



Keywords: transformer class
separation from combustible materials
barrier
fire rating

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.

SQUARE D
by Schneider Electric

ENERGY EFFICIENT LOW VOLTAGE DISTRIBUTION TRANSFORMER, DRY TYPE

CAT. NO. : EX300T3H	KVA : 300	PRI (H) VOLTS : 480D
STYLE NO. : EAV8915303	PHASE : 3	SEC (X) VOLTS : 208Y/120
SERIAL NO. : 0987654321	FREQ. : 60	PRI (H) AMPS : 360.8
DATE CODE : 1606	% IZ : 4.96	SEC (X) AMPS : 832.7

WEIGHT : 1969 LBS TYPE : SO

ENCL. : 2SJ TYPE 1, TYPE 3R WHEN 7400WS25J INSTALLED
TO BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE,
SECTION 450.9, AND UL1561, MAINTAIN MINIMUM CLEARANCE
OF 0.5 INCH TO WALL OR OTHER OBSTRUCTIONS.

INS CLASS : 220° C RISE : 150° C AMB : 40° C
EFFICIENCY : EFF. 99.02% @ 35% LOAD & 75° C
MEETS FINAL RULE U.S. 10 CFR 431 APR 2013

BASIC MODEL NO. : 024EX0300T480D208Y1A-001

WIRING DIAGRAM: Shows a three-phase transformer with primary terminals H1, H2, H3 and secondary terminals X1, X2, X3. Each phase has a tap point labeled 7654321.

TAP POSITIONS	PRI	TAP	VOLTS
7	1	1	506
6	2	2	489
5	3	3	480
4	4	4	471
3	5	5	454
2	6	6	446
1	7	7	429

UL LISTED 127H
INS SYS. : 24PDG220-1
MADE IN MEXICO

For More Information

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

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Schneider Electric USA, Inc.
800 Federal Street
Andover, MA 01810 USA
888-778-2733
www.schneider-electric.us

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