturer or supplier shall not install informational warning signs on the equipment furnished under this material specification. EWEB has a policy to install their own custom-warning signs on all equipment. These signs will meet NEMA requirements.

F. Oil

- 1) Dielectric fluid shall be natural ester-based that meets the minimum acceptance testing requirements described in the latest edition of IEEE C57.147 Guide for Acceptance and Maintenance of Natural Ester Fluids

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in Transformers. New transformers provided with natural ester-based fluid shall meet the National Electrical Code requirements for less-flammable liquid-insulated transformers. Fluid shall be Cargill Envirotemp FR3, or equal.

- 2) Provide a label indicating the transformer is filled with natural ester-based fluid.
- 3) The nameplate shall be stamped certified "NO DETECTABLE PCB. LESS THAN ONE PART PER MILLION PCB." The manufacturer shall provide non PCB certification.

4. TESTS

A. Factory Tests: In addition to the ANSI and IEEE specified tests, each unit shall successfully pass the following tests:

- 1) No load and Load Losses Tests: Each individual transformer manufactured shall be tested for No Load (core) losses at 100% rated voltage, and for load (copper) losses at 85°C and full load current. These tests shall be conducted at the nominal tap setting.
- 2) Full wave impulse test on high-voltage terminals at 95 kV, as specified in IEEE C57.12.90.
- 3) Suitable test to verify sealed tank construction.
- 4) Certification that each unit was subjected to and successfully passed all tests as specified shall be forwarded via SMTP email, to EWEB Transformer Department not later than transformer shipment.
- 5) A durable test tag, sticker or stamp, shall be attached to each transformer; stating that the transformer, after final assembly, has been tested and is suitable for normal use at rated voltage.

B. EWEB Acceptance Tests

- 1) Upon receipt, all transformers will be inspected for leaks, breakage, or damage, and checked for adherence to EWEB's material specification. All transformers will be turns-ratio-tested and meggered. Transformers failing these tests will be rejected and returned at the supplier's expense.

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- 2) EWEB will complete inspections and testing within five (5) business days after delivery of transformers. Transformers will be accepted after they pass inspections and tests.
- 3) If EWEB finds goods furnished to be incomplete or not in compliance with the Contract, EWEB, at its sole discretion, may either reject the goods, require Vendor to correct any defects without charge, or negotiate with Vendor to sell the goods to EWEB at a reduced price, whichever EWEB deems equitable under the circumstances.

5. WARRANTY

- A. Provide a warranty period of eighteen (18) months minimum after the date of acceptance.
- B. Unless otherwise stated, all equipment shall be free and clear of any lien or encumbrances and shall be new and the current model and shall carry full manufacturer warranties.
- C. Vendor warrants to EWEB that any transformers furnished will operate and function in the manner represented by Vendor and will achieve the performance stated in the material specification when operating within the design conditions described therein.
- D. Vendor warrants the transformers furnished are free from defects in material and workmanship, and agrees to repair or replace any unit that is unsuitable for operating or fails in operation during normal and proper use, including all parts and labor at no cost to EWEB.

6. PACKAGING AND DELIVERY

- A. EWEB's Transformer Shop shall be notified a minimum of two working days (48 hours) before delivery day. The successful bidder will be given the name and phone number of the Transformer Shop contact person at the time of the award of the contract.
- B. Delivery hours are 9:00 a.m. until 2:00 p.m., Monday through Friday.
- C. All transformers shall be secured to a hardwood pallet rated to support its weight.

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- D. Transformers shall be covered during transit to protect them from dirt and grime, either by covered van or tarped open flatbed truck.
- E. Transformers that are delivered in trucks that do not meet the instructions above may be assessed damages and supplier shall be required to correct damage. A minimum charge of \$50 per transformer may be assessed for each transformer delivered improperly.

7. SUBMITTALS

- A. Submit the information required in Exhibit A.

8. EWEB STORES INFORMATION

- A. This material specification shall be used to purchase the material with the following stock codes.

496-0001922 through 496-0001934
 496-0001937
 496-0001943
 496-0001957
 496-0001960

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EXHIBIT A

**SPECIFIC INFORMATION REQUIRED WITH BID
SINGLE PHASE PAD MOUNTED TRANSFORMERS
(Submit Separate Sheets for Each Item)**

Manufacturer: _____

KVA _____ High voltage _____ Low voltage _____

1. No load losses at 100% rated voltage
(Core losses) _____ watts
2. Load losses at 85°C and full-load current
(Copper losses) _____ watts
3. Number of Primary Bushings _____
4. Transformer Type
(ANSI Type 1, ANSI Type 2, Ranchrunner) _____
5. Quantity of oil per transformer _____ gal.
6. Total weight with oil _____ lbs.
7. Limiting overall dimensions:
 - Height _____ inches
 - Width _____ inches
 - Depth _____ inches
 - Cable Entry Length _____ inches
 - Cable Entry Width _____ inches
8. Type of tank material and thickness _____ inches
9. Type of finish _____
10. Tap changer voltage steps
(if supplied) _____ %

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