

SECTION 26 12 00  
LIQUID-TYPE TRANSFORMERS  
Design Standard

PART 1 GENERAL

1.1 PURPOSE

This design standard has the purpose of providing liquid-type transformers with a level of quality which meets the requirements throughout the San Mateo County Community College District for all renovation and new building projects. Provide for connection to campus medium voltage distribution system.

PART 2 PRODUCTS

2.1 Design and specify liquid-type transformers to step-down high voltage power for exterior installations. The liquid-type transformers shall have the following characteristics based on Code requirements and standard industry practices:

- A. Provide compartmental type, self cooled, tamperproof and weatherproof with pad mounting provisions. Comply within the latest applicable standards of NEMA and ANSI. Provide transformer with no exposed screws, bolts or other fastening devices which are externally removable.
- B. Voltage: Unless otherwise indicated on Drawings, operate transformers at 3 phase, nominal delta primary to 3 phase wye secondary. Provide standard NEMA, ANSI 3 phase primary taps; that is, 10 percent range of tap voltage adjustment for transformers smaller than 30KVA and 15 percent range tap voltage adjustment for 30KVA and larger.
- C. Rating: Unless otherwise indicated on Drawings, provide transformer ratings continuous, with an average temperature rise, by resistance, not to exceed 65C in a 30C ambient with 100 percent of rated nameplate load connected to the secondary.
- D. Provide sealed tank construction of sufficient strength to withstand a pressure of 7 psi without permanent distortion. Provide welded cover with the fastening tamperproof. Provide exterior cooling panels, lifting eyes, jacking pads, and welded cover.
- E. Provide core and coil assembly core type with aluminum windings. Where wye wye is specified or required provide triplex or 5 legged core design.
- F. Provide tap changing mechanism for deenergized operation only and externally operable with two 2.5 percent full capacity taps above and two 2.5 percent full capacity taps below normal rated primary voltage.
- G. Provide high and low voltage compartments located side-by-side separated by a steel barrier. Provide full height air filled terminal compartments with individual doors. Provide high voltage door fastenings which are not accessible until the low voltage door has been opened. Provide the low voltage door with a three point latching mechanism with vault type handle having provisions for a single padlock. Provide doors with lift off type stainless steel hinges and door stops. Provide removable front sills and ANSI tank grounding provisions in each compartment.
- H. Provide dead front construction with load break gang operated immersed switch with switch hand located in the high voltage compartment for operating with distribution hot stick. Provide 2 position on-off for radial feed unless loop feed is indicated on Drawings. If loop feed is indicated provide 4 position switch. Provide dry well canister mounted current limiting fuses externally replaceable with distribution hot stick. Size fuses to manufacturer's recommendation to final design load. Provide Series NX Arc-Strangler fuses. Provide distribution class lightning arrester mounted in the high voltage compartment.
- I. Provide low voltage bushings, 6 hole spade, molded epoxy with blade type spade terminals for NEMA standard hole spacing arranged for vertical take-off. Provide low voltage neutral

with insulated busing grounded to the transformer tank by removable grounding strap. Wye-wye connected transformers are provided with the high and low voltage neutrals internally tied with a removable link for testing.

- J. Provide the following accessories:
  - 1. 1 inch drain valve/sampling device
  - 2. Dial type thermometer
  - 3. Magnetic liquid level gauge
  - 4. Pressure/vacuum gauge
  - 5. Pressure relief valve
  - 6. 1000KVA and larger provide sudden pressure relay
- K. Provide transformer coils of continuous wire wound construction.
- L. Provide each coil layer with end fillers or tie-downs to provide maximum mechanical strength. Braze tap terminations directly to bus stubs or lugs firmly mounted.
- M. Provide windings continuous from start to finish. Splicing is unacceptable. Materials incorporated must have at least a minimum of 1 year of proven field usage. Accelerated laboratory test not acceptable.
- N. Degrease, clean, phosphatize, prime and finish enclosures with a gray, baked enamel. Visibly ground the core of the transformer to this enclosure by means of a flexible ground strap.
- O. Mount transformers core and coil on vibration mounting pads designed to suppress transmission of 120 cycle frequencies and harmonics thereof. Arrange and select pads in consideration of core and coil weight. Provide additional noise suppressing mountings external to transformers where transformers are located in mechanical spaces.
- P. Sound levels guaranteed by manufacturer, 45dB through 150KVA and 50dB through 300KVA.

2.2 Liquid-type transformers shall meet the following installation requirements based on Code and standard industry practices:

- A. Provide transformers with a concrete reinforced pad.
- B. Mount transformers not closer to combustible materials than allowed by CEC and NFPA. Provide adequate ventilation, mount transformers away from structure as recommended by manufacturer and power utility.
- C. Provide transformers with 8 inch round by 24 inch (above and below grade) concrete and steel bollards where subject to vehicular traffic.
- D. Where transformers are grouped exterior together or with switchgear, refinish transformer or switchgear resulting in transformers and switchgear finishes matching in color and type.

2.3 APPROVED MANUFACTURERS

- A. Eaton Electrical
- B. General Electric
- C. Square D
- D. ACME
- E. ABB

## PART 3 EXECUTION

3.1 SUBSTITUTES ALLOWED?

Yes, if performance and quality equivalency can be evidenced.

3.2 ASSOCIATED DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS

A. Division 26 Electrical Design Standards and Construction Specifications

END OF SECTION