

TECHNICAL REPORT



**High-voltage direct current (HVDC) systems – Guidance to the specification and design evaluation of AC filters –
Part 2: Performance**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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CONTENTS

FOREWORD	5
INTRODUCTION	7
1 Scope	8
2 Normative references	8
3 Current-based interference criteria	8
3.1 General	8
3.2 Determining the necessity for telephone interference limits	9
3.3 Defining telephone interference limits	11
3.3.1 General	11
3.3.2 Mechanisms of interference	11
3.3.3 Noise performance coordination levels	13
3.3.4 Influence of power transmission lines	14
3.3.5 Determination of IT limits for a specific project	19
3.3.6 Pre-existing harmonics and future growth	23
3.3.7 Recommendations for technical specifications	25
3.4 Consequences for filter design	26
3.5 Telephone infrastructure mitigation options	27
3.6 Experience and examples	28
3.6.1 General	28
3.6.2 Review of design requirements	28
3.6.3 Measured current levels of schemes in service	30
3.6.4 Example of actual telephone interference problems	31
3.6.5 Experience in China, showing no interference problems	33
3.7 Conclusions	33
4 Field measurements and verification	34
4.1 Overview	34
4.2 Equipment and subsystem tests	34
4.2.1 General	34
4.2.2 Fundamental frequency impedance and unbalance measurement	34
4.2.3 Frequency response curve	34
4.3 System tests	35
4.4 Measuring equipment	35
4.4.1 Overview	35
4.4.2 AC filter energization	36
4.4.3 Verification of the reactive power controller	36
4.4.4 Verification of the specified reactive power interchange	36
4.4.5 Verification of the harmonic performance	37
4.4.6 Verification of audible noise	39
4.5 In-service measurements	41
4.5.1 General	41
4.5.2 In-service tuning checks	41
4.5.3 On-line monitoring of tuning	41
4.5.4 Monitoring of IT performance	41
4.5.5 Measurements of pre-existing harmonic levels for design purposes	41
Annex A (informative) Voltage and current distortion – Telephone interference	42
A.1 Voltage distortion limits for HV and EHV networks	42

A.1.1	General	42
A.1.2	Recommended limits for HV or EHV networks	43
A.2	Harmonic current in generators	45
A.3	Causes of telephone interference	45
A.4	Definition of telephone interference parameters.....	47
A.5	Discussion	50
A.6	Coupling mechanism from power-line current to telephone disturbance voltage.....	51
Annex B (informative)	Example of induced noise calculation with Dubanton equations.....	52
B.1	General	52
B.2	Residual IT	52
B.3	Balanced IT	53
Annex C (informative)	Illustration of the benefit of including a TIF requirement in the technical specification.....	54
Annex D (informative)	Specification of IT limits dependent on network impedance	56
Annex E (informative)	The impact of AC network harmonic impedance and voltage level on the filter design necessary to fulfil an IT criterion.....	60
E.1	General	60
E.2	Assumptions and pre-conditions.....	61
E.3	Harmonic impedance of AC network.....	63
E.4	Filter design.....	65
E.5	Explanation of the difference in impact of relative and absolute performance criteria on required filter Mvar	67
Bibliography	68
Figure 1	– Conversion factor from positive sequence current at the sending end to positive sequence current at the receiving end, and input impedance of a 230 kV line, 124 km long, 1000 Ω -m.....	21
Figure 2	– Conversion factor from positive sequence current to residual current, and input impedance of a 230 kV line, 124 km long, 1 000 Ω -m.....	21
Figure 3	– Simple circuit for calculation of harmonic performance taking into account pre-existing harmonics.....	23
Figure 4	– Converter variables for harmonic performance tests	37
Figure 5	– Example of measurements made during a ramp of the converters.....	40
Figure A.1	– Contributions of harmonic voltages at different voltage levels in a simple network	42
Figure A.2	– C-message and psophometric weighting factors	46
Figure A.3	– Flow-chart describing the basic telephone interference mechanism	51
Figure D.1	– Simplification of the detailed network used for telephone interference simulation.....	56
Figure D.2	– Induced voltage in telephone circuit vs. network impedance, for unitary current injected.....	57
Figure D.3	– IT limits as defined for different network impedances	58
Figure E.1	– Converter harmonics un-weighted (A) and IT weighted (kA) on 240 kV base.....	62
Figure E.2	– Converter Mvar absorption versus load	63
Figure E.3	– Impedance sector diagram and RL-equivalent circuit.....	64
Figure E.4	– Simplified converter/system topology	64
Figure E.5	– Simplified circuit including overhead transmission line.....	65

Table 1 – Performance thresholds for metallic noise	14
Table 2 – Performance thresholds for longitudinal noise.....	14
Table 3 – Performance thresholds for balance	14
Table 4 – Illustrative maximum telephone line length to achieve the North American recommended longitudinal N_g level, as a function of balanced IT level, earth resistivity and separation distance	17
Table 5 – Illustrative maximum telephone line length to achieve the North American recommended longitudinal N_g level as a function of residual IT level, earth resistivity and separation distance.....	18
Table 6 – Some HVDC schemes – Specified telephone interference criteria	29
Table 7 – Measured 95 % values of THFF and I_{pe} of a 600 MW scheme (3 phases).....	31
Table 8 – Measured 95 % values of THFF and I_{pe} of a 300 MW scheme (3 phases).....	31
Table A.1 – Voltage distortion limits from IEEE 519-1992	43
Table A.2 – Compatibility levels for harmonic voltages (in percent of the nominal voltage) in LV and MV power systems [based on Table 1 of IEC TR 61000-3-6:2008]	44
Table A.3 – Indicative values of planning levels for harmonic voltages in HV and EHV power systems [based on Table 2 of IEC TR 61000-3-6:2008].....	44
Table E.1 – Required total amount of installed filter Mvars to meet a IT limit of 25 kA for 600 MW transmission	61

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HIGH-VOLTAGE DIRECT CURRENT (HVDC) SYSTEMS –
GUIDANCE TO THE SPECIFICATION AND
DESIGN EVALUATION OF AC FILTERS –****Part 2: Performance**

FOREWORD

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The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a Technical Report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC TR 62001-2, which is a Technical Report, has been prepared by subcommittee 22F: Power electronics for electrical transmission and distribution systems, of IEC technical committee 22: Power electronic systems and equipment.

This first edition of IEC TR 62001-2, together with IEC TR 62001-1, IEC TR 62001-3 and IEC TR 62001-4, cancels and replaces IEC TR 62001 published in 2009. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC TR 62001:

- a) expanded and supplemented Clause 19, and Annex B;
- b) new Clause 3 on current-based interference criteria;
- c) new annexes on induced noise calculation with Dubanton equations;
- d) addition of a TIF requirement in a technical specification,
- e) specification of IT limits dependent on network impedance and on the impact of AC network harmonic impedance; and
- f) specification of voltage level on the filter design necessary to fulfil an IT criterion.

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

Enquiry draft	Report on voting
22F/410/DTR	22F/414/RVC

Full information on the voting for the approval of this document can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 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 publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

The IEC 62001 series is structured in four parts:

Part 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.

Part 2 – Performance

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

Part 3 – Modelling

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

Part 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, audible noise, seismic requirements, equipment design and test parameters.

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

Part 2: Performance

1 Scope

This part of IEC 62001, which is a Technical Report, provides guidance on the performance aspects and verification of performance of harmonic filters.

The scope of this document covers AC side filtering for the frequency range of interest in terms of harmonic distortion and audible frequency disturbances. It excludes filters designed to be effective in the PLC and radio interference spectra.

This document concerns the "conventional" AC filter technology and line-commutated high-voltage direct current (HVDC) converters.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC TR 62001-1:2016, *High-voltage direct current (HVDC) systems – Guidebook to the specification and design evaluation of AC filters – Part 1: Overview*

IEC TR 62001-4:2016, *High-voltage direct current (HVDC) systems – Guidebook to the specification and design evaluation of AC filters – Part 4: Equipment*