

# Eskom Power Series

## Volume 9 (Part 1)

### HVDC Power Transmission: Basic Principles, Planning and Converter Technology

#### Who should read this book?

It is intended that this book will be helpful to university students and research engineers, both academic and industrial, and that it will become a suitable text for continuing engineering education purposes. It is also hoped, however, that the handbook will in time be recognised by the wide range of intended users, as being both practical and rigorous. The aims of the book, its intended readership and its technical scope are summarised in such a way as to give readers a concise introduction to what the book offers practitioners, specialists, technical managers, academics and students.



## What does this book cover?

In the period 2000 to mid-2012, the installed capacity of High Voltage Direct Current (HVDC) systems increased by some 60 GW worldwide, bringing the total to in excess of 110 GW. The growth has been due mainly to new, long (electrical) distance connections, to supply a rapidly growing demand for electrical energy, or to accommodate renewable power by the provision of connections and new interconnections between networks. HVDC is used because it is the most economical solution. This growing trend is set to increase. Therefore, there is considerable interest in HVDC and its technical attributes. The book has been written to support this need, and collates a comprehensive spectrum of information compiled by eminent experts in HVDC.

HVDC Power Transmission: Basic Principles, Planning and Converter Technology (Volume 9 (Part 1) of the Eskom Power Series) focuses on Line Commutated Converter (LCC) HVDC, which at the time of writing is the majority technology. Voltage Sourced Converter (VSC) HVDC is also covered briefly, since this technology is growing rapidly. The book deals with the theory and principles of HVDC transmission, how it compares technically and economically with High Voltage Alternating Current (HVAC) transmission, the management of its environmental and technical impact, planning studies and the implementation of the main power components and the control and protection of the HVDC converter station.

## Contents of the book:

Chapter 1:	Introduction
Chapter 2:	The HVDC Project: Preparatory and Complementary Activities
Chapter 3:	Principles of Operation of Converters
Chapter 4:	HVDC Schemes and Applications
Chapter 5:	Technical Comparison of AC and DC Transmission
Chapter 6:	Modelling for HVDC Studies
Chapter 7:	AC/DC Interaction and System Dynamic Behaviour
Chapter 8:	Environmental Impact
Chapter 9:	Performance of Existing Systems
Chapter 10:	Converter Station Design
Chapter 11:	Power Semiconductors for HVDC Applications
Chapter 12:	Thyristor Valves
Chapter 13:	Converter Transformers
Chapter 14:	DC Controls
Chapter 15:	Implementation of Control, Protection and Instrumentation
Chapter 16:	Harmonic Filtering
Chapter 17:	Insulation Co-ordination for HVDC Converter Stations
Chapter 18:	Electromagnetic Compatibility
Chapter 19:	Audible Noise from Converter Stations
Chapter 20:	Operation and Maintenance of Converter Stations
Chapter 21:	VSC HVDC Transmission
Chapter 22:	Technological Trends in HVDC

## What other books are available?

**Volume 1:** The Planning, Design and Construction of Overhead Power Lines (pp 772), ISBN No. 978-0-620-33042-8

**Volume 2:** Fundamentals and Practice of Overhead Line Maintenance (pp 258), ISBN No. 0-620-30906-7

**Volume 3:** The Practical Guide to Outdoor High Voltage Insulators (pp 224), ISBN No. 0-620-31074-X

**Volume 4:** Inductive Instrument Transformers and Protective Applications (pp 860), ISBN No. 0-620-37865-4

**Volume 5:** Theory, Design, Maintenance and Life Management of Power Transformers (pp 337), ISBN No. 978-0-620-38294-6

**Volume 6 (Part 1):** High Voltage Overhead Power Lines: Theoretical Calculations and Formulae for Conductor Installations (pp 349), ISBN No. 978-0-620-42834-7

**Volume 6 (Part 2):** High Voltage Overhead Power Lines: Theoretical Calculations and Formulae for Transmission Line Towers (pp 378), ISBN No. 978-0-620-46585-4

**Volume 7:** Corona in Transmission Systems: Theory, Design and Performance (pp 528), ISBN No. 978-0-620-49388-8

**Volume 8:** Power Quality in Electrical Power Systems: A Holistic Approach (pp 665), ISBN No. 978-0-9921781-2-3

**Volume 10:** Thermodynamics for Students and Practising Engineers (pp 262), ISBN No. 978-0-992-17811-6

**Volume 11:** Thermal Science for Engineers (pp 303), ISBN No. 978-0-992-17813-0

## What books are in development?

- The Engineer's Toolkit
- HVDC Power Transmission (Part 2)
- Power Station Chemistry Book
- High Voltage Overhead Power Lines: Construction Works
- Fly Ash Properties and Utilisation Book (Parts 1 to 6)
- Insulating Fluid for the Electrical Engineering Industry
- AC Substation Design Handbook
- Coal Classification and Utilisation Book

## Where can I purchase copies?

Contact: Sanjeev Bisnath

Email: [bisnats@eskom.co.za](mailto:bisnats@eskom.co.za)

Tel +27 11 629 5072

Visit our website: [www.eskom.co.za](http://www.eskom.co.za)

Eskom Holdings SOC Limited  
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