

## Gpsa Engineering Data Book 12th Edition

Annotation A handbook for chemical and process engineers who need a solution to their practical on-the-job problems. It solves process design problems quickly, accurately and safely, with hundreds of techniques, shortcuts and calculations. Natural gas has traditionally been used as a feedstock for the chemical industry, and as a fuel for process and space heating. Recent advances in exploration, drilling techniques and hydraulic fracturing have made it possible for natural gas to become available in abundance (as of 2012). As natural gas displaces traditional petroleum use in various sectors, a certain amount of disruption is likely. In such a changing landscape, this book tries to chronicle the state-of-the-art in various aspects of natural gas: exploration, drilling, gas processing, storage, distribution, end use and finally the impact on financial markets. Review articles as well as research papers contributed by leading authorities around the world comprise individual chapters of this book. Modeling approaches, as well as, recent advances in specific natural gas technologies are covered in detail.

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

Essentials of Water Systems Design in the Oil, Gas and Chemical Processing Industries provides valuable insight for decision makers by outlining key technical considerations and requirements of four critical systems in industrial processing plants—water treatment systems, raw water and plant water systems, cooling water distribution and return systems, and fire water distribution and storage facilities. The authors identify the key technical issues and minimum requirements related to the process design and selection of various water supply systems used in the oil, gas, and chemical processing industries. This book is an ideal, multidisciplinary work for mechanical engineers, environmental scientists, and oil and gas process engineers.

"The book covers the basic techniques of reservoir engineering necessary for a professional to master. The approach consists of starting from the fundamental physical laws down to the practical applications in reservoir engineering. Emphasis is placed on assumptions and limits attached to each concept and the link between theory and field applications. The theory in this book is developed with a homogenous unit system with useful formulas expressed in practical units."--BOOK JACKET.

Diagnose and Troubleshoot Problems in Chemical Process Equipment with This Updated Classic! Chemical engineers and plant operators can rely on the Third Edition of *A Working Guide to Process Equipment* for the latest diagnostic tips, practical examples, and detailed illustrations for pinpointing trouble and correcting problems in chemical process equipment. This updated classic contains new chapters on Control Valves, Cooling Towers, Waste Heat Boilers, Catalytic Effects, Fundamental Concepts of Process Equipment, and Process Safety. Filled with worked-out calculations, the book examines everything from trays, reboilers, instruments, air coolers, and steam turbines...to fired heaters, refrigeration systems, centrifugal pumps, separators, and compressors. The authors simplify complex issues and explain the technical issues needed to solve all kinds of equipment problems. Comprehensive and clear, the Third Edition of *A Working Guide to Process Equipment* features:

- Guidance on diagnosing and troubleshooting process equipment problems
- Explanations of how theory applies to real-world equipment operations
- Many useful tips, examples, illustrations, and worked-out calculations

New to this edition: Control Valves, Cooling Towers, Waste Heat Boilers, Catalytic Effects, and Process Safety

Inside this Renowned Guide to Solving Process Equipment Problems

- Trays
- Tower Pressure
- Distillation Towers
- Reboilers
- Instruments
- Packed Towers
- Steam and Condensate Systems
- Bubble Point and Dew Point
- Steam Strippers
- Draw-Off Nozzle Hydraulics
- Pumparounds and Tower Heat Flows
- Condensers and Tower Pressure Control
- Air Coolers
- Deaerators and Steam Systems
- Vacuum Systems
- Steam Turbines
- Surface Condensers
- Shell-and-Tube Heat Exchangers
- Fire Heaters
- Refrigeration Systems
- Centrifugal Pumps
- Separators
- Compressors
- Safety
- Corrosion
- Fluid Flow
- Computer Modeling and Control
- Field Troubleshooting Process Problems

*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

This book introduces a new and powerful approach based on rigorous process simulations conducted with professional simulators like HYSYS to predict the performance of supersonic separators (SS). The book addresses the utilization of SSs for the offshore processing of CO<sub>2</sub>-rich natural gas as an alternative to Joule-Thomson expansion, glycol absorption, membrane permeation and chemical absorption. It describes and analyzes the conventional offshore processing of CO<sub>2</sub>-rich natural gas, discussing the advantages of SS in terms of cost and power consumption. The book offers a comprehensive framework for modeling SS units, describing the physical principles of SS in detail. The thermodynamic multiphase sound speed is also discussed at the light shed by a classical analysis based on the Landau Model of phase transitions. A complete framework is presented for modelling and simulating SS units within HYSYS environment. A special chapter is dedicated to the performance of SSs for removing CO<sub>2</sub> from CO<sub>2</sub>-rich natural gas, taking into account the limitations of CO<sub>2</sub> freeze-out in various scenarios of gas feed in terms of CO<sub>2</sub> content, pressure and temperature. The immediate product extracted from oil and gas wells consists of mixtures of oil, gas, and water that is difficult to transport, requiring a certain amount of field processing. This reference analyzes principles and procedures related to the processing of reservoir fluids for the separation, handling, treatment, and production of quality petroleum oil and gas products. It details strategies in equipment selection and system design, field development and operation, and process simulation and control to increase plant productivity and safety and avoid losses during purification, treatment, storage, and export. Providing guidelines for developing efficient and economical treatment systems, the book features solved design examples that demonstrate the application of developed design equations as well as review problems and exercises of key engineering concepts in petroleum field development and operation.

Completions are the conduit between hydrocarbon reservoirs and surface facilities. They are a fundamental part of any hydrocarbon field development project. They have to be designed for safely maximising the hydrocarbon recovery from the well and may have to last for many years under ever changing conditions. Issues include: connection with the reservoir rock, avoiding sand production, selecting the correct interval, pumps and other forms of artificial lift, safety and integrity, equipment selection and installation and future well interventions. \*

Course book based on course well completion design by TRACS International \* Unique in its field: Coverage of offshore, subsea, and landbased completions in all of the major hydrocarbon basins of the world. \* Full colour

The Only Official Google Cloud Study Guide The Official Google Cloud Certified Associate Cloud Engineer Study Guide, provides everything you need to prepare for this important exam and master the skills necessary to land that coveted Google Cloud Engineering certification.

Beginning with a pre-book assessment quiz to evaluate what you know before you begin, each chapter features exam objectives and review questions, plus the online learning environment includes additional complete practice tests. Written by Dan Sullivan, a popular and experienced online course author for machine learning, big data, and Cloud topics, Official Google Cloud Certified Associate Cloud Engineer Study Guide is your ace in the hole for deploying and managing Google Cloud Services. • Select the right Google service from the various choices based on the application to be built • Compute with Cloud VMs and managing VMs • Plan and deploying storage • Network and

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configure access and security Google Cloud Platform is a leading public cloud that provides its users to many of the same software, hardware, and networking infrastructure used to power Google services. Businesses, organizations, and individuals can launch servers in minutes, store petabytes of data, and implement global virtual clouds with the Google Cloud Platform. Certified Associate Cloud Engineers have demonstrated the knowledge and skills needed to deploy and operate infrastructure, services, and networks in the Google Cloud. This exam guide is designed to help you understand the Google Cloud Platform in depth so that you can meet the needs of those operating resources in the Google Cloud.

Liquefied natural gas (LNG) is a commercially attractive phase of the commodity that facilitates the efficient handling and transportation of natural gas around the world. The LNG industry, using technologies proven over decades of development, continues to expand its markets, diversify its supply chains and increase its share of the global natural gas trade. The Handbook of Liquefied Natural Gas is a timely book as the industry is currently developing new large sources of supply and the technologies have evolved in recent years to enable offshore infrastructure to develop and handle resources in more remote and harsher environments. It is the only book of its kind, covering the many aspects of the LNG supply chain from liquefaction to regasification by addressing the LNG industries' fundamentals and markets, as well as detailed engineering and design principles. A unique, well-documented, and forward-thinking work, this reference book provides an ideal platform for scientists, engineers, and other professionals involved in the LNG industry to gain a better understanding of the key basic and advanced topics relevant to LNG projects in operation and/or in planning and development. Highlights the developments in the natural gas liquefaction industries and the challenges in meeting environmental regulations Provides guidelines in utilizing the full potential of LNG assets Offers advices on LNG plant design and operation based on proven practices and design experience Emphasizes technology selection and innovation with focus on a "fit-for-purpose design Updates code and regulation, safety, and security requirements for LNG applications 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.

Offering indispensable insight from experts in the field, Fundamentals of Natural Gas Processing, Second Edition provides an introduction to the gas industry and the processes required to convert wellhead gas into valuable natural gas and hydrocarbon liquids products. The authors compile information from the literature, meeting proceedings, and the

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

Reciprocating compressors and their applications. Design and materials of reciprocating compressor components. Operation and maintenance of reciprocating compressors. Overhaul and repair of reciprocating compressors. Troubleshooting compressor problems. Preventive maintenance of reciprocating compressors. Safety in operation and maintenance. Appendix: Reciprocating compressor calculations. Index.

This broad-based book covers the three major areas of Chemical Engineering. Most of the books in the market involve one of the individual areas, namely, Fluid Mechanics, Heat Transfer or Mass Transfer, rather than all the three. This book presents this material in a single source. This avoids the user having to refer to a number of books to obtain information. Most published books covering all the three areas in a single source emphasize theory rather than practical issues. This book is written with emphasis on practice with brief theoretical concepts in the form of questions and answers, not adopting stereo-typed question-answer approach practiced in certain books in the market, bridging the two areas of theory and practice with respect to the core areas of chemical engineering. Most parts of the book are easily understandable by those who are not experts in the field. Fluid Mechanics chapters include basics on non-Newtonian systems which, for instance find importance in polymer and food processing, flow through piping, flow measurement, pumps, mixing technology and fluidization and two phase flow. For example it covers types of pumps and valves, membranes and areas of their use, different equipment commonly used in chemical industry and their merits and drawbacks. Heat Transfer chapters cover the basics involved in conduction, convection and radiation, with emphasis on insulation, heat exchangers, evaporators, condensers, reboilers and fired heaters. Design methods, performance, operational issues and maintenance problems are highlighted. Topics such as heat pipes, heat pumps, heat tracing, steam traps, refrigeration, cooling of electronic devices, NOx control find place in the book. Mass transfer chapters cover basics such as diffusion, theories, analogies, mass transfer coefficients and mass transfer with chemical reaction, equipment such as tray and packed columns, column internals including structural packings, design, operational and installation issues, drums and separators are discussed in good detail. Absorption, distillation, extraction and leaching with applications and design methods, including emerging practices involving Divided Wall and Petluk column arrangements, multicomponent separations, supercritical solvent extraction find place in the book.

Thermal Insulation Handbook for the Oil and Gas Industries addresses relative design, materials, procedures, and standard installation necessities for various oil and gas infrastructure such as pipelines, subsea equipment, vessels, and tanks. With the continued increase in available natural gas ready to export — especially LNG — and the definition of "deepwater" changing every year, an understanding of thermal insulation is more critical than ever. This one-of-a-kind handbook helps oil and gas engineers ensure that their products are exporting safely and that the equipment's integrity is protected. Topics include: Design considerations and component selection, including newer materials such as cellular glass Methods to properly install the insulation material and notable inspection and safety considerations in accordance with applicable US and international standards, specifically designed for the oil and gas industry Calculations to make sure that every scenario is considered and requirements for size, composition, and packaging are met effectively

Understand all appropriate, new and existing, insulation material properties as well as installation requirements Gain practical knowledge on factors affecting insulation efficiency, rules of thumb, and links to real-world case studies

Maximize flow assurance safely and economically with critical calculations provided

The fourth edition of Ludwig's Applied Process Design for Chemical and Petrochemical Plants, Volume Three is a core reference for chemical, plant, and process engineers and provides an unrivalled reference on methods, process fundamentals, and supporting design data. New to this edition are expanded chapters on heat transfer plus additional chapters focused on the design of shell and tube heat exchangers, double pipe heat exchangers and air coolers. Heat tracer requirements for pipelines and heat loss from insulated pipelines are covered in this new edition, along with batch heating and cooling of process fluids, process integration, and industrial reactors. The book also looks at the troubleshooting of process equipment and corrosion and metallurgy. Assists engineers in rapidly analyzing problems and finding effective design methods and mechanical specifications Definitive guide to the selection and design of various equipment types, including heat exchanger sizing and compressor sizing, with established design codes Batch heating and cooling of process fluids supported by Excel programs

The routine jobs of yesterday are being replaced by technology and/or shipped off-shore. In their place, job categories that require knowledge management, abstract reasoning, and personal services seem to be growing. The modern workplace requires workers to have broad cognitive and affective skills. Often referred to as "21st century skills," these skills include being able to solve complex problems, to think critically about tasks, to effectively communicate with people from a variety of different cultures and using a variety of different techniques, to work in collaboration with others, to adapt to rapidly changing environments and conditions for performing tasks, to effectively manage one's work, and to acquire new skills and information on one's own. The National Research Council (NRC) has convened two prior workshops on the topic of 21st century skills. The first, held in 2007, was designed to examine research on the skills required for the 21st century workplace and the extent to which they are meaningfully different from earlier eras and require corresponding changes in educational experiences. The second workshop, held in 2009, was designed to explore demand for these types of skills, consider intersections between science education reform goals and 21st century skills, examine models of high-quality science instruction that may develop the skills, and consider science teacher readiness for 21st century skills. The third workshop was intended to delve more deeply into the topic of assessment. The goal for this workshop was to capitalize on the prior efforts and explore strategies for assessing the five skills identified earlier. The Committee on the Assessment of 21st Century Skills was asked to organize a workshop that reviewed the assessments and related research for each of the five skills identified at the previous workshops, with special attention to

recent developments in technology-enabled assessment of critical thinking and problem-solving skills. In designing the workshop, the committee collapsed the five skills into three broad clusters as shown below: Cognitive skills: nonroutine problem solving, critical thinking, systems thinking Interpersonal skills: complex communication, social skills, team-work, cultural sensitivity, dealing with diversity Intrapersonal skills: self-management, time management, self-development, self-regulation, adaptability, executive functioning Assessing 21st Century Skills provides an integrated summary of the presentations and discussions from both parts of the third workshop.

As deepwater wells are drilled to greater depths, pipeline engineers and designers are confronted with new problems such as water depth, weather conditions, ocean currents, equipment reliability, and well accessibility. Subsea Pipeline Design, Analysis and Installation is based on the authors' 30 years of experience in offshore. The authors provide rigorous coverage of the entire spectrum of subjects in the discipline, from pipe installation and routing selection and planning to design, construction, and installation of pipelines in some of the harshest underwater environments around the world. All-inclusive, this must-have handbook covers the latest breakthroughs in subjects such as corrosion prevention, pipeline inspection, and welding, while offering an easy-to-understand guide to new design codes currently followed in the United States, United Kingdom, Norway, and other countries. Gain expert coverage of international design codes Understand how to design pipelines and risers for today's deepwater oil and gas Master critical equipment such as subsea control systems and pressure piping

"Blue Pelican Java" is a somewhat unusual high school computer science textbook. Most computer science texts will begin with a section on the history of computers followed with a flurry of definitions that are just "so many words" to the average student. The approach here is to first give the student some experience upon which to hang the definitions that come later. The usual practice of introducing classes and objects is deferred until the student has a firm grasp of the fundamentals (loops, decision structures, etc). Thus, the beginning student is not overwhelmed by the simultaneous introduction of OOPs and the fundamentals. The book includes plenty of exercises (many in "contest" form), programming projects, and a huge appendix.

The demand for energy consumption is increasing rapidly. To avoid the impending energy crunch, more producers are switching from oil to natural gas. While natural gas engineering is well documented through many sources, the computer applications that provide a crucial role in engineering design and analysis are not well published, and emerging technologies, such as shale gas drilling, are generating more advanced applications for engineers to utilize on the job. To keep producers updated, Boyun Guo and Ali Ghalambor have enhanced their best-selling manual, Natural Gas Engineering Handbook, to continue to provide upcoming and practicing engineers the full scope of natural gas

engineering with a computer-assisted approach. This must-have handbook includes: A focus on real-world essentials rather than theory Illustrative examples throughout the text Working spreadsheet programs for all the engineering calculations on a free and easy to use companion site Exercise problems at the end of every chapter, including newly added questions utilizing the spreadsheet programs Expanded sections covering today's technologies, such as multi-fractured horizontal wells and shale gas wells

The second edition of Gas Installation Technology will be of interest to all concerned with gas installation work, whether plumbers, heating engineers or dedicated gas fitters. It continues to provide a definitive text for students taking NVQ gas installation and plumbing courses, and a useful reference for operatives renewing their gas competences. Brought fully up to date to comply with the latest regulations and best practices, it covers domestic, commercial and LPG installations, and provides essential information in a concise, readable, colourful and highly illustrated format. The new edition features enhanced diagrams and photographs to aid understanding. The second edition of Gas Installation Technology continues to be a companion to the author's highly successful textbook, Plumbing, and together both books offer plumbers, heating engineers and gas fitters, or students of these disciplines, unrivalled coverage of their subject.

Fully revised to cover the latest legislation, best practices and current installation procedures, it covers domestic, commercial and LPG installations. Still the only textbook devoted to domestic gas, commercial gas and LPG installation. Concise and readable, heavily illustrated with colour diagrams and photographs to aid understanding and recall. 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 CO<sub>2</sub> 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 requirements while delivering acceptable project economics. Covers all technical and operational aspects of natural gas transmission and processing. Provides 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.

Compression Machinery for Oil and Gas is the go-to source for all oil and gas compressors across the industry spectrum. Covering multiple topics from start to finish, this reference gives a complete guide to technology developments and their applications and implementation, including research trends. Including information on relevant standards and developments in subsea and downhole

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compression, this book aids engineers with a handy, single resource that will help them stay up-to-date on the compressors needed for today's oil and gas applications. Provides an overview of the latest technology, along with a detailed discussion of engineering Delivers on the efficiency, range and limit estimations for machines Pulls together multiple contributors to balance content from both academics and corporate research

The petroleum industry spends millions of dollars every year to combat the formation of hydrates-the solid, crystalline compounds that form from water and small molecules-that cause problems by plugging transmission lines and damaging equipment. They are a problem in the production, transmission and processing of natural gas, and it is even possible for them to form in the reservoir itself if the conditions are favorable. Natural Gas Hydrates is written for the field engineer working in the natural gas industry. This book explains how, when and where hydrates form, while providing the knowledge necessary to apply remedies in practical applications. New to the second edition, the use of new inhibitors: Kinetic Inhibitors and Anticoagulants and the topic of kinetics of hydrates. How fast do they form? How fast do they melt? New chapters on Hydrates in Nature, hydrates on the seafloor and a new section has also been added regarding the misconceptions about water dew points. Chapters on Hydrate Types and Formers, Computer Methods, Inhibiting Hydrate Formation with Chemicals, Dehydration of Natural Gas and Phase Diagrams Hydrate Dehydration of Natural Gas and Phase Diagrams have been expanded and updated along with the companion website. \* Understand what gas hydrates are, how they form and what can be done to combat their formation \* Avoid the same problems BP experienced with clogged pipelines \* Presents the four most common approaches to evaluate hydrates: heat, depressurization, inhibitor chemicals, and dehydration.

A unique, well-documented, and forward-thinking work, the second edition of Handbook of Natural Gas Transmission and Processing continues to present a thoroughly updated, authoritative, and comprehensive description of all major aspects of natural gas transmission and processing. It provides an ideal platform for engineers, technologists, and operations personnel working in the natural gas industry to get a better understanding of any special requirements for optimal design and operations of natural gas transmission pipelines and processing plants. First book of its kind that covers all aspects of natural gas transmission and processing Provides pivotal updates on the latest technologies, which have not been addressed in-depth in any existing books Offers practical advice for design and operation based on sound engineering principles and established techniques Examines ways to select the best processing route for optimal design of gas-processing plants Contains new discussions on process modeling, control, and optimization in gas processing industry

Natural gas is considered the dominant worldwide bridge between fossil fuels of today and future resources of tomorrow. Thanks to the recent shale boom in North America, natural gas is in a surplus and quickly becoming a major international commodity. Stay current with conventional and now unconventional gas standards and procedures with Natural Gas Processing: Technology and Engineering Design. Covering the entire natural gas process, Bahadori's must-have handbook provides everything you need to know about natural gas, including: Fundamental background on natural gas properties and single/multiphase flow factors How to

pinpoint equipment selection criteria, such as US and international standards, codes, and critical design considerations A step-by-step simplification of the major gas processing procedures, like sweetening, dehydration, and sulfur recovery Detailed explanation on plant engineering and design steps for natural gas projects, helping managers and contractors understand how to schedule, plan, and manage a safe and efficient processing plant Covers both conventional and unconventional gas resources such as coal bed methane and shale gas Bridges natural gas processing with basic and advanced engineering design of natural gas projects including real world case studies Digs deeper with practical equipment sizing calculations for flare systems, safety relief valves, and control valves

This book reviews and characterises promising single-compound solvents, solvent blends and advanced solvent systems suitable for CO<sub>2</sub> capture applications using gas-liquid absorption. Focusing on energy efficient solvents with minimal adverse environmental impact, the contributions included analyse the major technological advantages, as well as research and development challenges of promising solvents and solvent systems in various sustainable CO<sub>2</sub> capture applications. It provides a valuable source of information for undergraduate and postgraduate students, as well as for chemical engineers and energy specialists.

The precipitation and deposition of solids are a major challenge in the production of oil and gas. Flow assurance solids are formed because of unavoidable changes in temperature, pressure and composition of the oil-gas-water flowstream, from reservoir conditions to processing conditions. The advent of subsea production and the increased exploitation of heavy crudes have made flow assurance issues dominant in ensuring efficient and safe exploitation of hydrocarbon assets. Five troublesome flow assurance solids are described in the book: asphaltene, paraffin wax, natural gas hydrate, naphthenate and inorganic scale. These big-five solids are presented in stand-alone chapters. Each chapter is designed to be readable without clutter. Derivations of equations and descriptions of supporting details are given in several appendices. The book is intended for professional engineers and natural scientist working in E&P companies, engineering companies, service companies and specialized companies. An understanding of the big-five solids is required throughout the lifetime of oil and gas assets, from early development to abandonment. The technical, safety and environmental risks associated with deposition problems in near-wellbore formations, production tubing, wellhead equipment, flowlines and processing facilities, are relevant for decisions in the oil and gas industry and in outside regulatory and financial entities.

This book will provide the latest global perspective on the role and value of carbon capture and storage (CCS) in delivering temperature targets and reducing the impact of global warming. As well as providing a comprehensive, up-to-date overview of the major sources of carbon dioxide emission and negative emissions technologies, the book also discusses technical, economic and political issues associated with CCS along with strategies to enable commercialisation.

"The emphasis throughout is to link the fundamentals of the molecules through to the economic drivers for the industry, because this combination determines the technology used for processing."-From the Introduction The high demand for quality petroleum

products necessitates ongoing innovation in the science and engineering underlying oilsands extraction and upgrading. Beginning with a thorough grounding in the composition, fluid properties, reaction behaviour, and economics of bitumen and heavy oil, Murray Gray then delves into current processing technologies, particularly those used at full commercial scale. The tables of data on composition, yield, and behaviour of oilsands bitumen and heavy oil fractions are extensive. Though the focus is on bitumen from Alberta's oilsands-the largest resource in the world-the science applies to upgrading of heavy oil and petroleum residue feeds worldwide. *Upgrading Oilsands Bitumen and Heavy Oil* lays out the current best practice for engineers and scientists in the oilsands and refining industries, government personnel, academics, and students.

Most conventional cryogenic refrigerators and liquefiers operate with pure fluids, the major exception being natural gas liquefiers that use mixed refrigerant processes. The fundamental aspects of mixed refrigerant processes, though very innovative, have not received the due attention in open literature in view of commercial interests. Hundreds of patents exist on different aspects of mixed refrigerant processes. However, it is difficult to piece together the existing information to choose an appropriate process and an optimum composition or a given application. The aim of the book is to teach (a.) the need for refrigerant mixtures, (b.) the type of mixtures that can be used for different refrigeration and liquefaction applications, (c.) the different processes that can be used and (d.) the methods to be adopted for choosing the components of a mixture and their concentration for different applications. 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.

Providing in-depth guidance on how to design and rate emergency pressure relief systems, *Guidelines for Pressure Relief and Effluent Handling Systems* incorporates the current best designs from the Design Institute for Emergency Relief Systems as well as American Petroleum Institute (API) standards. Presenting a methodology that helps properly size all the components in a pressure relief system, the book includes software with the CCFlow suite of design tools and the new Superchems for DIERS Lite software, making this an essential resource for engineers designing chemical plants, refineries, and similar facilities. Access to Software Access the Guidelines for Pressure Relief and Effluent Handling Software and documents using a web browser at: <http://www.aiche.org/ccps/PRTools> Each folder will have a readme file and installation instructions for the program. After downloading SuperChems™ for DIERS Lite the purchaser of this book must contact the AIChE Customer Service with the numeric code supplied within the book. The purchaser will then be supplied with a license code to be able to install and run SuperChems™

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