Natural Gas Liquefaction Technology For Floating Lng

Liquefied natural gas' ('LNG') is normal gas (predominantly methane, CH4) that has been changed to fluid shape for effortlessness of storage either conveyance. There has never been a Liquefied Natural Gas Guide like this. It contains 101 answers, much more than you can imagine; comprehensive answers and extensive details and references, with insights that have never before been offered in print. Get the information you need--fast! This all-embracing guide offers a thorough view of key knowledge and detailed insight. This Guide introduces what you want to know about Liquefied Natural Gas. A quick look inside of some of the subjects covered: Cryogenics - Fuels, Alternative fuel - Carbon-neutral and negative fuels, Cryogenics - Industrial application, Cryogenic - Fuels, ConocoPhillips - History, Floating liquefied natural gas - Challenges, ExxonMobil - History, Natural gas - Elsewhere, Kawasaki Heavy Industries - Infrastructure, Industrial gas - Important liquefied gases, Carbon capture and storage - 3. Snohvit Injection - Norway, LNG train, Federal Energy Regulatory Commission, Petronas, Nigeria LNG, Carbon neutral fuel - Demonstration projects and commercial development, Compressed natural gas, Yemen LNG, Qatar - Economy, Floating liquefied

natural gas - Background, Carbon-neutral fuel - Demonstration projects and commercial development, Liquified natural gas - Trade, Liquified natural gas - LNG plant production, Das Island, Glossary of fuel cell terms - Liquefied natural gas, SEGAS LNG, Renewable energy, Sakhalin II - Onshore processing facility, Melkoya, Bi-fuel engine - Gas types used, North West Shelf Venture, Compressed natural gas - Comparison with other natural gas fuels, Natural gas storage - LNG, Hybrid cars - Power, Pacific Environment - California Energy, List of LNG terminals, Sakhalin II - Technical features, Centrica - 2010 to present, Solar flower tower, Liquified natural gas - Liquefaction technology, and much more...

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

Handbook of Liquefied Natural GasGulf Professional Publishing

The expert, all-inclusive guide on LNG risk based safety Liquefied Natural Gas (LNG) is the condensed form of natural gas achieved by cryogenic chilling. This process reduces gas to a liquid 600 times smaller in volume than it is in its original state, making it suitable for economical global transportation. LNG has been traded internationally and used with a good safety record since the 1960s. However, with some accidents occurring with the storage and liquefaction of LNG, a good understanding of its mechanisms, and its potential

ramifications to facilities and to the nearby public, is becoming critically important. With an unbiased eye, this book leans on the expertise of its authors and LNG professionals worldwide to examine these serious safety issues, while addressing many false assumptions surrounding this volatile energy source. LNG Risk Based Safety: Summarizes the findings of the Governmental Accountability Office's (GAO) survey of nineteen LNG experts from across North America and Europe Reviews the history of LNG technology developments Systematically reviews the various consequences from LNG releases—discharge, evaporation, dispersion, fire, and other impacts, and identifies best current approaches to model possible consequence zones Includes discussion of case studies and LNG-related accidents over the past fifty years Covering every aspect of this controversial topic, LNG Risk Based Safety informs the reader with firm conclusions based on highly credible investigation, and offers practical recommendations that researchers and developers can apply to reduce hazards and extend LNG technology.

This book highlights the developments in the natural gas liquefaction industries and the challenges in meeting environmental regulations. It provides guidelines in utilizing the full potential of LNG assets and offers advice on LNG plant design and operation. The book emphasizes technology

selection and innovation with focus on a "fit-for-purpose" design, and updates code and regulation, safety, and security requirements for LNG applications.

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

Advances in Gas Processing: Proceedings of the 2nd Annual Gas Processing Symposium 11-1 4 January, 2010, Doha, Qatar, reviews the state of knowledge in gas processing. The contributions are organized around five main themes: (i) environmental sustainability; (ii) natural gas processing technologies; (iii) energy efficiency in operations; (iv) design and safety; and (v) operational excellence. The papers on environmental sustainability cover topics such as the biogasification of waste monoethanolamine; the role of LNG in a carbon constrained world; and sustainable water management. The papers on natural gas processing technologies include the removal of acid gases from natural gas streams via membrane technology and selective control of Fischer-Tropsch synthesis hydrocarbons product distribution. The papers on energy efficiency in

operations cover lifted turbulent jet flame in a cross-flow; novel hybrid biomass and coal processes; and the adoption of plug-in hybrid electric vehicles (PHEVs). The papers on design and safety include studies on the optimal design and operation of a GTL process and efficient design, operating, and control strategies for LNG plants. The papers on operational excellence deal with topics such as chemicals in gas processing; the monitoring and optimization of hydrocarbon separation equipment; and the inhibition of gas hydrate formation. * Provides a state-of-the-art review of gas processing technologies * Covers design, operating tools, and methodologies * Includes case studies and practical applications

Natural gas is playing an increasing role in meeting world energy demands because of its abundance, versatility, and its clean burning nature. As a result, lots of new gas exploration, field development and production activities are under way, especially in places where natural gas until recently was labeled as “stranded . Because a significant portion of natural gas reserves worldwide are located across bodies of water, gas transportation in the form of LNG or CNG becomes an issue as well. Finally natural gas is viewed in comparison to the recently touted alternatives. Therefore, there is a need to have a book covering all the unique aspects and challenges related to natural gas from the upstream

to midstream and downstream. All these new issues have not been addressed in depth in any existing book. To bridge the gap, Xiuli Wang and Michael Economides have written a new book called Advanced Natural Gas Engineering. This book will serve as a reference for all engineers and professionals in the energy business. It can also be a textbook for students in petroleum and chemical engineering curricula and in training departments for a large group of companies.

This report provides insights and guidance on developments and needs in the natural gas market. The report, drafted by the Columbia University's School of International and Public Affairs for the UNECE Group of Experts on Gas, and in collaboration with a broad range of natural gas stakeholders from the UNECE region, highlights demand and supply trends for natural gas and Liquefied Natural Gas (LNG) and suggests areas where policy makers can support the development of LNG infrastructure and markets that can contribute to sustainable development.

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 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.

In a globalized economy logistics has become a crucial area for the success of companies. The performance of each company depends on the performance of its suppliers and of its business partners. The customers of each company are spread on a large geographical space. For this reason distribution logistics is the most important and complex part of logistics. An efficient and

effective management of distribution logistics is a key issue for the success of a company. There are many different problems to deal with, from facility location to transportation, to inventory management, and, most important, to the integration and optimization of the entire logistics network. Quantitative methods provide relevant tools to support decisions, from strategic to operational, in distribution logistics.

ÔProfessor SakmarÕs book is a must-read for anyone interested in gaining a better understanding of the most dynamic segment of the global energy industry.Õ Đ Jay Copan, Executive Director, LNG 17

ÔProfessor SakmarÕs book provides a well-rounded overview of the global role that natural gas is expected to play in the future and the important role of LNG as a means of transporting gas to where it is needed. Readers will find the book to be a very convenient compendium of relevant global information and an important educational, informational resource.Õ Đ Ronald D. Ripple, Director, Centre for Research in Energy and Minerals Economics, Curtin University, Australia

ÔUnderstanding global energy markets Đ what forces shape them and what trends define them Đ is critical for any professional trying to evaluate new energy developments and technological directions. Susan SakmarÕs impressive ability to provide this context in terms of LNG markets makes her book

valuable.Õ Ð Warren R. True, Sr., Chief Technology Editor, Oil & Gas Journal ÔWith clear and direct text, supplemented with key maps, charts and graphics from government, industry and other sources, the book moves the reader smoothly through the early history of LNG up to current developments, including shale gas and North American LNG exports. The book is a valuable resource for anyone interested in understanding global gas markets and the energy policy challenges facing us in the 21st century.Õ Ð Jacqueline L. Weaver, A.A. White Professor of Law, University of Houston Law Center, US Countries around the world are increasingly looking to liquefied natural gas (LNG) Ð natural gas that has been cooled until it forms a transportable liquid Ð to meet growing energy demand. Energy for the 21st Century provides critical insights into the opportunities and challenges LNG faces, including its potential role in a carbon-constrained world. This comprehensive study covers topics such as the LNG value chain, the historical background and evolution of global LNG markets, trading and contracts, and an analysis of the various legal, policy, safety and environmental issues pertaining to this important fuel. Additionally, the author discusses emerging issues and technologies that may impact global LNG markets, such as the development of shale gas, the prospects of North American LNG exports, the potential role of the Gas Exporting Countries Forum

and floating LNG. The author contextualizes the discussion about the importance of LNG with an analysis of why the 21st century will be the Ôgolden ageÕ of natural gas. Accessible and non-technical in nature, this timely book will serve as an essential reference for practitioners, scholars and anyone else interested in 21st century energy solutions.

Praxair, in conjunction with the Los Alamos National Laboratory, is developing a new technology, thermoacoustic heat engines and refrigerators, for liquefaction of natural gas. This is the only technology capable of producing refrigeration power at cryogenic temperatures with no moving parts. A prototype, with a projected natural gas liquefaction capacity of 500 gallons/day, has been built and tested. The power source is a natural gas burner. Systems will be developed with liquefaction capacities up to 10,000 to 20,000 gallons per day. The technology, the development project, accomplishments and applications are discussed. In February 2001 Praxair, Inc. purchased the acoustic heat engine and refrigeration development program from Chart Industries. Chart (formerly Cryenco, which Chart purchased in 1997) and Los Alamos had been working on the technology development program since 1994. The purchase included assets and intellectual property rights for thermoacoustically driven orifice pulse tube refrigerators (TADOPTR), a new and revolutionary Thermoacoustic Stirling Heat

Engine (TASHE) technology, aspects of Orifice Pulse Tube Refrigeration (OPTR) and linear motor compressors as OPTR drivers. Praxair, in cooperation with Los Alamos National Laboratory (LANL), the licensor of the TADOPTR and TASHE patents, is continuing the development of TASHE-OPTR natural gas powered, natural gas liquefiers. The liquefaction of natural gas, which occurs at -161 C (-259 F) at atmospheric pressure, has previously required rather sophisticated refrigeration machinery. The 1990 TADOPTR invention by Drs. Greg Swift (LANL) and Ray Radebaugh (NIST) demonstrated the first technology to produce cryogenic refrigeration with no moving parts. Thermoacoustic engines and refrigerators use acoustic phenomena to produce refrigeration from heat. The basic driver and refrigerator consist of nothing more than helium-filled heat exchangers and pipes, made of common materials, without exacting tolerances. The liquefier development program is divided into two components: Thermoacoustically driven refrigerators and linear motor driven refrigerators (LOPTRs). LOPTR technology will, for the foreseeable future, be limited to natural gas liquefaction capacities on the order of hundreds of gallons per day. TASHE-OPTR technology is expected to achieve liquefaction capacities of tens of thousands of gallons per day. This paper will focus on the TASHE-OPTR technology because its natural gas liquefaction

capacity has greater market opportunity. LOPTR development will be mentioned briefly. The thermoacoustically driven refrigerator development program is now in the process of demonstrating the technology at a capacity of about 500 gallon/day (gpd) i.e., approximately 42,000 standard cubic feet/day, which requires about 7 kW of refrigeration power. This capacity is big enough to illuminate the issues of large-scale acoustic liquefaction at reasonable cost and to demonstrate the liquefaction of about 70% of an input gas stream, while burning about 30%. Subsequent to this demonstration a system with a capacity of approximately 106 standard cubic feet/day (scfd) = 10,000 gpd with a projected liquefaction rate of about 85% of the input gas stream will be developed. When commercialized, the TASHE-OPTRs will be a totally new type of heat-driven cryogenic refrigerator, with projected low manufacturing cost, high reliability, long life, and low maintenance. A TASHE-OPTR will be able to liquefy a broad range of gases, one of the most important being natural gas (NG). Potential NG applications range from distributed liquefaction of pipeline gas as fuel for heavy-duty fleet and long haul vehicles to large-scale liquefaction at on-shore and offshore gas wellheads. An alternative to the thermoacoustic driver, but with many similar technical and market advantages, is the linear motor compressor. Linear motors convert electrical power

directly into oscillating linear, or axial, motion. Attachment of a piston to the oscillator results in a direct drive compressor. Such a compressor has two distinct advantages over rotary motor compressors. One, it is a completely dry system. Because there are no gearbox and roller bearings, there is no requirement for lubricants, which eliminates the cleanup issues associated with lubricants in cryogenic refrigerators driven by conventional compressors. Two, the oscillator is suspended by flexure bearings. Flexure bearings have no wearing parts and have essentially infinite lifetime. Linear motors can also be run in reverse as linear generators and can be driven by acoustic engines.

Although most natural gas is still carried from well to user as gas in pipelines, the use of liquefied natural gas (LNG) has been increasing. A typical modern, large liquefaction plant costs a billion dollars, liquefies 109 scfd, uses 10-15% of its throughput to power itself, and has substantial operating and maintenance costs.

The main objective of this thesis is to model a single mixed refrigerant process for offshore natural gas liquefaction using ASPEN HYSYS as a simulation tools. The liquefaction process employed in this part is a result of modification of previous case done by C.W. Remeljeja and A.F.A. Hoadley (2004). This work is divided into two sections. First is to model the PRICO LNG process that published result.

Second is to improve the model by adding the mixer in the mixed refrigerant stream after the separator. It allows two different phase of gas and liquid of mixed refrigerant to mix together before entering the LNG Heat Exchanger (cold box). The mixer also helps to maintain a constant flow rate of the stream to the cold box. The results are obtained after the system is converged. When modeling the PRICO process in Aspen Hysys, certain variables such as temperature and pressure at the streams entering and leaving the cold box cannot be changed directly. This will cause temperature cross and change of mixed refrigerant phase in the respected stream. As a result, by doing structural modification on the basic PRICO process specifically in case 3, the load duty of the compressor can be lowered significantly. After three different structural modifications discussed in this paper, the compressor duty to liquefy the natural gas can be reduced down to 82300.46 kW when compared to the base case. As a conclusion, structural modification in case 3 is the best model when compare case 1 and case 2 because it operates in lowest compressor duty. For the future improvement, a different structure modification can be done using case 3 as a base model, for example replacing the valve with a multiphase expander to generate electricity in this LNG liquefaction process.

In late 1877, Louis Cailletete in France and Raoul Pictet in Switzerland independently succeeded in liquefying

oxygen, thereby proving a hypothesis set forth by Antoine Lavoisier nearly 100 years earlier. The theme of the 1977 Cryogenic Engineering Conference "Cryogenics: A Century of Progress-A Chal lenge for the Future" properly commemorated this accomplishment by reviewing some of the noteworthy advances since that time and outlining many advances still to come. Both Volumes 23 and 24 of this series provide a good account of the many contributions that were presented at this conference. The 1977 Cryogenic Engineering Conference was appropriately again held in Boulder, Colorado where the first Cryogenic Engineering Conference was initiated 23 years ago by the late Russell B. Scott, then Chief of the Cryogenic Engineering Laboratory of the National Bureau of Standards. The Cryogenic Engineering Conference Board is extremely grateful to members of the National Bureau of Standards and the University of Colorado for serving as hosts for this meeting of cryogenic specialists from all over the world. The Cryogenic Engineering Conference is again pleased to have had the International Cryogenic Materials Conference co-host this biennial meeting for the second time in succession. This joint effort again has permitted an in-depth coverage of research on technical materials in areas currently receiving primary attention by the cryogenic engineering community. The Proceedings of the Inter national Cryogenic Materials Conference will be published as Volume 24 of the Advances in Cryogenic Engineering. Natural gas is a vital component of the world's supply of energy and an important source of many bulk chemicals

and speciality chemicals. It is one of the cleanest, safest, and most useful of all energy sources, and helps to meet the world's rising demand for cleaner energy into the future. However, exploring, producing and bringing gas to the user or converting gas into desired chemicals is a systematical engineering project, and every step requires thorough understanding of gas and the surrounding environment. Any advances in the process link could make a step change in gas industry. There have been increasing efforts in gas industry in recent years. With state-of-the-art contributions by leading experts in the field, this book addressed the technology advances in natural gas industry.

This volume collects together the presentations at the Eighth International Conference on Foundations of Computer-Aided Process Design, FOCAPD-2014, an event that brings together researchers, educators, and practitioners to identify new challenges and opportunities for process and product design. The chemical industry is currently entering a new phase of rapid evolution. The availability of low-cost feedstocks from natural gas is causing renewed investment in basic chemicals in the OECD, while societal pressures for sustainability and energy security continue to be key drivers in technology development and product selection. This dynamic environment creates opportunities to launch new products and processes and to demonstrate new methodologies for innovation, synthesis and design. FOCAPD-2014 fosters constructive interaction among thought leaders from academia, industry, and government and provides a showcase for the latest

research in product and process design. Focuses exclusively on the fundamentals and applications of computer-aided design for the process industries. Provides a fully archival and indexed record of the FOCAPD14 conference Aligns the FOCAPD series with the ESCAPE and PSE series

When natural gas was first discovered in Appalachia in the 19th century, its development as a fuel was rapid. Unlike oil and coal, gas could be moved only by pipeline and required large containers for storage. It was not possible to cope with peak loads without adding excessive pipeline capacity until just before World War II, when two sister gas companies developed a plant to liquefy and store natural gas as a liquid; the liquid was then regasified to deal with peak loads. The liquid is 1/600 the volume of the gas, but it requires storage at an extremely low temperature, 1-260°F. This worked well until 1944, when a liquid natural gas (LNG) tank in Cleveland ruptured and caused a fire with 130 fatalities. The fire did not end the industry but caused it to pause. Over the next few years the problems in materials, design, standards, and siting were solved. The recognition that liquefaction made LNG transportable without a pipeline was the breakthrough. In 1959 a shipload of LNG went from Louisiana to Britain and restarted the LNG industry. It is now a major worldwide energy industry and the topic of this work.

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

On January 1988, the ascertained and economically accessible reserves of Natural Gas (NG) amounted to over 144,000 billion cubic meters worldwide,

corresponding to 124 billion tons of oil equivalents (comparable with the liquid oil reserves, which are estimated to be 138 billion TOE). It is hypothesized that the volume of NG reserve will continue to grow at the same rate of the last decade. Forecasts on production indicate a potential increase from about 2,000 billion cubic meters in 1990 to not more than 3,300 billion cubic meters in 2010, even in a high economic development scenario. NG consumption represents only one half of oil: 1.9 billion TOE/y as compared to 3.5 of oil. Consequently, in the future gas will exceed oil as a carbon atom source. In the future the potential for getting energetic vectors or petrochemicals from NG will continue to grow. The topics covered in Natural Gas Conversion V reflect the large global R&D effort to look for new and economic ways of NG exploitation. These range from the direct conversion of methane and light paraffins to the indirect conversion through synthesis gas to fuels and chemicals. Particularly underlined and visible are the technologies already commercially viable. These proceedings prove that mature and technologically feasible processes for natural gas conversion are already available and that new and improved catalytic approaches are currently developing, the validity and feasibility of which will soon be documented. This is an exciting area of modern catalysis, which will certainly open novel and rewarding perspectives for the chemical, energy and petrochemical industries.

Significantly revised and updated since its first publication in 1996, Absorption Chillers and Heat Pumps,

Second Edition discusses the fundamental physics and major applications of absorption chillers. While the popularity of absorption chillers began to dwindle in the United States in the late 1990's, a shift towards sustainability, green buildings and the use of renewable energy has brought about a renewed interest in absorption heat pump technology. In contrast, absorption chillers captured a large market share in Asia in the same time frame due to relative costs of gas and electricity. In addition to providing an in-depth discussion of fundamental concepts related to absorption refrigeration technology, this book provides detailed modeling of a broad range of simple and advanced cycles as well as a discussion of applications. New to the Second Edition: Offers details on the ground-breaking Vapor Surfactant theory of mass transfer enhancement Presents extensively revised computer examples based on the latest version of EES (Engineering Equation Solver) software, including enhanced consistency and internal documentation Contains new LiBr/H2O property routines covering a broad range of temperature and the full range of concentration Utilizes new NH3/H2O helper functions in EES which significantly enhance ease of use Adds a new chapter on absorption technology applications Offers updated absorption fluid transport property information Absorption Chillers and Heat Pumps, Second Edition provides an updated and thorough discussion of the physics and applications of absorption chillers and heat pumps. An in-depth guide to evaluating and simulating absorption systems, this revised edition provides significantly increased

consistency and clarity in both the text and the worked examples. The introduction of the vapor surfactant theory is a major new component of the book. This definitive work serves as a resource for both the newcomer and seasoned professional in the field.

Worldwide, the use of natural gas as a primary energy source will remain vital for decades to come. This applies to industrialized, emerging countries and developing countries. Owing to the low level of impurities, natural gas is considered to be a climate-friendly fossil fuel because of the low CO2 emissions, but is at the same time an affordable source of energy. In order to enable transport over long distances and oceans (and hence create an economic and political alternative to pipelines) , the gas is liquefied, which is accompanied by a considerable reduction in volume, and then transported by ship. Thus, at international ports, many LNG tanks are required for temporary storage and further use. The trend towards smaller liquefaction and regasification plants with associated storage tanks for marine fuel applications has attracted new players in this market who often do not yet have the necessary experience and technical expertise. It is not sufficient to refer to all existing technical standards when defining consistent state-of-the-art specifications and requirements. The switch to European standardisation has made it necessary to revise and adapt existing national codes to match European standards. Technical committees at national and international level have begun their work of updating and completing the EN 14620 series. In the USA, too, the corresponding regulations are also being

updated. The revision of American Concrete Institute standard ACI 376 Requirements for Design and Construction of Concrete Structures for the Containment of Refrigerated Liquefied Gases, first published in 2011, will be completed in the spring of 2019, and the final version, published in autumn 2019. This book provides an overview of the state of the art in the design and construction of liquefied natural gas (LNG) tanks. Since the topic is very extensive and complex, an introduction to all aspects is provided, e.g. requirements and design for operating conditions, thermal design, hydrostatic and pneumatic tests, soil surveys and permissible settlement, modelling of and calculations for the concrete structure, and the actions due to fire, explosion and impact. Dynamic analysis and the theory of sloshing liquid are also presented.

Description of available technologies in gas liquefaction and LNG regasification

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. Even when the market is cloudy, LNG's future remains bright, with long-term annual growth projected to be steady. Natural gas is the cleanest burning fossil fuel and offers a potential solution to concerns over global warming and air pollution. In this updated and revised second edition, authors Michael D. Tusiani and Gordon Shearer uses everyday language and real-world examples to help readers understand the complex LNG industry. It provides the reader with insights into changes in the markets, technological advances, and the commercial evolution of what continues to be one of the most capital-intensive and formidable global industries. Features Include: Explains the technologies utilized: liquefaction, shipping and regasification, onshore and floating Covers existing and proposed worldwide LNG

projects Examines the economics and commercial structure of the LNG industry, including synopses gas supply agreements, LNG sales contracts, and financing Discusses shipping conventions and regulations This book is an important resource for energy industry leaders, investment bankers, energy professionals, or anyone looking to expand their knowledge of the LNG industry.

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.

26th European Symposium on Computer Aided Process Engineering contains the papers presented at the 26th European Society of Computer-Aided Process Engineering (ESCAPE) Event held at Portorož Slovenia, from June 12th to June 15th, 2016. Themes discussed at the conference include Process-product Synthesis,

Design and Integration, Modelling, Numerical analysis, Simulation and Optimization, Process Operations and Control and Education in CAPE/PSE. Presents findings and discussions from the 26th European Society of Computer-Aided Process Engineering (ESCAPE) Event

As the cleanest source of fossil energy with the most advantageous CO2 footprint, natural gas continues to increase its share in the global energy market. This book provides state-of-the-art contributions in the area of gas processing. Special emphasis is given to Liquified Natural Gas (LNG); the book also covers the following gas processing applications in parallel sessions: * Natural Gas processing and treatment * Gas To Power and water * Gas To Liquid (GTL) * Gas To Petrochemicals, including olefins, ammonia and methanol * Provides a state-of-the-art review of gas processing technologies * Covers design, operating tools, and methodologies * Includes case studies and practical applications

The European Symposium on Computer Aided Process Engineering (ESCAPE) series presents the latest innovations and achievements of leading professionals from the industrial and academic communities. The ESCAPE series serves as a forum for engineers, scientists, researchers, managers and students to present and discuss progress being made in the area of Computer Aided Process Engineering (CAPE). European industries large and small are bringing innovations into our lives, whether in the form of new technologies to address environmental problems, new products to make our homes more comfortable and energy efficient or new

therapies to improve the health and well-being of European citizens. Moreover, the European Industry needs to undertake research and technological initiatives in response to humanity's "Grand Challenges", described in the declaration of Lund, namely, Global Warming, Tightening Supplies of Energy, Water and Food, Ageing Societies, Public Health, Pandemics and Security. Thus, the Technical Theme of ESCAPE 21 will be "Process Systems Approaches for Addressing Grand Challenges in Energy, Environment, Health, Bioprocessing & Nanotechnologies".

This book on organic Rankine cycle technology presents nine chapters on research activities covering the wide range of current issues on the organic Rankine cycle. The first section deals with working fluid selection and component design. The second section is related to dynamic modeling, starting from internal combustion engines to industrial power plants. The third section discusses industrial applications of waste heat recovery, including internal combustion engines, LNG, and waste water. A comprehensive analysis of the technology and application of organic Rankine cycle systems is beyond the aim of the book. However, the content of this volume can be useful for scientists and students to broaden their knowledge of technologies and applications of organic Rankine cycle systems.

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