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

GB/Z 163.4-2025

**High-voltage direct current (HVDC) systems - Guidance to the
specification and design evaluation of AC filters - Part 4:
Equipment**

高压直流系统 交流滤波器规范和设计评估导则 第4部分：设备

(English Translation)

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Foreword

This document is a report-type guidance technical document.

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents". Drafting.

This document is Part 4 of GB /Z 163 "Specifications and Design Evaluation Guidelines for AC Filters in High Voltage DC Systems". GB /Z 163 has been... The following sections have been published.

---Part 1: Introduction;

---Part 4: Equipment.

This document is modified to adopt IEC TR62001-4:2021 "Specification and Design Evaluation Guidelines for AC Filters in High Voltage DC Systems" Section 4 Part. Equipment, the document type has been changed from IEC technical report to my country's national standardization guidance technical document.

The technical differences between this document and IEC TR62001-4:2021, and the reasons therefor, are as follows.

---The scope of application has been changed to comply with the requirements of GB/T 1.1-2020 (see Chapter 1);

---Regarding normative references, this document has been adjusted to reflect technical differences and adapt to my country's technical conditions. Specific adjustments are detailed below. as follows.

- Replace IEC 60099-4 with GB/T 11032 (see 5.1, 11.5.1 and Table 4);
- Replace IEC 61869-2 with GB/T 20840.2 (see 8.1, 11.6.2.1, 11.6.2.2 and 11.6.2.4);
- Replace IEC 60618 with GB/T 8287.1 (see 11.2.4, 11.3.4, 11.5.4 and 11.6.2.4);
- Replace IEC 60076-6 with GB/T 11024.1 (see 11.3.4 and 11.3.4);
- Replace IEC 60076-6 with GB/T 1094.6 (see 11.3.4 and 11.3.4);
- Replace IEC 60099-5 with GB/T 28547 (see 11.5 and Table 4);
- GB/T 30547 and GB /Z 55093.1-2025 have been added (see 11.4.4, Chapter 3, 6.2.1, and 7.1).

---The illustration in Figure 1 has been modified (see 4.2.1) to conform to the requirements of GB/T 4728.2;

---Change the letter symbols "lifr" to "lfr1" and "lifr" to "lfr2" (see 4.2.1 and 4.2.3) to conform to GB/T 1.1-2020 Requirements;

---The reference to another method for handling background harmonics, IEC TR62001-3, has been corrected due to an error (see 4.2.2);

---The usual value for the highest harmonic order of the LCC high-voltage DC system is changed to 50th to meet domestic standard requirements (see...). (4.2.4.1, 6.2.2, 6.3.1 and 6.3.2)

--- Corrected formulas (5), (8), (9), (11), (12), (15), (17), (19) and formula (20) (see 4.2.4.2~4.2.4.4, 6.2.2, 6.3.2 and 11.4.4), due to formula error;

---The formula (14) for harmonic voltage has been corrected to formula (8) (see 4.2.4.2) due to an error in the reference;

---Change R/G/B in Figures 2, 3, and 4 to A phase/B phase/C phase (see 5.2.1 and 5.2.2)

to conform to domestic conventions. Express;

---The cited clause in the description of grounding faults at the high-voltage end of the capacitor bank has been corrected to 5.3.3 (see 5.2.3), due to an error in the citation;

1 Scope

This document provides basic data for determining the AC filters and components of a high-voltage direct current (HVDC) system, such as steady-state settings, transient stresses, and... It provides guidance on setpoints, losses, design issues and special applications, protection, audible noise, seismic requirements, equipment design and test parameters.

This document applies to the suppression of harmonic distortion and audible sensitive frequency interference in high-voltage direct current systems employing grid-commutated converters (LCCs).

AC-side filters are not suitable for power line carrier (PLC) and radio interference spectrum. Voltage source converter (VSC) based filters... The AC filter for high-voltage DC systems should be used as a reference.

Note: High-voltage DC based on voltage source converter (VSC) is also called flexible DC.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 1094.6 Power Transformers - Part 6: Reactors (GB/T 1094.6-2011, IEC 60076-6:2007, MOD)

GB/T 8287.1 Post insulators for indoor and outdoor systems with nominal voltage above 1000V - Part 1: Porcelain

GB/T 11024.1 Parallel capacitors for AC power systems with nominal voltage above 1000V - Part 1: General provisions (GB/T 11024.1-2019, IEC 60871-1:2014, MOD)

GB/T 11032 AC gapless metal oxide surge arresters (GB/T 11032-2020, IEC 60099-4:2014, MOD)

GB/T 20840.2 Instrument Transformers - Part 2: Supplementary Technical Requirements for Current Transformers (GB/T 20840.2-2014)

IEC 61969-2:2012, MOD)