

Eskom Power Series

Volume 10

Thermodynamics for Students and Practising Engineers

Who should read this book?

As the title suggests, this book is for students and practising engineers and is written so that the most misunderstood aspects of thermodynamics are explained in a simple manner. The basic laws of thermodynamics leading up to applications in the gas and steam plant will be of relevance to both practising engineers and technologists. It is also useful to every engineer in the power generation environment, as he or she needs to possess an appreciation of the basic principles of thermodynamics.



What does this book cover?

An understanding of thermodynamics is essential for power plant design and Thermodynamics for Students and Practising Engineers (Volume 10 in the Eskom Power Series) outlines the key thermodynamic principles. The text includes, inter alia, basic concepts and definitions, the first and second laws of thermodynamics, steam and gas plant, compressor and refrigeration plant, entropy, and non-reactive and reactive systems.

These topics contain the key thermodynamic principles required by a typical power plant engineer to design a new asset, evaluate a new technology concept (i.e. to validate power output or thermal efficiency), or to understand a thermodynamics-related issue on existing plant. In principle, the book covers the basic theory with sample calculations that provide a foolproof methodology to approaching analyses at a system level.

Make everything as simple as possible, but not simpler, is the key theme of the book. To this end, the author presents a complex subject in simple terms without referencing additional chapters linked to research or emerging fields. The key intention of the book is to present a foundation to prepare readers for higher level thermodynamics texts.

Contents of the book:

Chapter 1:	Introduction to Basic Concepts and Definitions
Chapter 2:	The First Law of Thermodynamics
Chapter 3:	The Second Law of Thermodynamics
Chapter 4:	Entropy
Chapter 5:	Thermodynamics of Pure Substances
Chapter 6:	Internal Combustion Engines
Chapter 7:	Gas Turbine Engines
Chapter 8:	Reciprocating Compressors and Refrigeration Cycles
Chapter 9:	Non-reactive Mixtures
Chapter 10:	Reactive Mixtures

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 9 (Part 1): HVDC Power Transmission: Basic Principles, Planning and Converter Technology (pp 832), ISBN No. 978-0-9921781-0-9

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?

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