



1. APPLICATION

- A. Three phase, oil filled, self cooled, vault type submersible secondary network transformers are installed in below grade vaults and above grade vault rooms in the EWEB secondary grid network system.

2. REFERENCE STANDARDS

- A. The transformers supplied shall be manufactured and tested according to the latest editions, revisions, and amendments of IEEE C57.12.40 and all other applicable standards of NEMA, ANSI and IEEE, except as modified herein.

3. PRODUCTS

- A. Voltage Ratings: The high voltage rating shall be 12,000 volts delta for use on a 12470 GRD Y/7200 volts electrical system. The low voltage rating shall be 216Y/125 volts or 480Y/277 volts.
- B. KVA Rating: EWEB standard ratings are 500 and 750 KVA. The nominal KVA rating shall be based on 55°C average winding temperature rise above 30°C ambient temperature. Transformers shall also be rated for continuous operation at 65°C average winding rise above 30°C ambient and for 112% of nominal rating or an 80°C hot spot temperature rise. The top oil temperature shall not exceed 65° C rise above a 30°C ambient temperature.
- C. Construction
 - 1) Shall be subway type suitable for operation under normal underground vault operating conditions and capable of continuous operation when totally submerged in water.
 - 2) The transformer enclosure shall consist of a tank, radiators, a primary switch welded to one end of the transformer tank, a secondary network protector throat

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welded to the other end, bushing termination, and other accessories as specified herein.

- 3) The tank finish shall be resistant to chipping and shall have a primer coat and a final outer coat of high corrosion resistant material.
- 4) The transformer tank and primary switch chamber shall be in separate oil-filled compartments.
- 5) The transformer core and coil assembly shall be either three or five-legged construction.

D. Primary Terminals

- 1) Provide three primary bushing wells secured with studs or bolts on the outside of the transformer tank. No welded nor internally fastened bushing wells shall be accepted.
- 2) Provide factory installed 200 ampere load break bushing well inserts in all bushing wells, Elastimold catalog # 1601A4, or equal. Busing inserts shall be covered with dust caps prior to shipment.
- 3) Exposed surfaces of the primary terminals shall be grounded.
- 4) Provide one parking stand for each primary terminal.

E. Low Voltage Terminals. The low voltage terminals and flanged throat shall be suitable for connecting to a network protector.

F. Low-Voltage Neutral. Provide a fully rated neutral blade welded to the tank wall.

G. Grounding Pads. Provide each transformer with two unpainted, copper-faced-steel or stainless steel pads, 2 inches x 3 ½ inches at the opposite sides of the tank wall at six inches above floor level.

H. Arresters. Not required.

I. Accessory Equipment

- 1) Primary Voltage Tap Changer. The transformer shall be provided with 2 – 2 ½% taps above and 2 – 2 ½% taps below rated primary voltage. The tap changer shall be designed with an operating means available under a two (2)-inch plug.
- 2) Primary Voltage Switch. The primary voltage switch shall be an oil immersed, gang operated, three pole, three-positions (open-closed-ground) switch and shall be

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capable of breaking the magnetizing current of the transformer. Provide viewing window with hinged painted steel cover through which the switch blades are visible.

- 3) Pressure relief. Not required.
- 4) Oil drain and fill. All oil filled compartments of the transformer shall have one (1) inch combination drain and bottom filter press valve and a one (1) inch liquid filling and upper filter-press connection.
- 5) All oil filled compartments shall have a magnetic liquid level gauge readable while standing on vault floor, equipped with one SPDT contact, rated 10 amps at 250 volts to remotely monitor low level. Shall be Qualitrol 035 series (CS-47418), or equal.
- 6) Gasketed bolted hand hole.
- 7) Air test provision
- 8) Top oil temperature gauge readable while standing on vault floor, equipped with two SPDT contacts, rated 10 amps at 250 volts to remotely monitor high temperature. Shall be Qualitrol 16 series (CS-47417), or equal.
- 9) Jacking and lifting lugs to lift transformer with or without the network protector attached.
- 10) All of the contacts from all liquid level gauges and temperature gauge shall be wired to a NEMA 250 Type 6 terminal junction box mounted on transformer equipped with a threaded and plugged 3/4" diameter conduit hub for field wiring conduit connection.

J. 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 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.

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4. TESTS

- A. Factory Tests: In addition to ANSI and IEEE specified tests, each unit shall 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 via SMTP email, to EWEB Transformer Shop.
 - 5) A durable test tag, sickle 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 vendor'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 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.

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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 liens or encumbrances and shall be new and the current model and shall carry full manufacturer warranties.
- C. Vendor warrants to EWEB that any transformer 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 from 9:00 a.m. until 2:00 p.m. PT, Monday through Friday, EWEB holidays excepted.
- 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, by 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.

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7. SUBMITTALS

- A. Submit the information required in Exhibit A
- B. Submit a recommended spare parts list, including the part number and description of each part.
- C. Drawings and Instructions. Provide one set of drawings and instruction books with the transformer. When requested an electronic copy of all drawings shall be furnished. The files should be compatible with the latest version of AutoCAD®, or PDF file format.

8. EWEB STORES INFORMATION

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

496-0001873 through 496-0001876

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