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SECTION 26 22 00

LOW VOLTAGE TRANSFORMERS

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**PART 1 - GENERAL**

1.1 SUMMARY

- A. Section Includes:
  - 1. Dry-Type Distribution And Specialty Transformers Rated 1000 V And Less.
    - a. General-Purpose Distribution and Power Transformers.
    - b. Buck-Boost Transformers.
    - c. Control and Signal Transformers.

1.2 QUALITY ASSURANCE

- A. Listing and Labeling: Provide transformers specified in this Section that are listed and labeled.
  - 1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.
  - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.
- B. Comply with IEEE C2.
- C. Comply with NFPA 70.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

- A. Approved Manufacturers:
  - 1. [Acme Electric Corp.; Transformer Division](#) (800-334-5214)
  - 2. [Cutler-Hammer/Eaton Corp.](#) (800-498-2678)
  - 3. [GE Electrical Distribution & Control](#) (203-747-7111)
  - 4. [Siemens Energy & Automation, Inc.](#) (800-964-4114)
  - 5. [Square D; a Division of Groupe Schneider](#) (888-778-2733)

2.2 TRANSFORMERS, GENERAL

- A. Description: Factory-assembled and -tested, air-cooled units of types specified, designed for 60-Hz service.
- B. Cores: Grain-oriented, non-aging silicon steel.
- C. Coils: Continuous windings without splices, except for taps.

- D. Internal Coil Connections: Brazed or pressure type.
- E. Enclosure: Class complies with NEMA 250 for the environment in which installed.

## **2.3 GENERAL-PURPOSE DISTRIBUTION AND POWER TRANSFORMERS**

- A. Comply with NEMA ST 20 and list and label as complying with UL 1561.
- B. Cores: One leg per phase.
- C. Windings: One coil per phase in primary and secondary.
- D. Enclosure: Indoor, ventilated.
- E. Insulation Class: 185 or 220 deg C class for transformers 15 kVA or smaller; 220 deg C class for transformers larger than 15 kVA.
  - 1. Rated Temperature Rise: 115 deg C maximum rise above 40 deg C.
- F. Taps: For transformers 3 kVA and larger, full-capacity taps in high-voltage windings are as follows:
  - 1. Taps, 3 through 10 kVA: Two 5-percent taps below rated high voltage.
  - 2. Taps, 15 through 500 kVA: Six 2.5-percent taps, 2 above and 4 below rated high voltage.
  - 3. Taps, 750 kVA and Above: Four 2.5-percent taps, 2 above and 2 below rated high voltage.
- G. K-Factor Rating: Transformers indicated to be K-factor rated are listed to comply with UL 1561 requirements for non-sinusoidal load current handling capability to the degree defined by the designated K-factor.
  - 1. Transformer design prevents overheating when carrying full load with harmonic content corresponding to the designated K-factor.
  - 2. Nameplate states the designated K-factor of the transformer.
- H. Wall-Mounting Brackets: Manufacturer's standard brackets for transformers up to 45 kVA.

## **2.4 BUCK-BOOST TRANSFORMERS**

- A. Units comply with NEMA ST 1 and are listed and labeled as complying with UL 506 or UL 1561.
- B. Description: Self-cooled dry type, rated for continuous duty, and connected as autotransformers to provide the percentage of buck or boost indicated.

## **2.5 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.

## **2.6 FINISHES**

- A. Indoor Units: Manufacturer's standard paint over corrosion-resistant pretreatment and primer.
- B. Outdoor Units: Comply with ANSI C57.12.28.

## **2.7 SOURCE QUALITY CONTROL**

- A. Factory Tests: Design and routine tests comply with referenced standards.

# **PART 3 - EXECUTION**

## **3.1 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. Identify transformers and install warning signs according to Section 26 05 53 - "Identification for Electrical Systems."
- D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

## **3.2 GROUNDING**

- A. Separately Derived Systems: Comply with NFPA 70 requirements for connecting to grounding electrodes and for bonding to metallic piping near the transformer.

## **3.3 FIELD QUALITY CONTROL**

- A. Test Objectives: To ensure transformer is operational within industry and manufacturer's tolerances, is installed according to the Contract Documents, and is suitable for energizing.
- B. Test Labeling: On satisfactory completion of tests for each transformer, attach a dated and signed "Satisfactory Test" label to tested component.
- C. Schedule tests and provide notification at least 7 days in advance of test commencement.
- D. Report: Submit a written report of observations and tests. Report defective materials and installation.

- E. Tests: Include the following minimum inspections and tests according to manufacturer's written instructions. Comply with IEEE C57.12.91 for test methods and data correction factors.
  - 1. Inspect accessible components for cleanliness, mechanical and electrical integrity, and damage or deterioration. Verify that temporary shipping bracing has been removed. Include internal inspection through access panels and covers.
  - 2. Inspect bolted electrical connections for tightness according to manufacturer's published torque values or, if not available, those specified in UL 486A and UL 486B.

### 3.4 CLEANING

- A. On completion of installation, inspect components. 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.

### 3.5 ADJUSTING

- A. After installing and cleaning, touch up scratches and mars on finish to match original finish.
- B. Adjust transformer taps to provide optimum voltage conditions at utilization equipment throughout normal operating cycle of facility. Record primary and secondary voltages and tap settings and submit with test results.
- C. Adjust buck-boost transformer connections to provide optimum voltage conditions at utilization equipment throughout normal operating cycle of facility.
- D. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in readjusting transformer tap settings to suit actual occupied conditions. Provide up to 2 visits to Project site for this purpose without additional cost.
  - 1. Voltage Recordings: Contractor performed. Provide up to 48 hours of recording on the low-voltage system of each medium-voltage transformer.
  - 2. Point of Measurement: Make voltage recordings at load outlets selected by Owner's Representative.

### **END OF SECTION**