SECTION 26 22 13 – non-k-factor dry-type transformers

1. GENERAL
   * + 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.
          2. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.
       2. SUMMARY
          1. This Section specifies the furnishing and installation of non-K-factor dry-type transformers with 600 volt and below primary and rated 500 kVA and smaller. All K-factor transformers are indicated on the Drawings as K-factor.
       3. REFERENCE STANDARDS
          1. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
          2. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.
          3. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:

ANSI/NEMA ST 20 - Dry-Type Transformers for General Applications.

ANSI/UL 506 - Specialty Transformers.

* + - 1. SUBMITTALS
         1. Product Data:

Provide product data on each transformer, vibration isolators, and accessories. Include the following minimum information:

Manufacturer.

Rated kVA, number of phases and frequency.

Primary voltage and connections.

Secondary voltage and connections.

Number and percent taps.

Outline dimensions.

Total weight of unit.

* + - 1. DELIVERY, STORAGE and HANDLING
         1. Store units in a clean, dry space, protected from weather.
         2. Units shall not be used as work surfaces, scaffolds, or ladders.
         3. Handle units carefully to avoid damage to material components, enclosure, and finish. Use only lifting eyes and brackets provided for that purpose. Damaged transformers shall be rejected and shall not be installed.

1. PRODUCTS
   * + 1. GENERAL
          1. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.
       2. MANUFACTURERS
          1. Square D.
          2. Eaton
       3. NON-K-FACTOR DRY-TYPE TRANSFORMERS
          1. Required kVA, voltages, phases and winding configurations are indicated on the Drawings. Transformers must be rated for 60-hertz operation, self-cooled NEMA Class AA.
          2. Coil windings: Copper wire (bar stock. Aluminum coil windings are not acceptable.
          3. Taps: Furnish transformers with full load rated taps in the primary winding as follows:

|  |  |
| --- | --- |
| kVA Rating | Taps |
| 3-15 kVA, single phase;  9-15 kVA, three phase | Two (2) percent taps below normal rated voltage. |
| 25-100 kVA single phase;  30-300 kVA, three phase | Six (6) 2-½ percent taps, four (4) below normal and two (2) above normal rated voltage. |
| 167-250 kVA, single phase;  500 kVA, three phase | Four (4) 2-½ percent taps, two (2) below and two (2) above rated voltage. |

* + - * 1. Provide a 220 degrees C insulation system for rated kVA and temperature rise as follows:

|  |  |
| --- | --- |
| kVA Rating | Rise (Degrees C) |
| 3-10 kVA, single phase | 115 |
| 15-167 kVA, single phase | 150 |
| 3-30 kVA, three phase | 115 |
| 45-500 kVA, three phase | 150 |

* + - * 1. Average sound levels must not exceed the following values as measured in accordance with NEMA ST 20-4.12.

|  |  |
| --- | --- |
| kVA | dB |
| 0-9 | 40 |
| 10-50 | 45 |
| 51-150 | 50 |
| 151-300 | 55 |
| 301-500 | 60 |

* + - * 1. Enclosure: Unless otherwise specified or indicated, install transformers in metal enclosures designed to provide air-cooling and to prevent accidental contact with live conductors.
        2. Wiring Compartment: Locate the wiring compartment below the core and coil. Have the compartment cooled by air circulation or insulated from the core and coil with a suitable thermal barrier.
        3. Grounding: Ground the core of the transformer to the enclosure with a flexible grounding conductor sized according to NEC requirements.
        4. Mounting Brackets: Furnish mounting brackets, as required, for wall (15 kVA and less) or structure (45 kVA and less) mounting of transformers.

1. EXECUTION
   * + 1. INSTALLATION
          1. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
          2. All installation shall be in accordance with manufacturer’s published recommendations.
          3. Install transformers as indicated in accordance with the applicable requirements of the NEC and the National Electrical Contractor’s Association “Standard of Installation”.
          4. Install floor-mounted transformers on concrete housekeeping pads with vibration isolating pads suitable for isolating the transformer noise from the building structure in accordance with Section 26 01 00, General Electrical Requirements. Maintain a minimum of six (6) inches free air space between enclosure and walls.

For floor and trapeze transformer installations, use one pad type Korfund Elasto-Grip, waffle at each corner of the transformer, sized for load of 50 pounds per square inch.

For wall hung transformer installations (15kVA and less), use spring type Korfund Series P. Provide sound pads at each corner of the transformer sized for ½ inch deflection. Securely anchor wall-mounting brackets to wall to provide adequate support.

* + - * 1. Suspend transformers (45kVA and less) from structure by means of trapeze hangers constructed of ½ inch galvanized all-thread rods and metal framing channels. All-thread coupling shall not be used on hanger rod shorter than 10 feet. The quantity of all-thread coupling, where used, shall not exceed more than one in a 10-foot section. All-thread coupling shall be backed by a ½-inch nut, which is tightened, at each end of the coupling. Make double-nut connections between rods and channels. Locate transformers to provide adequate ventilation and accessibility.
        2. Check for damage and tighten connections prior to energizing transformer.
        3. Set transformer plumb and level.
        4. Verify removal of coil shipping anchor bolts before transformer is energized.
      1. TESTING
         1. Tap Setting:

Select the appropriate tap setting on transformer so that the actual secondary voltage is + 1/2 of a tap span at full load.

Record the transformer serial number, kVA rating, selected tap setting and secondary voltage readings.

Submit three (3) copies of the record to the Owner’s representative.

* + - * 1. Conduit Connections:

Attach incoming and outgoing conduits to the transformer enclosure with 48 inch long flexible metal conduit.

Run a bonding jumper, sized per NEC Article 250, on outside of flexible conduit.

* + - * 1. Cable Connections:

Make transformer cable connections with compression-type lugs suitable for termination of 75 degrees C rated conductors.

Position lugs so that field connections and wiring will not be exposed to temperature above 75 degrees C.

END OF SECTION 26 22 13