

To: Susan McNelly, Chair
IEEE Transformers Committee

Date: March 26, 2018

Subject: Changes proposed to 2020 NEC Section 450, Transformers

Summary: Changes that were accepted at the First Revision meetings were mainly editorial in nature. There seems to be nothing substantive that was enacted.

The significant items seem to be:

Sec. 450.3(B)

Proposed A new footnote 4 was proposed to be added to Table 450.3B as follows:
“Refer to 240.21 (C)(1) and 408.36 (B); transformer secondary overcurrent protection may be required for secondary conductor protection or panelboard protection.”.
Was RESOLVED (voted NO) as a violation of the Style Manual.

Sec 450.6(A)(1) removes the word “rated”:

(1) Loads at Transformer Supply Points Only.

Where all loads are connected at the transformer supply points at each end of the tie and overcurrent protection is not provided in accordance with Parts I, II, and VIII of Article 240, the ~~rated~~ ampacity of the tie shall not be less than 67 percent of the rated secondary current of the highest rated transformer supplying the secondary tie system.

Statement of Problem and Substantiation for Public Input

This public input is the work of an Ampacity Task Group. The task group consisted of the following members: Thomas Domitrovich, Dave Mercier, Christine Porter, Derrick Atkins, and Christel Hunter.

The Task Group identified the use of the word rated to describe ampacity is not appropriate when addressing the ampacity of a conductor. The use of the term "rating" generally applies to equipment where as ampacity applies to conductors.

Ampacity of a conductor is defined as part of Article 100 as "The maximum current, in amperes, that a conductor can carry continuously under the conditions of use without exceeding its temperature rating." Tables 310.15(B)(16) through (21) establish the ampacity of conductors under specified conditions of use.

In other words, the term “rated” is not correct when referring to ampacity.

Same was applied to 450.6 (A)(2)

Sec. 450.9

450.9 Ventilation and Operation .

The ventilation shall dispose of the transformer full-load heat losses without creating a temperature rise that is in excess of the transformer rating.

Informational Note No. 1: See ANSI/IEEE C57.12.00-1993, *General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers*, and ANSI/IEEE C57.12.01-1989, *General Requirements for Dry-Type Distribution and Power Transformers*.

Informational Note No. 2: Additional losses may occur in some transformers where nonsinusoidal currents are present, resulting in increased heat in the transformer above its rating. See ANSI/IEEE C57.110-1993, *Recommended Practice for Establishing Transformer Capability When Supplying Nonsinusoidal Load Currents*, where transformers are utilized with nonlinear loads.

Transformers shall operate in the same environment as they have been tested to operate. Transformers with ventilating openings shall be installed so that the ventilating openings are not blocked by walls or other obstructions. The required clearances shall be clearly marked on the transformer. Transformer surfaces shall not be used for storage of any kind.

Adds the terms “and operation” and “shall operate as they have been tested to operate” because some people felt that blocking ventilation ports or using the top as a shelf causes heat rise and present language does not account for such operating parameters.

Sec 450.10

450.10 Grounding Terminal Bar .

(A) Dry-Type Transformer Enclosures.

Where separate equipment grounding conductors and supply-side bonding jumpers are installed, a terminal bar for all grounding and bonding conductor connections shall be secured inside the transformer enclosure. The terminal bar shall be bonded to the enclosure in accordance with 250.12 and shall not be installed on or over any vented portion of the enclosure.

Exception: Where a dry-type transformer is equipped with wire-type connections (leads), the grounding and bonding connections shall be permitted to be connected together using any of the methods in 250.8 and shall be bonded to the enclosure if of metal.

(B) Other Metal Parts.

~~Where grounded, exposed~~ Exposed non-current-carrying metal parts of transformer installations, including fences, guards, and so forth, shall be ~~grounded and bonded under the conditions and in the manner specified for electrical equipment and other exposed metal parts in Parts V, VI, and VII of Article 250~~ connected to an equipment grounding conductor or grounded conductor in accordance with Article 250, Part VII .

Improves clarity, not a substantive change.

450.21 (B) merely updates the ASTM Standard date and title.

450.27 same updating

450.42 same updating

450.43 (C)

(C) Locks.

Doors shall be equipped with locks, and doors shall be kept locked, access being allowed only to qualified persons. Personnel doors shall open in the direction of egress and be equipped with listed ~~panic~~ fire exit hardware.

Statement of Problem and Substantiation for Public Input

Panic hardware is not permitted to be installed on fire rated doors. Section 450.42 requires the walls to be fire rated and only fire rated doors are permitted to be installed in fire rated walls.

Fire hardware is a more appropriate terminology.

450.45 (E) updated reference

450.46 is more interesting although RESOLVED (voted down):

450.46 Drainage.

Where practicable, vaults containing more than 100 kVA transformer capacity shall be provided with a drain or other means that will carry off any accumulation of oil or water in the vault unless local conditions make this impracticable. The floor shall be pitched to the drain where provided. Such drain or other means shall prevent discharge of transformer's oil into a public or private sewer and shall comply with AHJ regulations.

Resolution: The final location of drained water and oils are an environmental concern and should not be addressed in the NEC. The proposed wording would also prohibit users from utilizing current practices that have safeguards in place to allow for drainage of water when conditions merit.

This was rejected because environmental concerns are not a subject of this Code,

Note that final voting for the First Revision was due last Friday, March 23. Outcome of voting is not known. Once recirculated to Panel members, it goes to the Correlating Committee. It will be finally posted on July 6, 2018.

In any event, anyone in the public has an opportunity to make their views known or present evidence why the vote should be changed. Public input must be received by 5 PM on August 30, 2018. The Web site is nfpa.org, and the NEC is NFPA 70.

Respectfully,

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