The Mechanical Engineer’s Handbook, Fourth Edition provides the most comprehensive coverage of the entire discipline, with a focus on explanation and analysis. Packaged as a modular approach, these references are designed to be used either individually or as a set, providing engineers and students with a thorough, detailed, ready reference on a range of topics.

The four volume set is an efficient way to get complete coverage of these specialized areas in the engineering topics of interest. The accessible information offers discussions, examples, and analyses of each of the topics. The Handbook gives access to the basics of each topic and points you toward trusted resources for further reading.

Online Edition also Available
All four volumes are available at Wiley Online Library.
### VOL 1: MATERIALS AND ENGINEERING MECHANICS
**FULL COVERAGE OF MATERIALS AND ENGINEERING MECHANICS**

This first volume covers materials and engineering mechanics, giving you accessible and in-depth access to the most common topics you’ll encounter in the discipline: carbon and alloy steels, stainless steels, aluminum alloys, copper and copper alloys, titanium alloys for design, nickel and its alloys, magnesium and its alloys, superalloys for design, composite materials, smart materials, electronic materials, viscosity measurement, and much more.

- Presents comprehensive coverage of materials and mechanical design
- Offers the option of being purchased as a four-book set or as single books, depending on your needs
- Comes in a subscription format through the Wiley Online Library and in electronic and custom formats


ISBN 978-1-118-11282-3  US$ 195.00 • CAN$ 215.00 • £ 130.00
Available wherever books and eBooks are sold

<table>
<thead>
<tr>
<th>Part 1 Materials</th>
<th>Chapter 10-Composite Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 1-Carbon and Alloy Steels</td>
<td>Chapter 11-Smart Materials</td>
</tr>
<tr>
<td>Chapter 2-Stainless Steels</td>
<td>Chapter 12-Overview of Ceramic Materials, Design, and Application</td>
</tr>
<tr>
<td>Chapter 3-Aluminum Alloys</td>
<td>Chapter 13-Electronic Materials and Packaging</td>
</tr>
<tr>
<td>Chapter 4-Copper and Copper Alloys</td>
<td>Chapter 14-Sources of Material Data</td>
</tr>
<tr>
<td>Chapter 5-A Guide to Engineering Selection of Titanium Alloys for Design</td>
<td>Chapter 15-Quantitative Methods of Materials Selection</td>
</tr>
<tr>
<td>Chapter 6-Nickel and Its Alloys</td>
<td>Part 2 Mechanical Design</td>
</tr>
<tr>
<td>Chapter 7-Magnesium and Its Alloys</td>
<td>Chapter 16-Stress Analysis</td>
</tr>
<tr>
<td>Chapter 8-A Guide to Engineering Selection of Superalloys for Design</td>
<td>Chapter 17-Force Measurement</td>
</tr>
<tr>
<td>Chapter 9-Thermoplastics, Thermosets, and Elastomers—Descriptions and Properties</td>
<td>Chapter 18-Resistive Strain Measurement Devices</td>
</tr>
</tbody>
</table>

### VOL 2: DESIGN, INSTRUMENTATION, AND CONTROLS
**FULL COVERAGE OF ELECTRONICS, MEMS, AND INSTRUMENTATION AND CONTROL IN MECHANICAL ENGINEERING**

This second volume of Mechanical Engineers’ Handbook covers electronics, MEMS, and instrumentation and control, giving you accessible and in-depth access to the topics you’ll encounter in the discipline: computer-aided design, product design for manufacturing and assembly, design optimization, total quality management in mechanical system design, reliability in the mechanical design process for sustainability, life-cycle design, design for remanufacturing processes, signal processing, data acquisition and display systems, and much more.

- Presents the most comprehensive coverage of the entire discipline of Mechanical Engineering anywhere in four interrelated books
- Offers the option of being purchased as a four-book set or as single books
- Comes in a subscription format through the Wiley Online Library and in electronic and custom formats


ISBN 978-1-118-11283-0  US$ 195.00 • CAN$ 215.00 • £ 130.00
Available wherever books and eBooks are sold

<table>
<thead>
<tr>
<th>Part 1 Mechanical Design</th>
<th>Chapter 10-Design for Remanufacturing Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 1-Computer-Aided Design</td>
<td>Chapter 11-Design for Manufacture and Assembly with Plastics</td>
</tr>
<tr>
<td>Chapter 2-Product Design for Manufacturing and Assembly</td>
<td>Chapter 12-Design for Six Sigma: A Mandate for Competitiveness</td>
</tr>
<tr>
<td>Chapter 3-Design-for-Environment Processes and Tools</td>
<td>Chapter 13-Engineering Applications of Virtual Reality</td>
</tr>
<tr>
<td>Chapter 4-Design Optimization: An Overview</td>
<td>Chapter 14-Physical Ergonomics</td>
</tr>
<tr>
<td>Chapter 5-Total Quality Management in Mechanical System Design</td>
<td>Part 2 Systems, Controls, and MEMS</td>
</tr>
<tr>
<td>Chapter 6-Reliability in the Mechanical Design Process</td>
<td>Chapter 15-Electric Circuits</td>
</tr>
<tr>
<td>Chapter 7-Product Design and Manufacturing Processes for Sustainability</td>
<td>Chapter 16-Measurements</td>
</tr>
<tr>
<td>Chapter 8-Life-Cycle Design</td>
<td>Chapter 17-Signal Processing</td>
</tr>
<tr>
<td>Chapter 9-Design for Maintainability</td>
<td>Chapter 18-Data Acquisition and Display Systems</td>
</tr>
</tbody>
</table>

Chapter 19-Systems Engineering: Analysis, Design, and Information Processing for Analysis and Design

Chapter 20-Mathematical Models of Dynamic Physical Systems

Chapter 21-Basic Control Systems Design

Chapter 22-General-Purpose Control Devices

Chapter 23-Neural Networks in Feedback Control Systems

Chapter 24-Mechatronics

Chapter 25-Introduction to Microelectromechanical Systems (MEMS): Design and Application
This third volume of Mechanical Engineers’ Handbook covers Manufacturing & Management, and provides accessible and in-depth access to the topics encountered regularly in the discipline: environmentally benign manufacturing, production planning, production processes and equipment, manufacturing systems evaluation, coatings and surface engineering, mechanical fasteners, seal technology, statistical quality control, intelligent control of material handling systems, project management, safety engineering, and much more.

- Presents the most comprehensive coverage of the entire discipline of Mechanical Engineering
- Offers the option of being purchased as a four-book set or as single books
- Comes in a subscription format through the Wiley Online Library and in electronic and other custom formats

ISBN 978-1-118-11284-7  US$ 195.00 • CAN$ 215.00 • £ 130.00
Available wherever books and eBooks are sold

Part 1 Manufacturing
Chapter 1-Organization, Management, and Improvement of Manufacturing Systems
Chapter 2-Environmentally Benign Manufacturing
Chapter 3-Production Planning
Chapter 4-Production Processes and Equipment
Chapter 5-Manufacturing Systems Evaluation
Chapter 6-Metal Forming, Shaping, and Casting
Chapter 7-Coatings and Surface Engineering
Chapter 8-Mechanical Fasteners
Chapter 9-Seal Technology
Chapter 10-Statistical Quality Control
Chapter 11-Computer-Integrated Manufacturing
Chapter 12-TRIZ
Chapter 13-Data Exchange Using STEP
Chapter 14-Achieving Enterprise Goals with New Process Technology
Chapter 15-Nondestructive Inspection
Chapter 16-Materials Handling System Design

Part 2 Management, Finance, Quality, Law, and Research
Chapter 17-Intelligent Control of Material Handling Systems
Chapter 18-Managing People in Engineering and Technology
Chapter 19-Engineering Economy
Chapter 20-Evaluating and Selecting Technology-based Projects
Chapter 21-Lean Management
Chapter 22-Total Quality Management for Mechanical Engineers
Chapter 23-Registrations, Certifications, and Awards
Chapter 24-Safety Engineering
Chapter 25-What the Law Requires of the Engineer
Chapter 26-Patents
Chapter 27-Online Information Resources for Mechanical Engineers
Chapter 28-Sources of Mechanical Engineering Information

Vol 4: Energy and Power covers the essentials of fluids, thermodynamics, entropy, and heat, with chapters dedicated to individual applications such as air heating, cryogenic engineering, indoor environmental control, and more. Readers will find detailed guidance toward fuel sources and their technologies, as well as a general overview of the mechanics of combustion.

- Understand the nature of energy and its proper measurement and analysis
- Learn how the mechanics of energy apply to furnaces, refrigeration, thermal systems, and more
- Examine the and pros and cons of petroleum, coal, biofuel, solar, wind, and geothermal power
- Review the mechanical parts that generate, transmit, and store different types of power, and the applicable guidelines

ISBN 978-1-118-11285-4  US$ 195.00 • CAN$ 215.00 • £ 130.00
Available wherever books and eBooks are sold

Part 1 Energy
Chapter 1-Thermophysical Properties of Fluids
Chapter 2-Mechanics of Incompressible Fluids
Chapter 3-Thermodynamics Fundamentals
Chapter 4-Exergy Analysis, Entropy Generation Minimization, and the Constructal Law
Chapter 5-Heat Transfer Fundamentals
Chapter 6-Temperature Measurement
Chapter 7-Heat Flux Measurement
Chapter 8-Furnaces
Chapter 9-Heat Exchangers, Vaporizers, Condensers
Chapter 10-Heat Pipes
Chapter 11-Air Heating
Chapter 12-Cooling Electric Equipment
Chapter 13-Refrigeration
Chapter 14-Cryogenic Engineering
Chapter 15-Indoor Environmental Control
Chapter 16-Thermal Systems Optimization

Part 2 Power
Chapter 17-Combustion
Chapter 18-Gaseous Fuels
Chapter 19-Liquid Fossil Fuels from Petroleum
Chapter 20-Coals, Lignite, and Peat
Chapter 21-Clean Power Generation from Coal
Chapter 22-Biofuels for Transportation
Chapter 23-Solar Energy Measurements
Chapter 24-Geothermal Resources and Technology: Introduction
Chapter 25-Pumps, Fans, Blowers, and Compressors
Chapter 26-Gas Turbines
Chapter 27-Wind Power Generation
Chapter 28-Cogeneration
Chapter 29-Hydrogen Energy
Chapter 30-Steam Turbines
Chapter 31-Fuel Cells
Chapter 32-Fluid Power Systems

“With this fourth edition, I have continued to produce a practical reference for the mechanical engineer who is seeking to answer a question, solve a problem, reduce a cost, or improve a system or facility. The handbook is not a research monograph. Its chapters offer design techniques, illustrate successful applications, or provide guidelines to improving performance, life expectancy, effectiveness, or usefulness of parts, assemblies, and systems. The purpose is to show readers what options are available in a particular situation and which option they might choose to solve problems at hand.

The aim of this handbook is to serve as a source of practical advice to readers. I hope that the handbook will be the first information resource a practicing engineer consults when faced with a new problem or opportunity… In each chapter, the reader should feel that he or she is in the hands of an experienced consultant who is providing sensible advice that can lead to beneficial action and results.”

Contributors to The Mechanical Engineer’s Handbook, Fourth Edition

Ann M. Anderson
Union College
Schenectady, New York

Brian E. Anderson
Brigham Young University
Provo, Utah

Brian A. Baker
Special Metals Corporation
Huntington, West Virginia

Jonathan D. Blotter
Brigham Young University
Provo, Utah

Bruce L. Bramfitt
International Steel Group, Inc.
Bethlehem, Pennsylvania

Robert E. Brown
Magnesium Monthly Review
Prattville, Alabama

Bradford A. Bruno
Union College
Schenectady, New York

Patrick Collins
Mecmesin Ltd.
Slinfold, United Kingdom

J. A. Collins
The Ohio State University
Columbus, Ohio

S. R. Daniewicz
Mississippi State University
Starkville, Mississippi

Matthew J. Donachie
Rensselaer at Hartford
Hartford, Connecticut

Stephen J. Donachie (Deceased)
Special Metals Corporation
Huntington, West Virginia

Warren C. Fackler
Telesis Systems
Cedar Rapids, Iowa

Mahmoud M. Farag
The American University in Cairo
Cairo, Egypt

Franklin E. Fisher
Loyola Marymount University
Los Angeles, California
and Raytheon Company
El Segundo, California

Kent L. Gee
Brigham Young University
Provo, Utah

James A. Harvey
Under The Bridge Consulting, Inc.
Corvallis, Oregon

R. Nathan Katz
Worcester Polytechnic Institute
Worcester, Massachusetts

J. G. Kaufman
Kaufman Associates
Lewes, Delaware

James Kelly
Rochester, Michigan

Konrad J. A. Kundig
Metallurgical Consultant
Tucson, Arizona

John Marcin
Rensselaer at Hartford
Hartford, Connecticut

Dietrich Munz
University of Karlsruhe
Karlsruhe, Germany

Edward N. Peters
Sabic Innovative Plastics
Selkirk, New York

G. P. Potirniche
University of Idaho
Moscow, Idaho

Singiresu S. Rao
University of Miami
Coral Gables, Florida

Prasanta Sahoo
Jadavpur University
Kolkata, India

Vishu Shah
Diamond Bar, California

Gaylord D. Smith
Special Metals Corporation
Huntington, West Virginia

Lilla Safford Smith
Union College
Schenectady, New York

Scott D. Sommerfeldt
Brigham Young University
Provo, Utah

Mark Tuttle
University of Washington
Seattle, Washington

Robert D. Weed
Copper Development Association
New York, New York

Tarek I. Zohdi
University of California
Berkeley, California

Carl Zweben
Zweben Consulting
Devon, Pennsylvania