

SECTION 26 12 00: MEDIUM VOLTAGE DISTRIBUTION TRANSFORMERS

1. GENERAL

- A. This section includes design requirements for medium-voltage distribution transformers, typically utilized for use for building service entrance use, connected to the campus 11.2 KV and 4.16 KV distribution systems
- B. Transformers to be Underwriters’ Laboratories (UL) listed; indoor-mounted transformers to be FM listed
- C. Transformers shall conform to latest NEMA TP-1 requirements for energy efficiency
- D. Transformers shall be capable of operating at 100% of nameplate rating continuously while in an ambient temperature of 40°C (104°F). Maximum temperature rise shall be 80°C
- E. Three phase transformers shall be wound in a Delta-Wye configuration unless otherwise required for the application
- F. Coolant and insulating fluid: non-toxic, fire resistant, natural ester oil, Envirottemp FR3, as manufactured by Cooper Power Systems, or approved equal
- G. Use copper for transformer windings and terminations
- H. Provide concrete housekeeping pad for floor-mounted transformers
- I. Check primary and secondary voltages and make appropriate tap adjustments after transformer energization to provide optimum voltage conditions to the utilization equipment; provide final report to indicate as left voltages
- J. Label each transformer with laminated plastic nameplate, secured to the case with corrosion-resistant screws
- K. Manufacturers:
 - 1. Cooper
 - 2. Pauwels
 - 3. Square D
 - 4. Siemens
- L. Common transformer requirements:

| | NOMINAL | TAPS |
|------------------------|---|---|
| 11 KV primary | <ul style="list-style-type: none"> • 3 phase primary voltage • 11.5 KV | (4) 2.5% below nominal rated voltage |
| 4.16 KV primary | <ul style="list-style-type: none"> • 3 phase primary voltage • 4.16 KV | (2) 2.5% above & (2) 2.5% below nominal rated voltage |
| | <ul style="list-style-type: none"> • 1 phase primary voltage • 4.16 KV (phase to phase) | (2) 2.5% above & (2) 2.5% below nominal rated voltage |

3. PADMOUNT TYPE:

- A. Bolted access cover with tamper-proof fastenings
- B. Taps: externally-operated no-load tap changer, with padlocking provisions.
- C. High-voltage terminations: Dead-front type, with 600-amp rated integral dual (loop-feed) primary bushings for load-break elbows and elbow-style surge arrestor
- D. Low-voltage terminations: Molded epoxy bushings with blade-type spade terminals, arranged for vertical takeoff; neutral grounded to tank via removable strap
- E. Switches: Externally operable, load-break, gang-operated, liquid-immersed type; for loop feed, provide switch for Loop A, Loop B and transformer on-off
- F. Fuses: Bayonet type, oil-immersed type, current-limiting fuses, with external hook-stick access
- G. Enclosure:
 - 1. High and low voltage, full-height compartments located side by side, separated by a steel barrier; low voltage on the right side when facing the front of transformer
 - 2. High voltage door fastenings not accessible unless low voltage door is opened
 - 3. 3-point latches for both enclosures
 - 4. Low voltage door provided with vault type handle with padlock provisions and penta-head access bolt
 - 5. Stainless steel hinges and door stays
 - 6. Removable doors, sills and barriers to facilitate cable installation
- H. Accessories:
 - 1. Dial-type thermometer
 - 2. Liquid level gage
 - 3. Pressure vacuum gage
 - 4. Automatic Pressure relief device
 - 5. 1" upper filter press and filling plug
 - 6. 1" lower drain valve and sampling port, provide with threaded type sealing plug

3. SUBSTATION TYPE:

- A. Provide with natural convection-type cooling panels on back and sides as required; provide with automatic, thermostatically-controlled forced air cooling fan(s) when required per project design
- B. Taps: externally-operated no-load tap changer, with padlocking provisions
- C. High-voltage terminations: Dead-front type primary bushings, or molded epoxy bushings located within an air-filled terminal cabinet
- D. Low-voltage terminations: Molded epoxy bushings with blade-type spade terminals, arranged for vertical takeoff located within an air-filled terminal cabinet; neutral grounded to tank via removable strap
- E. Oil containment: Provide transformer with oil-containment pan
- F. Accessories:
 - 1. Dial-type thermometer
 - 2. Liquid level gage
 - 3. Pressure / vacuum gage

4. Automatic Pressure relief device
5. 1" upper filter press and filling plug
6. 1" lower drain valve and sampling port, provide with threaded type sealing plug
7. Sudden pressure relay
8. Alarm contacts for temperature and level gages
9. Forced air cooling: Control panel with temperature indicator, status indicating lights, fan controls, test switches, alarm and alarm silence switches, with 120VAC external power source

4. POLEMOUNT TYPE:

- A. Single or three-phase, "polemount" type transformers suitable for platform or pad mounting in a three-phase configuration
- B. Tank: Self-venting cover assembly with minimum dielectric strength of 15KV; provide with lifting and mounting lugs
- C. Provide with natural convection-type cooling panels on sides as required
- D. Taps: Externally-operated no-load tap changer, with padlocking provisions
- E. High-voltage terminations: Dead-front type primary bushings
- F. Low-voltage terminations: Molded epoxy bushings with blade-type spade terminals, arranged for vertical takeoff; neutral grounded to tank via removable strap
- G. Oil containment: Install transformer bank within a common oil-containment pan or bermed area
- H. Accessories:
 1. Dial-type thermometer
 2. Liquid level gage
 3. Automatic Pressure relief device
 4. Alarm contacts for temperature and level gages