

STN	Stanovenie výkonových strát usmerňovačov konvertorov napájaných napätím (VSC) pre systémy jednosmerného prúdu vysokého napätia (HVDC). Časť 2: Modulárne viacúrovňové konvertory.	STN EN 62751-2 35 1540
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Power losses in voltage sourced converter (VSC) valves for high-voltage direct current (HVDC) systems - Part 2: Modular multilevel converters

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 05/15

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EUROPEAN STANDARD

EN 62751-2

NORME EUROPÉENNE

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October 2014

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English Version

**Power losses in voltage sourced converter (VSC) valves for
high-voltage direct current (HVDC) systems - Part 2: Modular
multilevel converters
(IEC 62751-2:2014)**

Pertes de puissance dans les valves à convertisseur de
source de tension (VSC) des systèmes en courant continu
à haute tension (CCHT) - Partie 2: Convertisseurs
multiniveaux modulaires
(CEI 62751-2:2014)

Bestimmung der Leistungsverluste in
Spannungszwischenkreis-Stromrichtern (VSC) für
Hochspannungsgleichstrom(HGÜ)-Systeme - Teil 2:
Modulare Mehrstufen-Stromrichter
(IEC 62751-2:2014)

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Foreword

The text of document 22F/303/CDV, future edition 1 of IEC 62751-2, prepared by SC 22F "Power electronics for electrical transmission and distribution systems", of IEC/TC 22 "Power electronic systems and equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62751-2:2014.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2015-07-01
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IEC 61803:1999 NOTE Harmonised as EN 61803:1999.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60633	-	Terminology for high-voltage direct current (HVDC) transmission	EN 60633	-
IEC 62747	-	Terminology for voltage-sourced converters (VSC) for high-voltage direct current (HVDC) systems	EN 62747	-
IEC 62751-1	2014	Determination of power losses in voltage sourced converter (VSC) valves for high-voltage direct current (HVDC) systems -- Part 1: General requirements	EN 62751-1	2014
ISO/IEC Guide 98-3 -		Uncertainty of measurement -- Part-3: Guide to the expression of uncertainty in measurement (GUM:1995)	-	-



INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Power losses in voltage sourced converter (VSC) valves for high-voltage direct current (HVDC) systems –
Part 2: Modular multilevel converters**

**Pertes de puissance dans les valves à convertisseur de source de tension (VSC) des systèmes en courant continu à haute tension (CCHT) –
Partie 2: Convertisseurs multiniveaux modulaires**



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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
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INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Power losses in voltage sourced converter (VSC) valves for high-voltage direct current (HVDC) systems –
Part 2: Modular multilevel converters**

**Pertes de puissance dans les valves à convertisseur de source de tension (VSC) des systèmes en courant continu à haute tension (CCHT) –
Partie 2: Convertisseurs multiniveaux modulaires**

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**POWER LOSSES IN VOLTAGE SOURCED
CONVERTER (VSC) VALVES FOR HIGH-VOLTAGE
DIRECT CURRENT (HVDC) SYSTEMS –**

Part 2: Modular multilevel converters

FOREWORD

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International Standard IEC 62751-2 has been prepared by subcommittee 22F: Power electronics for electrical transmission and distribution systems, of IEC technical committee 22: Power electronic systems and equipment.

The text of this standard is based on the following documents:

CDV	Report on voting
22F/303/CDV	22F/322A/RVC

Full information on the voting for the approval of this standard 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 62751series, published under the general title *Power losses in voltage sourced converter (VSC) valves for high-voltage direct current (HVDC) systems*, 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

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POWER LOSSES IN VOLTAGE SOURCED CONVERTER (VSC) VALVES FOR HIGH-VOLTAGE DIRECT CURRENT (HVDC) SYSTEMS –

Part 2: Modular multilevel converters

1 Scope

This part of IEC 62751 gives the detailed method to be adopted for calculating the power losses in the valves for an HVDC system based on the “modular multi-level converter”, where each valve in the converter consists of a number of self-contained, two-terminal controllable voltage sources connected in series. It is applicable both for the cases where each modular cell uses only a single turn-off semiconductor device in each switch position, and the case where each switch position consists of a number of turn-off semiconductor devices in series (topology also referred to as “cascaded two-level converter”). The main formulae are given for the two-level “half-bridge” configuration but guidance is also given in Annex A as to how to extend the results to certain other types of MMC building block configuration.

The standard is written mainly for insulated gate bipolar transistors (IGBTs) but may also be used for guidance in the event that other types of turn-off semiconductor devices are used.

Power losses in other items of equipment in the HVDC station, apart from the converter valves, are excluded from the scope of this standard.

This standard does not apply to converter valves for line-commutated converter HVDC systems.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60633, *Terminology for high-voltage direct-current (HVDC) transmission*

IEC 62747, *Terminology for voltage-sourced converters (VSC) for high-voltage direct current (HVDC) systems*

IEC 62751-1:2014, *Power losses in voltage sourced converter (VSC) valves for high-voltage direct current (HVDC) systems – Part 1: General requirements*

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