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IEEE Standard for Submersible, Three-Phase Transformers, 3750 kVA and Smaller: High Voltage, 34 500 GrdY/19 920 Volts and Below; Low Voltage, 600 Volts and Below

IEEE Power & Energy Society

Sponsored by the
Transformers Committee

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Abstract: This standard is intended for use as a basis for establishing the performance, electrical and mechanical interchangeability, and safety of the equipment covered, and to assist in the proper selection of such equipment.

Keywords: copper-bearing steel, impedance, submersible, tank, tap charger, temperature, three-phase, transformer

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This introduction is not part of IEEE Std C57.12.24-2009, IEEE Standard for Submersible, Three-Phase Transformers, 3750 kVA and Smaller: High Voltage, 34 500 GrdY/19 920 Volts and Below; Low Voltage, 600 Volts and Below.

This standard was originally a NEMA/ANSI standard last published as ANSI C57.12.24-2000. There were a number of technical omissions in that publication. This publication adds to those technical requirements and now publishes the standard as an IEEE document.

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1. Overview

1.1 Scope

This standard covers certain electrical, dimensional, and mechanical characteristics and takes into consideration certain safety features of three-phase, 60 Hz, liquid-immersed, self-cooled, submersible transformers with separable insulated high-voltage connectors. These transformers are rated 3750 kVA and smaller with high voltages of 34 500 GrdY/19 920 V and below and with low voltages of 600 V and below. These transformers are generally used for step-down purposes from an underground primary cable supply. These transformers are typically installed in an enclosure below ground level, operated from above and suitable for continuous submerged operation.

1.2 Purpose

This standard is intended for use as a basis for establishing the performance, electrical and mechanical interchangeability, and safety of the equipment covered, and to assist in the proper selection of such equipment.

2. Normative references

The following referenced documents are indispensable for the application of this standard (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this standard 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.

IEEE Std 386™-2006, IEEE Standard for Separable Insulated Connector Systems for Power Distribution Systems Above 600 V.[1, 2]

IEEE Std C57.12.00™-2006, IEEE Standard for Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers.

IEEE Std C57.12.20™-2005, IEEE Standard For Overhead -Type Distribution Transformers, 500 kVA and Smaller: High Voltage, 34 500 V and Below; Low Voltage, 7970/13 800Y V and Below.

IEEE Std C57.12.32™-2002, IEEE Standard for Submersible Equipment–Enclosure Integrity.

IEEE Std C57.12.70™-2000, IEEE Standard Terminal Markings and Connections for Distribution and Power Transformers.

IEEE Std C57.12.80™-2002, IEEE Standard Terminology for Power and Distribution Transformers.

IEEE Std C57.12.90™-2006, IEEE Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers.

IEEE Std C57.91™-1995, IEEE Standard Test Code for Dry-Type Distribution and Power Transformers.

3. Definitions

Except as modified in this standard, transformer terminology found in IEEE Std C57.12.80-2002 shall apply.

4. Service conditions

Transformers conforming to this standard shall be suitable for operation at rated kilovolt-amperes (kVA) and rated voltage under the usual service conditions specified in IEEE Std C57.12.00-2006 except as specified below.

4.1 Cooling air-temperature limit

The temperature of the cooling air (enclosure ambient temperature) shall not exceed 50 °C and the average temperature of the cooling air shall not exceed 40 °C for any 24-hour period.

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