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IEEE Guide for Loading Dry-Type Distribution and Power Transformers

IEEE Power and Energy Society

Sponsored by the
Transformers Committee

IEEE
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New York, NY 10016-5997
USA

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Abstract: General recommendations for the loading of dry-type distribution and power transformers installed in ventilated, non-ventilated, and sealed type enclosures are included in this standard.

Keywords: ambient temperature, constant load, hottest-spot temperature, IEEE C57.96™, loading capability, loading transformer, rated output, resin-encapsulated, solid-cast transformer, time constant, transient loading

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Robert Ballard
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Derek Foster
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Mike Iman
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Robert Ballard
Peter Balma
Jeffrey Benach
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Introduction

This introduction is not part of IEEE Std C57.96-2013, IEEE Guide for Loading Dry-Type Distribution and Power Transformers.

This guide covers the loading of dry-type distribution and power transformers and has been developed to cover modern dry-type transformers through 10 000 kVA. The insulation systems referred to in this document meet the thermal evaluation criteria established by the now withdrawn IEEE Std C57.12.56™-1986[a] or the replacement document, IEEE Std C57.12.60™.

Work completed by the IEEE Insulation Life Subcommittee, comprising life test on transformer models, is the basis for the insulation life versus temperature relationship, designated as minimum life expectancy in IEEE Std C57.12.56-1986 and IEEE C57.12.60, which in turn are based on the Arrhenius reaction rate theory. To avoid ambiguity, this guide will use the term "life expectancy" to indicate the life to be expected at a given temperature. The "normal life expectancy" at rated hottest-spot temperature in a 30 °C ambient is expected to be 20 years. For calculation purposes, 180 000 h is used as the expected lifetime.

This revision of the guide combined the content for all dry-type transformers, including those with solid-cast and/or resin-encapsulated epoxy windings into the main body of the document. In addition, the computer programs in Annex B have been updated to include all transformer types and detailed examples of loading and aging have been provided in Annex C. Moreover, the document has been updated to reflect the current IEEE Style Guide format.

[a] Information on references can be found in Clause 2.

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IEEE Guide for Loading Dry-Type Distribution and Power Transformers

1. Overview

1.1 Scope

This guide covers general recommendations for the loading of dry-type distribution and power transformers installed in ventilated, non-ventilated, and sealed type enclosures.

1.2 Purpose

This document provides users with guidelines and limitations for loading dry-type transformers according to nameplate rating. Guidance is also provided for assessing the risks and consequences of loading above nameplate rating.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.