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“Process Plant Equipment Book is another great publication from Wiley as a reference book for final year students as well as those who will work or are working in chemical production plants and refinery...” -Associate Prof. Dr. Ramli Mat, Deputy Dean (Academic), Faculty of Chemical Engineering, Universiti Teknologi Malaysia “...give[s] readers access to both fundamental information on process plant equipment and to practical ideas, best practices and experiences of highly successful engineers from around the world... The book is illustrated throughout with numerous black & white photos and diagrams and also contains case studies demonstrating how actual process plants have implemented the tools and techniques discussed in the book. An extensive list of references enables readers to explore each individual topic in greater depth...” –Stainless Steel World and Valve World, November 2012 Discover how to optimize process plant equipment, from selection to operation to troubleshooting From energy to pharmaceuticals to food, the world depends on processing plants to manufacture the products that enable people to survive and flourish. With this book as their guide, readers have the information and practical guidelines needed to select, operate, maintain, control, and troubleshoot process plant equipment so that it is

efficient, cost-effective, and reliable throughout its lifetime. Following the authors' careful explanations and instructions, readers will find that they are better able to reduce downtime and unscheduled shutdowns, streamline operations, and maximize the service life of processing equipment. *Process Plant Equipment: Operation, Control, and Reliability* is divided into three sections: Section One: Process Equipment Operations covers such key equipment as valves, pumps, cooling towers, conveyors, and storage tanks. Section Two: Process Plant Reliability sets forth a variety of tested and proven tools and methods to assess and ensure the reliability and mechanical integrity of process equipment, including failure analysis, Fitness-for-Service assessment, engineering economics for chemical processes, and process component function and performance criteria. Section Three: Process Measurement, Control, and Modeling examines flow meters, process control, and process modeling and simulation. Throughout the book, numerous photos and diagrams illustrate the operation and control of key process equipment. There are also case studies demonstrating how actual process plants have implemented the tools and techniques discussed in the book. At the end of each chapter, an extensive list of references enables readers to explore each individual topic in greater depth. In summary, this text offers students, process engineers, and plant managers the expertise and technical

support needed to streamline and optimize the operation of process plant equipment, from its initial selection to operations to troubleshooting. Energy Systems Engineering is one of the most exciting and fastest growing fields in engineering. Modeling and simulation plays a key role in Energy Systems Engineering because it is the primary basis on which energy system design, control, optimization, and analysis are based. This book contains a specially curated collection of recent research articles on the modeling and simulation of energy systems written by top experts around the world from universities and research labs, such as Massachusetts Institute of Technology, Yale University, Norwegian University of Science and Technology, National Energy Technology Laboratory of the US Department of Energy, University of Technology Sydney, McMaster University, Queens University, Purdue University, the University of Connecticut, Technical University of Denmark, the University of Toronto, Technische Universität Berlin, Texas A&M, the University of Pennsylvania, and many more. The key research themes covered include energy systems design, control systems, flexible operations, operational strategies, and systems analysis. The addressed areas of application include electric power generation, refrigeration cycles, natural gas liquefaction, shale gas treatment, concentrated solar power, waste-to-energy systems, micro-gas turbines, carbon

dioxide capture systems, energy storage, petroleum refinery unit operations, Brayton cycles, to name but a few.

Comprehensive and a fundamental approach to the study of sustainable fuel conversion for the generation of electricity and for coproducing synthetic fuels and chemicals Both electricity and chemicals are critical to maintain our modern way of life however environmental impacts have to be factored in to sustain this type of lifestyle. "Sustainable Energy Conversion for Electricity and Coproducts" provides a unified, comprehensive and a fundamental approach to the study of sustainable fuel conversion in order to generate electricity and optionally coproduce synthetic fuels and chemicals. The book starts with an introduction to energy systems and describes the various forms of energy sources: natural gas, petroleum, coal, biomass, and other renewables and nuclear. Their distribution is discussed in order to emphasize the uneven availability and finiteness of some of these resources. Each topic in the book is covered in sufficient detail from a theoretical and practical applications standpoint essential for engineers involved in the development of the modern power plant. "Sustainable Energy Conversion for Electricity and Coproducts features: "Impact on the environment along with an introduction to the supply chain and life cycle analyses in order to emphasize the holistic approach required for sustainability. Not only are the emissions of criteria

pollutants addressed but also the major greenhouse gas CO₂ which is essential for the overall sustainability. Underlying principles of physics and their application to engineering including thermodynamics, fluid flow, and heat and mass transfer which form the foundation for the more technology specific chapters that follow. Details specific subjects within energy plants such as prime movers, systems engineering, Rankine cycle and the Brayton-Rankine combined cycle, and emerging technologies such as high temperature membranes and fuel cells etc... Sustainable energy conversion is an extremely active field of research at this time. By covering the multidisciplinary fundamentals in sufficient depth, this book is largely self-contained suitable for the different engineering disciplines, as well as chemists working in this field of sustainable energy conversion. Ashok Rao, PhD, is a well-acknowledged national and international leader in the field of energy conversion and has made wide-ranging contributions in these fields over the past 40 years in industry as well as at the University of California's Advanced Power and Energy Program where he is currently its Chief Scientist for Power Systems. While working at Fluor as a Director in Process Engineering, he was honoured by being made a Senior Fellow. In 2011 he was invited to be the associate editor for the ASME Journal of Engineering for Gas Turbines and Power and a keynote speaker at the 2011 International Conference on Applied

Energy, Perugia, Italy. He also has a number of patents to his credit in the field of energy conversion as well as numerous high quality publications.

Offering indispensable insight from experts in the field, *Fundamentals of Natural Gas Processing, Third Edition* provides an introduction to the gas industry and the processes required to convert wellhead gas into valuable natural gas and hydrocarbon liquids products including LNG. The authors compile information from the literature, meeting proceedings, short courses, and their own work experiences to give an accurate picture of where gas processing technology stands today as well as to highlight relatively new technologies that could become important in the future. The third edition of this bestselling text features updates on North American gas processing and changing gas treating requirements due to shale gas production. It covers the international nature of natural gas trade, LNG, economics, and more. To help nonengineers understand technical issues, the first 5 chapters present an overview of the basic engineering concepts applicable throughout the gas, oil, and chemical industries. The following 15 chapters address natural gas processing, with a focus on gas plant processes and technologies. The book contains 2 appendices. The first contains an updated glossary of gas processing terminology. The second is available only online and contains useful conversion factors and physical properties data.

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Aimed at students as well as natural gas processing professionals, this edition includes both discussion questions and exercises designed to reinforce important concepts, making this book suitable as a textbook in upper-level or graduate engineering courses.

Rarely covered in formal engineering courses, natural gas hydrates are a common problem and real-life danger for engineers worldwide. Updated and more practical than ever, *Natural Gas Hydrates, Third Edition* helps managers and engineers get up to speed on all the most common hydrate types, how to forecast when they will appear, and safely mitigate their removal. Known for being highly flammable, gas hydrates are a preventable threat that can cost millions of dollars in damage, as well as take the lives of workers and engineers on the rig. The third edition of *Natural Gas Hydrates* is enhanced with today's more complex yet practical utilization needs including: New hydrate types and formers, including mercaptans and other sulfur compounds Vital information on how to handle hydrate formation in the wellbore, useful information in light of the Macondo explosion and resulting oil spill More detailed phase diagrams, such as ternary systems, as well as more relevant multicomponent mixtures Quantifiably measure the conditions that make hydrates possible and mitigate the right equipment correctly Predict and examine the conditions at which hydrates form

with simple and complex calculation exercises Gain knowledge and review lessons learned from new real-world case studies and examples, covering capital costs, dehydration, and new computer methods

The most complete guide of its kind, this is the standard handbook for chemical and process engineers. All new material on fluid flow, long pipe, fractionators, separators and accumulators, cooling towers, gas treating, blending, troubleshooting field cases, gas solubility, and density of irregular solids. This substantial addition of material will also include conversion tables and a new appendix, "Shortcut Equipment Design Methods." This convenient volume helps solve field engineering problems with its hundreds of common sense techniques, shortcuts, and calculations. Here, in a compact, easy-to-use format, are practical tips, handy formulas, correlations, curves, charts, tables, and shortcut methods that will save engineers valuable time and effort. Hundreds of common sense techniques and calculations help users quickly and accurately solve day-to-day design, operations, and equipment problems.

As the demand for global energy increases, fact-based evaluations of alternative energy sources are needed in order to address the growing interest in how energy is produced, provided, and transported in sustainable ways. Future Energy, Second Edition provides scientists and decision makers with the

knowledge they need to understand the relative importance and magnitude of various energy production methods in order to make the energy decisions needed for sustaining development and dealing with climate change. The second edition of Future Energy looks at the present energy situation and extrapolates to future scenarios related to global warming and the increase of carbon dioxide and other greenhouse gases in the atmosphere. This thoroughly revised and updated edition contains over 30 chapters on all aspects of future energy, each chapter updated and expanded by expert scientists and engineers in their respective fields providing an unbiased and balanced view of the future of energy. Provides readers with an up-to-date overview of available energy options, both traditional and renewable, as well as the necessary tools to make informed decisions regarding selection, use, and environmental impacts. Covers a wide spectrum of future energy resources presented in a single book with chapters written by experts of the particular field Eleven new chapters including chapters on: solar heating, energy resources in developing nations and frontiers in oil and gas, Arctic drilling and unconventional oil and gas sources, thorium in nuclear fission, ethanol and other options for future transport fuel, fracking, smart grids, new batteries, environmental issues and the energy options for China This book provides a clear and basic understanding of the concept of reservoir

engineering to professionals and students in the oil and gas industry. The content contains detailed explanations of key theoretic and mathematical concepts and provides readers with the logical ability to approach the various challenges encountered in daily reservoir/field operations for effective reservoir management. Chapters are fully illustrated and contain numerous calculations involving the estimation of hydrocarbon volume in-place, current and abandonment reserves, aquifer models and properties for a particular reservoir/field, the type of energy in the system and evaluation of the strength of the aquifer if present. The book is written in oil field units with detailed solved examples and exercises to enhance practical application. It is useful as a professional reference and for students who are taking applied and advanced reservoir engineering courses in reservoir simulation, enhanced oil recovery and well test analysis.

The aim of this book is to present in a single volume an up-to-date account of the chemistry and chemical engineering which underlie the major areas of the chemical process industry. This most recent edition includes several new chapters which comprise important threads in the industry's total fabric. These new chapters cover waste minimization, safety considerations in chemical plant design and operation, emergency response planning, and statistical applications

in quality control and experimental planning. Together with the chapters on chemical industry economics and wastewater treatment~ they provide a unifying base on which the reader can most effectively apply the information provided in the chapters which describe the various areas of the chemical process industries. The ninth edition of this established reference work contains the contributions of some fifty experts from industry, government, and academe. I have been humbled by the breadth and depth of their knowledge and expertise and by the willingness and enthusiasm with which they shared their knowledge and insights. They have, without exception, been unstinting in their efforts to make their respective chapters as complete and informative as possible within the space available. Errors of omission, duplication, and shortcomings in organization are mine. Grateful acknowledgment is made to the editors of technical journals and publishing houses for permission to reproduce illustrations and other materials and to the many industrial concerns which contributed drawings and photographs. Comments and criticisms by readers will be welcome.

Modeling, Control, and Optimization of Natural Gas Processing Plants presents the latest on the evolution of the natural gas industry, shining a light on the unique challenges plant managers and owners face when looking for ways to optimize plant performance and efficiency, including topics such as the various

feed gas compositions, temperatures, pressures, and throughput capacities that keep them looking for better decision support tools. The book delivers the first reference focused strictly on the fast-growing natural gas markets. Whether you are trying to magnify your plants existing capabilities or are designing a new facility to handle more feedstock options, this reference guides you by combining modeling control and optimization strategies with the latest developments within the natural gas industry, including the very latest in algorithms, software, and real-world case studies. Helps users adapt their natural gas plant quickly with optimization strategies and advanced control methods Presents real-world application for gas process operations with software and algorithm comparisons and practical case studies Provides coverage on multivariable control and optimization on existing equipment Allows plant managers and owners the tools they need to maximize the value of the natural gas produced

Despite the length of time it has been around, its importance, and vast amounts of research, combustion is still far from being completely understood.

Environmental, cost, and fuel consumption issues add further complexity, particularly in the process and power generation industries. Dedicated to advancing the art and science of industrial combustion, The John Zink Hamworthy Combustion Handbook, Second Edition: Volume One –

Fundamentals gives you a strong understanding of the basic concepts and theory. Under the leadership of Charles E. Baukal, Jr., top combustion engineers and technologists from John Zink Hamworthy Combustion examine the interdisciplinary fundamentals—including chemistry, fluid flow, and heat transfer—as they apply to industrial combustion. What's New in This Edition Expanded to three volumes, with Volume One focusing on fundamentals Extensive updates and revisions throughout Updated information on HPI/CPI industries, including alternative fuels, advanced refining techniques, emissions standards, and new technologies Expanded coverage of the physical and chemical principles of combustion New practices in coal combustion, such as gasification The latest developments in cold-flow modeling, CFD-based modeling, and mathematical modeling Greater coverage of pollution emissions and NO_x reduction techniques New material on combustion diagnostics, testing, and training More property data useful for the design and operation of combustion equipment Coverage of technologies such as metallurgy, refractories, blowers, and vapor control equipment Now expanded to three volumes, the second edition of the bestselling The John Zink Combustion Handbook continues to provide the comprehensive coverage, up-to-date information, and visual presentation that made the first edition an industry

standard. Featuring color illustrations and photographs throughout, Volume One: Fundamentals helps you broaden your understanding of industrial combustion to better meet the challenges of this field. For the other volumes in the set, see The John Zink Hamworthy Combustion Handbook, Second Edition: Three-Volume Set.

Written by an internationally-recognized team of natural gas industry experts, the fourth edition of Handbook of Natural Gas Transmission and Processing is a unique, well-researched, and comprehensive work on the design and operation aspects of natural gas transmission and processing. Six new chapters have been added to include detailed discussion of the thermodynamic and energy efficiency of relevant processes, and recent developments in treating super-rich gas, high CO₂ content gas, and high nitrogen content gas with other contaminants. The new material describes technologies for processing today's unconventional gases, providing a fresh approach in solving today's gas processing challenges including greenhouse gas emissions. The updated edition is an excellent platform for gas processors and educators to understand the basic principles and innovative designs necessary to meet today's environmental and sustainability requirement while delivering acceptable project economics. Covers all technical and operational aspects of natural gas transmission and processing. Provides

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pivotal updates on the latest technologies, applications, and solutions. Helps to understand today's natural gas resources, and the best gas processing technologies. Offers design optimization and advice on the design and operation of gas plants.

This book describes oilfield processing and handling of natural gas in a direct, easy-to-follow format. Process descriptions, design methods, operating procedures and troubleshooting are covered in detail. This hands-on reference will be useful to field practitioners and is an ideal training text. Petroleum engineers will gain a better understanding of surface operations between the wellhead and the point of custody transfer or transport from the production facilities.

Here, in a compact, easy-to-use format, are practical tips, handy formulas, correlations, curves, charts, tables, and shortcut methods that will save engineers valuable time and effort. Hundreds of common sense techniques and calculations help users quickly and accurately solve day-to-day design, operations, and equipment problems.

A strong foundation in reservoir rock and fluid properties is the backbone of almost all the activities in the petroleum industry. Suitable for undergraduate students in petroleum engineering, *Petroleum Reservoir Rock and Fluid Properties, Second Edition* offers a well-

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balanced, in-depth treatment of the fundamental concepts and practical aspects that encompass this vast discipline. New to the Second Edition Introductions to Stone II three-phase relative permeability model and unconventional oil and gas resources Discussions on low salinity water injection, saturated reservoirs and production trends of five reservoir fluids, impact of mud filtrate invasion and heavy organics on samples, and flow assurance problems due to solid components of petroleum Better plots for determining oil and water Corey exponents from relative permeability data Inclusion of Rachford-Rice flash function, Plateau equation, and skin effect Improved introduction to reservoir rock and fluid properties Practice problems covering porosity, combined matrix-channel and matrix-fracture permeability, radial flow equations, drilling muds on fluid saturation, wettability concepts, three-phase oil relative permeability, petroleum reservoir fluids, various phase behavior concepts, phase behavior of five reservoir fluids, and recombined fluid composition Detailed solved examples on absolute permeability, live reservoir fluid composition, true boiling point extended plus fractions properties, viscosity based on compositional data, and gas-liquid surface tension Accessible to anyone with an engineering background, the text reveals the importance of understanding rock and fluid properties in petroleum engineering. Key literature references, mathematical expressions, and laboratory measurement techniques illustrate the correlations and influence between the various properties. Explaining how to acquire accurate and reliable data, the author describes coring and fluid sampling methods, issues related to handling samples for core analyses, and PVT studies. He also highlights core and phase behavior analysis using laboratory tests and calculations to elucidate a wide range of properties.

Distillation: Equipment and Processes—winner of the 2015 PROSE Award in Chemistry &

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Physics from the Association of American Publishers—is a single source of authoritative information on all aspects of the theory and practice of modern distillation, suitable for advanced students and professionals working in a laboratory, industrial plants, or a managerial capacity. It addresses the most important and current research on industrial distillation, including all steps in process design (feasibility study, modeling, and experimental validation), together with operation and control aspects. This volume features an extra focus on distillation equipment and processes. Winner of the 2015 PROSE Award in Chemistry & Physics from the Association of American Publishers Practical information on the newest development written by recognized experts Coverage of a huge range of laboratory and industrial distillation approaches Extensive references for each chapter facilitates further study

There has been a strong need to enhance the utilization of renewable energy systems (RESs) from onshore to offshore applications where oil and gas companies are pivoting to integrate such renewable energy options into their offshore operations to lower their carbon footprint, extend the lifetime of their assets, and expand their market. In this regard, innovative hybrid energy systems, such as “Power to Gas (P2G) and “Power to Liquid (P2L) options, as well as novel integration strategies for “Gas to Power (G2P) systems, offer the opportunity to implement solutions energy transition, paving the way to offshore RES deployment. Hybrid Energy Systems for Offshore Applications delivers a comprehensive presentation of state of the art and perspective developments of offshore RES exploitation strategies and technologies, and provides a unique portfolio of decision-making methodologies supporting the selection of the most suitable options for offshore renewable energy production at a specific site. System modeling and analysis along with the definitions of multicriteria methodologies

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and strategies based on sustainability, environmental impact, and safety performance indicators are addressed in an integrated fashion. Rounding out with both research and practical applications explained, this book gives academicians and industrial professionals fundamentals and methods for integrated performance analysis of innovative systems addressing offshore RES exploitation, sustainable chemical and power production, better efficiency, lower costs, lower environmental impact, and higher inherent safety. Harmonized presentation of RESs Unique coverage on hybrid energy systems and their offshore applications Comprehensive thermodynamic analysis and evaluation of the developed systems Process and system modeling, analysis, and decision-making methodologies for offshore P2G, P2L, and G2P solutions Sustainability modeling and assessment studies for various offshore applications Distinct parametric studies, illustrations, and case studies Specific sustainability and safety performance indicators for comparative evaluations

Working Guide to Reservoir Rock Properties and Fluid Flow provides an introduction to the properties of rocks and fluids that are essential in petroleum engineering. The book is organized into three parts. Part 1 discusses the classification of reservoirs and reservoir fluids. Part 2 explains different rock properties, including porosity, saturation, wettability, surface and interfacial tension, permeability, and compressibility. Part 3 presents the mathematical relationships that describe the flow behavior of the reservoir fluids. The primary reservoir characteristics that must be considered include: types of fluids in the reservoir, flow regimes, reservoir geometry, and the number of flowing fluids in the reservoir. Each part concludes with sample problems to test readers knowledge of the topic covered. Critical properties of reservoir rocks Fluid (oil, water, and gas) PVT relationships Methods to calculate hydrocarbons initially

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in place Dynamic techniques to assess reservoir performance Parameters that impact well/reservoir performance over time

Software tools are a great aid to process engineers, but too much dependence on such tools can often lead to inappropriate and suboptimal designs. Reliance on software is also a hindrance without a firm understanding of the principles underlying its operation, since users are still responsible for devising the design. In Process Engineering and Desi

Absorption-Based Post-Combustion Capture of Carbon Dioxide provides a comprehensive and authoritative review of the use of absorbents for post-combustion capture of carbon dioxide. As fossil fuel-based power generation technologies are likely to remain key in the future, at least in the short- and medium-term, carbon capture and storage will be a critical greenhouse gas reduction technique. Post-combustion capture involves the removal of carbon dioxide from flue gases after fuel combustion, meaning that carbon dioxide can then be compressed and cooled to form a safely transportable liquid that can be stored underground. Provides researchers in academia and industry with an authoritative overview of the amine-based methods for carbon dioxide capture from flue gases and related processes Editors and contributors are well known experts in the field Presents the first book on this specific topic

There is a renaissance that is occurring in chemical and process engineering, and it is crucial for today's scientists, engineers, technicians, and operators to stay current. With so many changes over the last few decades in equipment and processes, petroleum refining is almost a living document, constantly needing updating. With no new refineries being built, companies are spending their capital re-tooling and adding on to existing plants. Refineries are like small cities, today, as they grow bigger and bigger and more and more complex. A huge percentage

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of a refinery can be changed, literally, from year to year, to account for the type of crude being refined or to integrate new equipment or processes. This book is the most up-to-date and comprehensive coverage of the most significant and recent changes to petroleum refining, presenting the state-of-the-art to the engineer, scientist, or student. Useful as a textbook, this is also an excellent, handy go-to reference for the veteran engineer, a volume no chemical or process engineering library should be without. Written by one of the world's foremost authorities, this book sets the standard for the industry and is an integral part of the petroleum refining renaissance. It is truly a must-have for any practicing engineer or student in this area. This is the fifth volume in a series of books focusing on natural gas engineering, focusing on the extraction and disposal of acid gas. This volume includes information for both upstream and downstream operations, including chapters on modeling, carbon capture, chemical and thermodynamic models, and much more. Written by some of the most well-known and respected chemical and process engineers working with natural gas today, the chapters in this important volume represent the most cutting-edge and state-of-the-art processes and operations being used in the field. Not available anywhere else, this volume is a must-have for any chemical engineer, chemist, or process engineer working with natural gas. There are updates of new technologies in other related areas of natural gas, in addition to the extraction and disposal of acid gas, including testing, reservoir simulations, acid gas injection, and natural gas hydrate

formations. Advances in Natural Gas Engineering is an ongoing series of books meant to form the basis for the working library of any engineer working in natural gas today. Every volume is a must-have for any engineer or library.

Petroleum Engineer's Guide to Oil Field Chemicals and Fluids, Third Edition delivers all the necessary lists of chemicals by use, their basic components, benefits and environmental implications. Instead of searching through various sources, this updated reference presents a one-stop, non-commercialized approach by organizing products by function, matching the chemical to the process for practical problem-solving, and extending coverage with additional resources and supportive materials. Updates include shale specific fluids and organic additives, including swellable polymers and multi-walled carbon nanotubes. Covering the full spectrum, including fluid loss additives and oil spill treating agents, this book is ideal for every oil and gas operation with its options for lower costs, sustainable use and enhanced production. Helps readers effectively locate and utilize the right chemical application specific to their oil and gas operation Includes updated sections on shale specific fluids, defoamers and organic additives, including biodegradable waste and swellable polymers Covers environmental factors and risks for oil field chemicals, along with the pluses and minuses of each application

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This book offers a modern view of process control in the context of today's technology. It provides innovative chapters on the growth of educational, scientific, and industrial research among chemical engineers. It presents experimental data on thermodynamics and provides a broad understanding of the main computational techniques used for chemical processing. Readers will gain an understanding of the areas of process control that all chemical engineers need to know. The information is presented in a concise and readable format. The information covers the basics and also provides unique topics, such as using a unified approach to model representations, statistical quality control, and model-based control. The methods presented have been successfully applied in industry to solve real problems. Designed as an advanced research guide in process dynamics and control, the book will be useful in chemical engineering courses as well as for the teaching of mechanical, nuclear, industrial, and metallurgical engineering.

Fundamentals of Natural Gas Processing explores the natural gas industry from the wellhead to the marketplace. It compiles information from the open literature, meeting proceedings, and experts to accurately depict the state of gas processing technology today and highlight technologies that could become important in the future. This book cov

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A must-read for any practicing engineer or student in this area. There is a renaissance that is occurring in chemical and process engineering, and it is crucial for today's scientists, engineers, technicians, and operators to stay current. This book offers the most up-to-date and comprehensive coverage of the most significant and recent changes to petroleum refining, presenting the state-of-the-art to the engineer, scientist, or student. Useful as a textbook, this is also an excellent, handy go-to reference for the veteran engineer, a volume no chemical or process engineering library should be without.

This book covers different aspects of gas injection, from the classic pressure maintenance operation to enhanced oil recovery (EOR), underground gas storage (UGS), and carbon capture and storage (CCS). The authors detail the unique characteristics and specific criteria of each application, including: material balance equations, phase behaviour, reservoir engineering, well design, operating aspects, surface facilities, environmental issues. Examples, data, and simulation codes are provided to enable the reader to gain an in-depth understanding of these applications. *Fundamentals and Practical Aspects of Gas Injection* will be of use to practising engineers in the fields of reservoir engineering, and enhanced oil recovery. It will also be of interest to researchers, academics, and graduate students working in the field of petroleum engineering.

Rules of Thumb for Chemical Engineers, Fifth Edition, provides solutions, common sense techniques, shortcuts, and calculations to help chemical and process engineers deal with practical on-the-job problems. It discusses physical properties for proprietary materials, pharmaceutical and biopharmaceutical sector heuristics, and process design, along with closed-loop heat transfer systems, heat exchangers, packed columns, and structured packings. Organized into 27 chapters, the book begins with an overview of formulae and data for sizing piping systems for incompressible and compressible flow. It then moves to a discussion of design recommendations for heat exchangers, practical equations for solving fractionation problems, along with design of reactive absorption processes. It also considers different types of pumps and presents narrative as well as tabular comparisons and application notes for various types of fans, blowers, and compressors. The book also walks the reader through the general rules of thumb for vessels, how cooling towers are sized based on parameters such as return temperature and supply temperature, and specifications of refrigeration systems. Other chapters focus on pneumatic conveying, blending and agitation, energy conservation, and process modeling. Chemical engineers faced with fluid flow problems will find this book extremely useful. Rules of Thumb for Chemical Engineers brings together solutions, information and work-arounds that

engineers in the process industry need to get their job done. New material in the Fifth Edition includes physical properties for proprietary materials, six new chapters, including pharmaceutical, biopharmaceutical sector heuristics, process design with simulation software, and guidelines for hazardous materials and processes Now includes SI units throughout alongside

Rules of Thumb for Chemical Engineers, Sixth Edition, is the most complete guide for chemical and process engineers who need reliable and authoritative solutions to on-the-job problems. The text is comprehensively revised and updated with new data and formulas. The book helps solve process design problems quickly, accurately and safely, with hundreds of common sense techniques, shortcuts and calculations. Its concise sections detail the steps needed to answer critical design questions and challenges. The book discusses physical properties for proprietary materials, pharmaceutical and biopharmaceutical sector heuristics, process design, closed-loop heat transfer systems, heat exchangers, packed columns and structured packings. This book will help you: save time you no longer have to spend on theory or derivations; improve accuracy by exploiting well tested and accepted methods culled from industry experts; and save money by reducing reliance on consultants. The book brings together solutions, information and work-arounds from engineers in the process industry. Includes new chapters on biotechnology and filtration Incorporates additional tables with typical values and new calculations Features supporting data for selecting and specifying heat

transfer equipment

This volume focuses on the development and application of fundamental concepts in mechanics and physics of solids as they pertain to the solution of challenging new problems in diverse areas, such as materials science and micro- and nanotechnology. In this volume, emphasis is placed on the development of fundamental concepts of mechanics and novel applications of these concepts based on theoretical, experimental, or computational approaches, drawing upon the various branches of engineering science and the allied areas within applied mathematics, materials science, and applied physics. *Materials Physics and Chemistry: Applied Mathematics and Chemo-Mechanical Analysis* emphasizes the basics, such as design, equilibrium, material behavior, and geometry of deformation in simple structures or machines. Readers will find a thorough treatment of stress, strain, and the stress-strain relationships. Meanwhile it provides a solid foundation upon which readers can begin work in composite materials science and engineering. Many chapters include theory components with the equations students need to calculate different properties. Despite the length of time it has been around, its importance, and vast amounts of research, combustion is still far from being completely understood. Industrial applications of combustion add environmental, cost, and fuel consumption issues to its fundamental complexity, and the process and power generation industries in particular present their o

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This substantially revised and updated classic reference offers a valuable overview and myriad details on current chemical processes, products, and practices. No other source offers as much data on the chemistry, engineering, economics, and infrastructure of the industry. The two volume Handbook serves a spectrum of individuals, from those who are directly involved in the chemical industry to others in related industries and activities. Industrial processes and products can be much enhanced through observing the tenets and applying the methodologies found in the book's new chapters.

Advances in Hydrogen Research and Application: 2013 Edition is a ScholarlyEditions™ book that delivers timely, authoritative, and comprehensive information about Deuterium. The editors have built Advances in Hydrogen Research and Application: 2013 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Deuterium in this book to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Advances in Hydrogen Research and Application: 2013 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at <http://www.ScholarlyEditions.com/>. This is the seventh volume in the series, Advances in Natural Gas Engineering,

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focusing on carbon dioxide (CO₂) capture and sequestration, acid gas injection, and enhanced oil recovery, the “three sisters” of natural gas engineering. This volume includes information for both upstream and downstream operations, including chapters detailing the most cutting-edge techniques in acid gas injection, carbon capture, chemical and thermodynamic models, and much more. Written by some of the most well-known and respected chemical and process engineers working with natural gas today, the chapters in this important volume represent the most state-of-the-art processes and operations being used in the field. Not available anywhere else, this volume is a must-have for any chemical engineer, chemist, or process engineer in the industry. Advances in Natural Gas Engineering is an ongoing series of books meant to form the basis for the working library of any engineer working in natural gas today. Acid Gas Extraction for Disposal and Related Topics John Wiley & Sons

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