

SECTION 261202

THREE-PHASE PADMOUNTED TRANSFORMER

PART 1 - GENERAL

1.1 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.
- B. American National Standards Institute (ANSI) Publications:
- C2 National Electric Safety Code
 - C57.12.26 Pad-Mounted Compartmental-Type, Self-Cooled, Three-Phase Distribution Transformers, Separable Insulated High Voltage Connectors; High Voltage 24,940 GRDY/14400 Volts and below; 2500 kVA and Smaller
 - Z35.1 Specifications for Accident Prevention Signs
- C. American Society for Testing and Materials (ASTM) Publications (Latest Edition):
- D 92 Test Method for Flash and Fire Points by Cleveland Open Cup
 - D 117 Test Method for Electrical Insulating Oils of Petroleum Origin
 - D 877 Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using Disk Electrodes
 - D 3487 Mineral Insulating Oil Used in Electrical Apparatus, Standard Specification
- D. Institute of Electrical and Electronic Engineers, Inc. (IEEE) Publication (Latest Edition):
- 386 Separable Insulated Connectors for Power Distribution Systems Above 600 V
- E. National Fire Protection Association (NFPA) Publication (Latest Edition):
- 70 National Electrical Code
- F. Nema 210.

1.2 SUBMITTALS

- A. Catalog Information and Shop Drawings: Indicate ratings, capacity, and detailed arrangement of components.
1. Distribution Transformer
 2. Primary Fuses
 3. Primary Oil-Immersed Switches
- B. Certificates:

1. Certified Test Report of Transformer Manufacturer
 2. Provide CBC 2019 compliant seismic installation. See Section 260500 for all certification and submittal requirements.
- C. Equipment bushings, dead-end plugs, dead break junctions and grounding connectors shall be submitted to and approved by the Architect before ordering.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Distribution Padmount Compartmental-Type Transformer: The unit shall be suitable for loop connection and shall contain the transformer, six **600A (Addendum 03)** universal bushing wells, three two position rotary oil-immersed load break - load make switches including an A and a B loop switch and a transformer winding switch, primary current limiting fusing, and primary overload fusing in a weather resistant, tamper-resistant enclosure, arranged for padlocking, with a full tank and compartment weather cover. Transformer shall conform to ANSI C57.12.26. High voltage and low voltage compartments shall be isolated from each other in a manner to require a separate unlatching or unbolting action to give access to the high voltage compartment. (Note: provide radial connection where indicated on the drawings).
- B. Transformer shall conform to Owner's Standards, including testing and adjustment requirements.
- C. Transformer: Dead front, three phase, two winding, 60 Hz, 65 degree C rise, oil insulated, self-cooled type rated as indicated on the drawings, with two 2-1/2% full capacity taps above and below rated primary voltage. Basic Insulation Level shall be 125 kV on the primary side, and 30 kV minimum on the secondary side. High voltage winding shall be 12.47 kV delta (or 12.00 kV where indicated on the drawings). Low voltage shall be 277/480 V grounded wye, 4-wire. Windings shall be copper. Transformer tank shall be sealed except for bolted handhole access. Provide lifting lugs. Provide external tap changing for de-energized operation only. Locate the changer control handle within the high voltage compartment and provide position indicator and method of securing the control handle against unintentional operation. Switch indicating plate shall be readable from 5 feet away. Tank Construction: Liquid immersed transformer shall have a totally bolted gasketed cover with a weather cover over the compartment and over the tank.
- D. The transformer tank and compartment shall be assembled as an integral unit for mounting on a pad. There shall be no exposed screws, bolts, or other fastening devices, which are externally removable. There shall be no openings through which foreign objects such as sticks, rods, or wires might contact live parts. The construction shall limit the entry of water (other than flood water) into the compartment so as not to impair the operation of the transformer.
- E. Full-height, air-filled high voltage and low voltage terminal compartments with full-height and full-width hinged door for each compartment shall be located side-by-side separated by a steel barrier, with the high voltage compartment on the left (as viewed from the front of the transformer). To facilitate making connections and permit cable pulling, the doors and compartment hood shall be removable. Removable doorsill on compartments shall be provided to permit rolling or skidding of unit into place over conduit studs in foundation.

- F. Mineral Oil: ASTM D 3487, Type II tested in accordance with ASTM D 117.
- G. Transformer: Provide the accessories listed below:
1. Bronze drain and sampling valve: 1-inch trade size minimum, with FPT plugged discharge
 2. Filter press connections
 3. Ground pads
 4. Provision for lifting and jacking
 5. Top liquid dial-type thermometer without alarm contacts
 6. Pressure-vacuum gauge
 7. Pressure-relief device
 8. Oil fill connection: Capped, 1.25-inch trade size minimum
 9. Oil level gauge: With normal level at full load rated temperature rise indicated
 10. Oil temperature gauge: Calibrated in degrees C, with full load temperature rise indicated
 11. 4 extra hold down pads compliant with CBC 2019 seismic requirements
- H. High-voltage switches: Provide internal, oil-immersed rotary, gang-operated, load break - load make switches. Minimum switch rating shall be load-break and make, 200A continuous; make and latch 10,000A symmetrical; 6,000A minimum for 1 second.
- I. Primary Fusing:
1. Internal Fault Protection: Provide current limiting fusing in dry well, air-insulated, with non-load break fuse holders inserted in the transformer tank. Provide an integral warning notice and safety baffle to prevent fuse removal unless the transformer is de-energized. Fuse values shall be 150 percent of full load current and fuses shall be Class E.
 2. "Weak-link" primary fusing is not acceptable in lieu of current limiting primary fusing.
 3. Overload Protection: Expulsion fuses, dead front Bay-O-Net type.
 4. Provide a spare set of (3) fuses of each type in original cartons.
- J. A-B Loop Switches: Provide primary loop switches (both switches normally closed, to maintain loop).
- K. Enclosure: Enclosure shall be constructed in accordance with ANSI C57.12.26.
- L. Finish - Prior to prime coating, all welds shall be ground smooth. Rust inhibiting prime coat over cleaned and degreased surfaces. Vinyl paint for finish coat on all surfaces. Color shall be Munsell No. 7GY3.29/1.5 Green.
- M. Latches - Three Point Vault Style, chromium plated with 4-inch handle and provisions for padlocking.
- N. Grounding Pads - Steel ground pad welded to tank wall in primary and secondary compartment. Each pad drilled and tapped for two 3/8 inch (min.) steel bolts.
- O. Termination compartment dimensions shall be as follows:
1. Height: Maximum of 66 inches or the transformer height plus 2 inches (approx.)
 2. Depth: 18 inches minimum, 24 inches maximum.
 3. Width: Primary Compartment 42 inches min.; Secondary Compartment 24 inches min.

- P. The nameplate shall comply with ANSI C57.12.26 except that the number of gallons of coolant shall be shown.
- Q. Transformer shall be as manufactured by Eaton-Cutler Hammer, Schneider-Square D, ABB, Cooper, or approved equal.
- R. High Voltage Separable Connectors: Provide well bushings with 15 kV inserts for separable connector terminations – see Section 260513 for connector requirements.
- S. Secondary Connections - Spade bushings: National Electrical Manufacturers Association (NEMA) drilled copper terminal, 1.75 inch hole spacing. Provide secondary bus supports using an insulating material to prevent spade from bending due to cable weight. Hi-press lugs only for cable termination.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Padmounted transformer installation shall conform to the Manufacturer's shop drawings and mounting instructions and shall include securing it to a concrete pad by at least four anchor bolts. Completed installation shall conform to the requirements of ANSI C2.

3.2 FIELD TESTS

- A. Testing of medium voltage equipment shall be performed in conjunction with the Manufacturer's representative.
- B. Coordinate with the factory representative and provide all assistance required in the start-up and testing of the equipment.
- C. Perform inspection and tests per NETA ATS-2017 Section "Transformers - Liquid-Filled". Laboratory tests on the insulating fluid for the following items are not required: Specific gravity, power factor, water content, dissolved gas analysis, total combustible gas content. The following tests are not required; winding-resistance tests on each winding in final tap position, percent oxygen tests on the nitrogen gas blanket.
- D. Field testing requirements for transformer to include ASTM D877 dielectric liquid test, ASTM D971 interfacial tension test and ASTM D1533 moisture content test.
- E. See Section 260800, "TESTING", for additional requirements.

END OF SECTION