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IEEE Standard for General Requirements for Dry-Type Distribution and Power Transformers

IEEE Power and Energy Society

Sponsored by the
Transformers Committee

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USA

IEEE Std C57.12.01™-2015
(Revision of
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Abstract: Electrical and mechanical requirements of ventilated, non-ventilated, and sealed dry-type distribution and power transformers or autotransformers (single and polyphase, with a voltage of 601 V or higher in the highest voltage winding) are described.

Keywords: autotransformer, distribution, dry-type, IEEE C57.12.01™, power transformer, voltage, winding

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Introduction

This introduction is not part of IEEE Std C57.12.01-2015, IEEE Standard for General Requirements for Dry-Type Distribution and Power Transformers.

This standard is the result of an effort encompassing the interests of users, manufacturers, and others dedicated to producing voluntary consensus standards for dry-type transformers.

This standard was first published in 1979, and was revised and updated in 1989, 1998, and 2005. In the current version of the standard, the title has been revised to reflect the standard's inclusion of all types of dry-type transformers, without specific reference to newer types. In addition, the dielectric insulation table has been expanded to include 46.0 kV and 69.0 kV system voltages, and the references have been updated. Further, informative Annex A, Bibliography, and informative Annex B, Insulation at high altitude, have been added, and the standard has again been updated to match current style guide requirements.

Moreover, as part of ongoing efforts, the clause on partial discharge testing was revised to improve harmonization of this standard with international standards such as IEC 60076-11. This revision included removing the table on partial discharge limits and pre-stress limits, and replacing it with discussion and a figure describing the IEC partial discharge testing methodology.

The dielectric tests discussed in this standard consist of low-frequency and high-frequency testing. Low-frequency tests include induced voltages up to two times rated volts, which are intended to verify the integrity of turn-to-turn and layer-to-layer insulation systems. Applied potential tests verify the integrity of major insulation systems to ground and between separate windings. High-frequency tests include a 1.2 × 50 μs wave and a chopped wave to verify the integrity of electrical windings to withstand lightning and switching transients.

It is important to reference NEMA ST-20[a] and the National Electrical Code® (NEC®) (NFPA 70)[b, c] as these standards refer to this standard. NEMA ST-20 is a standard for dry-type transformers with primary windings connected to secondary distribution circuits with voltages of 600 V and below usually installed and used in accordance with the National Electric Code. NEMA ST-20 is referenced in this introduction for information on voltages 600 V and below applications only.

This revision was developed by the Working Group of the Dry-Type Transformers Subcommittee of the IEEE Transformers Committee of the IEEE Power and Energy Society.

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 relationship. To meet specialized needs and to allow innovation, specified changes are permissible when mutually determined by the user and the producer, provided such changes do not violate existing laws and are considered technically adequate for the function intended.

[a] NEMA publications are available from Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112, USA (http://global.ihs.com/).

[b] NFPA publications are available from Publications Sales, National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101 Quincy, MA 02269-9101, USA (http://www.nfpa.org/).

[c] The NEC is published by the National Fire Protection Association (http://www.nfpa.org/). Copies are also available from The Institute of Electrical and Electronics Engineers at http://shop.ieee.org/.

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IEEE Standard for General Requirements for Dry-Type Distribution and Power Transformers

1. Overview

1.1 Scope

This standard describes electrical and mechanical requirements of single and polyphase ventilated, non-ventilated, and sealed dry-type distribution and power transformers or autotransformers, with a voltage of 601 V or higher in the highest voltage winding. This standard applies to all dry-type transformers, including those with solid cast and/or resin-encapsulated windings except as follows:

a) Instrument transformers

b) Step- and induction-voltage regulators

c) Arc-furnace transformers

d) Rectifier transformers

e) Specialty and general-purpose transformers

f) Mine transformers

g) Testing transformers

h) Welding transformers