



**NSAI**  
Standards

Irish Standard  
I.S. EN 61975:2010&A1:2017

# High-voltage direct current (HVDC) installations - System tests

**I.S. EN 61975:2010&A1:2017**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

EN 61975:2010/A1:2017

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*This document is based on:*

EN 61975:2010

*Published:*

2010-09-03

*This document was published under the authority of the NSAI and comes into effect on:*

2017-03-01

ICS number:

NOTE: If blank see CEN/CENELEC cover page

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## National Foreword

I.S. EN 61975:2010&A1:2017 is the adopted Irish version of the European Document EN 61975:2010, High-voltage direct current (HVDC) installations - System tests

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EUROPEAN STANDARD

**EN 61975:2010/A1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2017

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ICS 29.130.10; 31.080.01

English Version

## High-voltage direct current (HVDC) installations - System tests (IEC 61975:2010/A1:2016)

Installations en courant continu à haute tension (CCHT) -  
Essais systèmes  
(IEC 61975:2010/A1:2016)

Anlagen zur Hochspannungsgleichstromübertragung (HGÜ)  
- Systemprüfungen  
(IEC 61975:2010/A1:2016)

This amendment A1 modifies the European Standard EN 61975:2010; it was approved by CENELEC on 2016-10-17. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

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

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

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**EN 61975:2010/A1:2017**

**European foreword**

The text of document 22F/375/CDV, future IEC 61975:2010/A1, prepared by SC 22F “Power electronics for electrical transmission and distribution systems” of IEC/TC 22 “Power electronic systems and equipment” was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61975:2010/A1:2017.

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) 2017-08-10
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-02-10

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 61975**

September 2010

ICS 29.130.10; 31.080.01

English version

**High-voltage direct current (HVDC) installations -  
System tests  
(IEC 61975:2010)**

Installations en courant continu  
à haute tension (CCHT) -  
Essais système  
(CEI 61975:2010)

Anlagen zur  
Hochspannungsgleichstromübertragung  
(HGÜ) -  
Systemprüfungen  
(IEC 61975:2010)

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

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

## Foreword

The text of document 22F/221/FDIS, future edition 1 of IEC 61975, prepared by SC 22F, Power electronics for electrical transmission and distribution systems, of IEC TC 22, Power electronic systems and equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61975 on 2010-09-01.

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- latest date by which the EN has to be implemented  
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Annex ZA has been added by CENELEC.

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## Endorsement notice

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

- |                |      |                               |
|----------------|------|-------------------------------|
| IEC/TR 60919-1 | NOTE | Harmonized as CLC/TR 60919-1. |
| IEC 61000-4-3  | NOTE | Harmonized as EN 61000-4-3.   |
| IEC 61803      | NOTE | Harmonized as EN 61803.       |



## **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 60633	1998	Terminology for high-voltage direct current (HVDC) transmission	EN 60633	1999
IEC/TR 60919-2	2008	Performance of high-voltage direct current (HVDC) systems with line-commutated converters - Part 2: Faults and switching	CLC/TR 60919-2	201X <sup>1)</sup>

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<sup>1)</sup> At draft stage.

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**IEC 61975**

Edition 1.0 2010-07

# **INTERNATIONAL STANDARD**

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**High-voltage direct current (HVDC) installations – System tests**





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**IEC 61975**

Edition 1.0 2010-07

# **INTERNATIONAL STANDARD**

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**High-voltage direct current (HVDC) installations – System tests**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

PRICE CODE **XC**

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ICS 29.130.10; 31.080.01

ISBN 978-2-88912-100-7

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### HIGH-VOLTAGE DIRECT CURRENT (HVDC) INSTALLATIONS – SYSTEM TESTS

#### FOREWORD

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International Standard IEC 61975 has been prepared by subcommittee 22F: Power electronics for electrical transmission and distribution systems, of IEC technical committee 22: Power electronic systems and equipment.

This first version of IEC 61975 cancels and replaces IEC/PAS 61975 published jointly in 2004 by IEC and CIGRÉ. It constitutes a technical revision incorporating engineering experience.

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

FDIS	Report on voting
22F/221/FDIS	22F/227/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 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,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version may be issued at a later date.

## INTRODUCTION

The standard is structured in eight clauses:

- a) Clause 1 – Scope
- b) Clause 2 – Normative references
- c) Clause 3 – Definitions
- d) Clause 4 – General
- e) This clause addresses the purpose of this standard, the HVDC system structure, the control and protection structure, the logical steps of commissioning, the structure of the system test and that of the system commissioning standard.
- f) Clause 5 – Converter station test
- g) This clause addresses the commissioning of converter units and verifies the steady state performance of units as well as switching tests.
- h) Clause 6 – Power transmission tests
- i) This clause concerns the commissioning of the transmission system, and verifies station coordination, steady-state and dynamic performance, interference, as well as interaction between the d.c. and a.c. systems.
- j) Clause 7 – Trial operation
- k) After completion of the system test, the period of trial operation is normally specified to verify the normal transmission.
- l) Clause 8 – System test plan and documentation

Clauses 5 to 7 comprise individual sections providing an introduction and covering objects, preconditions and procedures and general acceptance criteria as well as detailed descriptions of the individual tests.

## HIGH-VOLTAGE DIRECT CURRENT (HVDC) INSTALLATIONS – SYSTEM TESTS

### 1 Scope

This International Standard applies to system tests for high-voltage direct current (HVDC) installations which consist of a sending terminal and a receiving terminal, each connected to an a.c. system.

The tests specified in this standard are based on bidirectional and bipolar high-voltage direct current (HVDC) installations which consist of a sending terminal and a receiving terminal, each connected to an a.c. system. The test requirements and acceptance criteria should be agreed for back-to-back installations, while multi-terminal systems and voltage sourced converters are not included in this standard. For monopolar HVDC installations, the standard applies except for bipolar tests.

For the special functions or performances that are claimed by specific projects, some extra test items not included in this standard should be added according to the technical specification requirements.

This standard only serves as a guideline to system tests for high-voltage direct current (HVDC) installations. The standard gives potential users guidance, regarding how to plan commissioning activities. The tests described in the guide may not be applicable to all projects, but represent a range of possible tests which should be considered.

Therefore, it is preferable that the project organization establishes the individual test program based on this standard and in advance assigns responsibilities for various tasks/tests between involved organisations (e.g. user, supplier, manufacturer, operator, purchaser etc.) for each specific project.

### 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For updated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60633:1998, *Terminology for high-voltage direct current (HVDC) power transmission*

IEC/TR 60919-2:2008, *Performance of high-voltage direct current (HVDC) systems with line commutated converters – Part 2: Faults and switching*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60633 as well as the following terms and definitions apply.

#### 3.1 Test classifications terms

##### 3.1.1 station test

converter system test including items which verify the function of individual equipment of the converter station in energized state

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