



**NSAI**  
Standards

Irish Standard  
I.S. EN 60137:2008

# Insulated bushings for alternating voltages above 1 000 V (IEC 60137:2008 (EQV))

## I.S. EN 60137:2008

*Incorporating amendments/corrigenda issued since publication:*

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Údarás um Chaighdeáin Náisiúnta na hÉireann

English version

**Insulated bushings for alternating voltages above 1 000 V  
(IEC 60137:2008)**

Traversées isolées pour tensions  
alternatives supérieures à 1 000 V  
(CEI 60137:2008)

Isolierte Durchführungen  
für Wechselspannungen über 1 000 V  
(IEC 60137:2008)

This European Standard was approved by CENELEC on 2008-10-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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**CENELEC**

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

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**Foreword**

The text of document 36A/134/FDIS, future edition 6 of IEC 60137, prepared by SC 36A, Insulated bushings, of IEC TC 36, Insulators, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60137 on 2008-10-01.

This European Standard supersedes EN 60137:2003.

EN 60137:2008 includes the following significant technical changes with respect to EN 60137:2003:

- long duration power-frequency voltage for transformer bushings;
- special requirements for type and acceptance tests applicable to transformer and GIS bushings;
- specific insulation levels for bushings fitted to transformers and GIS;
- according to IEC Guide 111, clauses relating to safety and the environment have been added;
- the altitude correction procedure has been revised ( > 1 000 m).

The following dates were fixed:

- latest date by which the EN has to be implemented  
at national level by publication of an identical  
national standard or by endorsement (dop) 2009-07-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 2011-10-01

Annex ZA has been added by CENELEC.

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**Endorsement notice**

The text of the International Standard IEC 60137:2008 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60076-1	NOTE Harmonized as EN 60076-1:1997 (modified).
IEC 60076-2	NOTE Harmonized as EN 60076-2:1997 (modified).
IEC 60076-3	NOTE Harmonized as EN 60076-3:2001 (not modified).
IEC 60296	NOTE Harmonized as EN 60296:2004 (not modified).
IEC 60507	NOTE Harmonized as EN 60507:1993 (not modified).
IEC 60517	NOTE Harmonized as EN 60517:1996 (not modified).
IEC 60694	NOTE Harmonized as EN 60694:1996 (not modified).
IEC 60836	NOTE Harmonized as EN 60836:2005 (not modified).
IEC 60867	NOTE Harmonized as EN 60867:1994 (not modified).
IEC 62271-203	NOTE Harmonized as EN 62271-203:2004 (not modified).

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

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) applies.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60038 (mod)	1983	IEC standard voltages <sup>1)</sup>	HD 472 S1	1989
-	-		+ corr. February	2002
-	-		A1	1995
A1	1994			
A2	1997			
IEC 60050-212	1990	International Electrotechnical Vocabulary (IEV) - Chapter 212: Insulating solids, liquids and gases	-	-
IEC 60059	- <sup>2)</sup>	IEC standard current ratings	EN 60059	1999 <sup>3)</sup>
IEC 60060-1	- <sup>2)</sup>	High-voltage test techniques - Part 1: General definitions and test requirements	HD 588.1 S1	1991 <sup>3)</sup>
IEC 60068-2-17	1994	Environmental testing - Part 2: Tests - Test Q: Sealing	EN 60068-2-17	1994 <sup>3)</sup>
IEC 60071-1	- <sup>2)</sup>	Insulation co-ordination - Part 1: Definitions, principles and rules	EN 60071-1	2006 <sup>3)</sup>
IEC 60076-5	- <sup>2)</sup>	Power transformers - Part 5: Ability to withstand short circuit	EN 60076-5	2006 <sup>3)</sup>
IEC 60076-7	- <sup>2)</sup>	Power transformers - Part 7: Loading guide for oil-immersed power transformers	-	-
IEC 60216-2	- <sup>2)</sup>	Electrical insulating materials - Thermal endurance properties - Part 2: Determination of thermal endurance properties of electrical insulating materials - Choice of test criteria	EN 60216-2	2005 <sup>3)</sup>
IEC 60270	- <sup>2)</sup>	High-voltage test techniques - Partial discharge measurements	EN 60270	2001 <sup>3)</sup>
IEC 60376	- <sup>2)</sup>	Specification of technical grade sulfur hexafluoride (SF <sub>6</sub> ) for use in electrical equipment	EN 60376	2005 <sup>3)</sup>
IEC 60480	- <sup>2)</sup>	Guidelines for the checking and treatment of sulphur hexafluoride (SF <sub>6</sub> ) taken from electrical equipment and specification for its re-use	EN 60480	2004 <sup>3)</sup>

<sup>1)</sup> The title of HD 472 S1 is: Nominal voltages for low voltage public electricity supply systems.

<sup>2)</sup> Undated reference.

<sup>3)</sup> Valid edition at date of issue.

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<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60505	- <sup>2)</sup>	Evaluation and qualification of electrical insulation systems	EN 60505	2004 <sup>3)</sup>
IEC/TR 60815	- <sup>2)</sup>	Guide for the selection of insulators in respect - of polluted conditions		-
IEC 61462	- <sup>2)</sup>	Composite hollow insulators - Pressurized and unpressurized insulators for use in electrical equipment with rated voltage greater than 1 000 V - Definitions, test methods, acceptance criteria and design recommendations	EN 61462	2007 <sup>3)</sup>
IEC 61463	- <sup>2)</sup>	Bushings - Seismic qualification	-	-
IEC 62155 (mod)	- <sup>2)</sup>	Hollow pressurized and unpressurized ceramic and glass insulators for use in electrical equipment with rated voltages greater than 1 000 V	EN 62155	2003 <sup>3)</sup>
IEC 62217	- <sup>2)</sup>	Polymeric insulators for indoor and outdoor use with a nominal voltage > 1 000 V - General definitions, test methods and acceptance criteria	EN 62217 + corr. December	2006 <sup>3)</sup> 2006
IEC 62271	Series	High-voltage switchgear and controlgear	EN 62271	Series
IEC 62271-1	- <sup>2)</sup>	High-voltage switchgear and controlgear - Part 1: Common specifications	EN 62271-1	200X <sup>4)</sup>
IEC Guide 109	- <sup>2)</sup>	Environmental aspects - Inclusion in electrotechnical product standards	-	-
IEC Guide 111	- <sup>2)</sup>	Electrical high-voltage equipment in high-voltage substations - Common recommendations for product standards	-	-
CISPR 16-1	Series	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1: Radio disturbance and immunity measuring apparatus	EN 55016-1	Series
CISPR 18-2	- <sup>2)</sup>	Radio interference characteristics of overhead-power lines and high-voltage equipment - Part 2: Methods of measurement and procedure for determining limits		-

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<sup>4)</sup> To be ratified.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**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.
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- 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 sixth edition cancels and replaces the fifth edition, published in 2003, and constitutes a technical revision.

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

- Long duration power-frequency for transformer bushings.
- Special requirements for type and acceptance tests applicable to transformer and GIS bushings.
- Specific insulation levels for bushings fitted to transformers and GIS.
- According to IEC Guide 111, clauses relating to safety and the environment have been added.
- The altitude correction procedure has been revised ( > 1 000 m).

**I.S. EN 60137:2008**

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The text of this standard is based on the following documents:

FDIS	Report on voting
36A/134/FDIS	36A/135/RVD

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

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

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

## INTRODUCTION

In the preparation of this standard further consideration has been given to the test requirements for power transformers as described in IEC 60076-3:2000. Extensions have been made to the requirements for lightning impulse type testing and an additional test - long duration power-frequency withstand test - has been included.

In anticipation of changes in the creepage correction factors defined in IEC 60815 and currently under review by TC 36, details of the correction method have been removed from this standard.

## 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 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) applies.

IEC 60038:1983, *IEC standard voltages*  
Amendment 2 (1997)

IEC 60050(212):1990, *International Electrotechnical Vocabulary – Part 212: 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: 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 transformers*

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