

Guide for Field Test of Partial Discharge in Power Transformers

Submitter Email:

Type of Project: New IEEE Standard

1.1 Project Number: <unassigned>

1.2 Type of Document: Standard

1.3 Life Cycle: Full Use

2.1 Title: Guide for Field Test of Partial Discharge in Power Transformers

3.1 Working Group: State Grid Sichuan Electric Power Company, State Grid Sichuan Electric Power Research Institute

3.2 Sponsoring Society and Committee:

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None

4.1 Type of Ballot: Entity

4.2 Expected Date of submission of draft to the IEEE-SA for Initial Sponsor Ballot: Oct.2017

4.3 Projected Completion Date for Submittal to RevCom: Oct.2018

5.1 Approximate number of entities expected to be actively involved in the development of this project: 6

5.2 Scope:

The main scopes of this guide are as follow:

(1) specify PD test equipments and their performances, such as power supply, reactive power compensation system, measuring system, calibration system, and so on;

(2) recommend PD test circuits for different types of power transformers, especially the test circuit for the UHV AC transformers, UHV DC converter transformers, and traction transformers;

(3) recommend the calibration method of field PD test, especially for which under strong interference;

(4) recommend the method of identifying interference and measures to suppress and eliminate impact of interference;

(5) present typical PD pulses and interference signals, and recommend identification method of PD types;

(6) present the combined location technique of PD.

5.3 Is the completion of this standard dependent upon the completion of another standard: NO

5.4 Purpose:

The guide provide guidelines on field test of partial discharge in power transformers.

It will cover the shortage of current standards in the aspect of field PD tests. This guide can help testers to carry out field PD test for a high-voltage-level and large-capacity power transformers in serious electromagnetic environment, and obtain accurate PD signals. It is applicative not just for common power transformers, but also converter transformers and traction transformers.

It also will present efficient identification method and location method of PD, to help to formulate the most efficient repair scheme.

5.5 Need for the Project:

PD test is the most effective technical means to find the internal insulation defects of power transformers. However, with the increase of voltage level and the application of new transmission technology, it is becoming increasingly difficult to carry out field PD test due to the following reasons:

(1) with the increase of voltage level and capacity of power transformer, the performance requirements of PD test equipments and the field implementation difficulty increase;

(2) since more and more types of power transformers are developed and applied, different PD test circuits should be designed and used;

(3) since the electromagnetic environment of the field test become more and more serious, the suppression of interference is difficult.

Moreover, identifying the type and locating the position of PD can provide important reference for formulating the most efficient repair scheme.

However, the current standards of PD test are more appropriate for power transformers with low voltage level, small capacity and simple construction, and carry out PD test in a good electromagnetic environment. They has already been unable to handle the questions raised by field PD test.

5.6 Stakeholders for the Standard:

The universality of this standard relates to not only technical aspects, but also to manufacturers, utilities, energy service companies, and other interested entities.

Intellectual Property

6.1.a. Is the Sponsor aware of any copyright permissions needed for this project?: NO

6.1.b. Is the Sponsor aware of possible registration activity related to this project?: NO

7.1 Are there other standards or projects with a similar scope?:

Yes. Standards that with a similar scope are as below:

IEC 60060-1-2010 High-voltage test techniques - Part 1: General definitions and test requirements

IEC 60060-2-2010 High-voltage test techniques - Part 2: Measuring systems

IEC 60076-3-2013 Power transformers - Part 3: Insulation levels, dielectric tests and external clearances in air

IEC 60044-1-2003 Instrument transformers - Part 1: Current transformers

IEC 60044-2-2003 Instrument transformers - Part 2: Inductive voltage transformers

IEC 60044-5-2004 Instrument transformers - Part 5: Capacitor voltage transformers

IEC 60270-2000 High-voltage test techniques - Partial discharge measurements

These international standards make no specified request of characteristics and suppressions of interference in partial discharge measurements, typical waveform characteristics of field partial discharges, and the identification method of insulation defect based on partial discharge waveform.

7.2 Joint Development

Is it the intent to develop this document jointly with another organization?: NO

8.1 Additional Explanatory Notes (Item Number and Explanation):

8.2 Leader/Team

8.3 Previous Research Achievements

The details of previous research achievements are introduced in the supporting documents.