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

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IEEE Power and Energy Society

Developed by the
Transformers Committee

IEEE Std C57.12.01™-2020
(Revision of IEEE Std C57.12.01-2015)

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

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Transformers Committee
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IEEE Power and Energy Society

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IEEE SA Standards Board

Abstract: Electrical, mechanical, and safety 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 in this standard.

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

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Introduction

This introduction is not part of IEEE Std C57.12.01–2020, 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, 2005, and 2015. In the current version of the standard the cooling ratings were revised to correlate with those found in IEC and IEEE Std C57.12.00 and the description for Scott T connected transformers was enhanced. Additionally, the maximum system voltages were added to complement the nominal system voltages in Table 3 and the 0.25 kV and 0.6 kV voltage classes were removed as they are out of scope. The partial discharge (PD) test method and protocol was moved to IEEE Std C57.12.91 and an alternate short circuit thermal calculation was added from IEC.

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 certain switching transients.

It is important to reference NEMA ST 20 [B10] [1] and the National Electrical Code® (NEC®) (NFPA 70)[2,3] [B11] as these standards refer to this standard.[4] 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 General Requirements for Dry-Type Distribution and Power Transformers Working Group of the Dry-Type Transformers Subcommittee of the IEEE Transformers Committee of the IEEE Power and Energy Society.

[1]NEMA publications are available from the National Electrical Manufacturers Association (https://www.nema.org/).
[2]NFPA publications are published by the National Fire Protection Association (https:// www.nfpa.org/).
[3]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 (https://standards.ieee.org/).
[4]The numbers in brackets correspond to those of the bibliography in Annex A.

Contents

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

NOTE—Where IEEE standards do not exist for the transformers mentioned above or for other special transformers, this standard may be applicable as a whole or in parts subject to agreement between the parties responsible for the application and for the design of the transformer.[5]

1.2 Purpose

This standard is intended to serve as a basis for the establishment of performance, interchangeability requirements of equipment described, and for assistance in the proper selection of such equipment.

[5]Notes in text, tables, and figures are given for information only and do not contain requirements needed to implement the standard.