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IEEE Guide for Field Testing of Shielded Power Cable Systems Using Very Low Frequency (VLF)

Sponsor

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Abstract: This guide describes very low frequency (VLF) withstand and diagnostic tests and the measurements that are performed in the field on shielded power cable systems. Whenever possible, cable systems are treated in a similar manner to individual cables. Tables are included as an aid to identifying the effectiveness of the VLF test for various cable system insulation problems.
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Introduction

(This introduction is not part of IEEE Std 400.2-2004, IEEE Guide for Field Testing of Shielded Power Cable Systems Using Very Low Frequency (VLF).)

A significant investment with respect to electric power distribution is in cable systems. A high degree of reliability and reasonable life expectancy of the cable systems are necessary. In order to guarantee optimum performance of the power cable system, standards and guidelines have been developed which address the specific testing requirements for service-aged extruded and laminated dielectric insulation. This Guide is one part of an omnibus Guide that discusses known techniques for performing electrical tests in the field on shielded power cable systems.

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IEEE Guide for Field Testing of Shielded Power Cable Systems Using Very Low Frequency (VLF)

1. Overview

This guide provides a description of the methods and practices to be used in the application of very low frequency (VLF) high voltage excitation for field testing of shielded power cable systems (Bach [B1][1] and [B2]; Baur, Mohaupt, and Schlick [B5]; Gnerlich [B8]). VLF testing techniques, effective for a broad range of cable types, provide a new method of evaluation, and help to fill the need for more complete information on the cable system condition while minimizing or eliminating some potential adverse charging effects of the direct voltage high-potential test method (commonly known as the DC Hi-Pot test) (Eager [B6]; Groenefeld, von Olshausen, and Selle [B9]; Steennis, Boone, and Montfoort [B19]). This guide addresses VLF testing in the frequency range from 0.01 Hz to 1 Hz.

The information contained in this guide is intended to provide the methodology, voltages, and factors to be considered when utilizing VLF testing, whether as a withstand test or as a diagnostic test. For general information regarding other field testing methods, refer to the omnibus standard, IEEE Std 400™.[2]

1.1 Scope

This guide describes very low frequency withstand and diagnostic tests and measurements that are performed in the field on shielded medium voltage cables with extruded and laminated dielectric insulation. Whenever possible, cable systems are treated in a similar manner to individual cables. Charts are included as an aid in identifying the effectiveness of the VLF test for various cable insulation problems.

1.2 Purpose

This guide is intended to provide troubleshooting and testing personnel with information to test shielded medium voltage cable systems using very low frequency techniques.

[1] The numbers in brackets correspond to those of the bibliography in Annex B.
[2] Information on references can be found in Clause 2.