



1. APPLICATION

A. Single and three phase, oil filled, self-cooled, pole mounted transformers are installed on poles 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 C57.12.20, 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:
 - a) 12,470 grounded Y / 7200 volts for three phase transformers and single phase transformers with one primary bushing.
 - b) 12,470 volts for single phase delta transformers with two primary bushings.
- 2) The low voltage rating for single phase transformers shall be one of the following:
 - a) 120 / 240 volts, 2 windings
 - b) 240 / 480 volts, 2 windings
 - c) 277 volts, 1 winding

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- 3) The low voltage rating for three phase transformers shall be one of the following:
- a) 208Y/120 volts
 - b) 480Y/277 volts

B. kVA Rating. EWEB standard kVA ratings are listed below:

<u>SINGLE PHASE</u>		<u>THREE PHASE</u>
10	50	75
15	75	150
25	100	300
37.5	167	

These kVA ratings shall be for 65°C temperature rise transformers or an 80°C hot spot 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 30 kV BIL on the low voltage side.

D. Construction

- 1) Tank.
 - a) The transformer shall be weather-resistant.
 - b) The tank finish shall be resistant to chipping and shall be powder coated with a high corrosion resistant material. The color shall be light gray, Munsel 5 BG 7.0/0.4, or equal.
- 2) High Voltage Bushings. The high voltage bushings shall be of the cover type and mounted separately.
- 3) Low Voltage Terminals. The low voltage terminals shall be of the sidewall type, mounted separately, and Solderless
- 4) Grounding.
 - a) Provide tapped hole per IEEE C57.12-20 with bronze vise-type grounding stud with stainless steel hardware, Hubbell Power Systems GC 207 or equal.
 - b) Provide a copper ground strap between the transformer

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case and neutral lug.

- 5) Arresters. Not required. Provide standard arrester mounting pads with threaded hole for each transformer bushing.
- 6) Dimensions. The following dimensions and total weight (installed weight) are maximum allowable dimensions and weights.

Phase	kVA	Height	Width	Depth	Total Weight
		cm (in)	cm (in)	cm (in)	kg (lbs)
1	10	107 (42)	51 (20)	62 (24)	125 (275)
	15	113 (45)	51 (20)	62 (24)	159 (350)
	25	136 (54)	65 (26)	73 (29)	227 (500)
	37.5	136 (54)	65 (26)	73 (29)	261 (575)
	50	142 (56)	74 (29)	82 (32)	363 (800)
	75	150 (59)	72 (29)	83 (33)	454 (1000)
	100	162 (64)	78 (31)	91 (36)	590 (1300)
3	167	162 (64)	109 (43)	97 (38)	748 (1650)
	75	127 (50)	127 (50)	76 (30)	590 (1300)
	150	127 (50)	127 (50)	76 (30)	953 (2100)
	300	150 (59)	170 (67)	89 (35)	1361 (3000)

E. Accessory Equipment

- 1) High Voltage Tap Changer.
 - a) Provide primary winding taps of $\pm 5\%$ in four $2\frac{1}{2}\%$ steps.
 - b) Tap changer handle shall be operable from outside the transformer tank.
 - c) Provide tap changer on all transformers unless otherwise specified on the request for quotation or purchase order.
- 2) High Voltage Overload Device. Not required. EWEB will provide external fault and overload protection.

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- 3) High Voltage Switch. Not required.
- 4) Pressure Relief. Provide a pressure relief device per IEEE C57.12.20 on all units.
- 5) Oil Drain & Fill. Provide a ½ inch NPT drain plug for all three phase transformers.
- 6) Support Brackets. The support brackets shall provide for single-position mounting.

F. Oil

- 1) Dielectric fluid shall be natural ester-based that meets minimum acceptance testing requirements described in the latest edition of IEEE C57.147 Guide for Acceptance and Maintenance of Natural Ester Fluids 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 Envirottemp 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" or equivalent language. 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) Routine production full wave impulse test on high voltage terminals at 95kV, as specified in IEEE C57.12.90.

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- 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 Shop 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 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.
- 2) EWEB will complete inspections and testing within five (5) business days after delivery of transformers. Transformers will be accepted after they pass inspection 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 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

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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.
- D. Transformers shall be covered during transit to protect them from dirt and grime, either by covered van or tarped open flatbed truck. Transformers shipped in enclosed vans shall not exceed 4,500 lbs. each.
- 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:

496-0001879 through 496-0001921

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EXHIBIT A

**SPECIFIC INFORMATION REQUIRED WITH BID
SINGLE PHASE POLE 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. | Impedance | _____ | % |
| 4. | Number of primary bushings | _____ | |
| 5. | Quantity of oil per transformer | _____ | gal. |
| 6. | Total weight | _____ | lbs. |
| 7. | Limiting overall dimensions: | | |
| | Height | _____ | inches |
| | Width | _____ | inches |
| | Depth | _____ | inches |
| 8. | Type of tank material and thickness | _____ | inches |
| 9. | Type of finish | _____ | |
| 10. | Tap changer voltage steps
(if supplied) | _____ | % |

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