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IEEE Standard for the Design, Testing, and Application of Liquid-Immersed Distribution, Power, and Regulating Transformers Using High-Temperature Insulation Systems and Operating at Elevated Temperatures

IEEE Power and Energy Society

Sponsored by the
Transformers Committee

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IEEE Standard for the Design, Testing, and Application of Liquid-Immersed Distribution, Power, and Regulating Transformers Using High-Temperature Insulation Systems and Operating at Elevated Temperatures

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Abstract: All liquid-immersed distribution, power, and regulating transformers that are designed to operate at temperatures that exceed the normal thermal limits of IEEE C57.12.00™ under continuous load, in the designed average ambient, and at rated conditions are covered by this standard. Specific requirements and guidance in the design, testing, and application of the transformers covered within the scope of this standard are provided. High-temperature insulation systems or systems that use a combination of high-temperature and conventional insulation are incorporated by these transformers.

Keywords: conventional, full hybrid, high-temperature, hybrid, IEEE C57.154, insulation system, mixed hybrid

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Introduction

This introduction is not part of IEEE Std C57.154-2012, IEEE Standard for the Design, Testing, and Application of Liquid-Immersed Distribution, Power, and Regulating Transformers Using High-Temperature Insulation Systems and Operating at Elevated Temperatures.

The purpose of this document is to standardize the development of liquid-immersed transformers that use high-temperature insulation and operate at elevated temperatures. The solid insulation may encompass a broad range of materials with varying degrees of thermal capability. Key properties of insulating and cooling liquids also may vary substantially from mineral-oil insulating liquid.

This document is not intended to stand alone, but rather builds on the information and guidelines documented in the other parts of the IEEE C57 series. Accordingly, this document follows two guiding principles. The first principle is that liquid-immersed transformers are well known and are well defined in other parts of this series; therefore, the details of these transformers are not repeated in this document, except where such reference has value or where repetition is considered appropriate for purposes of emphasis or comparison.

The second principle is that the usual liquid-immersed transformer, insulated with thermally upgraded kraft paper, pressboard, wood, mineral oil, and many other commonly used materials, operating at established temperature limits, is well known. Conversely, other solid and liquid insulations that have a higher thermal capability than the materials used in this well-known system are considered "high-temperature."

The document addresses loading, overloading, testing, and accessories in the same manner. Only selected information for the "conventional" transformers is included in this document for comparison purposes or for emphasis. All other references are directed to the appropriate standard document.

Contents

IEEE Standard for the Design, Testing, and Application of Liquid-Immersed Distribution, Power, and Regulating Transformers Using High-Temperature Insulation Systems and Operating at Elevated Temperatures

1. Overview

1.1 Scope

This standard applies to all liquid-immersed distribution, power, and regulating transformers that are designed to operate at temperatures that exceed the normal thermal limits of IEEE Std C57.12.00™ [1] under continuous load, in the designed average ambient, and at rated conditions.

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