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TECHNICAL REPORT

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Part 1: Overview

FOREWORD

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IEC TR 62001-1 has been prepared by subcommittee 22F: Power electronics for electrical transmission and distribution systems, of IEC technical committee 22: Power electronic systems and equipment. It is a Technical Report.

This second edition cancels and replaces the first edition published in 2016. This edition constitutes a technical revision.

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

a) general updating of the document to reflect changes in practice;
b) 10.2.4 on fuseless capacitors has been transferred to IEC TR 62001-4;
c) Clause 11 on future developments has been expanded;
d) 10.3.3 and Annex F on voltage sourced converters have been deleted as their content is covered by IEC TR 62543.

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

DTR	Report on voting
22F/614/DTR	22F/623A/RVDTR

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 Report is English.

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/standardsdev/publications.

A list of all parts in the IEC TR 62001 series, published under the general title *High-voltage direct current (HVDC) systems – Guidance to the specification and design evaluation of AC filters*, can be found on the IEC website.

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- withdrawn,
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- amended.

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INTRODUCTION

The IEC TR 62001 series is structured in ~~four~~ five parts:

IEC TR 62001-1 – Overview

This part concerns specifications of AC filters for high-voltage direct current (HVDC) systems with line-commutated converters, permissible distortion limits, harmonic generation, filter arrangements, filter performance calculation, filter switching and reactive power management and customer specified parameters and requirements.

IEC TR 62001-2 – Performance

This part deals with current-based interference criteria, ~~design issues and special applications,~~ field measurements and verification.

IEC TR 62001-3 – Modelling

This part addresses the harmonic interaction across converters, pre-existing harmonics, AC network impedance modelling, simulation of AC filter performance.

IEC TR 62001-4 – Equipment

This part concerns steady-state and transient ratings of AC filters and their components, power losses, audible noise, design issues and special applications, filter protection, seismic requirements, equipment design and test parameters.

IEC TR 62001-5[1] – AC side harmonics and appropriate harmonic limits for high-voltage direct current (HVDC) systems with voltage sourced converters (VSC)

This document concerns specific issues of AC filter design related to VSC HVDC systems.

Parts 1 to 4 are written with focus on line commutated converters.

[1] Under preparation. Stage at the time of publication: IEC/RPUB 62001-5:2021.

HIGH-VOLTAGE DIRECT CURRENT (HVDC) SYSTEMS – GUIDANCE TO THE SPECIFICATION AND DESIGN EVALUATION OF AC FILTERS –

Part 1: Overview

1 Scope

This part of IEC 62001, which is a Technical Report, deals with the specification and design evaluation of AC side harmonic performance and AC side filters for HVDC schemes. It is intended to be primarily for the use of the utilities and consultants who are responsible for issuing the specifications for new HVDC projects and evaluating designs proposed by prospective suppliers.

This document provides guidance on the specifications of AC filters for high-voltage direct current (HVDC) systems with line-commutated converters and filter performance calculation.

The scope of this document covers AC side filtering for the frequency range of interest in terms of harmonic distortion and audible frequency disturbances. Where the term "HVDC converter" or "HVDC station" is referred to without qualification, in this document, it is understood to refer to LCC technology. It excludes filters designed to be effective in the power line carrier (PLC) and radio interference spectra.

The bulk of this document concentrates on the "conventional" AC filter technology and LCC (line-commutated converter) HVDC converters. The changes entailed by new technologies are also discussed. Voltage sourced converter (VSC) specific issues are discussed in CIGRE Technical Brochure 754 [1][2] and in IEC TR 62001-5 [2].

2 Normative references

There are no normative references in this document.

[2] Numbers in square brackets refer to the Bibliography.

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