

# TECHNICAL REPORT

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## Reliability and availability evaluation of HVDC systems

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## CONTENTS

FOREWORD.....	5
1 Scope .....	7
2 Normative references .....	7
3 Terms, definitions, abbreviated terms and symbols.....	7
3.1 Outage terms .....	8
3.2 Capacity terms.....	8
3.3 Outage duration terms .....	9
3.4 Time categories .....	9
3.5 Availability and utilization terms .....	10
3.6 Commutation failure performance terms.....	11
3.7 Abbreviated terms and symbols .....	11
4 Classification of HVDC transmission system equipment.....	12
4.1 General.....	12
4.2 AC and auxiliary equipment (AC-E).....	13
4.2.1 General .....	13
4.2.2 AC filter and other reactive power equipment (AC-E.F).....	13
4.2.3 AC control and protection (AC-E.CP) .....	13
4.2.4 Converter/interface transformer (AC-E.TX) .....	13
4.2.5 Synchronous compensator (AC-E.SC) .....	13
4.2.6 Auxiliary equipment and auxiliary power (AC-E.AX) .....	14
4.2.7 Other AC switchyard equipment (AC-E.SW).....	14
4.3 Valves (V).....	14
4.3.1 General .....	14
4.3.2 Valve electrical (V.E) .....	14
4.3.3 Valve cooling (V.VC) .....	14
4.3.4 Valve capacitor (V.C).....	14
4.3.5 Phase reactor (V.PR).....	14
4.4 DC control and protection equipment (C-P).....	14
4.4.1 General .....	14
4.4.2 Local control and protection (C-P.L) .....	15
4.4.3 Master control and protection (C-P.M) .....	15
4.4.4 Telecommunication equipment (C-P.T) .....	15
4.5 Primary DC equipment (DC-E) .....	15
4.5.1 General .....	15
4.5.2 DC filters (DC-E.F) .....	15
4.5.3 DC smoothing reactors (DC-E.SR).....	15
4.5.4 DC switching equipment (DC-E.SW) .....	15
4.5.5 DC measuring equipment (DC-E.ME).....	16
4.5.6 DC earth electrode (DC-E.GE).....	16
4.5.7 DC earth electrode line (DC-E.EL) .....	16
4.5.8 Other DC switchyard and valve hall equipment (DC-E.O).....	16
4.6 Other (O) .....	16
4.7 DC transmission line (TL).....	16
4.7.1 General .....	16
4.7.2 DC overhead transmission line (TL-OH).....	16
4.7.3 DC underground/submarine cable (TL-C).....	17

4.8	External (EXT) .....	17
5	Classification and severity of fault events and restoration codes.....	17
5.1	Classification of fault events .....	17
5.2	Severity codes .....	18
5.3	Restoration codes .....	19
6	Instructions for compilation of report.....	19
6.1	General.....	19
6.2	General instructions .....	19
6.3	Instructions for Table 2 and Table 3 .....	20
6.3.1	Section 1 .....	20
6.3.2	Section 2 .....	20
6.3.3	Sections 3, 4 and 5.....	20
6.3.4	Section 6 .....	21
6.3.5	Section 7 .....	21
6.4	Instructions for Table 4 and Table 5 .....	24
6.4.1	Forced outages – Table 4 .....	24
6.4.2	Scheduled outages – Table 5 .....	24
6.5	Instructions for Table 6 .....	26
6.6	Instructions for Table 7 .....	27
6.7	Instructions for Table 8 .....	28
6.8	Instructions for Table 9 .....	29
7	Interpretation and evaluation of reports .....	29
7.1	Calculation of outage duration .....	29
7.2	External events .....	29
7.3	Protective operation.....	30
7.4	Performance of special controls .....	30
Annex A	(informative) Outage log form and examples .....	33
A.1	Example of an outage log .....	33
A.2	Examples of application of rule f) of 6.3.3 – Scheduled outage during a forced outage.....	34
A.2.1	Case 1: Scheduled outage does not increase ODF or extends outage duration .....	34
A.2.2	Case 2: Scheduled outage increases ODF .....	35
A.3	Examples of application of rule g) of 6.3.3 – Second outage during an outage .....	36
A.3.1	Case 1: Second outage does not increase ODF or extends outage duration .....	36
A.3.2	Case 2: Second outage extends duration.....	37
A.3.3	Case 3: Second outage with variable ODF .....	38
Annex B	(informative) Sample annual report .....	39
Bibliography	.....	45
Figure A.1	– Scheduled outage does not increase ODF or extends outage duration.....	35
Figure A.2	– Scheduled outage increases ODF .....	35
Figure A.3	– Second outage does not increase ODF or extends outage duration .....	36
Figure A.4	– Second outage extends duration.....	37
Figure A.5	– Second outage with variable ODF .....	38

Table 1 – Classification of fault events.....	18
Table 2 – DC system performance for back-to-back systems and for two-terminal systems reporting jointly (corresponding to Table 1 of Cigré TB 590:2014) .....	22
Table 3 – DC system performance for multi-terminal systems and for stations reporting separately as part of two-terminal systems (corresponding to Table 1 M/S of Cigré TB 590:2014) .....	23
Table 4 – Forced outages of HVDC substation (corresponding to Table 2FS of Cigré TB 590:2014).....	25
Table 5 – Scheduled outages of HVDC substation (corresponding to Table 2 SS of Cigré TB 590:2014).....	26
Table 6 – HVDC overhead line protection operations (corresponding to Table 3 of Cigré TB 590:2014).....	27
Table 7 – AC system faults and commutation failure starts (back-to-back, two-terminal or multi-terminal LCC systems) (corresponding to Table 4 of Cigré TB 590:2014).....	28
Table 8 – Converter unit hours and semiconductor devices that failed (corresponding to Table 5 of Cigré TB 590:2014).....	29
Table 9 – Forced outage summary (corresponding to Table 6 of Cigré TB 590:2014).....	31
Table A.1 – Example of an outage log.....	33
Table B.1 – DC system performance for two-terminal systems reporting jointly .....	39
Table B.2 – Forced outages of HVDC substation .....	40
Table B.3 – Scheduled outages of HVDC substation .....	41
Table B.4 – HVDC overhead line protection operations.....	41
Table B.5 – AC system faults and commutation failure starts .....	42
Table B.6 – Converter unit hours and semiconductor devices failed .....	42
Table B.7 – Forced outage summary.....	43

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**RELIABILITY AND AVAILABILITY EVALUATION OF HVDC SYSTEMS****FOREWORD**

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IEC TR 62672, which is a Technical Report, has been prepared by IEC technical committee 115: High Voltage Direct Current (HVDC) transmission for DC voltages above 100 kV.

This first edition cancels and replaces the first edition of IEC 62672-1 published in 2013. This edition constitutes a technical revision.

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

- a) HVDC stations with voltage sourced converters have been included;
- b) this document has been aligned with latest Cigré TB 590:2014, which has superseded the previous Cigré TB 346:2008.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
115/177/DTR	115/185/RVDTR

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

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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

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

# RELIABILITY AND AVAILABILITY EVALUATION OF HVDC SYSTEMS

## 1 Scope

This document applies to all line-commutated and voltage-sourced high-voltage direct current (HVDC) transmission systems used for power exchange in utility systems.

In order to assess the operational performance of HVDC transmission systems, reliability and availability are evaluated. The intention of the performance evaluation is to identify further design improvements. For this purpose the HVDC users/owners are encouraged to compile reports on an annual basis based on the recommendations given in this document. The purpose of this document is to define a standardized reporting protocol so that data collected from different HVDC transmission systems can be compared on an equitable basis. Such reports can be sent to Cigré SC B4, “HVDC and Power Electronics” (<http://b4.cigre.org>) which collects such data and publishes it in a survey of HVDC systems throughout the world on a bi-annual basis.

This document covers point-to-point transmission systems, back-to-back interconnections and multi-terminal transmission systems. For point-to-point systems and back-to-back interconnections, i.e. two-terminal systems, statistics are reported based on the total transmission capability from the sending end to the receiving end measured at a given point. If, however, the two terminals are operated by different users/owners, or are composed of equipment of a different vintage or of equipment from different suppliers, statistics can be reported on an individual station basis if so desired by those responsible for reporting. In such a case, the outage is only reported under the originating converter station, taking care not to report the same event twice. For multi-terminal systems, i.e. systems with more than two terminals, statistics are reported separately for each converter station based on its own individual capability.

Multi-terminal systems, incorporating parallel converters but having only two converter stations on the DC line, can be considered as either point-to-point systems or as multi-terminal systems for purpose of reporting. Therefore, statistics for this special type of multi-terminal system can be reported based on either total transmission capability or on individual station capability. If the converters at one station use different technology, converter station statistics can be reported separately for each different type of capacity if desired. Multiple bipoles are also reported individually. Special mention is given in the text and in the tabulations to any common events resulting in bipolar outages.

NOTE Usually the agreement between the purchaser and the turnkey suppliers of the HVDC converter station includes specific requirements regarding contractual evaluation. Such specific requirements will prevail over this document.

## 2 Normative references

There are no normative references in this document.