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Measurement of internal electric field in insulating materials – Pressure wave propagation method

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CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms, definitions and abbreviated terms	7
3.1 Terms and definitions.....	7
3.2 Abbreviated terms.....	7
4 Principle of the method.....	8
5 Samples	10
6 Electrode materials.....	10
7 Pressure pulse wave generation	10
8 Set-up of the measurement.....	11
9 Calibrating the electric field	12
10 Measurement procedure	12
11 Data processing for the experimental measurement.....	13
12 Measurement examples.....	14
12.1 Samples.....	14
12.2 Pressure pulse generation	14
12.3 Calibration of sample and signal	14
12.4 Testing sample and experimental results	15
Annex A (informative) Preconditional method of the original signal for the PWP method	19
A.1 Simple integration limitation	19
A.2 Analysis of the resiliency effect and correction procedure	20
A.3 Example of the correction procedure on a PE sample	21
A.4 Estimation of the correction coefficients	22
A.5 MATLAB® code	24
Annex B (informative) Linearity verification of the measuring system	26
B.1 Linearity verification.....	26
B.2 Sample conditions.....	26
B.3 Linearity verification procedure	26
B.4 Example of linearity verification.....	26
Figure 1 – Principle of the PWP method.....	9
Figure 2 – Measurement set-up for the PWP method	11
Figure 3 – Sample of circuit to protect the amplifier from damage by a small discharge on the sample	11
Figure 4 – Measured current signal under –5,8 kV	14
Figure 5 – First measured current signal (< 1 min).....	15
Figure 6 – Measured current signal under –46,4 kV, after 1,5 h under high voltage.....	15
Figure 7 – Measured current signal without applied voltage, after 1,5 h under high voltage.....	16
Figure 8 – Internal electric field distribution under –5,8 kV	16
Figure 9 – Internal electric field distribution under –46,4 kV, at the initial state	17

Figure 10 – Internal electric field distribution under –46,4 kV, after 1,5 h under high voltage.....	17
Figure 11 – Internal electric field distribution without applied voltage after 1,5 h under high voltage	18
Figure A.1 – Comparison between practical and perfect pressure pulses	19
Figure A.2 – Original signal of the sample free of charge under moderate voltage	20
Figure A.3 – Comparison between original and corrected reference signals with a sample free of charge under moderate voltage	21
Figure A.4 – Electric field in a sample under voltage with space charge calculated from original and corrected signals	22
Figure A.5 – Geometrical characteristics of the reference signal for the correction coefficient estimation	23
Figure A.6 – Reference signal corrected with coefficients graphically obtained and adjusted.....	23
Figure A.7 – Electric field in a sample under voltage with space charge calculated with graphically obtained coefficient and adjusted coefficient	24
Figure B.1 – Voltage signals obtained from the oscilloscope by the amplifier with different amplifications	27
Figure B.2 – Current signals induced by the sample, considering the input impedance and the amplification of the amplifier.....	27
Figure B.3 – Relationship between the measured current peak of the first electrode and applied voltage.....	28
Table A.1 – Variants of symbols used in the text.....	24

INTERNATIONAL ELECTROTECHNICAL COMMISSION

MEASUREMENT OF INTERNAL ELECTRIC FIELD IN INSULATING MATERIALS – PRESSURE WAVE PROPAGATION METHOD

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The text of this Technical Specification is based on the following documents:

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Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Specification is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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- withdrawn,
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INTRODUCTION

High voltage insulating cables, especially high voltage DC cables, are subject to charge accumulation and this may lead to electrical breakdown if the electric field produced by the charges exceeds the electrical breakdown threshold. With the trend to multiply power plants, especially green power plants such as wind or solar generators, more cables will be used for connecting these power plants to the grid and share the electric energy between countries. Therefore, the materials for the cables, and even the structure of these cables, when considering electrodes or the junction between cables, need a standardized procedure for testing how the internal electric field can be characterized. The measurement of the internal electric field would give a tool for comparing materials and help to establish thresholds on the internal electric field for high voltage applications in order to limit breakdown risks as much as possible. The pressure wave propagation (PWP) method has been used by many researchers to measure the space charge distribution and the internal electric field distribution in insulators. However, since experimental equipment, with slight differences, is developed independently by researchers throughout the world, it is difficult to compare the measurement results between the different equipment.

The procedure outlined in this Technical Specification provides a reliable point of comparison between different test results carried out by different laboratories in order to avoid interpretation errors. The IEC has established a project team to develop a procedure for the measurement of PWP.

MEASUREMENT OF INTERNAL ELECTRIC FIELD IN INSULATING MATERIALS – PRESSURE WAVE PROPAGATION METHOD

1 Scope

This document provides an efficient and reliable procedure to test the internal electric field in the insulating materials used for high-voltage applications, using the pressure wave propagation (PWP) method. It is suitable for a sample with homogeneous insulating materials and an electric field higher than 1 kV/mm, but it is also dependent on the thickness of the sample and the pressure wave generator.

2 Normative references

There are no normative references in this document.