



CITY OF LOMPOC UTILITIES DEPARTMENT

ELECTRICAL DIVISION SPECIFICATION

**12KV-OIL FILED POLEMOUNTED
TRANSFORMERS STAINLESS
STEEL**

March 2018

SPECIFICATIONS
12kV-OIL FILLED POLEMOUNTED TRANSFORMERS

DIVISION 1 – GENERAL REQUIREMENTS

1-1 GENERAL

Electrical design and materials shall conform to the latest revisions of EEI-NEMA and ANSI Standards for Oil-Filled Equipment. It is the intent of these specifications to describe equipment of the best design and construction, for the service for which it is intended.

1-2 TESTS

Transformers shall receive and pass at least the following tests in accordance with the applicable ANSI and NEMA Standards:

- | | |
|---------------------------|--|
| (1) Load and no-load loss | (5) Applied and induced potential test |
| (2) Exciting current | (6) Impulse voltage test |
| (3) Polarity check | (7) Tank pressure test |
| (4) Ratio check | |

1-3 GUARANTEE

The manufacturer shall guarantee all equipment delivered under these specifications against any and all defects in material and/or workmanship for a period of at least one year from date of acceptance. The manufacturer shall rectify all such defects by repair or replacement at the manufacturer's expense and assume responsibility for associated shipping costs.

1-4 TECHNICAL INFORMATION

The following specifications shall be met:

1. Insulation level: 95 kV BIL (min.).
2. Insulation rating: 65° C rise.
3. Paint: All exterior surfaces shall be painted ANSI 70 gray, using a system of coordinated and thoroughly tested materials and application techniques that will assure long life. Special attention shall be given to welds, seams, edges and rough spots. Painting shall meet requirements of ANSI Standards C57.12.28 (latest revision).

DIVISION 1 – GENERAL REQUIREMENTS (cont.)

4. Lifting Lugs: Lifting lugs shall be provided on the tank and shall be located in such a way to avoid interference between lifting slings and any attachments on the transformer and to avoid scratching the transformer coating.

5. Tanks: Tanks shall be tested at a pressure equal to or greater than the maximum operating pressure and for a sufficient period of time to insure that all welds are free from leaks. Tank and radiator construction shall be consistent with good manufacturing and design practices prevalent in the transformer industry, and together they should continue to a high quality product. **The entire transformer tank, tank removable lid and retaining ring (if applicable) shall be stainless steel (AISI series 300, Austenitic grade, non-magnetic).**

6. Nameplates: Stainless steel or anodized aluminum nameplate shall be securely attached to the transformer by means of metal screws, rivets or similar mechanical device(s). The letters and numbers shall be stamped or engraved on the nameplate. The nameplate shall include the words, “Fluid is less than one p.p.m. PCB”; refer to Section 1-6. The instruction nameplate shall contain the information specified in Standard C57.12.00-2015 (latest revision).

7. Sound Level: The sound level shall be equal to or better than EEI-NEMA Standards.

8. Size: Size of the transformer, including radiators (fins), shall not interfere with installation or G.O. 95 requirements when banked together on cluster bracket (Turner Electric #305-100 or approved equal).

10. Height & Weight: Height and weight of the transformer shall be as listed below:

<u>Size (kVA)</u>	<u>Maximum Weight (lbs.)</u>	<u>Maximum Height (inches) Including Bushings</u>
15	400	45
25	500	45
37.5	625	45
50	800	45
75	1,100	51
100	1,200	51
167	1,600	51

DIVISION 1 – GENERAL REQUIREMENTS (cont.)

1-5 LOSSES

Losses will be considered in the evaluation of this bid as follows:

No-load (core) loss @ \$6.34/watt.

Load (winding) loss @ \$4.31/watt.

The cost of losses will be added to the equipment price (bid price) F.O.B. Lompoc, including maximum escalation, to determine the evaluated low bid of vendor otherwise meeting these specifications. All bidders shall supply the following guaranteed loss data for use in the evaluation, in addition to other data listed in the specifications:

1. No-load losses in watts at rated secondary voltage.
2. Load losses in watts at rated secondary voltage and rated load. The standard reference temperature for load loss shall be 85°C.
3. Upon requests, furnish certification/statement of the guaranteed loss measurement error of the test equipment and measurement method to be used, including the basis for determination of the accuracy of the test equipment and measurement method.
4. Transformers shall meet the efficiency standards stipulated by 10 CFR Part 431 Energy Conservation Program: Energy Conservation Standards for Distribution Transformers; Final Rule. Subpart K 431.196

The successful bidder shall supply a certified test report of actual losses of the unit(s) to be supplied. The no-load and load losses for each group (type and size) of transformer(s) will be averaged separately within their respective categories (no-load and load losses). If the average tested no-load (core) and/or load (winding) losses of the transformer group exceed the watt losses quoted in the proposal, the contract price shall be reduced by the above amounts per watt of actual group averaged no-load and/or actual load loss in excess of that quoted in the proposal. No-load loss penalties will be evaluated separately from load loss penalties. No additional payment will be made to the manufacturer or bidder for actual losses lower than the losses quoted in the proposal.

Certified test report of losses shall be submitted by the manufacturer prior to or at the time of shipment of the transformer.

1-6 PCB CONTENT

Transformer fluid must be **guaranteed** to contain less than one p.p.m. by weight (mg/kg) polychlorinated biphenyls (PCB). Certified test report of PCB content shall be produced upon request. The transformer nameplate **shall** include the words, “Fluid is less than one p.p.m. PCB.”

POLEMOUNT TRANSFORMER – OIL FILLED

DIVISION 2-SINGLE PHASE

2-1 GENERAL

In addition to that specified in Division 1 – General Requirements, transformers shall be provided with the following:

1. High voltage Bushings (Porcelain):
 - a. Quantity: Two
 - b. Bushing terminals to be clamp-type suitable for use with copper and aluminum conductor.
2. Low voltage Bushings (**Porcelain**)
 - a. Quantity:

277-Volt: **Two**

All Others: **Three**
 - b. Shall be tank wall-mounted.
 - c. Bushing terminals:

100 kVA and lower: Shall be clamp-type suitable for use with copper and aluminum conductor.

Over 100 kVA: Shall be NEMA-4 pads (4-hole).
3. Each transformer shall be equipped with a non-resettable device which detects and provides external indication of internal transformer faults, and also incorporates pressure relief functionality. The approved device is manufactured by IFD Corporation or approved equal.
4. Lifting lugs shall be welded to the tank.
5. Provide tank grounding lug and a visible tank-to-cover ground strap.
6. Hanger brackets, welded to the tank.
7. Hanger brackets shall permit bolting of transformer directly to pole.
8. Single phase, 60 Hz, Oil Immersed Self-Cooled (OISC).

DIVISION 2-SINGLE PHASE (cont.)

2-2 RATINGS AND DESIGN

Transformers shall have the following ratings and design:

1. Distribution type, pole-bolted transformers.
2. 12,000-volt Delta primary unless specified otherwise on proposal form. The primary bushings shall be rated 15kV.
3. Single phase.
- 4. Without arresters, fuses (weaklinks) or taps.**
5. Each transformer to have a properly sized breaker on the secondary side.
6. Secondary voltage to be as specified on proposal form.
7. kVA rating to be as specified on proposal form.

DIVISION 3 – OTHER REQUIREMENTS

3-1 SUBMITTALS

1. All proposals shall include the data as requested in Division 1, section 1-5 for evaluation. Supplied data shall remain in effect for the duration of any contract.
2. Certified test report of losses shall be submitted by the manufacturer prior to or at the time of shipment of the transformer. Any equipment ordered and delivered will not be evaluated for acceptance without the certified test reports.
3. Within thirty 30 calendar days after the award of order or contract, the Manufacturer shall furnish for review by the City, two full sets of outline, nameplate, and any other drawings as required.
 - a. Each set shall include a copy of the transmittal letter, a drawing list by the manufacturer's drawing number and titles of all drawings which the Manufacturer intends to be reviewed by the City.
 - b. Within twenty working days after their receipt, the City will return to the Manufacturer, one set of the drawings furnished for review. Comments, if any, will be in writing. The review or waiver of review of drawings shall in no way relieve the Manufacturer of his obligation to furnish apparatus in conformance with this specification.
 - c. Approved drawings (by the City) shall remain in effect for the duration of any contract unless otherwise revised and agreed upon with the City and the Manufacturer.

3-2 ACCEPTANCE

The City shall not be deemed to have accepted the apparatus until it has made sufficient evaluation and tests to enable it to determine that the apparatus meets all of the requirements of said Specifications. Such tests shall be made within sixty days from the date the apparatus is delivered. The conditions of any tests shall be mutually agreed upon and the Manufacturer shall be notified of and may be represented at all tests that may be made. If inspection and/or tests show the apparatus or any part thereof not to be represented and/or contracted for, the City may refuse to accept it, but the Manufacturer shall have a reasonable time within which to correct the apparatus at his own expense.