

THE LAWS OF THERMODYNAMICS

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649374151

The Laws of Thermodynamics by W. H. Macaulay

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

www.triestepublishing.com

W. H. MACAULAY

**THE LAWS OF
THERMODYNAMICS**

Cambridge Engineering Tracts

GENERAL EDITOR
B. HOPKINSON, M.A.

No. 2

The Laws of Thermodynamics

CAMBRIDGE UNIVERSITY PRESS

London: FETTER LANE, E.C.

C. F. CLAY, MANAGER



Edinburgh: 100, PRINCES STREET

Bombay: A. ASHER AND CO.

Leipzig: F. A. BROCKHAUS

New York: G. P. PUTNAM'S SONS

Bombay and Calcutta: MACMILLAN AND CO., LTD.

All rights reserved

THE LAWS OF THERMODYNAMICS

by

W. H. MACAULAY, M.A.

Fellow of King's College, Cambridge

UNIVERSITY OF
CAMBRIDGE

Cambridge :
at the University Press
1913

QC 311
Ms

Cambridge :
PRINTED BY JOHN CLAY, M.A.
AT THE UNIVERSITY PRESS

UNIVERSITY OF CAMBRIDGE
LIBRARY

PREFACE

THE aim of this tract is to provide a connected and accurate account of the fundamental principles of thermodynamics, combined with a sketch of methods of applying the theory in special cases, to supplement technical books on the subject. It may be well to warn a beginner not to attempt to read it straight through, but rather to use it as a help, in conjunction with other information.

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that this is crucial for ensuring transparency and accountability in the organization's operations.

2. The second part of the document outlines the various methods and tools used to collect and analyze data. It highlights the need for consistent and reliable data collection processes to ensure the validity of the results.

3. The third part of the document describes the different types of data that are collected and analyzed. It includes information on both quantitative and qualitative data, as well as the specific variables being measured.

4. The fourth part of the document discusses the various statistical techniques used to analyze the data. It covers both descriptive and inferential statistics, as well as the use of regression analysis and other advanced methods.

5. The fifth part of the document describes the different ways in which the results of the analysis are presented and communicated. It includes information on the use of tables, graphs, and other visual aids to make the data more accessible and understandable.

6. The sixth part of the document discusses the various challenges and limitations associated with data collection and analysis. It highlights the need for careful planning and execution to ensure the quality and reliability of the data.

7. The seventh part of the document describes the different ways in which the results of the analysis are used to inform decision-making and improve organizational performance. It includes information on the use of data-driven insights to identify areas for improvement and to develop effective strategies.

8. The eighth part of the document discusses the various ethical considerations that must be taken into account when collecting and analyzing data. It emphasizes the need for transparency, honesty, and respect for the privacy and rights of individuals.

9. The ninth part of the document describes the different ways in which the results of the analysis are used to inform policy-making and to shape the future of the organization. It includes information on the use of data to identify trends and to develop long-term plans.

CONTENTS

CHAPTER I. FUNCTIONS OF TWO VARIABLES.

SECT.	PAGE
1. Introductory	1
2. Diagrams	1
3. Line integrals	1
4. Perfect differentials	2
5. $Mdx + Ndy$ when not a perfect differential	6

CHAPTER II. THE FIRST LAW OF THERMODYNAMICS.

6. Measurement of heat	8
7. Temperature	9
8. The first law of thermodynamics	10
9. The energy equation	12
10. Combustion of fuel	13
11. Internal combustion engine	14
12. Continuous reversible processes	15
13. Adiabatic processes	18
14. Fluid working substance	19

CHAPTER III. PARTICULAR TYPES OF SUBSTANCE.

15. A vapour and its liquid	21
16. Superheated vapour	23
17. $E + Aps$	23
18. Throttled vapour	25
19. Perfect gas	27

CHAPTER IV. THE SECOND LAW OF THERMODYNAMICS.

20. Introductory	33
21. Example of apparatus for transferring heat.	34
22. Carnot's engine	35
23. Carnot cycle	38
24. Thermodynamic scale of temperature	39
25. Any reversible process	40
26. Historical note	42