

Specification Number: 26 12 16.10.FL

Product Name: PAD-MOUNTED TRANSFORMERS, DRY TYPE

**SECTION 26 12 16.10.FL
PAD-MOUNTED TRANSFORMERS, DRY-TYPE**

Three-phase, dry-type pad-mounted transformers, for use on underground power distribution systems, meet modern design requirements for flexibility, and provide a visually pleasing installation. Construction allows installation in locations accessible to the general public without the need for protective fencing or vaults. These units are ideally suited for apartment buildings, schools, hospitals, shopping centers, commercial buildings, and industrial sites. Standard sizes range from 225 - 750 kVA with primary ratings from 2,400 V to 15,000 V. These designs meet all applicable industry standards of ANSI, NEMA, CSA, and IEEE.

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Dry-type pad-mounted transformers.

1.02 REFERENCES

A. IEEE C37.47 - Specifications for Distribution Fuse Disconnecting Switches, Fuse Supports, and Current-Limiting Fuses

B. IEEE C57.12.01 - Standard General Requirements for Dry-Type Distribution and Power Transformers Including Those with Solid Cast and/or Resin-Encapsulated Windings

C. ANSI C57.12.28 - Switchgear and Transformers, Pad-Mounted Equipment - Enclosure Integrity

D. ANSI C57.12.50 - Requirements for Ventilated Dry-Type Distribution Transformers, 1-500 kVA Single-Phase and 15-500 kVA Three-Phase, with High Voltage 601-34,500 Volts, Low Voltage 120-600 Volts

E. ANSI C57.12.51 - Requirements for Ventilated Dry-Type Power Transformers, 501 kVA and Larger Three-Phase, with High Voltage 601-34,500 Volts, Low Voltage 208Y/120-4160 Volts

F. ANSI C57.12.55 - Conformance Standard for Transformers - Dry-Type Transformers Used in Unit Installations, Including Unit Substations

G. IEEE C57.12.56 - Standard Test Procedure for Thermal Evaluation of Insulation Systems for Ventilated Dry-Type Power and Distribution Transformers

H. IEEE C57.12.58 - Guide for Conducting a Transient Voltage Analysis of a Dry-Type Transformer Coil

I. IEEE C57.12.59 - Guide for Dry-Type Transformer Through-Fault Current Duration

J. IEEE C57.12.91 - Test Code for Dry-Type Distribution and Power Transformers

K. IEEE C57.94 - Recommended Practice for Installation, Application, Operation, and Maintenance of Dry-Type General Purpose Distribution and Power Transformers

L. IEEE C57.96 - Guide for Loading Dry-Type Distribution and Power Transformers (ANSI).

M. IEEE C57.105 - Guide for Application of Transformer Connections in Three-Phase Distribution Systems

N. CSA-C88 - Power Transformers and Reactors

O. NEMA AB1 - Molded Case Circuit Breakers

P. CAN/CSA-C88-M90 - Electrical Power Systems and Equipment

1.03 SUBMITTALS

A. Submit shop drawings indicating outline dimensions, connection and support points, weight, specified ratings and materials.

B. Submit product data indicating standard model design tests and options.

C. Submit manufacturer's installation instructions.

1.04 OPERATION AND MAINTENANCE DATA

A. Include procedures for cleaning and maintaining unit, and replacing components.

1.05 QUALITY ASSURANCE

A. Manufacturer: Company specializing in distribution transformers with [three] [] years [documented] experience.

PART 2 PRODUCT

2.01 SUPPLIER

A. Square D Company [no equal] [or approved equal]

2.02 DRY-TYPE PAD-MOUNTED TRANSFORMERS

A. The transformer(s) shall be compartment type, self-cooled, for mounting on a pad and shall comply with the latest applicable standards.

B. The transformer(s) shall be rated [kVA AA]. Primary voltage [][delta] [wye] . Secondary voltage [] [wye] [delta], [3-wire] [4-wire], 60 Hz with two 2-1/2% full capacity above normal and two 2-1/2% full capacity below normal primary taps. Impedance shall be [%] [manufacturer's standard impedance], $\pm 7\text{-}1/2\%$. All transformers shall have an average temperature rise of [150° C] [115° C] [80° C] above a 40° C maximum, 30° C average ambient.

C. The basic impulse levels (BIL) shall be a minimum of [60 kV for the 15 kV class] [optional 95 kV BIL available] [10 kV for the 1.2 kV class].

D. The coils shall be wound with [aluminum] [copper] conductors.

E. All insulating materials are to be in accordance with IEEE Standard C57.12.01 for 220° C UL insulation system.

F. All cores to be constructed of high grade, grain-oriented, non-aging silicon steel with high magnetic permeability, and low hysteresis and eddy current losses. Magnetic flux densities are to be kept well below the saturation point.

G. The coils and all clamping structure and buswork shall be assembled on the core, and then dried at atmospheric pressure in an oven through which hot air is continuously circulated. The totally assembled core and coil assembly shall be vacuum pressure impregnated in polyester varnish. The total VPI process shall apply a one (1) cycle polyester protective shield of varnish the coils and a protective shield to the bus, core and support structure. The varnish shall be cured on the core and coil assembly following an established temperature vs. time baking cycle in a hot air circulating oven. The VPI process shall effectively impregnate the entire core and coil assembly, which results in a unit, which is virtually impermeable to moisture, dust, salt air and other industrial contaminants.

H. The transformer shall be mounted in a heavy gauge enclosure consisting of three isolated sections; high voltage compartment, low voltage compartment, and transformer compartment. The enclosure is to be of NEMA Type 3R rated rain-resistant construction. Indoor enclosures with weather shields are not acceptable.

I. Rubber vibration isolation pads shall be installed by the manufacturer between the core and coil and the enclosure.

J. The high and low voltage compartments shall be located side by side, separated by a steel barrier. When facing the transformer, the low voltage compartments shall be on the right. Terminal compartments shall be full height, air-filled, with individual doors. The high voltage door fastenings shall not be accessible until the low voltage door has been opened. The low voltage door compartment shall have 3-point latching and padlocking provisions.

K. The high voltage terminations and equipment shall be [live front] [dead front]. (Available options include hook-stick operated and individual-pole load break fused disconnects with current limiting fuses.)

L. Live front terminations shall be spade type terminals with standard NEMA type hole patterns.

M. Dead front bushings shall be either universal wells or one-piece integrated for use with separable connectors.

N. The enclosure base is to be constructed of structural steel members to permit rolling or skidding in any direction. The base shall also be provided with lifting devices and jacking pads designed to be flush with the enclosure.

O. Access to the transformer section is to be through a removable panel with padlock hasps to prevent entry by unauthorized personnel when padlocks are installed.

P. Metal-oxide, gapless-type distribution class lightning arresters shall [shall not] be installed by the manufacturer on the high voltage side of the transformer to provide additional protection against high voltage lightning or switching surges.

Q. Transformer sound levels shall be warranted by the manufacturer not to exceed the values specified in IEEE Std. C57.12.01 .

R. Transformer shall be UL [c/UL] [non-UL] listed

S. Testing - Tests shall be conducted in accordance with the provisions of IEEE C57.12.91 and shall include, as a minimum, the following tests:

1. Ratio

2. Polarity
3. Phase Rotation
4. No-Load Loss
5. Excitation Current
6. Impedance Voltage
7. Load Loss
8. Applied Potential
9. Induced Potential
10. QC Impulse Test
11. Temperature Test (typical data from previous unit is acceptable)
12. Sound Test (typical data from previous unit is acceptable)

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that pads are ready to receive work.
- B. Verify field measurements are as [shown on drawings.] [instructed by manufacturer.]
- C. Verify that required utilities are available, in proper location and ready for use.
- D. Beginning of installation means installer accepts conditions.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install safety labels to NEMA 260.

3.03 FIELD QUALITY CONTROL

- A. Test transformer to IEEE C57.12.91 .

3.04 ADJUSTING

- A. Adjust primary taps so that secondary voltage is within [2] [] % of rated voltage.
- B. END OF SECTION