

Chemical Process Equipment Selection And Design

First published: Chemical process equipment / Stanley M. Walas. 1988. This text introduces the students and practicing engineers to the practices and standards of drafting the equipment used in chemical, food processing, polymer engineering, and pharmaceuticals processing industries. The textbook follows the Bureau of Indian Standards BIS 696-1972 specifications and methodology of equipment drawing. It introduces to the symbolic representations of the equipment as used in the chemical, food processing and pharma industries. It provides the detailed drawings of some commonly used equipment that are repeatedly used in different sizes and shapes. Orthographic and assembled views are illustrated. Several assignments have been suggested for practicing the drawing. In this second edition, a new chapter on computerized drawing method has been introduced. For this solid edge software has been used. Though the software itself guides the readers through the making of drawing of the parts and their assemblies, guidelines to use software is also given. The text is intended for the undergraduate students of chemical and its related branches such as polymer engineering, petroleum engineering and pipeline engineering.

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 Provides corrosion basics in a lucid manner to students and working

***professionals and over 80 corrosion-failure analysis case studies
Correlates Failure Analysis with Corrosion Science Exclusively provides
corrosion-related failure analysis case histories in one place in a
convenient format One-stop shop for both science and real time
occurrence of the phenomenon of corrosion Full coverage of all MOC,
Materials of Construction, used for process equipments Simple but Lucid
presentation of Failure Analysis procedure***

DESIGN AND DRAWING

Chemical Engineering Design

Structural Analysis and Design of Process Equipment

***A Practical Guide to Plant System and Equipment Installation and
Commissioning***

Chemical Process Equipment

DESIGN AND DRAWING (VOLUME I), Second Edition

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 • Pumpharounds 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 This book provides designers and operators of chemical process facilities with a general philosophy and approach to safe automation, including independent layers of safety. An expanded edition, this book includes a revision of original concepts as well as chapters that address new topics such as use of wireless automation and Safety Instrumented Systems. This book also provides an extensive bibliography to related publications and topic-specific information.

The Leading Integrated Chemical Process Design Guide: Now with New Problems, New Projects, and More More than ever, effective design is the focal point of sound chemical engineering. Analysis, Synthesis, and Design of Chemical Processes, Third Edition, presents design as a creative process that integrates both the big picture and the small details—and knows which to stress when, and why. Realistic from start to finish, this book moves readers beyond classroom exercises into open-ended, real-world process problem solving. The authors introduce integrated techniques for every facet of the discipline, from finance to operations, new plant design to existing process optimization. This fully updated Third Edition presents entirely new problems at the end of every chapter. It also adds extensive coverage of batch process design, including realistic examples of equipment sizing for batch sequencing; batch scheduling for multi-product plants; improving production via intermediate storage and parallel equipment; and new optimization techniques specifically for batch processes. Coverage includes Conceptualizing and analyzing chemical processes: flow diagrams, tracing, process conditions, and more Chemical process economics: analyzing capital and manufacturing costs, and predicting or assessing profitability Synthesizing and optimizing chemical processing: experience-based principles, BFD/PFD, simulations, and more Analyzing process performance via I/O models, performance curves, and other tools Process troubleshooting and “debottlenecking” Chemical engineering design and society: ethics, professionalism, health, safety, and new “green engineering” techniques Participating successfully in chemical engineering design teams Analysis, Synthesis, and Design of Chemical Processes, Third Edition, draws on

nearly 35 years of innovative chemical engineering instruction at West Virginia University. It includes suggested curricula for both single-semester and year-long design courses; case studies and design projects with practical applications; and appendixes with current equipment cost data and preliminary design information for eleven chemical processes—including seven brand new to this edition.

Written by a highly regarded author with industrial and academic experience, this new edition of an established bestselling book provides practical guidance for students, researchers, and those in chemical engineering. The book includes a new section on sustainable energy, with sections on carbon capture and sequestration, as a result of increasing environmental awareness; and a companion website that includes problems, worked solutions, and Excel spreadsheets to enable students to carry out complex calculations.

Selection and Design

Guidelines for Facility Siting and Layout

Systematic Methods of Chemical Process Design

Occupational Outlook Handbook

Chemical Engineer's Condensed Encyclopedia of Process Equipment

Industrial Chemical Process Analysis and Design

The Fourth Edition of Applied Process Design for Chemical and Petrochemical Plants Volume 2 builds upon the late Ernest E. Ludwig's classic chemical engineering process design manual.

Volume Two focuses on distillation and packed towers, and presents the methods and fundamentals of plant design along with supplemental mechanical and related data, nomographs, data charts and heuristics. The Fourth Edition is significantly expanded and updated, with new topics that ensure readers can analyze problems and find practical design methods and solutions to accomplish their process design objectives. A true application-driven book, providing clarity and easy access to essential process plant data and design information Covers a complete range of basic day-to-day petrochemical operation topics Extensively revised with new material on distillation process performance; complex-mixture fractionating, gas processing, dehydration, hydrocarbon absorption and stripping; enhanced distillation types

A complete overview and considerations in process equipment design Handling and storage of large quantities of materials is crucial to the chemical engineering of a wide variety of products. Process Equipment Design explores in great detail the design and construction of the containers – or vessels – required to perform any given task within this field. The book

provides an introduction to the factors that influence the design of vessels and the various types of vessels, which are typically classified according to their geometry. The text then delves into design and other considerations for the construction of each type of vessel, providing in the process a complete overview of process equipment design.

This updated version of one of the most popular and widely used CCPS books provides plant design engineers, facility operators, and safety professionals with key information on selected topics of interest. The book focuses on process safety issues in the design of chemical, petrochemical, and hydrocarbon processing facilities. It discusses how to select designs that can prevent or mitigate the release of flammable or toxic materials, which could lead to a fire, explosion, or environmental damage. Key areas to be enhanced in the new edition include inherently safer design, specifically concepts for design of inherently safer unit operations and Safety Instrumented Systems and Layer of Protection Analysis. This book also provides an extensive bibliography to related publications and topic-specific information, as well as key information on

failure modes and potential design solutions.

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

information and practical guidelines needed to select, operate, maintain, control, and troubleshoot process plant equipment so that it is efficient, cost-effective, and reliable throughout its lifetime. Following the authors' careful explanations and instructions, readers will find that they are better able to reduce downtime and unscheduled shutdowns, streamline operations, and maximize the service life of processing equipment. *Process Plant Equipment: Operation, Control, and Reliability* is divided into three sections: Section One: *Process Equipment Operations* covers such key equipment as valves, pumps, cooling towers, conveyors, and storage tanks. Section Two: *Process Plant Reliability* sets forth a variety of tested and proven tools and methods to assess and ensure the reliability and mechanical integrity of process equipment, including failure analysis, Fitness-for-Service assessment, engineering economics for chemical processes, and process component function and performance criteria. Section Three: *Process Measurement, Control, and Modeling* examines flow meters, process control, and process modeling and simulation. Throughout the book, numerous photos and diagrams illustrate

the operation and control of key process equipment. There are also case studies demonstrating how actual process plants have implemented the tools and techniques discussed in the book. At the end of each chapter, an extensive list of references enables readers to explore each individual topic in greater depth. In summary, this text offers students, process engineers, and plant managers the expertise and technical support needed to streamline and optimize the operation of process plant equipment, from its initial selection to operations to troubleshooting.

Guidelines for Safe Automation of Chemical Processes

Corrosion Failures

Chemical Process Equipment - Selection and Design (Revised 2nd Edition)

Process Equipment Design

Handbook of Air Pollution Prevention and Control

Perry's Chemical Engineers' Handbook, 9th Edition

Familiarizes the student or an engineer new to process safety with the concept of process safety management Serves as a comprehensive reference for Process Safety topics for student chemical engineers and newly graduate engineers Acts as a reference material for either a stand-

alone process safety course or as supplemental materials for existing curricula Includes the evaluation of SACHE courses for application of process safety principles throughout the standard Ch.E. curricula in addition to, or as an alternative to, adding a new specific process safety course Gives examples of process safety in design

The Leading Integrated Chemical Process Design Guide: With Extensive Coverage of Equipment Design and Other Key Topics More than ever, effective design is the focal point of sound chemical engineering.

Analysis, Synthesis, and Design of Chemical Processes, Fifth Edition, presents design as a creative process that integrates the big-picture and small details, and knows which to stress when and why. Realistic from start to finish, it moves readers beyond classroom exercises into open-ended, real-world problem solving. The authors introduce up-to-date, integrated techniques ranging from finance to operations, and new plant design to existing process optimization. The fifth edition includes updated safety and ethics resources and economic factors indices, as well as an extensive, new section focused on process equipment design and performance, covering equipment design for common unit operations, such as fluid flow, heat transfer, separations, reactors, and more.

Conceptualization and analysis: process diagrams, configurations, batch processing, product design, and analyzing existing processes Economic analysis: estimating fixed capital investment and manufacturing costs,

measuring process profitability, and more Synthesis and optimization: process simulation, thermodynamic models, separation operations, heat integration, steady-state and dynamic process simulators, and process regulation Chemical equipment design and performance: a full section of expanded and revamped coverage of designing process equipment and evaluating the performance of current equipment Advanced steady-state simulation: goals, models, solution strategies, and sensitivity and optimization results Dynamic simulation: goals, development, solution methods, algorithms, and solvers Societal impacts: ethics, professionalism, health, safety, environmental issues, and green engineering Interpersonal and communication skills: working in teams, communicating effectively, and writing better reports This text draws on a combined 55 years of innovative instruction at West Virginia University (WVU) and the University of Nevada, Reno. It includes suggested curricula for one- and two-semester design courses, case studies, projects, equipment cost data, and extensive preliminary design information for jump-starting more detailed analyses. This is a valuable reference that gives chemical and industrial engineers and technicians concise, accurate descriptions of process equipment. This handy source provides fingertip access to the details and definitions of hundreds of major types of machinery and equipment. In addition to explaining and illustrating the technology, it defines engineering

terminology and includes typical applications, operating limits and variables, and overviews of design and operating principles.

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
Process Equipment Malfunctions: Techniques to Identify and Correct
Plant Problems**

Industrial Chemical Process Design, 2nd Edition

Fortran Programs for Chemical Process Design, Analysis, and Simulation

Analysis, Synthesis and Design of Chemical Processes

**Volume 2: Distillation, packed towers, petroleum fractionation, gas
processing and dehydration**

Process Plant Equipment

This book gives engineers the fundamental theories, equations, and computer programs (including source codes) that provide a ready way to analyze and solve a wide range of process engineering problems.

Still the only book offering comprehensive coverage of the analysis and design of both API and ASME pressure vessels This edition of the classic guide to the analysis and design of process equipment has been thoroughly updated to reflect current practices as well as the latest ASME and API standards. In addition to covering the code requirements governing the design of process equipment, the book supplies structural, mechanical, and chemical engineers with expert guidance on the analysis and design of storage tanks, pressure vessels, boilers, heat exchangers, and related

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equipment and its associated external and internal components. The use of process equipment, storage tanks, pressure vessels, and heat exchangers has expanded considerably over the last decades in both the petroleum and chemical industries. The extremely high pressures and temperatures involved with the processes for which the equipment is designed makes it potentially very dangerous property and life if the equipment is not designed and manufactured to an exacting standard. Accordingly, codes and standards such as the ASME and API were written to assure safety. This guide covering the design of both API equipment and ASME pressure vessels, Structural Analysis and Design of Process Equipment, 3rd Edition: Covers the design of rectangular vessels with various wall thicknesses and updated equations for the design of heat exchangers Now includes numerical analysis needed for earthquake evaluation Relates the requirements of the ASME codes to international standards Describes, in detail, the background and assumptions made in deriving many design equations underpinning the ASME and API standards Includes methods for designing components that are not covered in either the API or ASME, including ring girders, leg supports, and internal components Contains procedures for calculating thermal stresses and discontinuity analysis of components Structural Analysis and Design of Process Equipment, 3rd Edition is an indispensable of-the-trade for mechanical engineers and chemical engineers working in the petroleum and chemical industries, manufacturing, as well as plant engineers in need of a reference for process equipment in power plants, petrochemical facilities, and nuclear facilities.

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 is specifically developed for the U.S. market. It provides the latest US codes and standards, including ASME and ISA design codes and ANSI standards. It contains new discussions of conceptual plant

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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 Pa. References for downloading from the companion website. Extensive instructor resources, including 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 graduate) and appropriate for capstone design courses where taken, plus graduates) and lecturers/tutors, and professionals in industry (chemical process, biochemical, pharmaceutical, petrochemical sectors). Changes to this edition: Revised organization into Part I: Process Design, and Part II: Plant Design. The themes of Part I are flowsheet development, economic analysis, safety and environmental impact, and process 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 and design. Realistic commercial design projects from diverse industries. A rigorous pedagogy assists learning.

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detailed worked examples, end of chapter exercises, plus supporting data and Excel spreadsheets, calculations plus over 150 Patent References, for downloading from the companion website E instructor resources: 1170 lecture slides plus fully worked solutions manual available to adopt instructors

The most complete guide of its kind, this is the standard handbook for chemical and process. All new material on fluid flow, long pipe, fractionators, separators and accumulators, cooling towers, gas treating, blending, troubleshooting field cases, gas solubility, and density of irregular solids. A substantial addition of material will also include conversion tables and a new appendix, "Shortcuts in Equipment Design Methods." This convenient volume helps solve field engineering problems with 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.

Chemical and Process Plant Commissioning Handbook
Principles, Practice and Economics of Plant and Process Design
Analysis, Synthesis, and Design of Chemical Processes
Polymer Science and Technology
Process Intensification
Theory, Case Studies, and Solutions

A facility is only as efficient and profitable as the equipment that is in it: this highly influential book is a powerful resource for chemical, process, or plant engineers who need to select, design

or configures plant successfully and profitably. It includes updated information on design methods for all standard equipment, with an emphasis on real-world process design and performance.

The comprehensive and influential guide to the selection and design of a wide range of chemical process equipment, used by engineers globally • Copious examples of successful applications, with supporting schematics and data to illustrate the functioning and performance of equipment Revised edition, new material includes updated equipment cost data, liquid-solid and solid systems, and the latest information on membrane separation technology Provides equipment rating forms and manufacturers' data, worked examples, valuable shortcut methods, rules of thumb, and equipment rating forms to demonstrate and support the design process Heavily illustrated with many line drawings and schematics to aid understanding, graphs and tables to illustrate performance data

The Chemical and Process Plant Commissioning Handbook, winner of the 2012 Basil Brennan Medal from the Institution of Chemical Engineers, is a guide to converting a newly constructed plant or equipment into a fully integrated and operational process unit. Good commissioning is based on a disciplined, systematic and proven methodology and approach that achieve results in the safest, most efficient, cost effective and timely manner. The book is supported by detailed, proven and effective commission templates, plus extensive commissioning scenarios that enable the reader to learn the context of good commissioning practice from an experienced commissioning manager. It focuses on the critical safety assessment and inspection regimes necessary to ensure that new plants are compliant with OSHA and environmental requirements.

Martin Killcross has brought together the theory of textbooks and technical information obtained from sales literature, in order to provide engineers with what they need to know before initiating talks with vendors regarding equipment selection. Unique information from a respected, global commissioning manager: delivers the know-how to succeed for anyone commissioning new plant or equipment Comes with online commissioning process templates that make this title a working tool kit as well as a key reference Extensive examples of successful commissioning processes with step-by-step guidance enable readers to understand the function and performance of the wide range of tasks required in the commissioning process

This is the eBook of the printed book and may not include any media, website access codes, or print supplements that may come packaged with the bound book. The Concise, Easy-to-Use Guide to Designing Chemical Process Equipment and Evaluating Its Performance Trends such as shale-gas resource development call for a deeper understanding of chemical engineering equipment and design. Chemical Process Equipment Design complements leading texts by providing concise, focused coverage of these topics, filling a major gap in undergraduate chemical engineering education. Richard Turton and Joseph A. Shaeiwitz present relevant design equations, show how to analyze operation of existing equipment, and offer a practical methodology for designing new equipment and for solving common problems. Theoretical derivations are avoided in favor of working equations, practical computational strategies, and approximately eighty realistic worked examples. The authors identify which equation applies to each situation, and show exactly how to use it to design equipment. By the time undergraduates

have worked through this material, they will be able to create preliminary designs for most process equipment found in a typical chemical plant that processes gases and/or liquids. They will also learn how to evaluate the performance of that equipment, even when operating conditions differ from the design case. Coverage includes Process fluid mechanics: designing and evaluating pumps, compressors, valves, and other piping systems Process heat transfer: designing and evaluating heat exchange equipment Separation equipment: understanding fundamental relationships underlying separation devices, designing them, and assessing their performance Reactors: basic equations and specific issues relating to chemical reactor equipment design and performance Other equipment: preliminary analysis and design for pressure vessels, simple phase-separators (knock-out drums), and steam ejectors This guide draws on fifty years of innovative chemical engineering instruction at West Virginia University and elsewhere. It complements popular undergraduate textbooks for practical courses in fluid mechanics, heat transfer, reactors, or separations; supports senior design courses; and can serve as a core title in courses on equipment design.

"The most complete, up-to-date, problem-solving toolkit for chemical engineers and process designers. Industrial Chemical Process Design, Second Edition provides a step-by-step methodology and 25 downloadable, customizable, needs-specific software applications that offer quick, accurate solutions to complex process design problems. These applications uniquely fill the gaps left by large, very expensive commercial process simulation software packages used to select, size, and design industrial chemical process equipment. Written by a hands-on industry

consultant and featuring more than 200 illustrations, this book thoroughly details: Sizing and cost estimating of process unit operation equipment Design and rating of fractionation equipment and three-phase separation equipment Chemical optimization Commercial distillation Packaged plant cost analysis Estimating cost for modular packages Performing operations such as liquid-liquid extraction and gas liquid separation vessel sizing and rating Green engineering New to the Second Edition: Added focus on sustainability with new green engineering coverage: crude oil database; vegetable oils and plant greenhouse production for use in automobile fuels; gasoline and diesel fuel database; greenhouse fuels; water removal treatment in three-phase vessel design New focus on engineering economics Simplified shell/tube design method and improved shell/tube exchanger software improvements Fluid flow coverage includes both single- and two-phase flow and the very desirable addition of complete process engineering of NO_x removal and catalytic SCR reactor processes necessary in all electric generator power plants and refinery furnace systems (per mandatory EPA regulations) Coverage of the Fischer-Tropsch process converting natural methane gas to crude oil products, liquids, gasoline, diesel, and jet fuel - all sulfur-free! Includes a plan to decrease reliance on crude oil imports Contains a packaged cost analysis natural gas-to-liquids plant turn-key software program "--

Vessel Design

Design And Economics

Chemical Process Equipment: Selection & Design

A Manual of Quick, Accurate Solutions to Everyday Process Engineering Problems
Chemical Process Design and Integration

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A PRACTICAL GUIDE TO TROUBLESHOOTING PROCESS EQUIPMENT

MALFUNCTIONS Process Equipment Malfunctions offers proven techniques for finding and fixing process plant problems and contains details on failure identification. Diagnostic tips, examples, and illustrations help to pinpoint and correct faults in chemical process and petroleum refining equipment. Complex math has been omitted. An essential resource for plant operators and process engineers, this book is based on the author's long career in field troubleshooting process problems. **COVERAGE INCLUDES:** Distillation tray malfunctions Packed tower problems Distillation tower pressure and composition control Fractionator product stripping Pumparounds Reboiled and steam side strippers Inspecting tower internals Process reboilers--thermosyphon circulation Heat exchangers Condenser limitations Air coolers Cooling water systems Steam condensate collection systems Steam quality problems Level control problems Process plant corrosion and fouling Vapor-liquid separation vessels Hydrocarbon-water

separation and desalters Fired heaters--draft and excess O₂
Disabling safety systems Vacuum systems and steam jets Vacuum
surface condensers Centrifugal pump limitations Steam turbine
drivers Centrifugal compressors Reciprocating compressors
This text introduces the student to the practices and standards
of making drawings for equipment used in chemical industries.
The textbook follows the Bureau of Indian Standards (BIS)
696-1972 specifications and methodology of equipment drawings.
It uses the symbolic representations of the equipment as used in
the industry and provides the detailed drawings of some commonly
used equipment. It includes numerous orthographic and assembled
views of equipment, and provides several photographs to relate
these drawings to equipment used in industries. Finally, the
book includes several assignments to reinforce the concepts
discussed in the text. The text is intended for the
undergraduate students of chemical engineering and its related
branches such as polymer engineering, petroleum engineering, and
pipeline engineering.

Good, No Highlights, No Markup, all pages are intact, Slight
Shelfwear, may have the corners slightly dented, may have slight

color changes/slightly damaged spine.

Process Intensification: Engineering for Efficiency, Sustainability and Flexibility is the first book to provide a practical working guide to understanding process intensification (PI) and developing successful PI solutions and applications in chemical process, civil, environmental, energy, pharmaceutical, biological, and biochemical systems. Process intensification is a chemical and process design approach that leads to substantially smaller, cleaner, safer, and more energy efficient process technology. It improves process flexibility, product quality, speed to market and inherent safety, with a reduced environmental footprint. This book represents a valuable resource for engineers working with leading-edge process technologies, and those involved research and development of chemical, process, environmental, pharmaceutical, and bioscience systems. No other reference covers both the technology and application of PI, addressing fundamentals, industry applications, and including a development and implementation guide Covers hot and high growth topics, including emission prevention, sustainable design, and pinch analysis World-class

authors: Colin Ramshaw pioneered PI at ICI and is widely credited as the father of the technology

Chemical Process Engineering

Rules of Thumb for Chemical Engineers

Process Equipment and Plant Design

Operation, Control, and Reliability

Vessel Design and Selection

Guidelines for Engineering Design for Process Safety

A resource for individuals responsible for siting decisions, this guidelines book covers siting and layout of process plants, including both new and expanding facilities. This book provides comprehensive guidelines in selecting a site, recognizing and assessing long-term risks, and the optimal lay out of equipment facilities needed within a site. The information presented is applicable to US and international locations. Note: CD-ROM/DVD and other supplementary materials are not included as part of eBook file.

Chemical Process Engineering presents a systematic approach to solving design problems by listing the needed equations, calculating degrees-of-freedom, developing calculation procedures to generate process specifications- mostly pressures, temperatures, compositions, and flow rates- and sizing equipment. This illustrative reference/text tabulates numerous easy-to-follow calculation procedures as well as the relationships needed for sizing commonly used equipment.

Wales (chemical and petroleum engineering, U. of Kansas) presents a minimum of essential

theory, with numerical examples to illustrate the more involved procedures. Emphasis is placed on short cut methods, rules of thumb and data for design by analogy; a short chapter on costs of equipment is included. The introductory chapters will provide a general background to process design, flowsheeting, and process control. Annotation copyrighted by Book News, Inc., Portland, OR

Over the last 20 years, fundamental design concepts and advanced computer modeling have revolutionized process design for chemical engineering. Team work and creative problem solving are still the building blocks of successful design, but new design concepts and novel mathematical programming models based on computer-based tools have taken out much of the guess-work. This book presents the new revolutionary knowledge, taking a systematic approach to design at all levels.

Chemical and Process Equipment Design

Engineering for Efficiency, Sustainability and Flexibility

CHEMICAL PROCESS EQUIPMENT

Introduction to Process Safety for Undergraduates and Engineers

Principles and Practices

Integrated Design and Simulation of Chemical Processes

The Handbook of Air Pollution Prevention and Control

provides a concise overview of the latest technologies for managing industrial air pollution in petrochemical, oil and gas, and allied industries. Detailed material on equipment

selection, sizing, and troubleshooting operations is provided along with practical design methodology. Unique to this volume are discussions and information on energy-efficient technologies and approaches to implementing environmental cost accounting measures. Included in the text are sidebar discussions, questions for thinking and discussing, recommended resources for the reader (including Web sites), and a comprehensive glossary. The Handbook of Air Pollution Prevention and Control also includes free access to US EPA's air dispersion model SCREEN3. Detailed examples on the application of this important software to analyzing air dispersion from industrial processes and point sources are provided in the Handbook, along with approaches to applying this important tool in developing approaches to pollution prevention and in selecting control technologies. By applying SCREEN3, along with the examples given in the Handbook, the user can: evaluate the impact of processes and operations to air quality, and apply the model to assess emergency scenarios to help in planning, to develop

environmental impact assessments, to select pollution control technologies, and to develop strategies for pollution prevention. Two companion books by Cheremisinoff are available: Handbook of Water and Wastewater Treatment Technologies, and Handbook of Solid Waste Management and Waste Minimization Technologies. Uniquely combines prevention and control concepts while covering the practices and technologies that are applied to the prevention of air pollution in the chemicals manufacturing, oil and gas, iron and steel, and pharmaceutical industries, and to the cleaning and control of industrial air emissions. Provides a bridge for today's environmental manager by focusing on an integrated approach to managing air pollution problems within industrial operations. Shows you how to calculate financial returns from pollution prevention projects.

Process Equipment and Plant Design: Principles and Practices takes a holistic approach towards process design in the chemical engineering industry, dealing with the design of individual process equipment and its configuration as a

complete functional system. Chapters cover typical heat and mass transfer systems and equipment included in a chemical engineering curriculum, such as heat exchangers, heat exchanger networks, evaporators, distillation, absorption, adsorption, reactors and more. The authors expand on additional topics such as industrial cooling systems, extraction, and topics on process utilities, piping and hydraulics, including instrumentation and safety basics that supplement the equipment design procedure and help to arrive at a complete plant design. The chapters are arranged in sections pertaining to heat and mass transfer processes, reacting systems, plant hydraulics and process vessels, plant auxiliaries, and engineered safety as well as a separate chapter showcasing examples of process design in complete plants. This comprehensive reference bridges the gap between industry and academia, while exploring best practices in design, including relevant theories in process design making this a valuable primer for fresh graduates and professionals working on design projects in the industry.

Serves as a consolidated resource for process and plant design, including process utilities and engineered safety
Bridges the gap between industry and academia by including practices in design and summarizing relevant theories
Presents design solutions as a complete functional system and not merely the design of major equipment
Provides design procedures as pseudo-code/flow-chart, along with practical considerations

Industrial Chemical Process Analysis and Design uses chemical engineering principles to explain the transformation of basic raw materials into major chemical products. The book discusses traditional processes to create products like nitric acid, sulphuric acid, ammonia, and methanol, as well as more novel products like bioethanol and biodiesel. Historical perspectives show how current chemical processes have developed over years or even decades to improve their yields, from the discovery of the chemical reaction or physico-chemical principle to the industrial process needed to yield commercial quantities. Starting with

an introduction to process design, optimization, and safety, Martin then provides stand-alone chapters—in a case study fashion—for commercially important chemical production processes. Computational software tools like MATLAB®, Excel, and Chemcad are used throughout to aid process analysis. Integrates principles of chemical engineering, unit operations, and chemical reactor engineering to understand process synthesis and analysis Combines traditional computation and modern software tools to compare different solutions for the same problem Includes historical perspectives and traces the improving efficiencies of commercially important chemical production processes Features worked examples and end-of-chapter problems with solutions to show the application of concepts discussed in the text

Chemical Process Equipment is a results-oriented reference for engineers who specify, design, maintain or run chemical and process plants. This book delivers information on the selection, sizing and operation of process equipment in a

format that enables quick and accurate decision making on standard process and equipment choices, saving time, improving productivity, and building understanding. Coverage emphasizes common real-world equipment design rather than experimental or esoteric and focuses on maximizing performance. Chemical process equipment is of two kinds: custom designed and built, or proprietary "off the shelf." For example, the sizes and performance of custom equipment such as distillation towers, drums, and heat exchangers are derived by the process engineer on the basis of established principles and data, although some mechanical details remain in accordance with safe practice codes and individual fabrication practices. The process design of proprietary equipment, as considered in this book, establishes its required performance and is a process of selection from the manufacturers' offerings, often with their recommendations or on the basis of individual experience.

Ludwig's Applied Process Design for Chemical and Petrochemical Plants

Working Guide to Process Equipment, Third Edition
Chemical Process Equipment Design