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UHV AC transmission systems -
Part 301: On-site acceptance tests

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC TS 63042-301:2018. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC TS 63042-301 has been prepared by IEC technical committee 122: UHV AC transmission systems. It is a Technical Specification.

This second edition cancels and replaces the first edition published in 2018. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) new subclause with measurement of short-circuit impedance and load loss for on-site assembly transformer has been added;
b) new subclause with measurement of no-load loss and current for on-site assembly transformer has been added;
c) on-site acceptance test requirement for GIL has been added;
d) new clause with protection and control system on-site acceptance tests has been added.

The text of this Technical Specification is based on the following documents:

Draft	Report on voting
122/199/DTS	122/211/RVDTS

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

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

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.

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. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,
– withdrawn, or
– revised.

INTRODUCTION

With the increase in voltage levels, the reliability and safety of high-voltage electric equipment is facing new challenges. There is a need to have consensus on a series of technical criteria and requirements for on-site acceptance tests for electrical equipment of ultra-high voltage (UHV) AC transmission systems exceeding 800 kV to detect the damages or abnormal conditions that ~~may~~ can occur during the transportation and installation processes and to determine whether equipment can be put into operation reliably and safely for power systems.

This document proposes on-site acceptance tests, relevant test items, test methods, and evaluation criteria for transformers, circuit-breakers, gas insulated switchgear (GIS) and gas insulated transmission line (GIL), surge arresters, voltage and current transformers, shunt reactors, series compensators, insulators, disconnectors, earthing switches and high-speed earthing switches.

1 Scope

This part of IEC 63042, which is a technical specification, applies to on-site acceptance tests of electrical equipment with the highest voltages of AC transmission system exceeding 800 kV and its protection and control system.

The electrical equipment exceeding 800 kV includes the following items:

– power transformers;
– circuit-breakers (CBs);
– gas insulated switchgear (GIS);
– gas insulated transmission line (GIL);
– surge arresters;
– voltage and current transformers;
– shunt reactors;
– series compensators;
– insulators;
– disconnectors and earthing switches;
– high-speed earthing switches (HSES).

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 60076-18, *Power transformers – Part 18: Measurement of frequency response*

IEC 60137:2017*, Insulated bushings for alternating voltages above 1 000 V*

~~IEC 60376, *Specification of technical grade sulfur hexafluoride (SF_6) for use in electrical equipment*~~

IEC 60383-1:2023, *Insulators for overhead lines with a nominal voltage above 1 000 V – Part 1: Ceramic or glass insulator units for a.c. systems – Definitions, test methods and acceptance criteria*

IEC 60480, ~~*Guidelines for the checking and treatment of sulfur hexafluoride (SF_6) taken from electrical equipment and specification for its re-use*~~ *Specifications for the re-use of sulphur hexafluoride (SF_6) and its mixtures in electrical equipment*

IEC 62271-1:2017, *High-voltage switchgear and controlgear – Part 1: Common specifications for alternating current switchgear and controlgear*
IEC 62271-1:2017/AMD1:2021

IEC 62271-4, *High-voltage switchgear and controlgear – Part 4: Handling procedures for ~~sulphur hexafluoride (SF_6) and its mixtures~~ gases for insulation and/or switching*

IEC 62271-100:~~2008~~2021, *High-voltage switchgear and controlgear – Part 100: Alternating-current circuit-breakers*
IEC 62271-100:2021/AMD1:2024

Bibliography

~~IEC 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*~~

~~IEC 60060-2, *High-voltage test techniques – Part 2: Measuring systems*~~

~~IEC 60060-3, *High-voltage test techniques – Part 3: Definitions and requirements for on-site testing*~~

IEC 60071-1~~:2006~~, *Insulation co-ordination – Part 1: Definitions, principles and rules*
~~IEC 60071-1:2006/AMD1:2010~~

IEC 60076-1, *Power transformers – Part 1: General*

IEC 60076-3, *Power transformers – Part 3: Insulation levels, dielectric tests and external clearances in air*

~~IEC 60076-18, *Power transformers – Part 18: Measurement of frequency response*~~

~~IEC 60137:2017, *Insulated bushings for alternating voltages above 1 000 V*~~

IEC 60143-1~~:2015~~, *Series capacitors for power systems – Part 1: General*

IEC 60143-2~~:2012~~, *Series capacitors for power systems – Part 2: Protective equipment for series capacitor banks*

IEC 60296, *Fluids for electrotechnical applications – ~~Unused Mineral insulating oils for transformers and switchgear~~ Mineral insulating oils for electrical equipment*

~~IEC 60383-1:1993, *Insulators for overhead lines with a nominal voltage above 1 000 V – Part 1: Ceramic or glass insulator units for a.c. systems – Definitions, test methods and acceptance criteria*~~

IEC 60376, *Specification of technical grade sulphur hexafluoride (SF_6) and complementary gases to be used in its mixtures for use in electrical equipment*

IEC 60422, *Mineral insulating oils in electrical equipment – Supervision and maintenance guidance*

IEC 60599, *Mineral oil-filled electrical equipment in service – Guidance on the interpretation of dissolved and free gases analysis*

~~IEC 61869-2, *Instrument transformers – Part 2: Additional requirements for current transformers*~~

~~IEC 61869-4, *Instrument transformers – Part 4: Additional requirements for combined transformers*~~

IEC 61869-5, *Instrument transformers – Part 5: Additional requirements for capacitor voltage transformers*

~~IEC 61936-1, *Power installations exceeding 1 kV a.c. – Part 1: Common rules*~~

~~IEEE 1861, *IEEE guide for on-site accept tests of electrical equipment and system commissioning of 1 000 kV ac and above*~~

IEC 62271-109:2019, *High-voltage switchgear and controlgear – Part 109: Alternating-current series capacitor by-pass switches*

IEC 62271-112:2021, *High-voltage switchgear and controlgear – Part 112: Alternating current high-speed earthing switches for secondary arc extinction on transmission lines*

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