



# IEEE Guide for Field Testing of Laminated Dielectric, Shielded Power Cable Systems Rated 5 kV and Above with High Direct Current Voltage

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**IEEE Power Engineering Society**

Sponsored by the  
Insulated Conductors Committee

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# **IEEE Guide for Field Testing of Laminated Dielectric, Shielded Power Cable Systems Rated 5 kV and Above with High Direct Current Voltage**

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**Insulated Conductors Committee  
of the  
IEEE Power Engineering Society**

Approved 22 March 2007

**IEEE-SA Standards Board**

**Abstract:** The recommended practices and procedures for direct voltage acceptance and maintenance testing of shielded, laminated dielectric insulated power cable systems rated 5 kV and above are presented in this guide. It applies to all types of laminated power cable systems such as paper insulated, lead covered, pipe-type, and pressurized cables that are intended for the transmission or distribution of electric power. The tabulated test levels assume that the cable systems have an effectively grounded neutral system or a grounded metallic shield.

**Keywords:** cable, cable installation, cable maintenance, cable tests, field test procedures, high direct voltage tests, insulated cable, power cable systems, shielded power cable systems

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## Introduction

This introduction is not part of IEEE Std 400.1-2007, IEEE Guide for Field Testing of Laminated Dielectric, Shielded Power Cable Systems Rated 5 kV and Above with High Direct Current Voltage.

To say that there is a marked difference of opinion on the matter of cable testing would be a decided understatement. Many users, particularly utilities, while practicing acceptance testing, do not favor maintenance testing, or testing after cable systems have been in service, believing that such tests may shorten cable life. A few utility users, and many industrial users, favor both acceptance and maintenance testing, believing that such testing will contribute to improved service reliability. Others feel that either acceptance or maintenance testing can cause cable damage, resulting in premature failures and customer dissatisfaction. Annex C of this guide gives additional background and more detailed commentary on these attitudes and philosophies. There is undoubtedly much to be said both for and against all viewpoints, only the individual user can determine whether, how frequently, and at what stresses testing is to be conducted.

In short, this guide does not suggest that cable system testing be done; it simply provides guidance for such testing, developed by those who have found it useful. Additionally, it provides interpretive information based on many years of experience. Finally, pervading the entire procedure, safety has been a constant consideration in each step of the recommended practices. It is hoped that use of this guide will increase the fund of knowledge on the subject and result in more meaningful testing procedures and methods.

Suggestions for improvements to this guide are welcome. They should be sent to the Secretary, IEEE-SA Standards Board, 445 Hoes Lane, Piscataway, NJ 08854, USA.

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## Contents

1. Overview .....	1
1.1 Scope .....	1
1.2 Purpose .....	1
2. Normative references .....	1
3. General .....	2
3.1 Environmental influences .....	2
3.2 Test equipment .....	3
4. Test procedure .....	4
4.1 Test precautions .....	4
4.2 Safety practices .....	5
4.3 Testing procedure .....	5
4.4 Recording of test results .....	8
5. Evaluation of results .....	8
5.1 Current-time relationships .....	8
5.2 Resistance values .....	9
Annex A (informative) Reasons for testing .....	11
A.1 Acceptance tests .....	11
A.2 Maintenance tests .....	11
A.3 Corrective actions .....	11
Annex B (informative) Protection against possible severe voltage conditions due to flashover .....	12
B.1 Possible surge voltage conditions .....	12
B.2 Surge protection requirements .....	12
Annex C (informative) Discussion of differences of opinions regarding dc testing .....	13
Annex D (informative) Bibliography .....	14

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# IEEE Guide for Field Testing of Laminated Dielectric, Shielded Power Cable Systems Rated 5 kV and Above with High Direct Current Voltage

## 1. Overview

This guide provides a description of the methods and practices to be used when field-testing laminated dielectric power cable systems. There is no requirement that any testing be performed either at the time of installation or periodically thereafter. However, it is well known that direct current (dc) testing of laminated dielectric shielded power cables has been performed for many years, especially for new installations or after repairs. If the user decides to have a direct voltage test made on the system, the following information is intended to provide a guide to the methodology, voltages, and concerns to be considered during the testing.

### 1.1 Scope

This guide presents the recommended practices and procedures for direct voltage acceptance and maintenance testing of shielded, laminated dielectric insulated power cable systems rated 5 kV and above. It applies to all types of laminated power cable systems such as paper-insulated lead covered, pipe-type, and pressurized cables that are intended for the transmission or distribution of electric power. The tabulated test levels assume that the cable systems have an effectively grounded neutral system or a grounded metallic shield.

### 1.2 Purpose

The purpose of this guide is to provide uniform practices and procedures for performing direct voltage acceptance and maintenance tests on shielded, laminated power cable systems in the field and to provide guidelines for evaluation of the test results.

## 2. Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.