

General Information Wobbe Index And Calorimeters Hobre

Combustion, the process of burning, is defined as a chemical reaction between a combustible reactant (the fuel) and an oxidizing agent (such as air) in order to produce heat and in most cases light while new chemical species (e.g., flue gas components) are formed. This book covers a gap on the market by providing a concise introduction to combustion. Most of the other books currently available are targeted towards the experienced users and contain too many details and/or contain knowledge at a fairly high level. This book provides a brief and clear overview of the combustion basics, suitable for beginners and then focuses on practical aspects, rather than theory, illustrated by a number of industrial applications as examples. The content is aimed to provide a general understanding of the various concepts, techniques and equipment for students at all level as well as practitioners with little or no prior experience in the field. The authors are all international experts in the field of combustion technology and adopt here a clear didactic style with many practical examples to cover the most common solid, liquid and gaseous fuels. The associated environmental impacts are also discussed so that readers can develop an understanding of the major issues and the options available for more sustainable combustion processes. With a foreword by Katharina Kohse-Höinghaus

This is the first of three essential reference volumes for those concerned with the installation and servicing of domestic and industrial gas equipment. This volume explains the basic principles underlying the practical and theoretical aspects of installing and servicing gas appliances and associated equipment, from the basics of combustion, to burners, pressure and flow, transfer of heat, controls, as well as materials and processes, electrical aspects, and metering and measuring devices. The revised fifth edition is brought fully up to date with current Standards and legislation to reflect recent developments in industry, in line with requirements of the ACS Certificates of Competence and NVQs. Covering both natural gas and liquefied petroleum gas, the many illustrations and worked examples included throughout the text will help the reader to understand the principles under discussion. Volume 1 of the Gas Service Technology Series will enable the reader to put into practice the safe installation and servicing procedures described in the companion volumes: Domestic Gas Installation Practice (Volume 2), and Industrial and Commercial Gas Installation Practice (Volume 3). Combining a comprehensive reference with practical application in real-world engineering contexts, Volume 1 provides an essential handbook for all aspects of fundamental gas servicing technology, ideal for both students new to the field as well as professionals and noneoperational professionals (e.g. specifiers, managers, supervisors) as an ongoing source of reference. * Comprehensive reference combined with practical application, an essential handbook for gas service technology * Fully updated in line with the latest changes to standards, NVQs and ACS Certificates of Competence * Hundreds of line drawings and photographs maximise accessibility of the text, enabling readers to easily recognise the appliances under discussion

The Instrument and Automation Engineers' Handbook (IAEH) is the #1 process automation handbook in the world. Volume one of the Fifth Edition, Measurement and Safety, covers safety sensors and the detectors of physical properties. Measurement and Safety is an invaluable resource that: Describes the detectors used in the measurement of process variables Offers application- and method-specific guidance for choosing the best measurement device Provides tables of detector capabilities and other practical information at a glance Contains detailed descriptions of domestic and overseas products, their features, capabilities, and suppliers, including suppliers' web addresses Complete with 163 alphabetized chapters and a thorough index for quick access to specific information, Measurement and Safety is a must-have reference for instrument and automation engineers working in the chemical, oil/gas, pharmaceutical, pollution, energy, plastics, paper, wastewater, food, etc. industries. About the eBook The most important new feature of the IAEH, Fifth Edition is its availability as an eBook. The eBook provides the same content as the print edition, with the addition of thousands of web addresses so that readers can reach suppliers or reference books and articles on the hundreds of topics covered in the handbook. This feature includes a complete bidders' list that allows readers to issue their specifications for competitive bids from any or all potential product suppliers.

**Technologies & Applications : an Integrated Approach to Energy Resource Optimization
Gas Engineering**

Thermal Pumping Gas Viscometer for Wobbe Index Determination Technology and Control

Natural Gas: A Basic Handbook, Second Edition provides the reader with a quick and accessible introduction to a fuel source/industry that is transforming the energy sector. Written at an introductory level, but still appropriate for engineers and other technical readers, this book provides an overview of natural gas as a fuel source, including its origins, properties and composition. Discussions include the production of natural gas from traditional and unconventional sources, the downstream aspects of the natural gas industry. including processing, storage, and transportation, and environmental issues and emission controls strategies. This book presents an ideal resource on the topic for engineers new to natural gas, for advisors and consultants in the natural gas

industry, and for technical readers interested in learning more about this clean burning fuel source and how it is shaping the energy industry. Updated to include newer sources like shale gas
Includes new discussions on natural gas hydrates and flow assurance Covers environmental issues Contain expanded coverage of liquefied natural gas (LNG)

Natural gas interchangeability is the key subject in the industry today and most recently Liquefied Natural Gas (LNG) has emerged as a major source and differs substantially from domestically produced gas. Interchangeability means the characteristics of a design that allow direct placement of one item without requiring any modification. This research was a challenge, as it is difficult to find the suitable equipment and available equipment in the lab is limited to a lab scale only as the objective is to investigate to what degree LNG in its gaseous form is interchangeable and to show Wobbe Index (WI) is a measure of the fuel interchangeability. From the research that has been conducted, the key parameters used to investigate the interchangeability of a fuel gas WI, Calorific Value (CV), Air Fuel Ratio (A/F) and CARI (Combustion Air Requirement). This research is conducted by experiment, studying the methane as LNG and LPG (at different composition) using Boys calorimeter to find the CV and WI. Then, the Flame Propagation and Stability Unit are used to measure each fuel gases A/F and CARI index. As expected, the result showed that LNG has higher WI value that is 304.787 Btu/Ft³ when compared to LPG with the value of 238.08 Btu/Ft³, followed with Propane with the value 228.51 Btu/Ft³ and Butane with the value of WI 210.816 Btu/Ft³. As a conclusion, LNG has much better characteristics in interchangeability factor and higher heating value meaning higher Wobbe Index which is better performance in terms of interchangeability when compared to other fuel. It is safe to say LNG provides higher energy to the burner and provides much efficient as well as safer combustion process. The accuracy and the efficiency of this research could be improved by using a metered or digitalizing the Boy's Calorimeter and well as customizing the flame properties for the flame propagation and stability unit at a constant flame color and rate.

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

Natural Gas

Carbon Dioxide Emission Management in Power Generation

Gas Pressure Control Systems with Automatic Correction of the Wobbe Index for Gas Engines

A Bibliographical Guide

Monitoring the Wobbe Index of Natural Gas Using Fiber-enhanced Raman Spectroscopy

This book contains detailed description of solid, liquid, gaseous fuels, combustion and furnaces. Beside short questions and answers and multiple choice questions & answers and multiple choice questions; answers drawn from the examination papers of various engineering Colleges and professional bodies examinations are also included. The book will be useful for degree & diploma curriculum of various branches of Engineering and for various associate membership examinations conducted by professional bodies like Institution of Engineers (AMIE), Indian Institute of Metals(AMIIM), Indian Institute of Chemical Engineers(AMIEChE), Institute of Chemicals etc.

This three-volume handbook contains a wealth of information on energy sources, energy generation and storage, fossil and renewable fuels as well as the associated processing technology. Fossil as well as renewable fuels, nuclear technology, power generation and storage technologies are treated side by side, providing a unique overview of the entire global energy industry. The result is an in-depth survey of industrial-scale energy technology. Your personal ULLMANN'S: A carefully selected "best of" compilation of topical articles brings the vast knowledge of the Ullmann's encyclopedia to the desks of energy and process engineers Chemical and physical characteristics, production processes and production figures, main applications, toxicology and safety information are all found here in one single resource New or updated articles include classical topics such as coal technologies, oil and gas as well as cutting-edge technologies like biogas, thermoelectricity and solar technology 3 Volumes

Natural gas, Fossil fuels, Fuels, Gaseous fuels, Calorific value, Density, Relative density, Mathematical calculations, Reproducibility, Estimation, Accuracy, Error correction

Interchangeability of Gaseous Fuels

Process Measurement and Analysis, Fifth Edition - Two Volume Set

A Basic Handbook

FERC reports

Calculation of Calorific Values, Density, Relative Density and Wobbe Index from Composition

Natural gas, Gaseous fuels, Fuels, Calorific value, Density, Relative density, Combustion, Heat measurement, Calorimeters, Heat-measuring instruments, Performance, Performance testing, Approval testing

ENCYCLOPEDIA OF RENEWABLE ENERGY Written by a highly respected engineer and prolific author in the energy sector, this is the single most comprehensive, thorough, and up-to-date

reference work on renewable energy. The world ' s energy industry is and has always been volatile, sometimes controversial, with wild swings upward and downward. This has, historically, been mostly because most of our energy has come from fossil fuels, which is a finite source of energy. Every so often, a technology comes along, like hydrofracturing, that is a game-changer. But is it, really? Aren ' t we just delaying the inevitable with these temporary price fixes The only REAL game-changer is renewable energy. For decades, renewable energy sources have been sought, developed, and studied. Sometimes wind is at the forefront, sometimes solar, and, for the last decade or so, there has been a surge in interest for biofeedstocks and biofuels. There are also the " old standbys " of nuclear and geothermal energy, which have both been around for a very long time. This groundbreaking new volume presents these topics and trends in an encyclopedic format, as a go-to reference for the engineer, scientist, student, or even layperson who works in the industry or is simply interested in the topic. Compiled by one of the world ' s best-known and respected energy engineers, this is the most comprehensive and up-to-date encyclopedia of renewable energy ever written, a must-have for any library.

Encyclopedia of Renewable Energy: Is written in an encyclopedic style, covering every aspect of renewable energy, including wind, solar, and many other topics Offers a comprehensive coverage of the industry, from the chemical processes of biofeedstocks and biofuels to the machinery and equipment used in the production of fuel and power generation Is filled with workable examples and designs that are helpful for practical applications Covers the state of the art, an invaluable resource for any engineer Audience Engineers across a variety of industries, including wind, solar, process engineering, waste utilization for fuels, and many others, such as process engineers, chemical engineers, electrical engineers, petroleum engineers, civil engineers, and the technicians and other scientists who work in this field

Volume 1 deals with the origins of process gases and describes recovery, properties and composition. It covers as well the shale gas, the production from hydrocarbon rich deep shale formations, being one of the most quickly expanding trends in onshore domestic gas exploration. Vol. 2: Composition and Processing of Gas Streams. Vol. 3: Uses of Gas and Effects.

Chemical and Process Engineering Unit Operations

Natural Gas. Calculation of Calorific Values, Density, Relative Density and Wobbe Index from Composition

The Study of Interchangeability of Liquefied Natural Gas (LNG) with Other Fuels

Hydrocarbon Exploration and Production

The Importance of the Wobbe-Index

Analytical Instrumentation examines analyzers for detecting pollutants and other hazardous matter, including carbon monoxide, chlorine, fluoride, hydrogen sulfide, mercury, and phosphorous. Also covers selection, application, and sampling procedures.

This is the first of three volumes of essential reference for those concerned with the installation and servicing of domestic and industrial gas equipment. This volume explains the basic principles underlying the practical and theoretical aspects of installing and servicing gas appliances and associated equipment, from the basics of combustion, to burners, pressure and flow, transfer of heat, controls, as well as materials and processes, electrical aspects, and metering and measuring devices. The revised fourth edition is brought fully up to date with current Standards and legislation to reflect recent developments in industry, in line with requirements of the ACS Certificates of Competence and NVQs. The book includes a new section on medium to low pressure regulators for domestic properties. Covering both Natural Gas and Liquefied Petroleum Gas, the many illustrations and worked examples included throughout the text will help the reader to understand the principles under discussion. Volume 1 of the Gas Service Technology Series will enable the reader to put into practice the safe installation and servicing procedures described in the companion volumes: Domestic Gas Installation Practice (Volume 2), and Industrial and Commercial Gas Installation Practice (Volume 3). Combining a comprehensive reference with practical application in real-world engineering contexts, Volume 1 provides an essential handbook for all aspects of fundamental gas servicing technology, ideal for both students new to the field as well as professionals and non-operational professionals (e.g. Specifiers, Managers, Supervisors) as an ongoing source of reference.

This pocket manual provides a selective survey of available engineering for the product range of LOI Thermoprocess GmbH. Furthermore, important information material based on specialized literature is summarized. The pocket manual primarily focuses on engineering aspects. Information on process technology is limited to topics which concern all or most of all plant equipment (furnaces) in order not to exceed the pocket manual concept. Data is mainly provided numerically in tables in order to simplify direct calculable utilization. Diagrams are only used if they improve illustration or to feature the plant equipment (furnace) based origin of the data. The SI measuring units are used pragmatically. For most tables the conversion factor is directly assigned for the area in which the Anglo- American language prevails. The American notation is used for designation of magnitude of the numerical values.

From Basics to Applications

Rules of Thumb for Petroleum Engineers

Analytical Instrumentation

Materials, Processes, Systems and Technology, 2 Volume Set

Hydrogen Science and Engineering

Provides a unique overview of energy management for the process industries Provides an overall approach to energy management and places the technical issues that drive energy efficiency in context Combines the perspectives of freewheeling consultants and corporate insiders In two sections, the book provides the organizational framework (Section 1) within which the technical aspects of energy management, described in Section 2, can be most effectively executed Includes success stories from three very different companies that have achieved excellence in their energy management efforts Covers energy management, including the role of the energy manager, designing and implementing energy management programs, energy benchmarking, reporting, and energy management systems Technical topics cover efficiency improvement opportunities in a wide range of utility systems and process equipment types, as well as techniques to improve process design and operation

Combustion under sufficiently fuel-lean conditions can have the desirable attributes of high efficiency and low emissions, this being particularly important in light of recent and rapid increases in the cost of fossil fuels and concerns over the links between combustion and global climate change. Lean Combustion is an eminently authoritative, reference work on the latest advances in lean combustion technology and systems. It will offer engineers working on combustion equipment and systems both the fundamentals and the latest developments in more efficient fuel usage and in much-sought-after reductions of undesirable emissions, while still achieving desired power output and performance. This volume brings together research and design of lean combustion systems across the technology spectrum in order to explore the state-of-the-art in lean combustion and its role in meeting current and future demands on combustion systems. Readers will learn about advances in the understanding of ultra lean fuel mixtures and how new types of burners and approaches to managing heat flow can reduce problems often found with lean combustion such as slow, difficult ignition and frequent flame extinction. The book will also offer abundant references and examples of recent real-world applications. Covers all major recent developments in lean combustion science and technology, with new applications in both traditional combustion schemes as well as such novel uses as highly preheated and hydrogen-fueled systems Offers techniques for overcoming difficult ignition problems and flame extinction with lean fuel mixtures Covers new developments in lean combustion using high levels of pre-heat and heat re-circulating burners, as well as the active control of lean combustion instabilities

The Instrument and Automation Engineers' Handbook (IAEH) is the Number 1 process automation handbook in the world. The two volumes in this greatly expanded Fifth Edition deal with measurement devices and analyzers. Volume one, Measurement and Safety, covers safety sensors and the detectors of physical properties, while volume two, Analysis and Analysis, describes the measurement of such analytical properties as composition. Complete with 245 alphabetized chapters and a thorough index for quick access to specific information, the IAEH, Fifth Edition is a must-have reference for instrument and automation engineers working in the chemical, oil/gas, pharmaceutical, pollution, energy, plastics, paper, wastewater, food, etc. industries.

Encyclopedia of Renewable Energy

Combined Heating, Cooling & Power Handbook

Tolley's Basic Science and Practice of Gas Service

Handbook of Liquefied Natural Gas

Ullmann's Energy

Authored by 50 top academic, government and industry researchers, this handbook explores mature, evolving technologies for a clean, economically viable alternative to non-renewable energy. In so doing, it also discusses such broader topics as the environmental impact, education, safety and regulatory developments. The text is all-encompassing, covering a wide range that includes hydrogen as an energy carrier, hydrogen for storage of renewable energy, and incorporating hydrogen technologies into existing technologies.

Finally, there is a one-stop reference book for the petroleum engineer which offers practical, easy-to-understand responses to complicated technical questions. This is a must-have for any engineer or non-engineer working in the petroleum industry, anyone studying petroleum engineering, or any reference library. Written by one of the most well-known and prolific petroleum engineering writers who has ever lived, this modern classic is sure to become a staple of any engineer's library and a handy reference in the field. Whether open on your desk, on the hood of your truck at the well, or on an offshore platform, this is the only book available that covers the petroleum engineer's rules of thumb that have been compiled over decades. Some of these "rules," until now, have been "unspoken but everyone knows," while others are meant to help guide the engineer through some of the more recent breakthroughs in the industry's technology, such as hydraulic fracturing and enhanced oil recovery. The book covers every aspect of crude oil, natural gas, refining, recovery, and any other area of petroleum engineering that is useful for the engineer to know or to be able to refer to, offering practical solutions to everyday engineering problems and a comprehensive reference work that will stand the test of time and provide aid to its readers. If there is only one reference work you buy in petroleum engineering, this is it.

Many of the economic road blocks which have previously served to discourage the implementation of alternative power generation technologies can now be

readily overcome through effective energy resource optimization. It is now a fact that solid financial returns can be achieved from combined heating, cooling and power generation projects by integrating energy and cost efficiency goals, and seeking a match between power production and heating/cooling requirements. This book is intended to serve as a road map to those seeking to realize optimum economic returns on such projects. The first section provides an introduction to basic heat and power thermodynamics, with an overview of heat and power generation technologies and equipment. The second section explores the infrastructure in which the project must be implemented, including environmental considerations, as well as utility rate structures. The third section provides detailed coverage of a broad range of technology types, and discusses how opportunities for their application can be identified and successfully exploited. The final section takes you through each step of project development, implementation and operation. Numerous examples are provided of actual field applications, with supporting documentation of system layouts and performance. The text is supplemented with more than one thousand graphics, including photos, cutaway drawings, layout schematics, performance curves, and data tables.

Federal Energy Guidelines

Environmental Impact Statement

Resources, Processes, Products

Pocket Manual for Thermprocess Technology

Measurement and Safety

A comprehensive resource to the origin, properties, and analysis of natural gas and its constituents Handbook of Natural Gas Analysis is a comprehensive guide that includes information on the origin and analysis of natural gas, the standard test methods, and procedures that help with the predictability of gas composition and behavior during gas cleaning operations and use. The author—a noted expert on the topic—also explores the properties and behavior of the various components of natural gas and gas condensate. All chapters are written as stand-alone chapters and they cover a wealth of topics including history and uses; origin and production; composition and properties; recovery, storage, and transportation; properties and analysis of gas stream and gas condensate. The text is designed to help with the identification of quality criteria appropriate analysis and testing that fall under the umbrella of ASTM International. ASTM is an organization that is recognized globally across borders, disciplines and industries and works to improve performance in manufacturing and materials and products. This important guide: Contains detailed information on natural gas and its constituents Offers an analysis of methane, gas hydrates, ethane, propane, butane, and gas condensate Includes information on the behavior of natural gas to aid in the planning for recovery, storage, transportation, and use Covers the test methods that are applicable to natural gas and its constituents Written in accessible and easy-to-understand terms Written for scientists, engineers, analytical chemists who work with natural gas as well as other scientists and engineers in the industry, Handbook of Natural Gas Analysis offers a guide to the analysis, standard test methods, and procedures that aid in the predictability of gas composition and behavior during gas cleaning operations and use.

Mots-clés de l'auteur: natural gas quality ; Wobbe Index sensor ; dynamic viscometer ; biogas ; power-to-gas ; thermal pumping ; differential pressure sensor ; LTCC heater ; sulfur-induced corrosion ; flower-of-sulfur chamber.

This book on hydrocarbon exploration and production is the first volume in the series Developments in Petroleum Science. The chapters are: The Field Life Cycle, Exploration, Drilling Engineering, Safety and The Environment, Reservoir Description, Volumetric Estimation, Field Appraisal, Reservoir Dynamic Behaviour, Well Dynamic Behaviour, Surface Facilities, Production Operations and Maintenance, Project and Contract Management, Petroleum Economics, Managing the Producing Field, and Decommissioning.

Lean Combustion

Combustion

Handbook of Natural Gas Analysis

Reference Materials in Measurement and Technology

Implications of Natural Gas Interchangeability for California Customers

Provides an engaging and clearly structured source of information on the capture and storage of CO₂ Designed to bridge the gap between the many disciplines involved in carbon dioxide emission management, this book provides a comprehensive yet easy-to-understand introduction to the subject of CO₂ capture. Fit for graduate students, practicing process engineers, and others interested in the subject, it offers a clear understanding and overview of thermal power plants in particular and of carbon dioxide capture and storage (CCS) in general. Carbon Dioxide Emission Management in Power Generation starts with a discussion of the greenhouse effect, climate change, and CO₂ emissions as the rationale for the concept of CCS. It then looks at the long-term storage of CO₂. A chapter covering different fossil fuels, their usage, and properties comes next, followed by sections on: CO₂ generation, usage and properties; power plant technologies; theory of gas separation; power plant efficiency calculations; and classification of CO₂ capture methods. Other chapters examine: CO₂ capture by gas absorption and other gas separation methods; removing carbon from the fuel; pre- and post-combustion CO₂ capture in power cycles; and oxy-combustion CO₂ capture in power cycles. -Discusses both CO₂ capture technologies as well as power generation technologies -Bridges the gap between many different disciplines?from scientists, geologists and engineers, to economists -One of the few books that covers all the different sciences involved in

the capture and storage of CO₂ -Introduces the topic and provides useful information to the academic as well as professional reader Carbon Dioxide Emission Management in Power Generation is an excellent book for students who are interested in CO₂ capture and storage, as well as for chemists in industry, environmental chemists, chemical engineers, geochemists, and geologists.

Natural Gas Calculation of Calorific Values, Density, Relative Density and Wobbe Index from Composition Natural Gas. Calculation of Calorific Values, Density, Relative Density and Wobbe Index from Composition Energy Management and Efficiency for the Process Industries John Wiley & Sons

This is the first of three essential reference volumes for those concerned with the installation and servicing of domestic and industrial gas equipment. This volume explains the basic principles underlying the practical and theoretical aspects of installing and servicing gas appliances and associated equipment, from the basics of combustion, to burners, pressure and flow, transfer of heat, controls, as well as materials and processes, electrical aspects, and metering and measuring devices. The revised fifth edition is brought fully up to date with current Standards and legislation to reflect recent developments in industry, in line with requirements of the ACS Certificates of Competence and NVQs. Covering both natural gas and liquefied petroleum gas, the many illustrations and worked examples included throughout the text will help the reader to understand the principles under discussion. Volume 1 of the Gas Service Technology Series will enable the reader to put into practice the safe installation and servicing procedures described in the companion volumes: Domestic Gas Installation Practice (Volume 2), and Industrial and Commercial Gas Installation Practice (Volume 3). Combining a comprehensive reference with practical application in real-world engineering contexts, Volume 1 provides an essential handbook for all aspects of fundamental gas servicing technology, ideal for both students new to the field as well as professionals and noneoperational professionals (e.g. specifiers, managers, supervisors) as an ongoing source of reference.

Instrument and Automation Engineers' Handbook

Energy Management and Efficiency for the Process Industries

The Influence of Temperature Variations on the Measurement of the Wobbe-index by the Wirox

Natural Gas. Measurement of Properties. Calorific Value and Wobbe Index

Summary Final Report