SECTION 26 22 00 - DRY-TYPE TRANSFORMERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes power distribution control dry-type transformers rated 600 V and less.

1.3 SUBMITTALS

A. Product Data: Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer indicated.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   1. Wiring Diagrams: Power, signal, and control wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For transformers to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each transformer type through one source from a single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with IEEE C57.12.91, "Test Code for Dry-Type Distribution and Power Transformers."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit, throughout periods during which equipment is not energized and when transformer is not in a space that is continuously under normal control of temperature and humidity.

1.6 COORDINATION

A. Coordinate size and location of concrete bases with actual transformer provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate installation of wall-mounting and structure-hanging supports with actual transformer provided.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Eaton Electrical Inc.; Cutler-Hammer Products.
2. General Electric Company.
3. Siemens Energy & Automation, Inc.
4. Square D; Schneider Electric.

2.2 GENERAL TRANSFORMER REQUIREMENTS

A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.

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

C. Coils: Continuous windings without splices except for taps.
1. Internal Coil Connections: Brazed or pressure type.
2. Coil Material: Copper.

2.3 DISTRIBUTION TRANSFORMERS

A. Comply with NEMA ST 20, and list and label as complying with UL 1561.

B. Cores: One leg per phase.

C. Enclosure: Ventilated, NEMA 250, Type 3R.
1. Core and coil shall be encapsulated within resin compound, sealing out moisture and air.

D. Taps for Transformers 25 kVA and Larger: Two 2.5 percent taps above and four 2.5 percent taps below normal full capacity.

E. Insulation Class: 220 deg C, UL-component-recognized insulation system with a maximum of 115 deg C rise above 40 deg C ambient temperature.

F. Energy Efficiency for Transformers Rated 15 kVA and Larger:
1. Complying with NEMA TP 1, Class 1 efficiency levels.
2. Tested according to NEMA TP 2.

G. Wall Brackets: Manufacturer's standard brackets.

2.4 CONTROL AND SIGNAL TRANSFORMERS

A. Units comply with NEMA ST 1 and are listed and labeled as complying with UL 506.

B. Ratings: Continuous duty. If rating is not indicated, provide capacity exceeding peak load by 50 percent minimum.

C. Description: Self-cooled, 2 windings.

2.5 FINISHES

A. Indoor Units: Manufacturer's standard paint over corrosion-resistant pretreatment and primer.

2.6 IDENTIFICATION DEVICES

A. Nameplates: Engraved, laminated-plastic or metal nameplate for each transformer, mounted with corrosion-resistant screws. Nameplates and label products are specified in Division 26 Section "Identification for Electrical Systems."

2.7 SOURCE QUALITY CONTROL

A. Test and inspect transformers according to IEEE C57.12.91.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for each transformer.

B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's written instructions.

C. Examine walls, floors, roofs, and concrete bases for suitable mounting conditions where transformers will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with safety requirements of IEEE C2.

B. Arrange equipment to provide adequate spacing for access and for circulation of cooling air.

C. Install floor-mounted transformers on concrete base, 4-inch (100-mm) nominal thickness extending 2” beyond enclosure with chamfered edge. Comply with requirements for concrete base specified in Division 03 Section "Cast-in-Place Concrete."

D. Install wall-mounting transformers level and plumb with wall brackets fabricated by transformer manufacturer.

E. Grounding: Provide single, multi-barrel (conductor) mechanical grounding lug for all grounding and bonding connections in transformer.

3.3 EQUIPMENT TESTING

A. Physical Inspection and Testing

1. Verify equipment rating correspond to drawings and specifications.
2. Inspect the physical and mechanical condition and verify that it complies with manufacturer’s standards.
3. Verify equipment is properly secured and aligned with the required clearances as specified in the drawings and specifications. Assure that the equipment is properly grounded.
4. Verify that all packing materials have been removed and the equipment has been cleaned.
5. Confirm bolted electrical connections are provided with high impedance using one of the following means:

a. Measure the resistance with a low-resistance ohmmeter. Bolted electrical connection resistances shall be compared to resistances measured on similar connections. Any similar resistance values that deviate more than 50 percent should be investigated.

b. Inspect the bolted connection and verify that it is at the manufacturer’s rated torque using a calibrated torque wrench. If manufacturer’s data is not available verify the torque meets the requirements of Table 100.12 in the ANSI/NETA ATS-2009.

B. Electrical Inspection and Testing

1. Measure the secondary voltage from phase to phase and from phase to ground to verify it meets the requirements of the drawings and specifications as well as the equipment rating. Measurements should be taken after the transformer has been energized but prior to transformer loading.

C. Test Reports: Prepare a written report to record the following:

1. Document primary and secondary voltages on transformers. L-L, L-N and L-G all phases.

3.4 CONNECTIONS

A. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

B. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.5 CLEANING

A. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Remove paint splatters and other spots, dirt, and debris. Repair scratches and mars on finish to match original finish. Clean components internally using methods and materials recommended by manufacturer.

END OF SECTION 26 22 00