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

GB/T 25308-2022

Replacing GB/T 25308-2010

DC filters for high voltage direct current transmission systems

高压直流输电系统直流滤波器

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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 replaces GB/T 25308-2010 "DC filter for HVDC transmission system". Compared with GB/T 25308-2010, except Apart from structural adjustments and editorial changes, the main technical changes are as follows:

---Changed the "scope" and "normative references" (see Chapter 1 and Chapter 2, Chapter 1 and Chapter 2 of the.2010 edition);

--- Changed the definition of "DC filter" (see 3.1,

3.1 of the.2010 edition), and deleted the terms "characteristic harmonics" and "non-characteristic harmonics" and "auxiliary circuit" (see 3.3,

3.6 of the.2010 edition), adding the terms "[DC] neutral bus capacitor" and "[DC Flow] smoothing reactor" (see

--- Changed the "normal conditions of use" in the provisions of the temperature and altitude of the installation and operation place (see

4.1.1 and 4.1.3, the.2010 edition

4.1.1 and 4.1.3), the regulations on pollution level and creepage distance (see 4.1.2), the regulations on "seismic intensity" and "wind speed" (see

4.1.4 and 4.1.5);

---Changed the provisions of "high relative humidity", "mold growth" and "corrosive atmosphere" in "special conditions of use" (see 4.2.1~4.2.3, 4.2.1~

4.2.3 of the.2010 edition); delete the provisions of "earthquake area" (see

4.2.4 of the.2010 edition);

--- Increased DC filter parameter design including "calculation of harmonic voltage generated by the converter" (see 5.1), DC filter The description of "parallel circuit resonant frequency f_p " in the type and the content of the three-tuned filter (see 5.2);

1 Scope

China's national standard for the direct current filters of HVDC transmission systems. It specifies the service conditions, the requirements, the design, the tests and the marking of DC side filters for high voltage direct current schemes. A line-commutated converter does not produce a smooth direct voltage. It produces a stepped waveform whose ripple contains harmonics at multiples of the pulse number, and those harmonics are impressed on the transmission line, which for an overhead HVDC line is a conductor running hundreds or thousands of kilometres alongside telecommunications and through inhabited country. The consequence is interference: the harmonic currents flowing in the line and returning through

earth induce noise in telephone circuits and in any other conductor running parallel to it, and the effect is measured as an equivalent disturbing current that the scheme is contractually obliged to keep below a limit. The smoothing reactor reduces the ripple, but not enough on its own, so the DC filter is connected between the line and neutral to shunt the remaining harmonic currents away before they reach the line. What makes the component difficult is what it must withstand while doing that. It sits at full DC line voltage continuously, so its capacitors carry a large direct voltage with the harmonic voltage superimposed; it must remain in tune despite temperature and ageing, because a detuned filter passes what it was built to trap; and it must survive the transient overvoltages of a fault or a converter blocking. So the standard covers the electrical design and rating, the capacitors, reactors and resistors, the insulation coordination, the protection, the seismic and environmental requirements, and the type and routine tests. Issued on 30 December 2022 and in force since 1 July 2023, it replaces GB/T 25308-2010.

This document specifies the use conditions, parameter design requirements, equipment design requirements, test, structure and conductor requirements, logo etc. This document applies to DC filters installed in high-voltage direct current (HVDC) transmission systems with voltage levels of $\pm 1100\text{kV}$ and below.

2 Normative references

The contents of the following documents constitute the essential provisions of this document through normative references in the text. Among them, dated references For documents, only the version corresponding to the date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to this document.

GB/T 311.1-2012 Insulation coordination Part

3 Terms and Definitions

The following terms and definitions defined in GB/T 13498-2017 apply to this document.

3.1 DC [harmonic] filter DC (harmonic) filter Cooperate with DC smoothing reactor and DC impact capacitor (if any), the main function is to reduce the filter for circuit current or voltage fluctuations. [Source: GB/T 13498-2017, 9.4]

4 For DC systems insulator

GB/T 28543-2021 Power capacitor noise measurement method

GB/T 30547-2014 Resistors for filters in HVDC transmission systems

GB/T 50260 Code for Seismic Design of Power Facilities

6 Reactors

GB/T 1985 High-voltage AC isolating switch and grounding switch

GB/T 13498-2017 Terminology for HVDC Transmission

GB/T 20840.1 Transformers Part

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