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IEEE Recommended Practice for Routine Impulse Tests for Distribution Transformers

IEEE Power and Energy Society

Sponsored by the
Transformers Committee

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IEEE Std C57.138™-2016
(Revision of IEEE Std C57.138-1998)

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Abstract: General test procedures for performing routine quality control tests that are suitable for high-volume, production line testing are included in this recommended practice. Transformer connections, test methods, circuit configurations, and failure detection methods are addressed. This recommended practice covers liquid-immersed, single- and three-phase distribution transformers.

Keywords: distribution transformers, IEEE C57.138™, production line testing, routine test

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Introduction

This introduction is not part of IEEE Std C57.138™-2016, IEEE Recommended Practice for Routine Impulse Tests for Distribution Transformers.

The routine impulse test for distribution transformers was proposed and developed by manufacturers of small distribution transformers as a means of including a simplified and reliable impulse test into their routine test procedures.

This recommended practice was first published in 1998 and was the result of almost a decade of working group discussion that progressed through multiple drafts. The intent was to document not just a test procedure but to include a compendium of tutorial information to enable testing engineers and operators to better understand the test procedures necessary to a successful implementation of the routine impulse test.

Included in this document are sections on the design of the impulse test circuit and how it was adapted for use with a wide range of distribution transformers, test circuit connection diagrams for single- and three-phase transformers, recommended fault detection methods, and the use of analog and digital fault detection systems.

Since its first publication there have been only minor changes made to the original, which goes to indicate the efficacy of this document.

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1. Overview

1.1 Scope

This recommended practice covers routine impulse tests performed on distribution transformers, as required in IEEE Std C57.12.00™, and described in 10.4 of IEEE Std C57.12.90™-2015[1]. Distribution transformers covered by this recommended practice are liquid-immersed, single- and three-phase overhead-type up to 500 kVA; single-phase pad-mounted compartmental-type and underground-type up to 167 kVA; three-phase pad-mounted compartmental-type; and underground-type up to 2500 kVA.

This recommended practice covers only those aspects of impulse testing that are specific to routine testing of distribution transformers. For more thorough coverage of impulse testing of transformers in general, IEEE Std C57.98™ should be consulted.

1.2 Purpose

This recommended practice assists manufacturers of distribution transformers in the setup and operation of a routine impulse test, and assists distribution transformer users and purchasers in understanding the routine impulse test and how it differs from design tests.

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.

IEEE Std 4™, IEEE Standard Techniques for High-Voltage Testing.[2,3]

IEEE Std 1122™, IEEE Standard for Digital Recorders for Measurements in High-Voltage Impulse Tests.

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