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An Introduction to Engine Testing and Development

By Richard D. Atkins

This book presents the basic principles required for the testing and development of internal combustion engine powertrain systems, providing the new automotive engineer with the basic tools required to effectively carry out meaningful tests. This book explains the test process - from setting up a dynamometer test facility to testing for performance and durability.

Topics covered include:
- The test facility and the methods of measuring engine power
- Instrumentation, temperature, pressure flow and calibration
- Combustion analysis and emissions
- Fitting operations within the test cell best practices
- Quality standards for engine testing


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Opposed Piston Engines: Evolution, Use, and Future Applications

By Jean-Pierre Pirault, Martin L.S. Flint

This book is an extensive survey of opposed piston engines from 1887 – 2006. The authors explore design and performance details of all major types of opposed piston engines in stationary, ground, marine, and aviation applications. Some performance and emission comparisons to 4-stroke engines are made, as is a case for reconsidering opposed piston engines for certain applications.

Topics covered include:
- Rationale for opposed piston engines
- Their diverse architecture
- Detailed design aspects
- and leading engineers and applications


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Automotive Lubricants Reference Book, 2nd Edition
By Roger Frederick Haycock, John Hillier, Arthur J. Caines
The automotive lubricants arena has undergone significant changes since the first edition of this book was published in 1996. This second edition includes updated and expanded details of these changes, and provides a solid foundation to this important element of automotive engineering.
Chapters include:
• Introduction and Fundamentals
• Practical Experiences with Lubricant Problems
• Performance Levels, Classification, and Specification
• Blending, Storage, Purchase, and Use
• The Future
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Engine Testing: Theory & Practice 3rd Edition
By Tony Martyr, Michael James Plint
This book brings together the large and scattered body of information on the theory and practice of engine testing, to which any engineer responsible for work of this kind must have access. The eclectic nature of engine, powertrain, chassis and whole vehicle testing makes this comprehensive book a true must-have reference for those in the automotive industry, as well as more advanced students of automotive engineering.
Covers all key aspects of engine testing, including:
• Test Facility Specification
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Bestseller
Vehicular Engine Design

By Kevin L Hoag

This book provides an introduction to the design and mechanical development of reciprocating piston engines for vehicular applications. It covers each major engine component and subsystem in a step-by-step process.

Chapters include:
- The Engine Development Process
- Determining Displacement
- Engine Configuration and Balance
- Cylinder Block and Head
- and more


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Innovations in Automotive Transmission Engineering

By Martin G. Gabriel

This report examines the technological innovations in transmission design that contribute to important overall vehicle characteristics such as fuel economy, vehicle performance, quality and reliability. This book is a reference providing solid supportive data for the manager and engineer with responsibility for directing the application of the transmission in vehicle design concepts.

Topics Covered:
- Background and Innovations
- Transmission Types and Components
- Performance Attributes
- Power Requirements, Losses, and Efficiency
- and more


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Bestseller
Design and Simulation of Two-Stroke Engines

By Gordon P. Blair

The author, having designed and developed many two-stroke engines, offers practical and empirical assistance to the engine designer on many topics ranging from porting layout, to combustion chamber profile, to tuned exhaust pipes. The information presented extends from the most fundamental theory to pragmatic design, development, and experimental testing issues.

Chapters cover:
- Introduction to the Two-Stroke Engine
- Combustion in Two-Stroke Engines
- Computer Modeling of Engines
- Reduction of Fuel Consumption and Exhaust Emissions
- Reduction of Noise Emission from Two-Stroke Engines
- and more


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Design and Simulation of Four-Stroke Engines

By Gordon P. Blair

This book provides design assistance with the actual mechanical design of an engine in which the gas dynamics, fluid mechanics, thermodynamics, and combustion have been optimized so as to provide the required performance characteristics such as power, torque, fuel consumption, or noise emission.

Chapters cover:
- Introduction to the Four-Stroke Engine
- Discharge Coefficients of Flow
- Combustion
- Computer Modeling
- Reduction of Noise Emission
- and more


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Modern Engine Technology from A to Z
By Richard Van Basshuysen, Fred Schaefer

Part dictionary, part encyclopedia, this book will serve as a comprehensive reference guide for personnel in the automotive, engine, petroleum and supporting industries. It is derived from the successful German publication Shell-Lexikon Verbrennungsmotor (Shell Lexicon of the Combustion Engine) which originally appeared in supplements to the Journal of Automotive Engineering and Journal of Engine Engineering.

What to expect:
• In-depth contributions from nearly 100 experts
• Theory and Practice on state-of-the-art engine development
• Keywords, cross-references, illustrations, and more

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Vehicle and Engine Technology
2nd Edition
By Heinz Heisler

A comprehensive description of the body of four-wheeled vehicles, engine components, and how these elements work together, this book provides precise and clear descriptions and explanations of the fundamentals of all essential components of the motor vehicle.

This edition includes updated information on:
• Pollution Control
• Automatic Transmission
• Steering Systems
• Braking Systems
• and more

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Introduction to Internal Combustion Engines
3rd Edition
By Richard Stone

A valuable reference for students studying the internal combustion engine and for engineers needing a practical overview of the subject, this third edition includes material covering fuel chemistry, additive performance and variable geometry turbocharging.

Chapters cover:
• Thermodynamic Principles
• Combustion and Fuels
• Spark Ignition Engines
• Induction and Exhaust Processes
• Turbocharging
• and more

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Internal Combustion Engine Handbook - Basics, Components, Systems, and Perspectives
By Richard Van Basshuysen, Fred Schaefer

Thorough in its presentation, this resource illustrates knowledge in engine development, paying particular attention to the presentation of theory and practice in a balanced ratio, and includes an insightful look into the internal combustion engine’s future viability.

Chapter topics include:
• Historical Review
• Thermodynamic Fundamentals
• Engine Components
• Powertrain
• and more


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Automotive Gasoline Direct-Injection Engines

By Fuquan Zhao, David L. Harrington, Ming-Chia D. Lai

This book covers the latest global technical initiatives in the rapidly progressing area of gasoline direct injection (GDI), spark-ignited gasoline engines and examines the contribution of each process and sub-system to the efficiency of the overall system.

Chapters cover:
• Fuel Injection System
• Mixture Formation Processes and Approaches
• Combustion Process and Control Strategies
• Emissions
• Fuel Economy: Potential and Challenges
• and more


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Hydrogen and Its Future as a Transportation Fuel

By Daniel J. Holt

With today’s emphasis on emissions and the search for an alternative fuel, hydrogen is being touted by many as the fuel of the future. This book is a collection of 43 SAE technical papers covering the five years (1998-2002) of research on the uses of hydrogen as a transportation fuel.

Contents Include:
• Hydrogen Issues
• Internal Combustion Engines
• Diesel Engines
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Diesel Particulate Filter Technology

By Timothy V. Johnson

This book covers the latest and most important research in Diesel Particulate Filter (DPF) systems, focusing mainly on the advancements of the years 2002-2006. This reference includes an introduction, an extensive bibliography, and 29 technical papers.

Sections include:
• Nature of Ultrafines
• DPF Soot Load Modeling
• Filter Regeneration Principles
• Integrated DPF and NOx Control
• and more

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Diesel Common Rail and Advanced Fuel Injection Systems

By Ming-Chia D Lai, Philip J Dingle

This report is a resource that addresses the important aspects relating to the diesel fuel injection system, explaining how we have arrived where we are, what systems are available today, and future outlook and technology trends.

Chapter titles include:
• History and Background
• Injector Nozzle and Spray Technologies and Their Impact on Emissions
• Common Rail Fuel Injection Equipment
• Hydraulic Electronic Unit Injectors
• and more

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Hybrid Gasoline-Electric Vehicle Development

By John M. German

This book chronicles recent advances in hybrid vehicle technologies and looks ahead to future hybrid vehicle development, with a focus on hybrid vehicles with electrical energy storage systems and potential synergies provided by the electric power. It’s an invaluable resource for practicing engineers, managers, students, and those with an interest in this promising technology.

Sections include:
- Hybrid Production Vehicles
- Heavy-Duty and Military Applications
- Future Directions
- Hybrid Systems Components
- and more


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Hybrid Powered Vehicles

By John M. German

The report explores the basis of hybrid components and system engineering, and then delves into the design constraints, challenges and opportunities. It concludes with a look toward the future presenting an expert’s outlook on developments in the technology, its applications and potential markets.

Chapters include:
- Hybrid Vehicles - Transitional Technology or Ultimate Solution
- Hybrid Electric System Design
- Hybrid Components
- Real World Design Constraints
- Hybrid System Optimization: Challenges and Optimization
- and more


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Introduction to Engine Valvetrains

By Yushu Wang

Focusing on the fundamental concepts, this book enables you to appreciate design and material considerations, while at the same time understanding the difficulties in designing valvetrains to satisfy functional requirements and manufacturing challenges. It will serve as your single resource providing a systematic introduction to valvetrain systems and components.

The book is broken down into the following main topics:

- Introduction and Overview of Engines
- Valvetrain Systems
- Valvetrain Components
- Valvetrain Testing
- Valvetrain Tribology
- Valvetrain Failure Analysis


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Nonlinear and Hybrid Systems in Automotive Control

By Rolf Johansson, Anders Rantzer

With contributions from leading scientists in the field, this book presents an overview of research in this rapidly-expanding area. New approaches to solving theoretical problems, as well as numerous systems and control research issues are covered.

Subjects include:

- Vehicle Dynamics and Active Suspension
- Anti-lock Braking Systems and Optimal Braking Control
- Combustion Engine Control
- Stability Analysis of Hybrid Systems
- Modeling of Driver Position and Behavior
- and more


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Continuously Variable Transmission (CVT)

By John R Maten, Bruce D Anderson

Building on an earlier SAE publication, the 37 technical papers selected for this book cover updated information on a variety of topics within the area of CVTs. Although this book is not intended to represent the full body of CVT technology, it provides technical presentations and their reference documents, which can lead to discussions covering several topics of interest in CVTs.

Topics covered include:
• Belt Drive
• Vehicle
• Transmission
• Belt/Variator System
• Fluid
• Traction Drive

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Variable Valvetrain System Technology

By Robert J Moran

This combination of 27 papers covers a decade of technical information reviewing the wide-range of approaches to Variable Valve Actuation (VVA). Each approach has unique benefits and a range of applications.

Topics include:
• Engine Cycles with VVA
• Cam Phasing Systems
• Profile Switching and Lost Motion Systems
• Cylinder Deactivation
• Mechanical Variable Valvetrain Systems
• Camless Valve Actuation

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Particulate Emissions from Vehicles
By Peter Eastwood

Pulling together a wealth of knowledge that is currently only available through journal and conference papers, this book addresses a field of increasing international interest, research activity, and legislation.

Topics include:
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• Formation, Composition and Location
• Measurement
• Characterisation
• Abatement
• and more

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Topics include:
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Diesel Exhaust Aftertreatment 2000-2007
By Federico Millo, Magdi K. Khair

As diesel emission restrictions grow tighter, exhaust aftertreatment technologies must become more efficient and reliable. The 55 SAE technical papers in this compilation will guide engineers in their efforts to meet these new regulations, by summarizing the latest diesel exhaust aftertreatment technology for both light- and heavy-duty applications.

Chapters include:
• Introduction: Regulations, Emission Control Requirements, Technology Trends
• PM Control
• NOx Control
• Integrated and Combined Systems for Simultaneous PM and NOx Control
• Fuel and Lubricants Effects
• Modelling

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Diesel Emissions and Their Control
By W. Addy Majewski, Magdi K. Khair

This book will assist readers in meeting today’s tough challenges of improving diesel engine emissions, diesel efficiency, and public perception of the diesel engine. It can be used as an introductory text, while at the same time providing practical information that will be useful for experienced readers.

This comprehensive book contains 23 chapters, separated into 5 main sections:
• Diesel Engine Basics
• Diesel Emissions
• Diesel Fuels
• Emission Control through Engine Design
• Exhaust Gas Aftertreatment

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Technologies for Near-Zero-Emission Gasoline-Powered Vehicles

By Fuquan Zhao

Experts in the field address a broad spectrum of key research and development issues in the rapidly progressing area of near-zero-emission gasoline-powered vehicles. Written in response to the increasingly stringent emissions legislation, this book provides the reader with a concise introduction to state-of-the-art technology developments in near-zero-emission gasoline-powered vehicles.

A must-read for anyone interested in gasoline-powered vehicles:
- Engineers
- Managers
- Research and Development
- Academia
- Students


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Fuel Cell Powered Vehicles: Automotive Technology of the Future - Update

By Daniel J. Holt

The report reviews concepts behind fuel cell technology and then describes the improvements and new vehicles that have been developed since 2001 as the technology has been refined. It also examines the remaining challenges, in particular the issue of what fuel should be used and the necessary refueling infrastructure. Mr. Holt concludes with a look to the future and discusses when and if fuel cell vehicles (FCV) will become a reality.

Chapters include:
• The Fuel Cell
• Vehicles
• The Race Is On
• Refueling Infrastructure
• The Future

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Fuel Cell Systems Explained
3rd Edition

By Andrew Dicks, James Larminie

Building on the success of the first edition, this fully revised and updated book presents a balanced introduction to this growing area and provides an essential guide to the principles, design and application of fuel cell systems.

Topics include:
• Fuel processing and hydrogen generation and storage systems
• The direct methanol fuel cell
• Examples of real fuel cell systems
• Fuel cell operation and thermodynamics
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Alternative Fuels
Transportation Fuels for Today and Tomorrow
By Richard L. Bechtold

Discover the ground-breaking technological advances being made in this field, how they will revolutionize transportation and the impact they will have on your business. This research report examines the accepted alternative fuels, providing historical background, physical and chemical properties, production technology, and prospects of each.

Chapters include:
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