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IEEE Standard for Performance and Test Requirements for Instrument Transformers of a Nominal System Voltage of 115 kV and Above

STANDARDS

IEEE Power and Energy Society

Developed by the
Transformers Committee

IEEE Std C57.13.5™-2019
(Revision of IEEE Std C57.13.5-2009)

IEEE

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Approved 7 November 2019

IEEE SA Standards Board

Abstract: Single-phase instrument transformers of a nominal system voltage of 115 kV and above with capacitive insulation system for line-to-ground connection and for both indoor and outdoor application are discussed in this standard. This standard is intended for use as a supplement to IEEE Std C57.13™-2016 and as a basis for performance and safety of equipment. Test sequences, criteria, methods, and documentation for the test are also described.

Keywords: design test, high-voltage, IEEE C57.13.5™, instrument transformers, routine tests, special tests, test criteria, test method, test requirements, test sequence

The Institute of Electrical and Electronics Engineers, Inc.
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PDF: ISBN 978-1-5004-6357-7 STD24004
Print: ISBN 978-1-5004-6358-4 STDPD24004

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Introduction

This introduction is not part of IEEE Std C57.13.5-2019, IEEE Standard for Performance and Test Requirements for Instrument Transformers of a Nominal System Voltage of 115 kV and Above.

The mission of C57.13.5™ Test Requirements for Instrument Transformers of a Nominal System Voltage of 115 kV and Above Working Group is to develop a comprehensive set of performance and test requirements for instrument transformers of a nominal system voltage of 115 kV and above. The objective is to improve the performance and safety of the instrument transformers in response to the concern indicated in the publication EPRI Workshop on Failed High Voltage Instrument Transformers, held in September 1990.

The first edition was published in 2003. The second edition was published in 2009.

The main changes introduced in this revision are:

- Update of references
- New definitions have been added for gas-filled instrument transformers
- Wind speed has been decreased from 160 km/h to 40 m/s (144 km/h)
- Partial discharge levels (type test vs routine test) have been combined in a single table
- Requirements of for density monitoring for gas-filled instrument transformers have been added
- Pressure routine and type tests have been added for enclosures used on gas-filled instrument transformers
- Addition of a rated arc proof current
- Reference to R10 series has been added for the arc proof current
- Additional identification for current transformers having an anti-remanence gap in the magnetic circuit
- Addition of a remanence factor test
- RIV performance have been restricted to rated voltages equal to or higher than 245 kV
- RIV test levels have been adjusted to I,1 Um/√3
- Allowable gas leakage rates at low temperature have been reduced
- Maximum acetylene concentration has been decreased to non-detectable
- Ambient air temperature range during testing has been clarified
- Cumulative test methodology is now prescribed instead of sniffing for gas leakage measurement
- Correction of the equation in the assumption for Figure 5 for the accuracy and excitation current measurements
- Clarifications added to the short-time mechanical test for current transformers and voltage transformers
- Clarifications added for the internal arc test
- Clarification added for the electrical endurance test
- Revision of the temperature rise test methodology
- Additional requirements regarding the number of reduced lightning impulse
- Clarifications have been added regarding chopped lightning impulse tests
- Addition of an Annex D regarding gas tightness measurement

Contents

IEEE Standard for Performance and Test Requirements for Instrument Transformers of a Nominal System Voltage of 115 kV and Above

1. Overview

1.1 Scope

This standard is intended for use as a supplement to IEEE Std C57.13™-2016 and as a basis for performance and safety of equipment.[1] It also describes test sequences, criteria, methods, and documentation for tests. This standard applies to single-phase instrument transformers of a nominal system voltage of 115 kV and above with capacitive insulation system for line-to-ground connection and for both indoor and outdoor application.

1.2 Purpose

The purpose of this standard is to supplement the IEEE Std C57.13-2016 with specific requirements to single-phase instrument transformers of a nominal system voltage of 115 kV and above, with capacitive insulation system for line-to-ground connection, and for both indoor and outdoor application.

1.3 Word usage

The word *shall* indicates mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted (shall equals is required to).[2, 3]

The word *should* indicates that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required (should equals is recommended that).

The word *may* is used to indicate a course of action permissible within the limits of the standard (may equals is permitted to).

The word *can* is used for statements of possibility and capability, whether material, physical, or causal (can equals is able to).

[1]Information on references can be found in Clause 2.
[2]The use of the word *must* is deprecated and shall not be used when stating mandatory requirements, *must* is used only to describe unavoidable situations.
[3]The use of *will* is deprecated and shall not be used when stating mandatory requirements, *will* is only used in statements of fact.