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IEEE Standard for Bushings for High-Voltage (Over 1000 Vac) Circuit Breakers and Gas-Insulated Switchgear

IEEE Power and Energy Society

Developed by the
Switchgear Committee
and the
Substations Committee

IEEE Std C37.017™-2020
(Revision of IEEE Std C37.017-2010)

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Approved 3 December 2020

IEEE SA Standards Board

Abstract: This standard is applicable to bushings intended for use in high-voltage circuit breakers and gas-insulated switchgear. These bushings are intended for indoor and outdoor use, operating on alternating current with a rated voltage greater than 1000 V and a frequency of 50 Hz or 60 Hz. These bushings are usually a part of an apparatus and tested according to the apparatus of which they form part.

Keywords: bushings, circuit breakers, IEEE C37.017™, gas-insulated bushings, gas-insulated substations, hollow insulators

The Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, New York, NY 10016-5997, USA

PDF: ISBN 978-1-5044-7299-9 STD24556
Print: ISBN 978-1-5044-7300-2 STDPD24556

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Introduction

This introduction is not part of IEEE Std C37.017-2020, IEEE Standard for Bushings for High-Voltage (Over 1000 Vac) Circuit Breakers and Gas-Insulated Switchgear.

This standard is based on the standard practices in the United States for bushings for high-voltage power circuit breakers, gas-insulated substation switchgear, and gas-insulated transmission lines. It is the result of joint efforts of the users and manufacturers working together in the Bushings Working Group of the High Voltage Circuit Breakers Subcommittee of the IEEE Switchgear Committee and the Gas Insulated Switchgear (GIS) Subcommittee of the IEEE Substations Committee.

Prior to 1991, ANSI C76.1 was the governing standard for the circuit breaker bushings. These bushings were oil-filled condenser type and intended for oil-filled power circuit breakers. NEMA, who had responsibility for this standard, transferred its content to the Transformers Committee of the IEEE Power and Energy Society. ANSI C76.1 was revised as IEEE Std C57.19.00-1991™[B1][1]. IEEE Std C57.19.00-1991™[B1] was "shared" between the Switchgear and Transformers Committees of the IEEE Power and Energy Society as it included the bushings that were interchangeable between the power transformers and the oil-filled circuit breakers. Since oil-filled circuit breakers were no longer being supplied in the United States, the bushings for oil-filled circuit breakers were eliminated in the 2000 edition of IEEE Std C57.19.00™[B1]. This standard fills the void in North America of a suitable bushing standard for circuit breakers and GIS. Electrical characteristics of the replacement bushings for the oil-filled circuit breakers are included in Annex A of IEEE Std C57.19.01-2000™[B3].

This issue of IEEE Std C37.017™ is a revision of IEEE Std C37.017-2010™. Significant changes in this revision include changes in the partial discharge test requirement during routine test. Order of Clause 7 (Tests) and Clause 8 (Hollow insulators tests) of the 2010 version of the standard has been reversed in this issue to correspond with a normal sequence of tests on insulators and bushings. The clauses were updated to refer to IEEE Std C37.100.1-2018™.[2] Normative references and definitions were updated. There were several other editorial type changes.

The related IEC standard is IEC 60137:2017, Insulated bushings for alternating voltages above 1000 V.[3]

Acknowledgments

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[2]IEEE publications are available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, Piscataway, NJ 08854, USA (https://standards.ieee.org/).
[3]Information on references can be found in Clause 2.

Contents

IEEE Standard for Bushings for High-Voltage (Over 1000 Vac) Circuit Breakers and Gas-Insulated Switchgear

1. Overview

1.1 Scope

This standard is applicable to bushings intended for use in high-voltage circuit breakers and gas-insulated switchgear. These bushings are intended for indoor and outdoor use, operating on alternating current with a rated voltage greater than 1000 V and a frequency of 50 Hz or 60 Hz. These bushings are usually a part of an apparatus and tested according to the apparatus of which they form part. Insulators or bushings used as an element of metal-enclosed switchgear assemblies, or in reclosers, sectionalizers, or similar equipment, are not included in the scope of this document. This standard does not apply to the following:

a) High-voltage cable terminations

b) Bushings for instrument transformers

c) Bushings for test transformers

d) Bushings for power transformers

e) Bushings for oil-filled circuit breakers

f) Oil-filled bushings in general

1.2 Purpose

This standard defines the special terms used, service conditions, ratings, general requirements, test procedures, and acceptance criteria for these bushings.

1.3 Word usage

The word *shall* indicates mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted (*shall* equals is *required to*).[4,5]

[4]The use of the word *must* is deprecated and cannot be used when stating mandatory requirements, *must* is used only to describe unavoidable situations.

[5]The use of *will* is deprecated and cannot be used when stating mandatory requirements, *will* is only used in statements of fact.