



# SLOVENSKI STANDARD

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**Visokonapetostne stikalne in krmilne naprave - 4. del: Ravnanje z žveplovim heksafluoridom (SF<sub>6</sub>) (IEC 62271-4:2013)**

High-voltage switchgear and controlgear - Part 4: Handling procedures for sulphur hexafluoride (SF<sub>6</sub>)

Hochspannungs-Schaltgeräte und -Schaltanlagen - Teil 4: Handhabungsmethoden zum Umgang mit Schwefelhexafluorid (SF<sub>6</sub>)

Appareillage à haute tension - Partie 4: Procédures de manipulation de l'hexafluorure de soufre (SF<sub>6</sub>)

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**Ta slovenski standard je istoveten z: EN 62271-4:2013**

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**ICS:**

29.130.10	Visokonapetostne stikalne in krmilne naprave	High voltage switchgear and controlgear
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**SIST EN 62271-4:2013**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 62271-4**

November 2013

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Supersedes CLC/TR 62271-303:2009

English version

**High-voltage switchgear and controlgear -  
Part 4: Handling procedures for sulphur hexafluoride (SF<sub>6</sub>)  
and its mixtures  
(IEC 62271-4:2013)**

Appareillage à haute tension -  
Partie 4: Utilisation et manipulation de  
l'hexafluorure de soufre (SF<sub>6</sub>) et des  
mélanges contenant du SF<sub>6</sub>  
(CEI 62271-4:2013)

Hochspannungs-Schaltgeräte und -  
Schaltanlagen -  
Teil 4: Handhabungsmethoden im  
Umgang mit Schwefelhexafluorid (SF<sub>6</sub>)  
und seinen Mischgasen  
(IEC 62271-4:2013)

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SIST EN 62271-4:2013

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Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels**

## Foreword

The text of document 17A/1044/FDIS, future edition 1 of IEC 62271-4, prepared by SC 17A "High-voltage switchgear and controlgear" of IEC/TC 17 "Switchgear and controlgear" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62271-4:2013.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-06-30
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2016-09-30

This document supersedes CLC/TR 62271-303:2009.

EN 62271-4:2013 includes the following significant technical changes with respect to CLC/TR 62271-303:2009:

- a) the description of the potential effects on health of SF<sub>6</sub> by-products (former Annex D of CLC/TR 62271-303:2009) has been replaced by the calculation methods for evaluating of the potential effects on health of SF<sub>6</sub> by-products (see Annex H);
- b) information about cryogenic reclaim of SF<sub>6</sub> have been added (see Annex I);
- c) handling procedures for the most popular SF<sub>6</sub> mixtures have been added (see Annex J).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

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### Endorsement notice

The text of the International Standard IEC 62271-4:2013 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 62271-203:2011	NOTE	Harmonized as EN 62271-203:2012 (not modified).
ISO 14040:2006	NOTE	Harmonized as EN ISO 14040:2006 (not modified).

## Annex ZA (normative)

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

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 60050-441	-	International Electrotechnical Vocabulary (IEV) - Chapter 441: Switchgear, controlgear and fuses	-	-
IEC 60050-601	-	International Electrotechnical Vocabulary (IEV) - Chapter 601: Generation, transmission and distribution of electricity - General	-	-
IEC 60376	-	Specification of technical grade sulfur hexafluoride (SF <sub>6</sub> ) for use in electrical equipment	EN 60376	-
IEC 60480	-	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	-
IEC 62271-1	-	High-voltage switchgear and controlgear Part 1: Common specifications	EN 62271-1	-
-	-	Transportable gas cylinders - Gas cylinder identification (excluding LPG) - Part 3: Colour coding	EN 1089-3	-

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Edition 1.0 2013-08

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



High-voltage switchgear and controlgear –  
Part 4: Handling procedures for sulphur hexafluoride (SF<sub>6</sub>) and its mixtures

Appareillage à haute tension –  
Partie 4: Utilisation et manipulation de l'hexafluorure de soufre (SF<sub>6</sub>) et des  
mélanges contenant du SF<sub>6</sub>

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

**Part 4: Handling procedures for sulphur hexafluoride (SF<sub>6</sub>)  
and its mixtures**

## 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 62271-4 has been prepared by subcommittee 17A: High-voltage switchgear and controlgear, of IEC technical committee 17: Switchgear and controlgear.

This first edition cancels and replaces the first edition of IEC/TR 62271-303 published in 2008.

This first edition constitutes a technical revision. This edition includes the following significant technical changes with respect to the previous edition:

- a) the description of the potential effects on health of SF<sub>6</sub> by-products (former Annex D of IEC/TR 62271-303:2008) has been replaced by the calculation methods for evaluating of the potential effects on health of SF<sub>6</sub> by-products (see Annex H);
- b) information about cryogenic reclaim of SF<sub>6</sub> have been added (see Annex I);
- c) handling procedures for the most popular SF<sub>6</sub> mixtures have been added (see Annex J).

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

FDIS	Report on voting
17A/1044/FDIS	17A/1051/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.

A list of all parts in the IEC 62271, published under the general title *High-voltage switchgear and controlgear*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability 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,
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- replaced by a revised edition, or
- amended.

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## INTRODUCTION

As agreed with TC 10, annexes A, E, F, G, H and I will be removed from this document as soon as the revised editions of IEC 60376 and IEC 60480 have been published.

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## HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

### Part 4: Handling procedures for sulphur hexafluoride (SF<sub>6</sub>) and its mixtures

#### 1 General

##### 1.1 Scope

This part of IEC 62271 applies to the procedures for handling of SF<sub>6</sub> during installation, commissioning, normal and abnormal operations, disposal at the end-of-life of high-voltage switchgear and controlgear.

These procedures are regarded as minimum requirements to ensure the safety of personnel working with SF<sub>6</sub> (see Annex B) and to minimize the SF<sub>6</sub> emission to the environment.

This standard generally applies also to gas mixtures containing SF<sub>6</sub>. The particularities for their handling are covered in Annex J.

NOTE 1 Throughout this standard, use of the term High-Voltage (refer to IEC 60050-601:1985, 601-01-27) means a rated voltage above 1 000 V. However the term Medium Voltage (refer to IEC 60050-601: 1985, 601-01-28) is commonly used for distribution systems with voltages above 1 kV and generally applied up to and including 52 kV.

NOTE 2 Throughout this standard, the term “electric power equipment” stands for “high-voltage and medium-voltage switchgear and controlgear”.

NOTE 3 Throughout this standard, the term “pressure” stands for “absolute pressure”.

##### 1.2 Normative references

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

IEC 60050-441, *International Electrotechnical Vocabulary – Chapter 441: Switchgear, controlgear and fuses*

IEC 60050-601, *International Electrotechnical Vocabulary – Chapter 601: Generation, transmission and distribution of electricity – General*

IEC 60376, *Specification of technical grade sulphur hexafluoride (SF<sub>6</sub>) for use in electrical equipment*

IEC 60480, *Guidelines for the checking and treatment of sulphur hexafluoride (SF<sub>6</sub>) taken from electrical equipment and specifications for its re-use*

IEC 62271-1, *High-voltage switchgear and controlgear – Part 1: Common specifications*

EN 1089-3, *Transportable gas cylinders. Gas cylinder identification (excluding LPG). Colour coding*

## 2 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-441 and IEC 60050-601, as well as the following apply.

### 2.1

#### **abnormal release of SF<sub>6</sub>**

release from equipment in service due to a failure in the pressure system or mistake in the handling process

Note 1 to entry: An abnormal SF<sub>6</sub> leak is usually an unwanted and continuous emission of gas at a higher rate than the equipment designed leak rate. As soon as an abnormal SF<sub>6</sub> leak is detected, appropriate measures to locate and eliminate it should be arranged.

### 2.2

#### **handling of SF<sub>6</sub>**

any process which might involve transfer of SF<sub>6</sub>

### 2.3

#### **evacuation**

transfer of a gas different from SF<sub>6</sub> (e.g. air or N<sub>2</sub>) which can be released into the atmosphere. The operation is performed utilising a vacuum pump

### 2.4

#### **recovery of SF<sub>6</sub>**

transfer of SF<sub>6</sub> from the gas compartment into a reclaimer or storage container

Note 1 to entry: The operation is normally performed utilising a recovery compressor.

### 2.5

#### **topping-up with SF<sub>6</sub>**

filling a pre-filled compartment with SF<sub>6</sub> to the rated filling pressure

Note 1 to entry: Pre-filled compartments are closed pressure systems filled in the factory prior to shipment. They contain SF<sub>6</sub> at a typical pressure between 0,12 MPa to 0,15 MPa allowing for a faster and easier commissioning on-site.

### 2.6

#### **re-filling with SF<sub>6</sub>**

filling a compartment with SF<sub>6</sub> to the rated filling pressure to assure continuity of service

### 2.7

#### **reclaim of SF<sub>6</sub>**

a series of SF<sub>6</sub> handling procedures including recovery and minimum SF<sub>6</sub> refining process such as filtering dust, by-products, moisture, oil, etc.

Note 1 to entry: A standard reclaimer is described in Annex D; while a cryogenic reclaimer is described in Annex I.

Note 2 to entry: Sometimes the words "reclaiming" or "reclamation" may be used with the same meaning as "reclaim".

### 2.8

#### **gas-insulated metal-enclosed switchgear**

metal-enclosed switchgear in which the insulation is obtained, at least partly, by an insulating gas other than air at atmospheric pressure

Note 1 to entry: This term generally applies to high-voltage switchgear and controlgear.

[SOURCE: IEC 60050-441: 1984, 441-12-05]