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TECHNICAL REPORT

UHV AC transmission systems – Part 100: General information



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UHV AC transmission systems – Part 100: General information

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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UHV AC TRANSMISSION SYSTEMS –

Part 100: General information

FOREWORD

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The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected a different kind of data from that which is normally published as an International Standard, for example "state of the art".

The technical report IEC 63042-100 was prepared by IEC Technical Committee 122: UHV AC transmission systems.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
122/29/DTR	122/31A/RVC

Full information on the voting for the approval of this technical report 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.

A list of all parts in the IEC 63042 series, published under the general title *UHV AC transmission systems*, can be found on the IEC website.

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- withdrawn,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.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

UHV AC transmission systems are capable of transmitting large amounts of electric power. However, if a failure occurs in a UHV AC system, the system influence can be severe from the viewpoints of reliability and overall security of the supply of the power system. Most UHV AC substations are located far from city areas, with large equipment in size and mass installed. Equipment is transported over long distances from where it is manufactured and tested to where it is installed and commissioned. Also, the installation time of equipment is generally longer compared with lower voltage classes. For UHV AC transmission lines, the design of insulation is an important aspect due to non-linearity effect.

Therefore, securing the reliability, availability, and environmental aspects are crucial issues. Standards and/or applications guidance, as relevant, in the following aspects of UHV AC transmission systems exceeding 800 kV are necessary:

a) planning (guidance);

b) design;

c) technical requirements (exclusively systems-related);

d) construction;

e) commissioning;

f) reliability;

g) availability (continuity of power supply, % availability);

h) operation;

i) maintenance.

This document describes both specific issues to UHV AC transmission systems and common issues of UHV AC and lower voltage transmission systems because it is very easy to understand UHV AC transmission systems as a whole.

In this Technical Report, minimum items or requirements for the standards and guidelines for each step of UHV AC transmission systems are described.

UHV AC TRANSMISSION SYSTEMS –

Part 100: General information

1 Scope

This part of IEC 63042, which is a Technical Report, specifies the reference for the standards and guidelines for UHV AC transmission systems. This document provides an overview of these standards as well as guidelines.

This document is developed to clarify standardization items and/or guideline items for UHV AC transmission systems. It describes the items to be considered for each stage of planning, design, construction, commissioning, operation, and maintenance during the development of IEC publications for UHV AC transmission systems.

NOTE Based on this IEC/TR 63042-100, TC 122 will prepare the standards and guidelines for UHV AC transmission systems, but it is not limited by the framework of the TR. A systematic approach is necessary for the preparation of systems-oriented specifications such as those for planning, design, technical requirements, construction, commissioning, reliability, availability, operation, and maintenance.

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
UHV AC
the highest voltage of the AC transmission system exceeding 800 kV

Note 1 to entry: UHV stands for Ultra High Voltage.

4 Planning

4.1 General

Large scale power sources have been developed. It is important to transmit the electric power efficiently from these power sources to consumption areas. Moreover, the network enhancement might decrease the system stability and worsen fault current problems. To