

Distillation Design Kister

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Applied Process Design for Chemical and Petrochemical Plants Ernest E. Ludwig 1965

Distillation Engineering Reinhard Billet 1979 Partial Table of Contents I. The Thermal Separation of Liquids II. Thermodynamics of Mixtures 1. Definitions and Relationships A. Separability of a Liquid Mixture B. Partial Pressures in Vapor Mixtures C. Evaporation of Liquid Mixtures 2. Types of Mixtures A. Ideal Binary Mixtures B. Nonideal Binary Mixtures C. Ideal Multicomponent Mixtures D. Nonideal Multicomponent Mixtures III. Continuous Rectifiers 1. Mode of Operations 2. Operating Lines A. Enrichment Line B. The Stripping Line 3. Stepwise Separation in Rectifiers A. Theoretical Plates for Separation of Binaries B. The Reflux Ratio in the Separation of Binaries C. Multicomponent Mixtures 4. Column Diameter and Column Throughput 5. Heat Requirements IV. The Batch Still 1. Operation 2. Operating Line and Separation Steps 3. Column Diameter, Column Throughput, and Heat Requirements 4. Time for Separation and Related Variables at Constant Product Concentration A. Molar Vapor Load Constant in Time B. Heat Requirement Constant in Time 5. Separation Time for Variable Heating Area V. The Semicontinuous Still 1. Operation 2. Finding the Operating Lines, the Separation Steps, the Column Load, the Column: Size, and the Heat Demand VI. Engineering Data, Optimization of Costs, and Selection of Column Internals 1. General A. Packing Types B. Plates and Trays 2. Designs and Functions A. Packed Towers B. Plate Columns 3. Evaluation of Rectifying Columns and Best Mode of Operation A. Evaluating and Calculations, Separating Effect, Pressure Loss, Load, Specific Column Volume, and Specific Column Cost B. Numerical Evaluation for Packed Towers C. Quantitative Evaluation for Plate-Type Columns D. Packed Columns versus Tray Columns-Operational Features and Cost E. Special Designs for Vacuum Operation 4. Tests of Full-Size Tower Internals VII. Optimum Separation 1. Optimization of Simple Columns A. The Theory and Its Application B. Quantitative Evaluation 2. Optimization of Multiple Columns A. Duplex Columns: Number of Theoretical Steps, Reflux Ratios, and Vapor Loads B. Vapor Loads of Multiple Columns Subdivided Because of Limited Height C. Optimizing Duplex Rectifiers for Minimum Pressure Loss 3. Optimum Operation of Combined Columns of Different Types Under Special Consideration A. Parallel Arrangement B. Series Arrangement 4. Specialized Operations A. Specialized Hookups and their Calculation B. Rectification in Straight Stripping Columns C. Rectification in Straight Enriching Columns D. Direct Heating of Columns E. Saving Heat in Rectification VIII. Detail Planning of Separating Columns 1. General Viewpoints in the Selection of Column Types 2. Packed Columns Columns 3. Special Packings 4. Plate-Type Columns 5. Pressure Losses in Rectification Columns IX. Partial Distillation 1. Separation of Liquids by Continuous Partial

Distillation 2. Separation of Liquids by Discontinuous Partial Distillation X. Partial Condensation 1. Partial Condensation in Dephlegmators 2. Partial Countercurrent Direct Condensation in Columns XI. Laboratory Columns and Pilot Plants 1. Distillation Columns with Miniature Size Packing 2. Transferring Data Gained From Semi-industrial Units to Full-Scale XII. Distillation in Fine and High Vacuum 1. Molecular Distillation 2. Thin-Film Distillation 3. Mechanism of Separation XIII. Components of a Separation Plant 1. Internal Components 2. Heat Exchangers 3. Pumps 4. Measuring and Controls XIV. Use of Computers XV. Distillation and Environmental Protection XVI. Outlook Bibliography Symbols and Units Glossary Index

Perry's Chemical Engineers' Handbook, 9th Edition Don W. Green 2018-07-13 Up-to-Date Coverage of All Chemical Engineering Topics—from the Fundamentals to the State of the Art Now in its 85th Anniversary Edition, this industry-standard resource has equipped generations of engineers and chemists with vital information, data, and insights. Thoroughly revised to reflect the latest technological advances and processes, *Perry's Chemical Engineers' Handbook, Ninth Edition*, provides unsurpassed coverage of every aspect of chemical engineering. You will get comprehensive details on chemical processes, reactor modeling, biological processes, biochemical and membrane separation, process and chemical plant safety, and much more. This fully updated edition covers: Unit Conversion Factors and Symbols • Physical and Chemical Data including Prediction and Correlation of Physical Properties • Mathematics including Differential and Integral Calculus, Statistics, Optimization • Thermodynamics • Heat and Mass Transfer • Fluid and Particle Dynamics • Reaction Kinetics • Process Control and Instrumentation • Process Economics • Transport and Storage of Fluids • Heat Transfer Operations and Equipment • Psychrometry, Evaporative Cooling, and Solids Drying • Distillation • Gas Absorption and Gas-Liquid System Design • Liquid-Liquid Extraction Operations and Equipment • Adsorption and Ion Exchange • Gas-Solid Operations and Equipment • Liquid-Solid Operations and Equipment • Solid-Solid Operations and Equipment • Chemical Reactors • Bio-based Reactions and Processing • Waste Management including Air, Wastewater and Solid Waste Management* Process Safety including Inherently Safer Design • Energy Resources, Conversion and Utilization* Materials of Construction

Distillation Design Henry Z. Kister 1992-02-22 Providing coverage of design principles for distillation processes, this text contains a presentation of process and equipment design procedures. It also highlights limitations of some design methods, and offers guidance on how to overcome them.

Distillation: Operation and Applications Andrzej Gorak 2014-07-16 *Distillation: Operation and Applications*—winner of the 2015 PROSE Award in Chemistry & Physics from the Association of American Publishers—is a single source of authoritative information on all aspects of the theory and practice of modern distillation, suitable for advanced students and professionals working in a laboratory, industrial plants, or a managerial capacity. It addresses the most important and current research on industrial distillation, including all steps in process design (feasibility study, modeling, and experimental validation), together with operation and control aspects. This volume features an extra focus on distillation applications. Winner of the 2015 PROSE Award in Chemistry & Physics from the Association of American Publishers Practical information on the newest development written by recognized experts Coverage of a huge range of laboratory and industrial distillation approaches Extensive references for each chapter facilitates further study

Distillation Operation Henry Z. Kister 1990 Discussing distillation, this book gives readers guidelines for operation, troubleshooting and control. It offers a compendium of Do's and Don'ts, good practices, and guidelines for trouble-free design; operation and troubleshooting for inlets and outlets; avoiding tray damage; installation; commissioning and startup techniques; and more.

Disjunctive Programming Egon Balas 2018-11-27 Disjunctive Programming is a technique and a discipline initiated by the author in the early 1970's, which has become a central tool for solving nonconvex optimization problems like pure or mixed integer programs, through convexification (cutting plane) procedures combined with enumeration. It has played a major role in the revolution in the state of the art of Integer Programming that took place roughly during the period 1990-2010. The main benefit that the reader may acquire from reading this book is a deeper understanding of the theoretical underpinnings and of the applications potential of disjunctive programming, which range from more efficient problem formulation to enhanced modeling capability and improved solution methods for integer and combinatorial optimization. Egon Balas is University Professor and Lord Professor of Operations Research at Carnegie Mellon University's Tepper School of Business.

Practical Distillation Control W.L. Luyben 2012-12-06 Distillation column control has been the the "Lehigh inquisition" and survived! So it subject of many, many papers over the last has been tested by the fire of both actual half century. Several books have been de review by a hard-nosed plant experience and voted to various aspects of the subject. The group of practically oriented skeptics. technology is quite extensive and diffuse. In selecting the authors and the topics, There are also many conflicting opinions the emphasis has been on keeping the ma about some of the important questions. terial practical and useful, so some subjects We hope that the collection under one that are currently of mathematical and the cover of contributions from many of the oretical interest, but have not been demon leading authorities in the field of distillation strated to have practical importance, have control will help to consolidate, unify, and not been included. clarify some of this vast technology. The The book is divided about half and half contributing authors of this book represent between methodology and specific applica tion examples. Chapters 3 through 14 dis both industrial and academic perspectives, and their cumulative experience in the area cuss techniques and methods that have of distillation control adds up to over 400 proven themselves to be useful tools in at tacking distillation control problems.

Process Vacuum System Design and Operation James L. Ryans 1986

Design of Distillation Column Control Systems P. Buckley 1986 A distillation column is both multivariable and nonlinear - and it consumes immense quantities of energy. Yet, despite the design challenges it presents, it is still the most popular unit operation for refining in industrial plants today. Much has been published on the subject of distillation column design, but much remains to be explained. That is why this book is unique. In a departure from the more traditional empirical and theoretical approaches, it introduced the reader to the practical realm, by presenting quantitative design techniques that have been demonstrated to be useful and valid over the course of hundreds of actual applications. The book is divided into three main parts. Part I, an introduction, presents an industrial perspective of control objectives. It discusses briefly the relationship between column design features and column controllability. It thus provides a short refresher course for chemical engineers and background for those trained in other branches of engineering. Part II, Concepts and Configurations, discusses column overhead and base arrangements, typical control schemes, and some hardware considerations. Part III is dedicated to quantitative design. Mathematical models are presented for pressure and differential pressure controls, liquid level control, and composition control of binary distillation. Emphasis on topics of primary interest to the control engineer Essentially nonmathematical treatment Ideal for those involved in troubleshooting existing columns as well to design engineers

Rules of Thumb for Chemical Engineers Carl Branan 2002 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,

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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.

Perry's Chemical Engineers' Handbook Robert H. Perry 1999 The Platinum Edition presents the complete content of Perry's Chemical Engineer's Handbook, Seventh Edition, in both print and electronic formats packaged together and now available at one great price. The print Handbook is the world renowned source to chemical engineering practices--covering everything from the fundamentals to details on computer applications and control, as well as the newest advances in your field. The accompanying CD, with its extensive graphics and fast problem-solving capabilities, is the perfect interactive complement to the text. This exclusive set is expressively designed for engineers with the highest standards--professionals who will settle for nothing less than the outstanding, superior-quality reference tools in this Platinum Edition. Two great reference tools--available at one great price! On the CD-ROM *The entire text of Perry's Chemical Handbook, Seventh Edition *75 interactive equations *On-screen problem-solving: math formulas, calculations, graphs, and tables *Automatic conversions from U.S. to metric (SI) standard units *Fully searchable Adobe Acrobat format *Hyperlinked Table of Contents and Index Minimum System Requirements PC with 486 or higher processor Microsoft Windows 3.1, Windows 95, or Windows NT 3.5.1 or later / 16 MB of RAM 25 MB of available hard-disk space SVGA monitor / 2x CD-ROM drive / Mouse

Distillation: Fundamentals and Principles Andrzej Gorak 2014-07-22 Distillation: Fundamentals and Principles — winner of the 2015 PROSE Award in Chemistry & Physics — is a single source of authoritative information on all aspects of the theory and practice of modern distillation, suitable for advanced students and professionals working in a laboratory, industrial plants, or a managerial capacity. It addresses the most important and current research on industrial distillation, including all steps in process design (feasibility study, modeling, and experimental validation), together with operation and control aspects. This volume features an extra focus on the conceptual design of distillation. Winner of the 2015 PROSE Award in Chemistry & Physics from the Association of American Publishers Practical information on the newest development written by recognized experts Coverage of a huge range of laboratory and industrial distillation approaches Extensive references for each chapter facilitates further study

Chemical Process Design Alexandre C. Dimian 2008-04-09 This practical how-to-do book deals with the design of sustainable chemical processes by means of systematic methods aided by computer simulation. Ample case studies illustrate generic creative issues, as well as the efficient use of simulation techniques, with each one standing for an important issue taken from practice. The didactic approach guides readers from basic knowledge to mastering complex flow-sheets, starting with chemistry and thermodynamics, via process synthesis, efficient use of energy and waste minimization, right up to plant-wide control and process dynamics. The simulation results are compared with flow-sheets and performance indices of actual industrial licensed processes, while the complete input data for all the case studies is also provided, allowing readers to reproduce the results with their own simulators. For everyone interested in the design of innovative chemical processes.

Distillation Johann G. Stichlmair 2021-05-07 *Distillation Principles and Practice Second Edition* covers all the main aspects of distillation including the thermodynamics of vapor/liquid equilibrium, the principles of distillation, the synthesis of distillation processes, the design of the equipment, and the control of process operation. Most textbooks deal in detail with the principles and laws of distilling binary mixtures. When it comes to multi-component mixtures, they refer to computer software nowadays available. One of the special features of the second edition is a clear and easy understandable presentation of the principles and laws of ternary distillation. The right understanding of ternary distillation is the link to a better understanding of multi-component distillation. Ternary distillation is the basis for a conceptual process design, for separating azeotropic mixtures by using an entrainer, and for reactive distillation, which is a rapidly developing field of distillation. Another special feature of the book is the design of distillation equipment, i.e. tray columns and packed columns. In practice, empirical know-how is preferably used in many companies, often in form of empirical equations, which are not even dimensionally correct. The objective of the proposed book is the derivation of the relevant equations for column design based on first principles. The field of column design is permanently developing with respect to the type of equipment used and the know-how of two-phase flow and interfacial mass transfer.

Distillation and Other Industrial Separations Gail Nalven 1997 A compendium of 31 recent articles selected for their usefulness to process industry practitioners and for their practical emphasis; 18 articles are on distillation, and 13 on other separations technologies, e.g. adsorption, centrifugation, and membranes, as well as phase separators, cyclones, elect

Packed Tower Design and Applications Ralph F. Strigle 1994

Practical HPLC Method Development Lloyd R. Snyder 2012-12-03 This revision brings the reader completely up to date on the evolving methods associated with increasingly more complex sample types analyzed using high-performance liquid chromatography, or HPLC. The book also incorporates updated discussions of many of the fundamental components of HPLC systems and practical issues associated with the use of this analytical method. This edition includes new or expanded treatments of sample preparation, computer assisted method development, as well as biochemical samples, and chiral separations.

Distillation Design and Control Using Aspen Simulation William L. Luyben 2013-04-29 The new edition of this book greatly updates and expands the previous edition. It boasts new chapters on the divided wall column and carbon dioxide capture from stack gas, revises the design and control of distillation systems, and explains the use of dynamic simulation to study safety issues in the event of operating failures. Using Aspen Plus to develop rigorous simulations of single distillation columns and sequences of columns, the book considers the economics of capital investment and energy costs to create an optimal system for separation methods in the chemical and petroleum industries.

Chemical Engineering Design Gavin Towler 2012-01-25 *Chemical Engineering Design, Second Edition*, deals with the application of chemical engineering principles to the design of chemical processes and equipment. Revised throughout, this edition has been specifically developed for the U.S. market. It provides the latest US codes and standards, including API, ASME and ISA design codes and ANSI standards. It contains new discussions of conceptual plant design, flowsheet development, and revamp design; extended coverage of capital cost estimation, process costing, and economics; and new chapters on equipment selection, reactor design, and solids handling processes. A rigorous pedagogy assists learning, with detailed worked examples, end of chapter exercises, plus supporting data, and

Excel spreadsheet calculations, plus over 150 Patent References for downloading from the companion website. Extensive instructor resources, including 1170 lecture slides and a fully worked solutions manual are available to adopting instructors. This text is designed for chemical and biochemical engineering students (senior undergraduate year, plus appropriate for capstone design courses where taken, plus graduates) and lecturers/tutors, and professionals in industry (chemical process, biochemical, pharmaceutical, petrochemical sectors). New to this edition: Revised organization into Part I: Process Design, and Part II: Plant Design. The broad themes of Part I are flowsheet development, economic analysis, safety and environmental impact and optimization. Part II contains chapters on equipment design and selection that can be used as supplements to a lecture course or as essential references for students or practicing engineers working on design projects. New discussion of conceptual plant design, flowsheet development and revamp design Significantly increased coverage of capital cost estimation, process costing and economics New chapters on equipment selection, reactor design and solids handling processes New sections on fermentation, adsorption, membrane separations, ion exchange and chromatography Increased coverage of batch processing, food, pharmaceutical and biological processes All equipment chapters in Part II revised and updated with current information Updated throughout for latest US codes and standards, including API, ASME and ISA design codes and ANSI standards Additional worked examples and homework problems The most complete and up to date coverage of equipment selection 108 realistic commercial design projects from diverse industries A rigorous pedagogy assists learning, with detailed worked examples, end of chapter exercises, plus supporting data and Excel spreadsheet calculations plus over 150 Patent References, for downloading from the companion website Extensive instructor resources: 1170 lecture slides plus fully worked solutions manual available to adopting instructors

Distillation Control, Optimization, and Tuning Lanny Robbins 2016-04-19 With a focus on the fundamentals and strategies of distillation columns, this book covers the process variables for continuous distillation columns, as well as four basic control strategies and the typical cases in which they are used. The author defines the inlet and outlet streams and process variables for a distillation column and then explains the overall concept of the separation and purification that is performed. Performance and product quality are described in terms of specification requirements, and tools and techniques for the optimization of quality performance are provided. Figures and graphs are included within the reference to illustrate concepts.

Equipment for Distillation, Gas Absorption, Phase Dispersion, and Phase Separation Don W. Green 2007-10-26 Get Cutting-Edge Coverage of All Chemical Engineering Topics— from Fundamentals to the Latest Computer Applications First published in 1934, Perry's Chemical Engineers' Handbook has equipped generations of engineers and chemists with an expert source of chemical engineering information and data. Now updated to reflect the latest technology and processes of the new millennium, the Eighth Edition of this classic guide provides unsurpassed coverage of every aspect of chemical engineering—from fundamental principles to chemical processes and equipment to new computer applications. Filled with over 700 detailed illustrations, the Eighth Edition of Perry's Chemical Engineering Handbook features: Comprehensive tables and charts for unit conversion A greatly expanded section on physical and chemical data New to this edition: the latest advances in distillation, liquid-liquid extraction, reactor modeling, biological processes, biochemical and membrane separation processes, and chemical plant safety practices with accident case histories Inside This Updated Chemical Engineering Guide - Conversion Factors and Mathematical Symbols • Physical and Chemical Data • Mathematics • Thermodynamics • Heat and Mass Transfer • Fluid and Particle Dynamics Reaction Kinetics • Process Control • Process Economics • Transport and Storage of Fluids • Heat Transfer Equipment • Psychrometry, Evaporative Cooling, and Solids Drying • Distillation • Gas

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Absorption and Gas-Liquid System Design • Liquid-Liquid Extraction Operations and Equipment • Adsorption and Ion Exchange • Gas-Solid Operations and Equipment • Liquid-Solid Operations and Equipment • Solid-Solid Operations and Equipment • Size Reduction and Size Enlargement • Handling of Bulk Solids and Packaging of Solids and Liquids • Alternative Separation Processes • And Many Other Topics!

Troubleshooting Process Operations Norman P. Lieberman 1991 The author, a highly respected consultant to major U.S. refineries, shares information on topics such as common coke quality questions, catalyst-feed mixing, light hydrocarbon distillation, steam to heater passes, haze in jet fuel, optimizing excess air, convection and radiation, reboiler-induced foaming, flooding and computer control consoles. Of special interest in the new section on gas drying and compression. A troubleshooting checklist accompanies each chapter. The author expertly combines field observations with engineering principles to unravel and solve specific process operation problems using an easy-to-understand style devoid of textbook terminology and excessive mathematics. Contents: Specific processes Process equipment Practical problems Gas drying and compression The process engineer's job Appendix.

Integrated Design and Simulation of Chemical Processes Alexandre C. Dimian 2014-09-18 This comprehensive work shows how to design and develop innovative, optimal and sustainable chemical processes by applying the principles of process systems engineering, leading to integrated sustainable processes with 'green' attributes. Generic systematic methods are employed, supported by intensive use of computer simulation as a powerful tool for mastering the complexity of physical models. New to the second edition are chapters on product design and batch processes with applications in specialty chemicals, process intensification methods for designing compact equipment with high energetic efficiency, plantwide control for managing the key factors affecting the plant dynamics and operation, health, safety and environment issues, as well as sustainability analysis for achieving high environmental performance. All chapters are completely rewritten or have been revised. This new edition is suitable as teaching material for Chemical Process and Product Design courses for graduate MSc students, being compatible with academic requirements world-wide. The inclusion of the newest design methods will be of great value to professional chemical engineers. Systematic approach to developing innovative and sustainable chemical processes Presents generic principles of process simulation for analysis, creation and assessment Emphasis on sustainable development for the future of process industries

Packed Bed Columns Nikolai Kolev 2006-08-08 Packed bed columns are largely employed for absorption, desorption, rectification and direct heat transfer processes in chemical and food industry, environmental protection and also processes in thermal power stations like water purification, flue gas heat utilization and SO₂ removal. These Separation processes, are estimated to account for 40%-70% of capital and operating costs in process industry. Packed bed columns are widely employed in this area. Their usage also for direct heat transfer between gas and liquid, enlarge their importance. They are the best apparatuses, from thermodynamical point of view, for mass and heat transfer processes between gas and liquid phase. Their wide spreading is due to low capital investments and operating costs. Since 1995 there has not been published a specialised book in this area, and this is a period of quick development of packed columns. Packed Bed Columns reflects the state of this field including the author's experience on creating and investigating of new packings, column internals and industrial columns. Considers the theories of mass transfer processes and shows how they help the construction of highly effective packings Complete information about the performance characteristics of different modern types of highly effective packings Considers the models for calculation and areas of their

application

The Art of Distilling Whiskey and Other Spirits Bill Owens 2009-11 An encyclopedia guide to the thousand-year history and dynamic future of the distillation of whiskey, vodka, gin, rum, brandy, and more.

Advanced Distillation Technologies Anton A. Kiss 2013-02-26 Distillation has historically been the main method for separating mixtures in the chemical process industry. However, despite the flexibility and widespread use of distillation processes, they still remain extremely energy inefficient. Increased optimization and novel distillation concepts can deliver substantial benefits, not just in terms of significantly lower energy use, but also in reducing capital investment and improving eco-efficiency. While likely to remain the separation technology of choice for the next few decades, there is no doubt that distillation technologies need to make radical changes in order to meet the demands of the energy-conscious society. *Advanced Distillation Technologies: Design, Control and Applications* gives a deep and broad insight into integrated separations using non-conventional arrangements, including both current and upcoming process intensification technologies. It includes: Key concepts in distillation technology Principles of design, control, sizing and economics of distillation Dividing-wall column (DWC) - design, configurations, optimal operation and energy efficient and advanced control DWC applications in ternary separations, azeotropic, extractive and reactive distillation Heat integrated distillation column (HIDiC) - design, equipment and configurations Heat-pump assisted applications (MVR, TVR, AHP, CHRP, TAHP and others) Cyclic distillation technology - concepts, modeling approach, design and control issues Reactive distillation - fundamentals, equipment, applications, feasibility scheme Results of rigorous simulations in Mathworks Matlab & Simulink, Aspen Plus, Dynamics and Custom Modeler Containing abundant examples and industrial case studies, this is a unique resource that tackles the most advanced distillation technologies - all the way from the conceptual design to practical implementation. The author of *Advanced Distillation Technologies*, Dr. Ir. Anton A. Kiss, has been awarded the Hoogewerff Jongerenprijs 2013.

http://www.hoogewerff-fonds.nl/nieuws/26/hoogewerff_jongerenprijs_2013_toegekend_aan_veelzijdige_procestechnoloog Findout more (website in Dutch).../a

Petroleum Refining Mark J. Kaiser 2019-09-11 For four decades, *Petroleum Refining* has guided thousands of readers toward a reliable understanding of the field, and through the years has become the standard text in many schools and universities around the world offering petroleum refining classes, for self-study, training, and as a reference for industry professionals. The sixth edition of this perennial bestseller continues in the tradition set by Jim Gary as the most modern and authoritative guide in the field. Updated and expanded to reflect new technologies, methods, and topics, the book includes new discussion on the business and economics of refining, cost estimation and complexity, crude origins and properties, fuel specifications, and updates on technology, process units, and catalysts. The first half of the book is written for a general audience to introduce the primary economic and market characteristics of the industry and to describe the inputs and outputs of refining. Most of this material is new to this edition and can be read independently or in parallel with the rest of the text. In the second half of the book, a technical review of the main process units of a refinery is provided, beginning with distillation and covering each of the primary conversion and treatment processes. Much of this material was reorganized, updated, and rewritten with greater emphasis on reaction chemistry and the role of catalysis in applications. *Petroleum Refining: Technology, Economics, and Markets* is a book written for users, the practitioners of refining, and all those who want to learn more about the field.

Distillation Troubleshooting Henry Z. Kister 2011-11-30 THE FIRST BOOK OF ITS KIND ON

DISTILLATION TECHNOLOGY The last half-century of research on distillation has tremendously improved our understanding and design of industrial distillation equipment and systems. High-speed computers have taken over the design, control, and operation of towers. Invention and innovation in tower internals have greatly enhanced tower capacity and efficiency. With all these advances, one would expect the failure rate in distillation towers to be on the decline. In fact, the opposite is the case: the tower failure rate is on the rise and accelerating. Distillation Troubleshooting collects invaluable hands-on experiences acquired in dealing with distillation and absorption malfunctions, making them readily accessible for those engaged in solving today's problems and avoiding tomorrow's. The first book of its kind on the distillation industry, the practical lessons it offers are a must for those seeking the elusive path to trouble-free distillation. Distillation Troubleshooting covers over 1,200 case histories of problems, diagnoses, solutions, and key lessons. Coverage includes: * Successful and unsuccessful struggles with plugging, fouling, and coking * Histories and prevention of tray, packing, and internals damage * Lessons taught by incidents and accidents during shutdowns, commissioning, and abnormal operation * Troubleshooting distillation simulations to match the real world * Making packing liquid distributors work * Plant bottlenecks from intermediate draws, chimney trays, and feed points * Histories of and key lessons from explosions and fires in distillation towers * Prevention of flaws that impair reboiler and condenser performance * Destabilization of tower control systems and how to correct it * Discoveries from shutdown inspections * Suppression of foam and accumulation incidents A unique resource for improving the foremost industrial separation process, Distillation Troubleshooting transforms decades of hands-on experiences into a handy reference for professionals and students involved in the operation, design, study, improvement, and management of large-scale distillation.

The ChemSep Book Harry A. Kooijman 2000

Packed Towers Reinhard Billet 1995-02-22 Discusses important theoretical and practical aspects for the calculation, design and operation of packed towers. This text also outlines the advantages of packed towers, as opposed to plate towers, for saving energy and protecting the environment.

Distillation Tray Fundamentals M. J. Lockett 1986 First published in 1986, this book contains an in-depth treatment on distillation tray hydrodynamics and efficiency, with an emphasis on sieve and valve trays. As distillation lies at the heart of the petroleum and chemical industries, so at the heart of most distillation columns are the trays used to effect the separation. Topics covered by the author include froth, foam and spray, dispersion height, pressure drop, flooding and weeping. Procedures for predicting tray efficiency are outlined including the effects of entrainment, weeping and flow maldistribution. Methods for multicomponent efficiency are also covered with examples. Although distillation tray hydrodynamics is probably one of the most well-researched areas of chemical engineering, few books cover the subject other than on an elementary level. The present volume will be used by graduate students and research workers in chemical engineering, and by chemical and process engineers in industry concerned with distillation and absorption.

Handbook of Hydraulics for the Solution of Hydraulic Engineering Problems Ernest Frederick Brater 1982

Bubble-tray Design Manual American Institute of Chemical Engineers. Research Committee 1958

Handbook of Laboratory Distillation E. Krell 1982-02-01 Handbook of Laboratory Distillation

Process-control Systems F. Greg Shinskey 1967

Process Analysis and Simulation in Chemical Engineering Iván Darío Gil Chaves 2015-11-27 This book offers a comprehensive coverage of process simulation and flowsheeting, useful for undergraduate students of Chemical Engineering and Process Engineering as theoretical and practical support in Process Design, Process Simulation, Process Engineering, Plant Design, and Process Control courses. The main concepts related to process simulation and application tools are presented and discussed in the framework of typical problems found in engineering design. The topics presented in the chapters are organized in an inductive way, starting from the more simplistic simulations up to some complex problems.

Working Guide to Process Equipment, Third Edition Norman Lieberman 2008-05-18 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

Distillation Design and Control Using Aspen Simulation William L. Luyben 2006-04-20 A timely treatment of distillation combining steady-state design and dynamic controllability As the world continues to seek new sources of energy, the distillation process remains one of the most important separation methods in the chemical, petroleum, and energy industries. And as new renewable sources of energy and chemical feedstocks become more universally utilized, the issues of distillation design and control will remain vital to a future sustainable lifestyle. Distillation Design and Control Using Aspen Simulation introduces the current status and future implications of this vital technology from the dual perspectives of steady-state design and dynamics. Where traditional design texts have focused mainly on the steady-state economic aspects of distillation design, William Luyben also addresses such issues as dynamic performance in the face of disturbances. Utilizing the commercial simulators Aspen Plus and Aspen Dynamics, the text guides future and practicing chemical engineers first in the development of optimal steady-state designs of distillation systems, and then in the development of effective control structures. Unique features of the text include: * In-depth coverage of the dynamics of column design to help develop effective control structures for distillation columns * Development of rigorous simulations of single distillation columns and sequences of columns * Coverage of design and control of petroleum fractionators Encompassing nearly four decades of research and practical developments in this dynamic field, the text represents an important reference for both students and

experienced engineers faced with distillation problems.

Distillation: Equipment and Processes Andrzej Gorak 2014-06-24 Distillation: Equipment and Processes—winner of the 2015 PROSE Award in Chemistry & Physics from the Association of American Publishers—is a single source of authoritative information on all aspects of the theory and practice of modern distillation, suitable for advanced students and professionals working in a laboratory, industrial plants, or a managerial capacity. It addresses the most important and current research on industrial distillation, including all steps in process design (feasibility study, modeling, and experimental validation), together with operation and control aspects. This volume features an extra focus on distillation equipment and processes. Winner of the 2015 PROSE Award in Chemistry & Physics from the Association of American Publishers Practical information on the newest development written by recognized experts Coverage of a huge range of laboratory and industrial distillation approaches Extensive references for each chapter facilitates further study