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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 311.14-2024

**Insulation co-ordination - Part 14: Insulation co-ordination for
AC/DC filters of HVDC system**

绝缘配合 第14部分：高压直流系统AC/DC滤波器绝缘配合

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part

1. Structure and drafting rules for standardization documents" Drafting. This document is part 14 of GB/T 311 "Insulation Coordination". GB/T 311 has published the following parts.

1. Definitions, principles and rules;

2. Guidelines for use;

3. Insulation coordination procedures for high voltage DC converter stations;

4. Calculation guide for network insulation coordination and its simulation;

14. Insulation coordination of AC/DC filters for high voltage DC systems. Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document was proposed by the China Electrical Equipment Industry Association. This document is under the jurisdiction of the National Technical Committee for High Voltage Test Technology and Insulation Coordination Standardization (SAC/TC163). This document was drafted by:

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GB/T 311 "Insulation Coordination" aims to establish the principles and guidelines for high-voltage AC and high-voltage DC insulation coordination. There are obvious differences between AC insulation coordination and DC insulation coordination, and it needs to be divided into two aspects. AC insulation coordination and DC insulation coordination, which are planned to be composed of the following parts.

1. Definitions, principles and rules. The purpose is to establish definitions, principles and rules for insulation coordination.
2. User Guide. The purpose is to provide user guidance for the correct implementation of Part 1.
3. Insulation coordination procedures for high-voltage DC converter stations. The purpose is to provide guidance on insulation coordination for high-voltage DC converter stations.
4. Calculation guide for insulation coordination of power grids and its simulation. The purpose is to determine the guidelines for digital calculation of insulation coordination.
11. Definitions, principles and rules for insulation coordination of high voltage DC systems. The purpose is to establish the definition, principles and rules for insulation coordination of DC systems. principles and rules.
12. Guidelines for the application of insulation coordination for high-voltage DC converter stations (LCC). The purpose is to provide guidance for the application of insulation coordination for high-voltage DC converter stations (LCC) using LCC as the converter. Provide guidance for insulation coordination of DC converter stations.

1 Scope

GB/T 311.14-2024 covers insulation co-ordination for the AC and DC filters of an HVDC converter station. China operates by far the largest HVDC network in the world, and the

filters are a distinctive insulation problem within it: the components sit at potentials that combine direct voltage with substantial harmonic content, the stress distribution across a filter bank changes when a component fails and is bypassed, and the arresters protecting them have to be co-ordinated with switching, lightning and internal fault overvoltages that have no equivalent in an AC substation. The standard sets the typical configuration schemes of the AC and DC filters, the symbols and abbreviations, and then the insulation co-ordination procedure: the overvoltage cases to be studied, the arrester arrangement and its energy duties, the determination of the protective levels, the selection of the withstand voltages for each element of the filter, the clearances, and the treatment of pollution and altitude. It takes effect on 1 October 2024, and for a converter station designer or an equipment supplier this is the governing text.

This document gives the insulation coordination procedures and requirements for AC filters (including shunt capacitors) and DC filters for HVDC transmission systems. Rules, arrester arrangements and stress characteristics etc. This document is applicable to AC and DC filters in high voltage DC transmission systems. It provides guidance on voltage and lightning arrester selection and does not involve requirements for personal safety.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document.

GB/T 311.1-2012 Insulation coordination Part

3 Terms and definitions

GB/T 311.1-2012, GB/T 25093-2010, GB/T 25308-2022, IEC 60071-11.2022, IEC 60071-12. For the purposes of this document, the terms and definitions defined in 2022 apply.

4.1 Notation

4.1.1 Text symbols The following symbols apply to this document. Ka. Altitude correction factor. Kc. coordination factor. Ks. Safety factor. n. harmonic order. Uccov. Peak continuous operating voltage of the arrester. Ucw. Coordinate withstand voltage. Uref. Reference voltage of the arrester.