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IEC/TR 62836

Edition 1.0 2013-09

# TECHNICAL REPORT



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

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

PRICE CODE

**M**

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ICS 17.220.99; 29.035.01

ISBN 978-2-8322-1102-1

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

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IEC/TR 63836, which is a technical report, has been prepared by IEC technical committee 112: Evaluation and qualification of electrical insulating materials and systems.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
112/258/DTR	112/263/RVC

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

## INTRODUCTION

High-voltage insulating cables, especially high-voltage d.c. cables, are subject to charge accumulation and thus 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 as much as possible breakdown risks. The pressure wave propagation (PWP) method has been used by several 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 over the world, it is difficult to compare the measuring results between the different researchers.

The procedure outlined in this technical report would give a reliable point of comparison between different test results carried out by different laboratories and avoid interpretation errors. The IEC has established a project team to develop a procedure to evaluate PWP measurement. The method will be verified in a Round Robin test. Once, having received reliable experience, this report is intended later to be upgraded to a technical specification in order to establish a specified way to estimate fairly the performance of a PWP measurement.

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

### **1 Scope**

IEC/TR 62836, which is a technical report, contains 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 depended on the thickness of sample and the pressure wave generator.