AS/NZS 60137:2020

Australian/New Zealand Standard™

Insulated bushings for alternating voltages above 1000 V (IEC 60137:2017 (ED.7.0) MOD)

AS/NZS 60137:2020

This Joint Australian/New Zealand Standard™ was prepared by Joint Technical Committee EL-008, Power Transformers. It was approved on behalf of the Council of Standards Australia on 22 April 2020 and by the New Zealand Standards Approval Board on 6 May 2020.

This Standard was published on 15 May 2020.

The following are represented on Committee EL-008:

Australian Industry Group
Electricity Engineers Association of New Zealand
Energy Efficiency & Conservation Authority of New Zealand
Energy Networks Australia
Engineers Australia
Rail Industry Safety and Standards Board

This Standard was issued in draft form for comment as DR AS/NZS 60137:2020.

Keeping Standards up-to-date

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:

www.standards.org.au

www.standards.govt.nz

ISBN 978 1 76072 840 3

Australian/New Zealand Standard™

Insulated bushings for alternating voltages above 1000 V (IEC 60137:2017 (ED.7.0) MOD)

Originated in Australia as AS C325—1959.
Revised and redesignated as AS 1265—1974.
Second edition 1990.
Jointly revised and redesignated as AS/NZS 60137:2008.
Second edition 2020.

Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-008, Power Transformers to supersede AS/NZS 60137:2008, *Insulated bushings for alternating voltages above 1000 V (IEC 60137, Ed. 5.0 (2003) MOD)*.

The objective of this Standard is to specify the characteristics and tests for insulated bushings.

This Standard is applicable to bushings, as defined in Clause 3, intended for use in electrical apparatus, machinery, transformers, switchgear and installations for three-phase alternating current systems, having highest voltage for equipment above 1 000 V and power frequencies of 15 Hz up to and including 60 Hz.

Subject to special agreement between purchaser and supplier, this standard may be applied, in part or as a whole to the following:

(a) Bushings used in other than three-phase systems.

(b) Bushings for high-voltage direct current systems.

(c) Bushings for testing transformers.

(d) Bushings for capacitors.

Special requirements and tests for transformer bushings in this Standard apply also to reactor bushings.

This Standard is applicable to bushings made and sold separately. Bushings which are a part of an apparatus and which cannot be tested according to this Standard should be tested with the apparatus of which they form part.

This Standard is an adoption with national modifications, and has been reproduced from, IEC 60137:2017, *Insulated bushings for alternating voltages above 1000 V*.

The modifications are additional requirements and are set out in Appendix ZZ, which has been added at the end of the source text.

Appendix ZZ lists the variations to IEC 60137:2017 for the application of this Standard in Australia and New Zealand.

As this document has been reproduced from an International Standard, the following applies:

(i) In the source text "this International Standard" should read "this Australian/New Zealand Standard".

(ii) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms "normative" and "informative" are used in Standards to define the application of the appendices or annexes to which they apply. A "normative" appendix or annex is an integral part of a Standard, whereas an "informative" appendix or annex is only for information and guidance.

NOTES

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

INSULATED BUSHINGS FOR ALTERNATING VOLTAGES ABOVE 1 000 V

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60137 has been prepared by sub-committee 36A: Insulated bushings, of IEC technical committee 36: Insulators.

This seventh edition cancels and replaces the sixth edition, published in 2008, and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- Resin-impregnated synthetic (RIS) bushings has been introduced.
- Bushings with U_m ≤ 1,1 kV, U_m = 1 100 kV and U_m = 1 200 kV have been introduced.
- Temperature rise testing has been included for liquid-insulated bushings according to clause to 3.4.
- Introducing dry lightning impulse testing as a routine test for all transformer bushings with U_m > 72,5 kV.
- The altitude correction procedure has been revised (> 1 000 m).

- An explanation about Very Fast Transient (VFT) phenomenon and its impact on bushings has been included.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
36A/187/FDIS	36A/189/RVD

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

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

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

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

The contents of the corrigendum of May 2018 have been included in this copy.

INTRODUCTION

In the preparation of the current edition of this standard further consideration has been given to the test requirements for power transformers as described in IEC 60076-3:2013.

INSULATED BUSHINGS FOR ALTERNATING VOLTAGES ABOVE 1 000 V

1 Scope

This International Standard specifies the characteristics and tests for insulated bushings.

This standard is applicable to bushings, as defined in Clause 3, intended for use in electrical apparatus, machinery, transformers, switchgear and installations for three-phase alternating current systems, having highest voltage for equipment above 1 000 V and power frequencies of 15 Hz up to and including 60 Hz.

Subject to special agreement between purchaser and supplier, this standard may be applied, in part or as a whole, to the following:

- bushings used in other than three-phase systems;
- bushings for high-voltage direct current systems;
- bushings for testing transformers;
- bushings for capacitors.

Special requirements and tests for transformer bushings in this standard apply also to reactor bushings.

This standard is applicable to bushings made and sold separately. Bushings which are a part of an apparatus and which cannot be tested according to this standard should be tested with the apparatus of which they form part.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60038, *IEC standard voltages*

IEC 60050-212:2010, *International Electrotechnical Vocabulary – Part 212: Electrical insulating solids, liquids and gases*

IEC 60059, *IEC standard current ratings*

IEC 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60068-2-17:1994, *Basic environmental testing procedures – Part 2-17: Tests – Test Q: Sealing*

IEC 60071-1, *Insulation co-ordination – Part 1: Definitions, principles and rules*

IEC 60076-5, *Power transformers – Part 5: Ability to withstand short circuit*

IEC 60076-7, *Power transformers – Part 7: Loading guide for oil-immersed power transformers*