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

GB/Z 163.1-2025

**High-voltage direct current (HVDC) systems - Guidance to the
specification and design evaluation of AC filters - Part 1:
Overview**

高压直流系统 交流滤波器规范和设计评估导则 第1部分：概论

(English Translation)

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References

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 1 of GB /Z 163 "Specifications and Design Evaluation Guidelines for AC Filters in High Voltage Direct Current 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 TR62001-1:2021 "Specification and Design Evaluation Guidelines for AC Filters in High Voltage DC Systems" Section 1 Part. Overview, the document type has been changed from an IEC technical report to a national standardization guidance technical document of my country.

The technical differences between this document and IEC TR62001-1:2021, and the reasons therefor, are as follows.

---The scope description has been revised (see Chapter 1 to comply with GB/T 1.1-2020);

---The symbol for the quality factor of reactors has been changed to QL, and the symbol for the quality factor of filters is now QF, to avoid symbol redundancy. See 7.3, 7.4.1, 7.4.2, 7.5.1.1, 8.2.1, 8.2.3, 8.2.4, and 11.2.2;

---The illustrative diagram references for second-order and third-order filters (see 7.3) have been changed due to a reference error;

---The IGB T converter has been changed to a voltage source converter, which is more in line with domestic usage (see 11.2.4). The following editorial changes have been made to this document.

---Appendix A has been deleted because the alternative procurement procedure has never been used domestically (see Appendix A of IEC TR62001-1:2021);

---The formula (B.10) has been corrected (see B.3).

Introduction

High-voltage direct current (HVDC) transmission, as an important means to solve the problems of large-capacity, long-distance power transmission and asynchronous grid interconnection, plays a crucial role in my country's energy optimization and regional interconnection. It plays an important role in the network.

AC filters are an important component of high-voltage direct current (HVDC) transmission systems. With the development of HVDC transmission technology, the demand for AC filters has increased.

The basic requirements, performance, and components of AC filters have all been raised to higher standards. This is particularly relevant in DC transmission systems that traditionally use grid-commutated converters.

Based on the engineering foundation, requirements for harmonics in flexible DC transmission projects were further proposed. GB /Z 163, "AC Filtering for High Voltage Direct Current Systems," was compiled.

The "Specifications and Design Evaluation Guidelines for High Voltage Direct Current Transmission Equipment" aims to provide guidance for the construction of high voltage direct current transmission projects in my country and is planned to consist of five parts.

---Part 1: Introduction. The purpose is to provide specifications for AC filters in high-voltage direct current (HVDC) systems employing grid-commutated converters.

Specifications, permissible distortion limits, harmonic generation, filter configuration, filter performance calculation, filter switching, reactive power control, and owner-specified parameters. Number and requirements.

---Part 2: Performance. The aim is to provide standards, field measurements, and verifications based on current interference.

---Part 3: Modeling. The aim is to provide modeling for converter harmonic interactions, background harmonics, AC grid impedance, and AC filtering. Device performance simulation.

---Part 4: Equipment. The purpose is to provide steady-state and transient settings, power