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

INTERNATIONAL
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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- withdrawn,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*