

**Section 16320 - PAD MOUNT TRANSFORMER**

**PART 1 GENERAL:**

1.01 Work Included Herein

- A. Pad mount transformer installations.

**PART 2 PRODUCTS:**

2.01 MANUFACTURER

- A. Acceptable Manufacturers:
  - General Electric
  - Square D
  - Cooper
  - Cutler Hammer*

2.02 TESTING

- A. Testing shall be performed in accordance with ANSI C57.12, IEEE standards 48 and 93, NEMA TRi and TR5, and ASTM D3487.

2.03 SUBMITTALS

- A. Provide complete submittals and shop drawings on the unit including the following:
  1. Shop Drawings and catalog cuts
  2. Sufficient information to determine compliance with specifications.
  3. Include all electrical ratings, nameplate data, impedance, dimensions, weight, mounting, footprint, material, decibel ratings, terminations, temperature rise, no load and full load losses, regulation, overcurrent protection, connection diagrams, fuse sizes, fuse curves with transformer damage points, and accessories.

2.04 POWER TRANSFORMERS

- A. The transformer shall be of the *non burning or high flash point* liquid filled type. The unit shall be designed for outdoor installation a temperature variations from 0 to 45 degrees Celsius at 5% to 95% relative humidity. Cooling oil shall be in accordance with ASTM D3487.

- B. Transformer shall have the following characteristics:

1.	Continuous rating, KVA	XXX KVA
2.	Number of phases	3
3.	Number of windings	3
4.	Frequency, hertz	60
5.	Impedance, at rated KVA	5.75%
6.	High voltage winding, volts	13,800/4160 dual rated
7.	Low voltage winding, volts	120/208
8.	Temperature Rise	65° C Resistive and 80° hot spot

- C. Connections:
 

1.	High-voltage winding	delta
2.	Low-voltage winding	wye
3.	Taps 2@+/-2.5%	yes
4.	Basic Insulation Level (BIL)	
5.	high-voltage winding, kV	95
- D. The windings shall have insulation of high dielectric and mechanical strength and shall be arranged to permit free circulation of cooling medium. Proper internal barriers shall be provided and additional insulation shall be provided on end coils to protect against line disturbances. The coils shall be adequately braced to prevent distortion due to any abnormal operating conditions. The windings shall withstand impulses, induced and dielectric test voltage in accordance with ANSI Standard C57.12.00.
- E. The transformers shall be furnished with a primary no-load tap changer. The transformer shall be provided with four (4) approximately 2-1/2% full capacity taps in the high voltage winding, two below and two above normal, brought out to an externally-operated, de-energized tap changer. The tap changer handle shall be capable of being locked in any tap position.
- F. The transformers shall be provided with an indicating dial thermometer, having a range from 0 degrees C. to 1 20 degrees C., indicating the transformer winding temperature.
- G. The transformers shall be furnished with two suitable ground pads on opposite sides near the bottom. The ground pads shall include a flat finished surface with NEMA drilling.
- H. The base of each transformer shall be provided with jacking pads.
- I. The transformers shall be provided with an approved nameplate conforming to the requirements of ANSI Standard C57.12.00.
- J. All windings shall be copper. Fillers or tie downs shall be provided for the coil windings.
- K. Cores shall be rigidly braced grain oriented, non aging silicon steel to minimize losses

2.05 PRIMARY EQUIPMENT

- A. The primary connections shall be live front. NOTE: Units shall have all dead front features with the exception of bolted spade type primary bushings.
- B. The primary switch shall be a gang operated load break oil immersed disconnect switch.
- C. The primary fuses shall be non load rated dry well mounted current limiting primary fuses.
- D. The entire transformer shall be of a single unit.
- E. One set of spare primary fuses shall be provided for the transformer.
- F. Provide distribution class surge arresters in the primary terminal compartment to protect the transformer primary. The arresters shall be rated at 10kv.

2.06 SECONDARY EQUIPMENT

- A. The low voltage leads shall be brought out of the tank by epoxy, pressure tight bushings, using the standard arrangement per ANSI. The neutral terminal shall be isolated from the transformer tank. A removable bonding jumper shall be provided from the secondary neutral to ground. The bonding jumper shall be sized in accordance with the NEC.

## 2.07 ENCLOSURE AND DOORS

- A. The enclosure of the transformer shall be of tamper resistant construction with no exposed screws, bolts, or other fastening devices which are externally removable.
- B. The doors shall be designed and constructed to guard against unauthorized entry.
  - 1. The high voltage compartment door shall be latched with captive bolts accessible only after the low voltage door is released and opened.
  - 2. The low voltage door shall three point latching with a pentahead type captive bolt in the door handle for additional security. Provisions for padlocking the handle shall be included whereby the padlock cannot be engaged until the captive bolt is seated.
  - 3. Access to the tank hand hole shall be only after the low and high voltage compartment doors are opened.
  - 4. A rigid steel partition shall separate the high and low voltage compartments.
  - 5. The doors shall have full return baffles on the edges and have concealed latching mechanisms and hinges to provide maximum resistance to prying or probing with sticks, rods, or wires.
- C. Exothermically weld pad ground conductor to transformer ground pad.
- D. *Transformer shall be painted white, Dupont #817. Sand with 220 grit paper, prime with Dupont Vari-Prime, apply 3 coats of Dupont catalyzed urethane color.*

## 2.08 TRANSFORMER TANK

- A. Transformer tank shall be of sealed construction of sufficient strength to withstand a pressure on 7 psi without permanent distortion.
- B. The following shall be provided on the wall on the tank inside of the locked low voltage compartment of the transformer:
  - 1. Drain valve and sampling device
  - 2. Pressure Relief valve
  - 3. Oil filling plug
  - 4. Oil level plug
  - 5. Non corrosive metal nameplate
  - 6. Ground pad
  - 7. Oil Level gage
  - 8. Dial type thermometer
  - 9. Pressure/vacuum gage
- C. The following shall be provided on the wall on the tank inside of the locked high voltage compartment of the transformer:
  - No load tap changer handle
  - Ground pad
  - Bayonet fusing
  - Lightning arresters
- D. On the door of the secondary compartment shall have provisions for mounting a 1 5 kv rated hot stick. Hot stick shall be provided with transformer.

**PART 3 EXECUTION**

## 3.1 INSTALLATION

- A. Install complete transformer pad as indicated on drawings. Pad shall have block outs for minimum of 2 additional primary and 4 additional secondary conduits.
- B. Transformer shall be securely bolted to the concrete foundation pad in accordance with the manufacturer's recommendations.
- C. *Exothermically weld pad ground conductor to transformer ground pad.*

## 3.2 TESTING

- A. The manufacturer shall perform the following tests on each transformer prior to shipment and furnish the test results to the U of A electrical Engineer.
  - 1. Resistance measurements, ratios, polarity, and phase relation tests
  - 2. No load core loss and exciting current at rated voltage
  - 3. Impedance and load loss
  - 4. Applied potential test
  - 5. Induced potential test
  - 6. Pressure leak test
  - 7. Audible sound levels
  - 8. Temperature rise
  - 9. Impedance
  - 10. Verification of compliance from prototype testing and conformance verification
- B. Notify the U of A engineer , in writing when the transformers are ready for field testing.
- C. The electrical contractor shall adjust, test, and place the equipment into operation to the complete satisfaction of the U of A Electrical Engineer.

**End of Section 16320**