IEEE Standard for General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers

IEEE Power & Energy Society

Sponsored by the
Transformers Committee

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Abstract: Electrical and mechanical requirements for liquid-immersed distribution and power transformers, and autotransformers and regulating transformers; single- and polyphase, with voltages of 601 V or higher in the highest voltage winding, are set forth. This standard is a basis for the establishment of performance, and limited electrical and mechanical interchangeability requirements of equipment are described; it is also a basis for assistance in the proper selection of such equipment. The requirements in this standard apply to all liquid-immersed distribution, power, and regulating transformers except the following: instrument transformers, step voltage and induction voltage regulators, arc furnace transformers, rectifier transformers, specialty transformers, grounding transformers, mobile transformers, and mine transformers.
Keywords: autotransformers, distribution transformers, electrical requirements, mechanical requirements, power transformers, regulating transformers

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Introduction

This introduction is not part of IEEE Std C57.12.00-2010, IEEE Standard for General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers.

This standard is a voluntary consensus standard. Its use may become mandatory only when required by a duly constituted legal authority or when specified in a contractual agreement. To meet specialized needs and to allow for innovation, specific changes are permissible when mutually determined by the user and the manufacturer, provided these changes do not violate existing laws and are considered technically adequate for the function intended.

When this standard is used on a mandatory basis, the words *shall* and *must* indicate mandatory requirements. The words *should* and *may* refer to matters that are recommended or permissible, but not mandatory.

When applicable, editorial changes have been incorporated into this revision. Sentence structure and punctuation have been edited to improve clarity and conciseness. Also, editorial changes have been made to conform to the *2009 IEEE Standards Style Manual*.[a] Some changes have also been made to correct errors in previous revisions. When applicable, references to other standards have been updated.

A summary of the major changes is listed here, in sequential order.

a) Editorial changes were made to the Scope, and a Purpose was added.

b) Old Table 4 through Table 9 and related Notes have been deleted.

c) New Table 4, Table 5, and Table 6 have been added.

d) Subclause 5.10, second sentence, has been revised to read "…shall be its *maximum system voltage and* basic lightning impulse insulation level (BIL)."

e) Former 5.10.1.3 is now 5.10.1 and was revised. The old table for front-of-wave insulation levels was not included in the 2006 version of this standard. This table has been included as Annex A in this 2010 version of the standard for historical purposes.

f) Former 5.10.2.4 is now 5.10.3.4 and has been revised to read: "In any case, the insulation level of the neutral bushing shall be equal or greater than the specified insulation level of the neutral end of the winding."

g) Former 5.10.2.5 is now 5.10.3.5 has been revised to read: "Insulation levels shall not be assigned where the neutral end of the winding is not brought out of the tank through a bushing and is solidly grounded to the tank."

h) Former 5.10.3.1 has been deleted.

i) Former 5.10.4 and 5.10.5 have been combined into one new subclause 5.10.5.

j) Subclauses 5.10.7.1 and 5.10.7.2 have been revised.

k) Subclause 5.11.3 is new, along with Figure 3.

l) Former Table 10 is now Table 7, and several Notes were changed.

m) A new introduction has been added to 7.1.3.

n) The X0/X1 ratio was changed from "2.0" to "1.0" in 7.1.5.3.

o) Former Table 21 has been replaced with a new Table 18.

[a] The *IEEE Standards Style Manual* is available at http://standards.ieee.org/guides/style/.

p) Subclause 8.6 has been added, and the old 8.6 has been renumbered as 8.7.

q) Annex A has been added; and the old Annex A (Bibliography) has been changed to Annex B.

Revisions of individual clauses (now modified) were prepared by separate groups within the Transformers Committee. Those clauses were balloted independently according to applicable rules and procedures of the IEEE for the preparation and approval of voluntary consensus standards. This process was approved by the IEEE Transformers Committee, the IEEE-SA Standards Board, and the Accredited Standards Committee for Distribution and Power Transformers and Regulators (C57). Applicable rules and procedures; specifically procedures for voting, review, and attempted reconciliation of dissenting viewpoints; a 60-day public review period; and final review and approval by the ANSI Board of Standards Review, were followed.

Suggestions for improvement resulting from use of this standard will be welcomed.

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The following members of the individual balloting committee voted on this standard. Balloters may have voted for approval, disapproval, or abstention.

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Contents

IEEE Standard for General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers

1. Overview

1.1 Scope

This standard describes electrical and mechanical requirements of liquid-immersed distribution and power transformers, and autotransformers and regulating transformers, single-phase and polyphase, with voltages of 601 V or higher in the highest voltage winding.

This standard applies to all liquid-immersed distribution, power, and regulating transformers that do not belong to the following types of apparatus:

a) Instrument transformers

b) Step voltage and induction voltage regulators

c) Arc furnace transformers

d) Rectifier transformers

e) Specialty transformers

f) Grounding transformers