Separation Requirements for Dry Type Transformers

Introduction

The National Electrical Code® (NEC®) separation requirements for dry type transformers (in compliance with Article 450) often result in questions concerning the transformer Class and whether special barriers or room construction is required. Transformer separation is based on the voltage rating, insulation system utilized, and proximity to combustible material. While voltage ratings are common and generally well understood, the term transformer Class refers to the transformer insulation system and is not common. Transformer insulation is identified by the classification (Class) corresponding to the maximum insulation temperature rating. Industrial standards like NEMA ST20 set the average temperature rise and allowable hot spot limitations for various insulation systems or classifications.

Indoor Installations

Not over 112½ kVA

For indoor installations where the transformer size is less than or equal to 112½ kVA, the NEC requires at least 12 in. (300 mm) separation from combustible material unless a fire resistant, heat-insulated barrier is provided between the transformer and combustible material.

However, there is an exception for low voltage transformers, rated 600 V or less, that are completely enclosed, with or without ventilating openings.

Over 112½ kVA

The NEC requires transformers over 112½ kVA to be installed in a transformer room of fire resistant construction. In this context, the term fire resistant means a construction having a minimum fire rating of one hour.

There are two exceptions to this requirement.

Exception 1: Transformers with Class 155 or higher insulation systems and separated from combustible material by a fire resistant, heat insulating barrier or by not less than 6 ft. (1.83 m) horizontally and 12 ft. (3.7 m) vertically.

Exception 2: Transformers with Class 155 or higher insulation systems and completely enclosed except for ventilating openings.

Over 35,000 Volts

Installations of transformers over 35,000 volts must be made in a transformer vault in compliance with Article 450, Part III.
Outdoor Installations

All outdoor installations of dry type transformers must be installed in a weather proof enclosure. Transformers over 112½ kVA must have at least 12 in. (300 mm) separation from combustible materials unless the transformer has Class 155 insulation systems or higher and is completely enclosed, except for ventilation openings.

Schneider Electric™ Dry Transformers

When considering the NEC requirements for transformer separation it is important to remember that Schneider Electric products meet the criteria for many of the code exceptions. For example, Schneider Electric transformers use Class 200 or 220 insulation systems and are completely enclosed, except for ventilating openings. This impacts the separation requirements as follows:

- **Indoor Installations—Not over 112½ kVA** For transformers rated 600 V or less, no separation barriers are required.
- **Indoor Installations—Over 112½ kVA** For transformers rated 35,000 V or less, no separation barriers are required.
- **Outdoor Installations—Over 112½ kVA** No separation barriers are required.

NEC Compliance

Inspectors, consultants, and users can readily determine the transformer insulation Class from the transformer nameplate and drawings. Using this information, along with the system voltage and proximity to combustible materials, the appropriate NEC requirements can be determined.

For More Information

All above references to the NEC are to the 2014 Edition.

Visit the Schneider Electric North America Codes and Standards Electrical Shortz website at:

“Electrical Shortz” are produced by the Schneider Electric North America Codes and Standards Group. These documents provide general guidance on a specific issue. Circumstances regarding particular installation issues may need further consideration. Schneider Electric and Square D are trademarks owned by Schneider Electric Industries SAS or its affiliated companies. All other trademarks are the property of their respective owners.