

# TECHNICAL SPECIFICATION



**UHV AC transmission systems –  
Part 102: General system design**



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Part 102: General system design**

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The language used for the development of this Technical Specification is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/standardsdev/publications](http://www.iec.ch/standardsdev/publications).

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## INTRODUCTION

Large capacity power sources including large-scale renewable energy have recently been developed, but they are generally located far away from load centres. To meet the requirements for large capacity power transmission, some countries have introduced, or are considering introducing, ultra high voltage (UHV) transmission systems, overlaying these on the existing extra high voltage (EHV) systems.

The objective of UHV AC power system planning and design is to achieve both economic efficiency and high reliability, considering its impact on EHV systems.

Moreover, UHV AC transmission systems require comparatively large spaces, and the method of minimizing and optimizing the size and structure of UHV AC transmission lines and substation apparatus is another important issue.

## UHV AC TRANSMISSION SYSTEMS –

### Part 102: General system design

#### 1 Scope

This part of IEC 63042 specifies the procedure to plan and design UHV transmission projects and the items to be considered.

#### 2 Normative references

There are no normative references in this document.

#### 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

##### **extra high voltage**

##### **EHV**

voltages in the range of 345 000 V to 765 000 V

##### 3.2

##### **right-of-way**

##### **ROW**

strip of land that is used to construct, operate, maintain and repair transmission line facilities

##### 3.3

##### **surge impedance loading**

##### **SIL**

power delivered by a line to a purely resistive load equal in value to the surge impedance of that line

##### 3.4

##### **ultra high voltage**

##### **UHV**

highest voltage exceeding 800 000 V

#### 4 Objective and key issues of UHV AC transmission application

##### 4.1 Objective

Recently, large capacity power sources including large-scale renewable energy have been developed, in most cases, far away from the load centres. To fully utilize these facilities, it is important to transmit power generated from these sources efficiently. Evacuation through extra high voltage (EHV) network enhancements would need more lines (right-of-way, ROW) and substations, increasing transmission losses and worsening fault current problems.