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261200 - Distribution Transformers

Sandra Hickey
sandra.hickey@unh.edu

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SECTION 26 1200 – DISTRIBUTION TRANSFORMERS

PART 1 - GENERAL

- 1.1 All transformers purchased for use at the University after August 1, 2009, shall meet the DOE 2010 energy code.
- 1.2 See Chapter 5, Division 01, Section 017700.1.1.B.1.i Closeout Procedures - Project Record Documents for equipment list requirements for all equipment provided in this section.

PART 2 - PRODUCTS

2.1 DEAD FRONT OIL-FILLED 35KV PAD-MOUNT TRANSFORMERS

- A. This type of transformer shall be used on all new construction that require pad-mounted equipment or as directed by the Owner.
 1. The transformers shall be: ---KVA, 34,500 Grd.Y/19,920 Volt 3 phase loop feed primary, 65 degrees C rise, 60 Hz, 150 kV BIL, ---/--- Volt 3-phase secondary, Envirotemp FR3 high flash point oil insulated, self-cooled, externally removable bayonet type overload sensing fuses in series with a properly coordinated partial range current limited fuse, primary taps, loop feed high voltage load-break switch, externally clamped high voltage RTE Large Interface 200 Amp Load break Bushings, externally clamped secondary bushings, steel divider between the high voltage side and the low voltage side, 1" NPT filler plug, drain valve with sampling device, liquid level gauge, liquid temperature gauge, pressure vacuum gage, automatic pressure relief valve, hand hole in the top of the tank.
 2. All transformers & liquids shall comply with UL, FMRC, ANSI and NEMA industry standards.
 3. Transformer Energy efficiency shall meet the minimum requirements of the DOE October 12, 2007 ruling
 4. Envirotemp FR3 high flash point oil insulated UL Listed and FM Approved, proof of non-P.C.B. oil.
 5. Externally removable bayonet type overload sensing expulsion fuses in series with properly coordinated partial range current limited oil submersible fuses to clear high current faults. The bayonet fuse operators shall be located in the high voltage compartment. The partial range current limited fuses shall be located inside the tank and under oil.
 6. The transformer shall have an externally operated primary tap changer with taps, 2 – 2-1/2 % above and 2 – 2-1/2 % below, control switch shall be located in the high voltage compartment.
 7. Loop Feed high voltage load-break switch shall be located in the high voltage compartment.
 8. Externally clamped high voltage RTE Large Interface 200 Amp Load break Bushings shall be located in the high voltage compartment.
 9. Elbow type 27KV lightning arresters shall be mounted on one set of the loop feed bushings located in the high voltage compartment.

10. Drain valve with sampling device shall be located in the high voltage compartment.
11. Steel divider between the high voltage compartment and the low voltage compartment.
12. Externally clamped low voltage bushings, low voltage bushing terminals shall be plated to accommodate aluminum/copper conductors, located in the low voltage compartment.
13. 1" NPT filler plug shall be located in the low voltage compartment.
14. Automatic pressure relief valve shall be located in the low voltage compartment.
15. Pressure vacuum gage shall be located in the low voltage compartment.
16. Liquid level gage shall be located in the low voltage compartment.
17. Liquid temperature gauge shall be located in the low voltage compartment.
18. Secondary voltage shall be as listed within the specification or as shown on the drawing.

2.2 CSP OIL-FILLED 35KV POLE-MOUNT TRANSFORMER

- A. The transformer shall be: ---KVA, 34,500GY/19,920 Volt single phase primary, 65 degrees C rise, 60 Hz, Class A, additive polarity, 150 kV BIL, ----/--- Volt single phase secondary, oil insulated, primary protective link, surge arrester, secondary circuit breaker, single position pole mounting.
- B. All transformers shall comply with ANSI and NEMA industry standards.
- C. Transformer Energy efficiency shall meet the minimum requirements of the DOE October 12, 2007 ruling (referred to as the Final Ruling becoming law effective January 1, 2010).
- D. Proof of non-P.C.B. oil.
- E. Internal primary protective link under oil.
- F. High voltage cover mounted bushing, bushing terminal shall be plated to accommodate aluminum/copper conductors.
- G. Low voltage side wall mounted bushings, terminals shall be plated to accommodate aluminum or copper conductors.
- H. Secondary circuit breaker shall have an externally operated handle with emergency overload reset and an overload signal light.
- I. 27kv surge arrester.
- J. The transformer shall have an externally operated tap changer with tap's, 2 - 2-1/2% above and 2 - 2-1/2% below.
- K. Automatic pressure relief device.
- L. Secondary voltages shall be as listed within the specification or as shown on the drawing.

2.3 CONVENTIONAL OIL-FILLED 35KV POLE-MOUNT TRANSFORMERS

- A. The transformer shall be: ---KVA, 34,500GY/19,920 Volt single phase primary, 65 degrees C rise, 60 Hz, Class A, additive polarity, 150 kV BIL, ----/--- Volt single phase secondary, oil insulated, primary protective link, single position pole mounting.
- B. All transformers shall comply with ANSI and NEMA industry standards.
- C. Transformer Energy efficiency shall meet the minimum requirements of the DOE October 12, 2007 ruling (referred to as the Final Ruling becoming law effective January 1, 2010).
- D. Proof of non-P.C.B. oil.
- E. Internal primary protective link under oil.
- F. High voltage cover mounted bushing, bushing terminal shall be plated to accommodate aluminum/copper conductors.
- G. Low voltage side wall mounted bushings, terminals shall be plated to accommodate aluminum or copper conductors.
- H. The transformer shall have an externally operated tap changer with taps, 2 – 2 1/2% above and 2 - 2-1/2% below.
- I. Automatic pressure relief device.
- J. Secondary voltages shall be as listed within the specification or as shown on the drawing.

2.4 Dead Front Oil-Filled 5kv Pad-Mount Transformers

- A. This type of transformer shall be used on all new construction that requires pad-mounted equipment or as directed by the Owner.
- B. The transformers shall be: ----KVA, 4160Grd.Y/2400 Volt 3 phase loop feed primary, 65 degrees C rise, 60 Hz, 60 kV BIL, ----/---Volt 3 phase secondary Envirotemp FR3 high flash point oil insulated, self-cooled, externally removable bayonet type overload sensing fuses in series with properly coordinated partial range current limited fuses, primary taps, loop feed high voltage load-break switch, externally clamped high voltage 200 Amp loadbreak bushing, externally clamped secondary bushings, steel divider between the high voltage side and the low voltage side, 1" NPT filler plug, drain valve with sampling device, liquid level gage, liquid temperature gauge, pressure vacuum gage, automatic pressure relief valve, hand hole in the top of the tank.
- C. All transformers & liquids shall comply with UL, FMRC, ANSI and NEMA industry standards.
- D. Transformer Energy efficiency shall meet the minimum requirements of the DOE October 12, 2007 ruling (referred to as the Final Ruling becoming law effective January 1, 2010).

- E. Envirotemp FR3 high flash point oil insulated UL Listed and FM Approved, proof of non-P.C.B. oil.
- F. Externally removable bayonet type overload sensing expulsion fuses in series with properly coordinated partial range current limited oil submersible fuses to clear high current faults. The bayonet fuse operators shall be located in the high voltage compartment. The partial range current limited fuses shall be located inside the tank and under oil.
- G. The transformer shall have an externally operated primary tap changer with taps, 2 - 2-1/2 % above and 2 - 2-1/2 % below, control switch shall be located in the high voltage compartment.
- H. Loop Feed high voltage load-break switch shall be located in the high voltage compartment.
- I. Externally clamped high voltage 200 Amp load break bushings shall be located in the high voltage compartment.
- J. Elbow type 3KV lightning arresters shall be mounted on one set of the loop feed bushings located in the high voltage compartment.
- K. Drain valve with sampling device shall be located in the high voltage compartment.
- L. Steel divider between the high voltage compartment and the low voltage compartment.
- M. Externally clamped low voltage bushings, low voltage bushing terminals shall be plated to accommodate aluminum/copper conductors, located in the low voltage compartment.
- N. 1" NPT filler plug shall be located in the low voltage compartment.
- O. Automatic pressure relief valve shall be located in the low voltage compartment.
- P. Pressure vacuum gage shall be located in the low voltage compartment.
- Q. Liquid level gage shall be located in the low voltage compartment.
- R. Liquid temperature gauge shall be located in the low voltage compartment.
- S. Secondary voltage shall be as listed within the specification or as shown on the drawing.

2.5 Live Front Oil-Filled 5kv Pad-Mount Transformers

- A. Live front transformers will only be used to replace existing live front transformers or as otherwise directed by the Owner.
 - 1. The transformer shall be: ----KVA, 4160Y/2400 Volt 3 phase radial feed primary, 65 degrees C rise, 60 Hz, 60 kV BIL,----/--- Volt 3 phase secondary, Envirotemp FR3 high flash point oil insulated, self-cooled, externally removable bayonet type overload sensing fuses in series with properly coordinated partial range current limited fuses, primary taps,

radial feed high voltage load-break switch, externally clamped high voltage bushing, externally clamped secondary bushings, steel divider between the high voltage side and the low voltage side, 1" NPT filler plug, drain valve with sampling device, liquid level gage, liquid temperature gauge, pressure vacuum gage, automatic pressure relief valve, hand hole in the top of the tank.

2. All transformers & liquids shall comply with UL, FMRC, ANSI and NEMA industry standards.
3. Transformer Energy efficiency shall meet the minimum requirements of the DOE October 12, 2007 ruling (referred to as the Final Ruling becoming law effective January 1, 2010).
4. Envirotemp FR3 high flash point oil insulated UL Listed and FM Approved, proof of non-P.C.B. oil.
5. Externally removable bayonet type overload sensing expulsion fuses in series with properly coordinated partial range current limited oil submersible fuses to clear high current faults. The bayonet fuse operators shall be located in the high voltage compartment. The partial range current limited fuses shall be located inside the tank and under oil.
6. The transformer shall have an externally operated primary tap changer with taps, 2 - 2-1/2% above and 2 - 2-1/2% below, control switch shall be located in the high voltage compartment.
7. Radial Feed high voltage load-break switch shall be located in the high voltage compartment.
8. Externally clamped high voltage bushings, high voltage bushing terminals shall be plated to accommodate aluminum/copper conductors, located in the high voltage compartment.
9. 3KV lightning arresters shall be located in the high voltage compartment.
10. Drain valve with sampling device shall be located in the high voltage compartment.
11. Steel divider between the high voltage compartment and the low voltage compartment.
12. Externally clamped low voltage bushings, low voltage bushing terminals shall be plated to accommodate aluminum/copper conductors, located in the low voltage compartment.
13. 1" NPT filler plug shall be located in the low voltage compartment.
14. Automatic pressure relief valve shall be located in the low voltage compartment.
15. Pressure vacuum gage shall be located in the low voltage compartment.
16. Liquid level gage shall be located in the low voltage compartment.
17. Liquid temperature gauge shall be located in the low voltage compartment.
18. Secondary voltage shall be as listed within the specification or as shown on the drawing.

2.6 LIVE FRONT OIL-filled 5kv pad-mount transformers

- A. Live front transformers will only be used to replace existing live front transformers or as otherwise directed by the Owner.
 1. The transformer shall be: ----KVA, 4160 Volt 3 phase Delta primary, radial feed primary, 65 degrees C rise, 60 Hz, 60 kV BIL,----/--- Volt 3 phase

secondary, Envirotemp FR3 high flash point oil insulated, self-cooled, externally removable bayonet type overload sensing fuses in series with properly coordinated partial range current limited fuses, primary taps, radial feed high voltage load-break switch, externally clamped high voltage bushing, externally clamped secondary bushings, steel divider between the high voltage side and the low voltage side, 1" NPT filler plug, drain valve with sampling device, liquid level gage, liquid temperature gauge, pressure vacuum gage, automatic pressure relief valve, hand hole in the top of the tank.

2. All transformers & liquids shall comply with UL, FMRC, ANSI and NEMA industry standards.
3. Transformer Energy efficiency shall meet the minimum requirements of the DOE October 12, 2007 ruling (referred to as the Final Ruling becoming law effective January 1, 2010).
4. Envirotemp FR3 high flash point oil insulated UL Listed and FM Approved, proof of non-P.C.B. oil.
5. Externally removable bayonet type overload sensing expulsion fuses in series with properly coordinated partial range current limited oil submersible fuses to clear high current faults. The bayonet fuse operators shall be located in the high voltage compartment. The partial range current limited fuses shall be located inside the tank and under oil.
6. The transformer shall have an externally operated primary tap changer with taps, 2 - 2-1/2% above and 2 - 2-1/2% below, control switch shall be located in the high voltage compartment.
7. Radial Feed high voltage load-break switch shall be located in the high voltage compartment.
8. Externally clamped high voltage bushings, high voltage bushing terminals shall be plated to accommodate aluminum/copper conductors, located in the high voltage compartment.
9. 3KV lightning arresters shall be located in the high voltage compartment.
10. Drain valve with sampling device shall be located in the high voltage compartment.
11. Steel divider between the high voltage compartment and the low voltage compartment.
12. Externally clamped low voltage bushings, low voltage bushing terminals shall be plated to accommodate aluminum/copper conductors, located in the low voltage compartment.
13. 1" NPT filler plug shall be located in the low voltage compartment.
14. Automatic pressure relief valve shall be located in the low voltage compartment.
15. Pressure vacuum gage shall be located in the low voltage compartment.
16. Liquid level gage shall be located in the low voltage compartment.
17. Liquid temperature gauge shall be located in the low voltage compartment.
18. Secondary voltage shall be as listed within the specification or as shown on the drawing.

2.7 CSP Oil-Filled 5kv Pole-Mount Transformer

- A. The transformer shall be: ---KVA, 4160Y/2400 Volt single phase primary, 65 degrees. C rise, 60 Hz, Class A, additive polarity, 60 KV BIL, ----/--- Volt single

phase secondary, oil insulated, self-cooled, primary protective link, surge arrester, secondary circuit breaker, single position pole mounting.

- B. All transformers shall comply with ANSI and NEMA industry standards.
- C. Transformer Energy efficiency shall meet the minimum requirements of the DOE October 12, 2007 ruling (referred to as the Final Ruling becoming law effective January 1, 2010).
- D. Proof of non-P.C.B. oil.
- E. Internal primary protective link under oil.
- F. High voltage, side wall mounted bushings, bushing terminals shall be plated to accommodate aluminum or copper conductors.
- G. Low voltage, side wall mounted bushings, bushing terminals shall be plated to accommodate aluminum or copper conductors.
- H. Secondary circuit breaker shall have an externally operated handle with emergency overload reset and an overload signal light.
- I. 3kv surge arrester.
- J. The transformer shall have an externally operated tap changer with taps, 2 - 2-1/2% above and 2 - 2-1/2% below.
- K. Automatic pressure relief device.
- L. Secondary voltages shall be as listed within the specification or as shown on the drawing.

2.8 Conventional oil-filled 5kv pole-mount transformers

- A. The transformer shall be: ---KVA, 4160Y/2400 Volt single phase primary, 65 degrees C rise, 60 HZ, Class A, additive polarity, 60 kV BIL, ----/--- Volt single phase secondary, oil insulated, self-cooled, primary protective link, single position pole mounting.
- B. All transformers shall comply with ANSI and NEMA industry standards.
- C. Transformer Energy efficiency shall meet the minimum requirements of the DOE October 12, 2007 ruling (referred to as the Final Ruling becoming law effective January 1, 2010).
- D. Proof of non-P.C.B. oil.
- E. Internal primary protective link under oil.
- F. High voltage, side wall mounted bushings, bushing terminals shall be plated to accommodate aluminum or copper conductors.

- G. Low voltage, side wall mounted bushings, bushing terminals shall be plated to accommodate aluminum or copper conductors.
- H. The transformer shall have an externally operated tap changer with taps, 2 - 2-1/2% above and 2 - 2-1/2% below.
- I. Automatic pressure relief device.
- J. Secondary voltages shall be as listed within the specification or as shown on the drawing.
- K. All transformers data sheets shall be submitted to the client for approval:

END OF SECTION 26 1200