SECTION 26 2200

TRANSFORMERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Transformers for electric power 600 volts and below.

B. General-purpose transformer.

1.2 RELATED SECTIONS

A. Equipment foundations: Section 26 0528.

1.3 REFERENCES

A. NEMA ST 20: Dry-Type Transformers for General Applications.

B. DOE 2016: Department of Energy federal law 10 CFR Part 431 "Energy Efficiency Program for Certain Commercial and Industrial Equipment."

1.4 SUBMITTALS

A. Product data: Each transformer, includes the following:

1. Outline dimensions and weights.
2. kVA rating.
3. Primary and secondary voltage.
4. Taps.
5. Impedance.
6. Insulation class and temperature rise.
7. Sound level.

B. Certifications:

1. Specified sound levels.
2. Compliance with DOE 2016 for energy efficiency.

C. Test reports: Factory and field test reports specified in Parts 2 and 3 below.

D. Unit shown on drawings is based on the characteristics of the design basis unit specified in Part 2. If another acceptable manufacturer's unit should be proposed, ascertain that it will meet the required standards and performance. Include, with shop drawings of the unit, scale drawings similar to the contract drawings, showing any changes in wiring, arrangement or access made necessary to accommodate the unit proposed.

E. Operation and maintenance data: For transformer to include in operation and maintenance manuals: In addition to items specified in Division 01 and Section 26 0101, include the following:

1. Final settings for transformer taps and measured voltage.

1.5 QUALITY ASSURANCE

A. UL label and local testing (if required): As specified in Section 26 0500, Common Work Results for Electrical.

B. UL Energy Verification Mark to confirm compliance with DOE 2016.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Schneider Electric; Square D products units are the basis for design of the project. The following listed manufacturers also provide units of acceptable quality. If units by any of these manufacturers should be proposed, verify that they meet requirements specified in the article “Product Options” in Section 26 0101, and submit shop drawings as specified in the article “Submittals” above.

1. ABB; General Electric products
2. Eaton Corporation
3. Schneider Electric; Square D products
4. Siemens Industry, Inc.

2.2 TRANSFORMERS, GENERAL

A. Factory-assembled and -tested, air-cooled units of types specified, of size, phase, and voltage ratings indicated on the drawings, designed for 60-Hz service.

B. Cores: Grain-oriented, non-aging silicon steel.

C. Coils: Continuous copper windings without splices except for taps.

D. Enclosure: Heavy-gauge steel enclosure and base, arranged for conduit entrance on the primary and secondary sides and provided with adequate louvered openings to allow suitable ventilation and cooling. NEMA 250 Type 1.

E. Enclosure finish: Degreased, cleaned, phosphatized, primed and finished with baked enamel paint. Comply with NEMA 250; color manufacturer's standard gray.

F. Taps: Four, 2.5 percent rated kVA taps, two below and two above rated primary voltages, except transformers rated 15 kVA and smaller may have two 5-percent-rated kVA taps, one above and one below rated primary voltage.

G. Sound levels based on NEMA ST 20 test procedure:

1. Transformer 50 kVA and smaller: Not more than 45 dB.
2. Transformers 51 to 150 kVA: Not more than 50 dB.
3. Transformers 151 to 300 kVA: Not more than 55 dB.
4. Transformers 500 kVA: Not more than 60 dB.

2.3 GENERAL-PURPOSE TRANSFORMERS

A. Self-cooled, dry type of size, phase, and voltage rating indicated on the drawings, designed in accordance with NEMA ST-20. Dry-type, general-purpose transformers shall be Energy Efficient type in compliance with DOE 2016.

B. Insulation: The maximum hot spot temperature can be 30 degrees C higher than the specified average below.

1. Transformers below 15 kVA: Class 150 degrees C having a maximum temperature rise under full load conditions not exceeding 115 degrees C when the transformer is operating in 40 degrees C ambient temperature.

2. Transformers 15 kVA and higher: Class 220 degrees C having a maximum temperature rise under full load conditions not exceeding 150 degrees C when the transformer is operating in 40 degrees C ambient temperature.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Mount on wall, ceiling, or floor as shown on the drawings. Transformers shall be level and plumb. Transformers shall not be mounted in corrosive areas.

1. Wall mount: Use manufacturer's wall-mounted bracket in accordance with manufacturers' instructions.
2. Ceiling mount: Use one of the following two methods:

a. Use manufacturer's ceiling-mounted bracket in accordance with manufacturers' instructions.
b. Field-fabricated trapeze mount: Trapeze mounting made from galvanized-steel strut or channel. Suspend trapeze from galvanized-steel rods, anchor to ceiling or structure above. If trapeze is adjacent to wall, additionally fasten to wall. Provide vibration isolation between transformer and trapeze or between trapeze and its supports.

B. Floor mount: On equipment foundation (housekeeping pad).

C. Mount exterior equipment on equipment foundation as shown on drawings.

D. Ground neutrals of dry type transformers as specified in Section 26 0526, Grounding and Bonding and as required by NEC (NFPA 70).

3.2 INSTALLING TRANSFORMER

A. Protect against overload on the primary side by circuit breakers in the panelboards or fused disconnects as indicated.

B. Install transformers on neoprene vibration isolator pads.

C. Make immediate connections to and from transformers through flexible metal conduit.

3.3 IDENTIFICATION

A. Materials: Refer to Section 26 0553, Identification for Electrical Systems.

B. Nameplates: Refer to Section 26 0553, Identification for Electrical Systems, for additional requirements. Provide identification nameplate for each transformer located on front of assembly.

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

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1. Manufacturer's field service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Remove and replace units that do not pass tests or inspections and retest as specified above.

C. Test labeling: On completion of satisfactory testing of each unit, attach a dated and signed "Satisfactory Test" label to tested component.

3.5 ADJUSTING AND CLEANING

A. Refinish painted surfaces damaged during construction to match the rest of the equipment.

B. Measure voltage on the secondary side of transformer during a typical occupancy period and adjust taps to achieve nominal voltage output. Nominal voltage shall be plus three percent or minus two percent of nameplate secondary voltage.

C. Record final tap settings and measured voltage and include in Operation and Maintenance manuals.

3.6 PROTECTION

A. Apply temporary heat within indoor transformer enclosures, in accordance with manufacturer's recommendations, until the space temperature and humidity are under normal control.

END OF SECTION