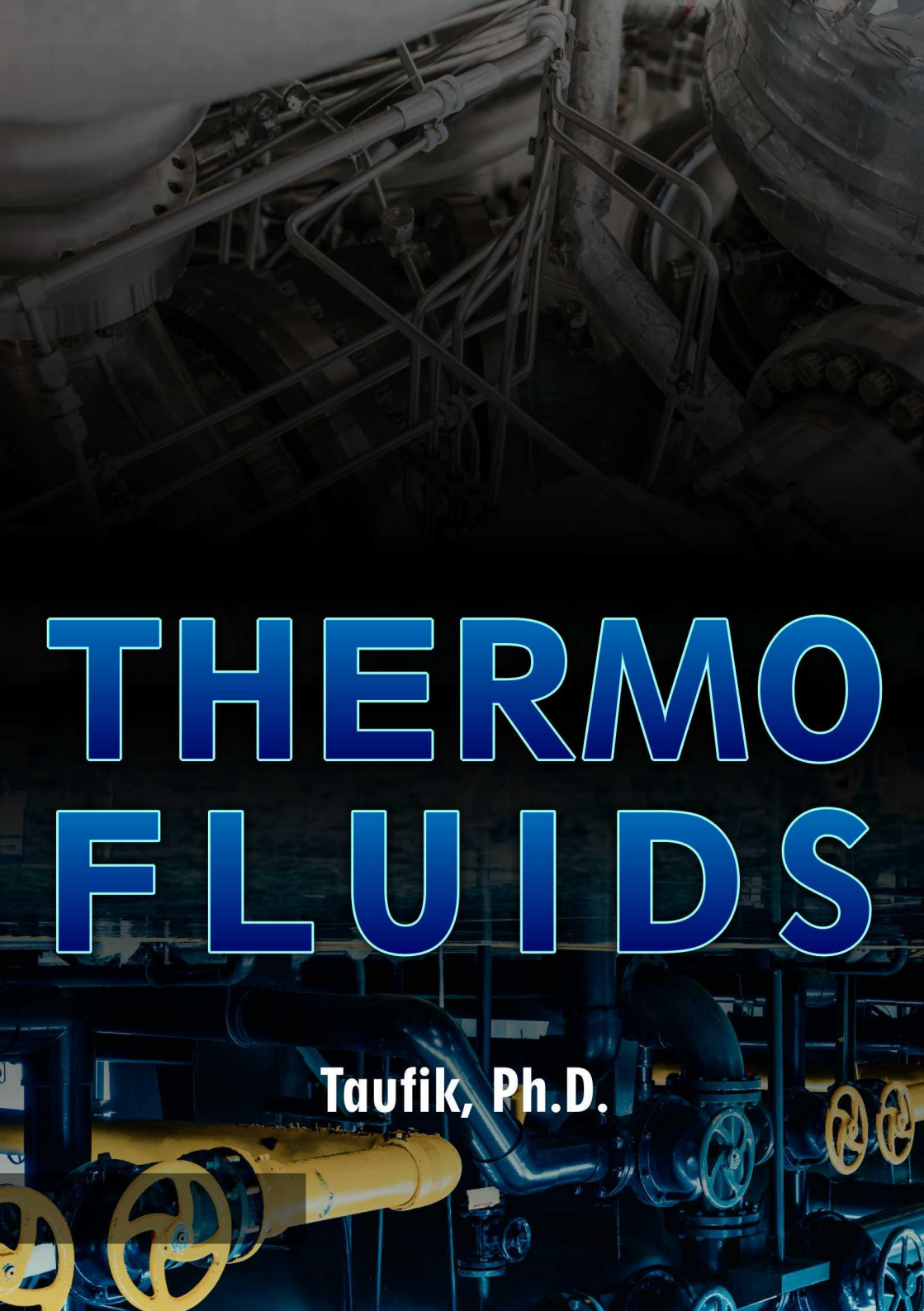


THERMO FLUIDS

Taufik, Ph.D.

Buku Ajar

Thermo-Fluids

UU No 28 tahun 2014 tentang Hak Cipta

Fungsi dan sifat hak cipta Pasal 4

Hak Cipta sebagaimana dimaksud dalam Pasal 3 huruf a merupakan hak eksklusif yang terdiri atas hak moral dan hak ekonomi.

Pembatasan Pelindungan Pasal 26

Ketentuan sebagaimana dimaksud dalam Pasal 23, Pasal 24, dan Pasal 25 tidak berlaku terhadap:

i. penggunaan kutipan singkat Ciptaan dan/atau produk Hak Terkait untuk pelaporan peristiwa aktual yang ditujukan hanya untuk keperluan penyediaan informasi aktual;
ii. Penggandaan Ciptaan dan/atau produk Hak Terkait hanya untuk kepentingan penelitian ilmu pengetahuan;
iii. Penggandaan Ciptaan dan/atau produk Hak Terkait hanya untuk keperluan pengajaran, kecuali pertunjukan dan Fonogram yang telah dilakukan Pengumuman sebagai bahan ajar; dan
iv. penggunaan untuk kepentingan pendidikan dan pengembangan ilmu pengetahuan yang memungkinkan suatu Ciptaan dan/atau produk Hak Terkait dapat digunakan tanpa izin Pelaku Pertunjukan, Produser Fonogram, atau Lembaga Penyiaran.

Sanksi Pelanggaran Pasal 113

1. Setiap Orang yang dengan tanpa hak melakukan pelanggaran hak ekonomi sebagaimana dimaksud dalam Pasal 9 ayat (1) huruf i untuk Penggunaan Secara Komersial dipidana dengan pidana penjara paling lama 1 (satu) tahun dan/atau pidana denda paling banyak Rp100.000.000 (seratus juta rupiah).
2. Setiap Orang yang dengan tanpa hak dan/atau tanpa izin Pencipta atau pemegang Hak Cipta melakukan pelanggaran hak ekonomi Pencipta sebagaimana dimaksud dalam Pasal 9 ayat (1) huruf c, huruf d, huruf f, dan/atau huruf h untuk Penggunaan Secara Komersial dipidana dengan pidana penjara paling lama 3 (tiga) tahun dan/atau pidana denda paling banyak Rp500.000.000,00 (lima ratus juta rupiah).

Taufik, Ph.D

Buku Ajar

Thermo-Fluids

deepublish
glorify and develop the intellectual of human's life

BUKU AJAR THERMO-FLUIDS

Taufik

Desain Cover : Dwi Novidiantoko
Tata Letak Isi : Cinthia Morris Sartono
Sumber Gambar: www.freepik.com

Cetakan Pertama: Januari 2018

PENERBIT DEEPUBLISH
(Grup Penerbitan CV BUDI UTAMA)
Anggota IKAPI (076/DIY/2012)
Jl.Rajawali, G. Elang 6, No 3, Drono, Sardonoharjo, Ngaglik, Sleman
Jl.Kaliurang Km.9,3 – Yogyakarta 55581
Telp/Faks: (0274) 4533427
Website: www.deepublish.co.id
www.penerbitdeepublish.com
E-mail: cs@deepublish.co.id

Katalog Dalam Terbitan (KDT)

TAUFIK
Buku Ajar Thermo-Fluids/oleh Taufik.--Ed.1, Cet. 1--Yogyakarta: Deepublish, Januari 2018.

ix, 188 hlm.; Uk:14x20 cm

ISBN : **978-602-453-471-4**
ISBN Elektronis : **978-602-453-667-1**

1. Physics I. Judul
530

Kata Pengantar

Alhamdulillah, segala puji dan syukur tidak terhingga penerbit sampaikan kehadirat Allah SWT, dengan terbitnya *Buku Ajar Thermo-Fluids*, karya Taufik, Ph.D.

Dalam kajian yang komprehensif ini, Taufik, Ph.D., memaparkan penjelasan yang mendalam dan unik mengenai *thermo-fluids*. Secara rinci, terbagi dalam 7 *chapter*. Chapter 1 Introduction To Thermal and Fluids Engineering, Chapter 2 The First Law of Thermodynamics, Chapter 3 Thermodynamic Properties, Chapter 4 Thermodynamics Cycles and The Second, Chapter 5 Refrigeration, Heat Pump and Power Cycles, Chapter 6 Fundamentals of Fluids Mechanics, dan Chapter 7 Internal Flow.

Akhirnya, selain syukur ke hadirat Ilahi, penerbit juga berharap semoga dapat mendorong masyarakat umum untuk selalu antusias dalam menambah wawasan dan ilmu pengetahuan.

Penerbit

Table of Contents

CHAPTER 1 INTRODUCTION TO THERMAL AND FLUIDS ENGINEERING

In thermal-fluids systems, the focus is on energy: its use, conversion, or transmission in one form or another. For example, consider a few of the energy flows in a car. Gasoline is stored in a tank until its energy is needed to move the vehicle from one place to another, and then the gasoline is pumped from the tank to the engine. In the engine the fuel is burned, and some of the released chemical energy is converted to useful mechanical power to propel the car. Mechanical power is also extracted to drive: the water pump used in the engine-cooling system; the alternator to provide electrical power for the CD player, lights, cooling fan motor, and fuel pump; and the air-conditioning system.

Cars of the 21st century are dramatically improved over those of the early 1900s. The advances in engineering are the result of improved technical knowledge and the systematic application of this knowledge. The intelligent use of basic thermal and fluids engineering principles has improved the design of cars and other thermal-fluids systems as diverse as buildings and window air conditioners.

To analyze these systems, one, two, or three energy disciplines are needed, separately or in combination. These disciplines are:

CHAPTER 2 THE FIRST LAW OF THERMODYNAMICS

LEARNING OUTCOMES

At the end of this chapter, you should be able to:

1. Discuss the nature of internal energy.
2. Introduce the first law of thermodynamics, energy balances, and mechanisms of energy transfer to or from a system.
3. Describe the hypothetical substance “ideal gas” and the ideal-gas equation of state.

2.1. The First Law of Thermodynamics

The first law of thermodynamics, also known as the conservation of energy principle, provides a sound basis for studying the relationships among the various forms of energy and energy interactions.

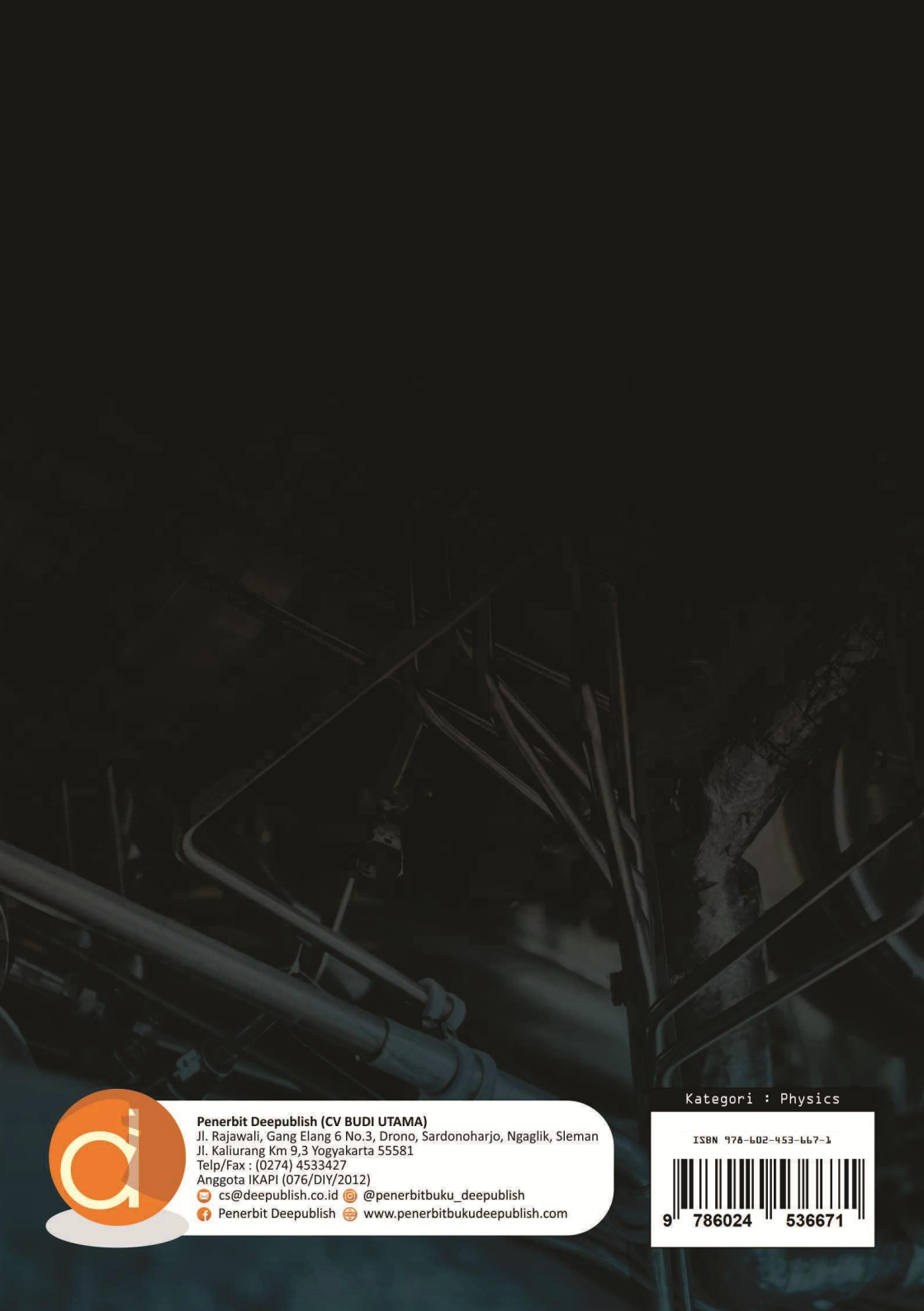
Based on experimental observations, the first law of thermodynamics states that energy can be neither created nor destroyed; it can only change forms. Therefore, every bit of energy should be accounted for during a process.

2.2. Internal Energy

Internal energy can be referred as the store of energy which results from the random motion of atoms and molecules of a body. At any particular state, the atoms and molecules will have a particular overall degree of random motion and, in pure substance; this degree of random motion will be the same each time the substance returns to that state. The degree of random motion must therefore be

REFERENCES

a. Deborah A. Kaminsky and Michael K. Jensen, (2005), “Introduction to Thermal and Fluid Engineering”, John Wiley & Sons, Inc.
b. Eastop, T.D, McConkey, A., (2004), 5th Edition, “Applied Thermodynamics for Engineering Technologist”, Longman.
c. Yunus, A.C, Michael, A.B., (2002), 4th Edition, “Thermodynamics, An Engineering Approach”, Mc Graw Hill, New York.
d. D.F. Young, B.R. Munson, T.H. Okiishi, (2004), “Fundamental of Fluid Mechanics”, 4th Edition, John Wiley & Sons, Inc.



Penerbit Deepublish (CV BUDI UTAMA)
Jl. Rajawali, Gang Elang 6 No.3, Drono, Sardonoharjo, Ngaglik, Sleman
Jl. Kaliurang Km 9,3 Yogyakarta 55581
Telp/Fax : (0274) 4533427
Anggota IKAPI (076/DIY/2012)
cs@deepublish.co.id @penerbitbuku_deepublish
Penerbit Deepublish www.penerbitbukudeepublish.com

Kategori : Physics

ISBN 978-602-453-667-1

9 786024 536671