SECTION 262200 - LOW VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. This sections is a Division 26 Basic Electrical Materials and Methods section and is part of each Division 26 section making reference to electrical connections for equipment specified herein.

1.02 SCOPE OF WORK

A. Provide a dry type transformer as herein specified at each location indicated by the drawings either in plan or schematic diagram.

1.03 REFERENCES

A. NEMA ST 1 - Specialty Transformers (Except General Purpose Type); National Electrical Manufacturers Association; 1988 (R1997).

B. NEMA ST 20 - Dry-Type Transformers for General Applications; National Electrical Manufacturers Association; 1992 (R1997).

C. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; 2003.

D. NFPA 70 - National Electrical Code; National Fire Protection Association; 2005.

E. NEMA ST-TP2 - Standard Test Method for Measuring the Energy Consumption of Distribution Transformers.

F. NEMA ST-TP3 - Standard for the Labeling of Distribution Transformers.

G. UL 1561 - Standard for Safety for Dry Type General Purpose and Power transformers.

H. UL 506 - Standard for Safety of Specialty Transformers.

I. NEMA 250 - Enclosures for Electrical Equipment.

1.04 SUBMITTALS

A. Product Data: Provide outline and support point dimensions of enclosures and accessories, unit weight, voltage, kVA, and impedance ratings and characteristics, tap configuration, insulation system type, and rated temperature rise and basic impulse level.

B. Test Reports: Indicate loss data, efficiency at 35, 50, 75 and 100 percent rated load and sound level. Test shall be conducted complying with NEMA Standard TP2.

C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

D. Project Record Documents: Record actual locations of transformers.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Eaton Corporation (Cutler-Hammer)

B. GE Co.

C. Square D Co. (Schneider Electric)

D. Siemens Energy & Automation Inc.

E. Federal Pacific

F. Asea Brown Boveri

2.02 TWO-WINDING TRANSFORMERS

A. Description: NEMA ST 20, factory-assembled, air-cooled dry type transformers, ratings as indicated on the drawings.

B. Primary Voltage: 480 volts, 3 phase, or 480 volts, 1-phase, or as indicated on the drawings.

C. Secondary Voltage: 208Y/120 volts, 3 phase, or 240/120 volts, 1-phase, or as indicated on the drawings.

D. Insulation system and average winding temperature rise for rated kVA as follows:

1. 1-9 kVA: Class 185 with 80 degrees C rise.

2. 15-500 kVA: Class 220 with [80], [115], [150] degrees C rise.

E. Transformer rated 15-500 kVA shall be energy efficient, low no load loss, complying with Department of Energy 2016 Mandate (10 CFR Part 431).

F. Case temperature: Do not exceed 35 degrees C rise above ambient at warmest point at full load.

G. Winding Taps:

1. Transformers Less than 15 kVA: Two 5 percent below rated voltage, full capacity taps on primary winding.

2. Transformers 15 kVA to 500 kVA: NEMA ST 20. Four 2.5% below rated voltage, and two 2.5% above rated voltage.

H. Sound Levels: Maximum sound levels are as follows:

1. 45 kVA and below: 45 dB

2. 75 kVA to 150 kVA: 50 dB

3. 225 kVA to 300 kVA: 55 dB

4. 500 kA: 60 dB

I. Basic Impulse Level: 10 kV.

J. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.

K. Mounting:

1. 1-15 kVA: Suitable for wall mounting.

2. 15-75 kVA: Suitable for wall or floor mounting or suspended.

3. Larger than 75 kVA: Suitable for floor mounting.

L. Coil Conductors: Continuous windings with terminations brazed or welded.

M. Transformer enclosure: NEMA ST 20.

1. Type 1.

2. Provide lifting eyes or brackets.

3. Provide lifting eyes or brackets.

N. Isolate core and coil from enclosure using vibration-absorbing mounts.

O. Nameplate: Include transformer connection data.

P. Magnetizing Current: No more than 12 times rated primary current. Where limit is exceeded, primary circuit protective device, conductors and raceways shall be increased to accommodate the magnetizing current. The price shall include all engineering, materials and labor. Submit proposed selection, data and calculation for approval.

2.03 CONSTRUCTION

A. Transformer coils shall be of the continuous wound aluminum construction and shall be impregnated with non-hydroscopic, thermosetting varnish.

B. Cores shall be constructed of high grade, non-aging silicone steel with high magnetic permeability, and low hysteresis and eddy current losses. The core laminations shall be clamped together with structural steel members. The complete core and coil shall be bolted to the base of the enclosure but isolated there from by means of vibration-absorbing mounts.

C. Transformers shall be mounted in a heavy gauge, sheet metal, ventilated enclosure. The ventilating openings shall be designed to prevent accidental access to live parts in accordance with UL, NEMA and NEC standards for ventilated enclosures. Enclosure shall be cleaned, primed and finished in the manufacturer's standard color baked enamel.

D. The core of the transformer shall be grounded to the enclosure by a flexible grounding conductor sized in accordance with applicable NEMA, IEEE and ANSI standards.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Transformers shall be floor, wall or ceiling suspended as indicated in sections 2.02 and 2.03, or as indicated on the drawings.

B. Set transformers plumb and level.

C. Install wall-mounted transformers using integral flanges or accessory brackets furnished by the manufacturer.

D. Install floor-mounted transformers on vibration isolation mounts suitable for isolating the transformer vibration and noise from the building structure. Mounts shall be similar to Mason Industries type ND, with a nominal 0.25" deflection. Provide 2 inch thick concrete housekeeping pad.

E. Suspended transformers shall have vibration isolation hangers similar to Mason Industries type HD, with a nominal 0.25" deflection, which shall support the weight of the transformer, plus 250 pounds of live load.

F. Provide seismic restraints.

G. Transformer shall be connected by nominally 18-inches of flexible conduit.

H. Transformer shall be located to provide adequate ventilation on all sides and code required clearance for access to connections and taps.

3.02 ADJUSTING

A. Measure primary and secondary voltages and make appropriate tap adjustments.

END OF SECTION 262200