IEEE Std 4-1995
(Revision of IEEE Std 4-1978)

IEEE Standard Techniques for High-Voltage Testing

Sponsor

Power Systems Instrumentation and Measurements Committee of the IEEE Power Engineering Society

Approved March 16, 1995

IEEE Standards Board

Abstract: This standard establishes standard methods to measure high-voltage and basic testing techniques, so far as they are generally applicable, to all types of apparatus for alternating voltages, direct voltages, lightning impulse voltags, switching impulse voltages, and impulse currents. This revision implements many new procedures to improve accuracy, provide greater flexibility, and address practical problems associated with high-voltage measurements.
Keywords: high-voltage testing, testing

The Institute of Electrical and Electronics Engineers, Inc.
345 East 47th Street, New York, NY 10017-2394, USA

ISBN 1-55937-532-9

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Foreword

(This foreword is not a part of IEEE Std 4-1995, IEEE Standard Techniques for High-Voltage Testing.)

This revision of *IEEE Standard Techniques for High-Voltage Testing* is notable for its implementation of many new procedures to improve accuracy, provide greater flexibility, and address practical problems associated with high-voltage measurements. Users of this document are urged to study it carefully to learn about the differences between it and previous versions. A significant effort has been made to clarify some of the techniques that may have been difficult to interpret, eliminate methods that are not technically sound, and provide the user with sufficient guidance.

Introduction

(This introduction is not a part of IEEE Std 4-1995, IEEE Standard Techniques for High-Voltage Testing.)

The current revision of this standard is the seventh edition of this document as a separate standard. The subject had been addressed in the earliest Standardization Report of the American Institute of Electrical Engineers (AIEE) in 1889 and had been substantially elaborated upon in the subsequent reports issued from 1902 to 1933. When it was decided, in 1922, to reorganize the Institute's standards into separate sections, measurement of test voltages became one of the first subjects to be designated for a separate publication. The first edition was published in 1928.

This standard establishes standard methods of measurement of high voltage and basic testing techniques, so far as they are generally applicable, to all types of apparatus for alternating voltages, direct voltages, lightning impulse voltages, switching impulse voltages, and impulse currents. The following standards have been used in preparing this document:

IEEE Std 1122-1987, IEEE Standard for Digital Recorders for Measurement in High-Voltage Impulse Tests (ANSI).

IEEE Std C57.113-1991, IEEE Guide for Partial Discharge Measurement in Liquid-Filled Power Transformers and Shunt Reactors.

IEC Publication 60-1 (1989), High-voltage test techniques—Part 1: General definitions and test requirements.

IEC Publication 507 (1991), Artificial pollution tests on high-voltage insulators to be used on a.c. systems.

IEC Publication 1245 (1993), Artificial pollution tests on high-voltage insulators to be used on d.c. systems.

Major revisions contained in this document are the description of the wet test procedure, methods for artificial contamination tests, and techniques for ensuring accuracy in high-voltage measurements. Especially significant for impulse measurements is the inclusion of a comparison method in which tests may be performed at relatively low voltage with a reference divider.

At the time this standard was completed by the High-Voltage Testing Techniques Subcommittee of the Power Systems Instrumentation and Measurements Committee, the following members contributed actively to its revision:

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IEEE Standard Techniques for High-Voltage Testing

1. Overview

1.1 Scope

This standard is applicable to

a) Dielectric tests with direct voltages
b) Dielectric tests with alternating voltages
c) Dielectric tests with impulse voltages
d) Tests with impulse currents
e) Tests with combinations of the above
f) Capacitance and dielectric loss measurements

This standard is applicable only to tests on equipment with a rated voltage above 1000 V.

Procedures are given for applying correction factors to convert test data to standard atmospheric conditions.

This standard also specifies procedures for testing equipment when external insulation of the test object is to be subjected to dry, wet, or contaminated conditions.

1.2 Purpose

The purpose of this standard is to

a) Define terms of general applicability
b) Present general requirements regarding test equipment, objects, and procedures
c) Describe methods for evaluation of test results

1.3 Application

The methods of measurement and testing techniques described in this standard are generally applicable to all types of apparatus. Alternative test procedures may be required or permitted by the appropriate apparatus committee standards.