

**PART 1      GENERAL**

**1.1            RELATED DOCUMENTS**

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

**1.2            SECTION INCLUDES**

- .1      Materials and components for dry type transformers up to 600 V primary, equipment identification and transformer installation.
- .2      This Section includes the following types of dry-type transformers rated 600 V and less, with capacities up to 1000 kVA:
  - .1      Distribution transformers.
  - .2      Buck-boost transformers.

**1.3            RELATED SECTIONS**

- .1      Section 01 33 00 - Submittal Procedures.
- .2      Section 26 80 00 –Commissioning of Electrical Systems.
- .3      Section 26 05 00 – Common Work Results - Electrical.

**1.4            REFERENCES**

- .1      Canadian Standards Association (CSA)
  - .1      CAN/CSA-C22.2 No.47, Air-Cooled Transformers (Dry Type).
  - .2      CSA C9, Dry-Type Transformers.
- .2      National Electrical Manufacturers Association (NEMA)

**1.5            SUBMITTALS**

- .1      Product Data for each type and size of transformer indicated.
  - .1      Physical: Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features.
  - .2      Product warranty.
- .2      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.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- .1 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.

**1.7 COORDINATION**

- .1 Coordinate size and location of concrete bases with actual transformer provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and form work requirements are specified in Division 03.
- .2 Coordinate installation of wall-mounting and structure-hanging supports with actual transformer provided.

**Part 2 PRODUCTS**

**2.1 TRANSFORMERS**

- .1 Provide 10 year limited warranty.
- .2 Use transformers of one manufacturer throughout project.
- .3 Comply with the following production tests:
  - .1 NEMA ST 20
  - .2 CSA C9 & CAN/CSA C22.2 No. 47
  - .3 CSA 802.2
- .4 Cores: One leg per phase.
- .5 Standard Design:
  - .1 Type: ANN.
  - .2 Phases: 3.
  - .3 kVA rating: as indicated.
  - .4 Voltage: 600V delta primary, 120/208V wye secondary.
  - .5 Voltage taps: standard.
  - .6 Insulation: 220°C system
  - .7 Core Construction: high grade non-aging, fully processed silicon steel laminations or better.
  - .8 Coil Conductors copper or aluminum windings, with terminations brazed, welded or bolted.
  - .9 Impregnation: vacuum impregnated core & coils.
  - .10 Excitation current: 3% of full load current rating (max.)

- .11 Sound Level: 3dB below NEMA ST 20
- .12 Temperature Rise: 150°C.
- .13 Basic Impulse Level (BIL): standard.
- .14 Enclosure: Ventilated, NEMA Type 3R.
- .15 Enclosure Finish: ANSI 61 Grey.
- .16 Electrostatic Shielding.
- .17 Anti-vibration pads/isolators shall be used between the transformer core and coil and the enclosure.
- .18 Mounting: floor or wall as indicated.
- .6 Taps: To NEMA ST 20
  - .1 Taps for Transformers smaller than 3 kVA: None.
  - .2 Taps for Transformers 7.5 to 24 kVA: One 5 percent tap above and one 5 percent tap below normal full capacity.
  - .3 Taps for Transformers 25 kVA and larger: Two 2.5 percent taps above and four 2.0 percent taps below normal full capacity.
- .7 Manufacturers: Hammond Power Solutions Inc, Delta, Schneider, Eaton, Siemens, or approved equivalent.

## **2.2 IDENTIFICATION DEVICES**

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

## **Part 3 EXECUTION**

### **3.1 EXAMINATION**

- .1 Examine conditions for compliance with enclosure and ambient temperature requirements for each transformer.
- .2 Verify that field measurements are as needed to maintain working clearances required by CEC-C22.1-18 and manufacturer's written instructions.
- .3 Examine walls, floors, roofs, and concrete bases for suitable mounting conditions where transformers will be installed.
- .4 Verify that ground connections are in place and requirements in Division 26 Section "Grounding and Bonding for Electrical System's have been met.
- .5 Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 INSTALLATION**

- .1 Install wall-mounting transformers level and plumb with wall brackets fabricated by transformer manufacturer.
- .2 Construct concrete bases and anchor floor-mounting transformers according to manufacturer's written instructions.

**3.3 CONNECTIONS**

- .1 Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems".
- .2 Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables".

**3.4 FIELD QUALITY CONTROL**

- .1 Perform tests and inspections and prepare test reports.
  - .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.
- .2 Tests and Inspections:
  - .1 Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
- .3 Remove and replace units that do not pass tests or inspections and retest as specified above.

**3.5 ADJUSTING**

- .1 Record transformer secondary voltage at each unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding name plate voltage plus 10 percent and not being lower than name plate voltage minus 3 percent at maximum load conditions. Submit recording and tap settings as test results.
- .2 Output Settings Report: Prepare a written report recording output voltages and tap settings.

**3.6 CLEANING**

- .1 Vacuum dirt and debris; do not use compressed air to assist in cleaning.

**END OF SECTION**