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# Mass Transfer Operations 3rd Edition 3rd Third Edition By Treybal Robert E Published By Mcgraw Hill Book Company 1980 Hardcover

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Food Process Engineering and Technology

Diffusion

Principles and Operations

Separation Process Engineering

Separation Process Principles with Applications Using Process Simulators, 4th Edition

Analysis, Synthesis and Design of Chemical Processes

Fluid flow, heat transfer and mass transfer

HEAT TRANSFER

Principles and Modern Applications of Mass Transfer Operations

Transport Processes and Unit Operations

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Mass Transfer in Fluid Systems  
Fermentation and Biochemical Engineering Handbook, 2nd Ed.  
Mass-transfer Operations  
Fundamentals of Hazardous Waste Site Remediation  
Processing and Finishing of Polymeric Materials, 2 Volume Set  
Handbook of Separation Process Technology  
Mass Transfer Operations for the Practicing Engineer  
Volume 1B: Heat and Mass Transfer: Fundamentals and Applications  
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Industrial Separation Processes

Principles of Chemical Engineering

A HEAT TRANSFER TEXTBOOK

Diffusion

Mass Transfer

Proceedings of the Second Pacific Basin Conference on Adsorption Science and Technology : Brisbane, Australia, 14-18 May 2000

Fundamentals of Heat and Mass Transfer

*Mass Transfer  
Operations 3rd Edition  
3rd Third Edition By  
Treybal Robert E  
Published By McGraw  
Hill Book Company  
1980 Hardcover*

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Food Process Engineering and  
Technology McGraw Hill Professional

Separation operations are crucial throughout the process industry with respect to energy consumption, contribution to investments and ability to achieve the desired product with the right specifications. Our main objective in creating this graduate level textbook is to present an overview of the fundamentals underlying the most

frequently used industrial separation methods. We focus on their physical principles and the basic computation methods that are required to assess their technical and economical feasibility. The textbook is organized into three main parts. Separation processes for homogeneous mixtures are treated in the parts on equilibrium based molecular separations and rate-controlled molecular separations. The part on mechanical separation technology presents an overview of the most important techniques for heterogeneous mixture separation. Each chapter provides a condensed overview of the most commonly used equipment types. The textbook is concluded with a final chapter on the main considerations in selecting an appropriate separation

process for a separation task. As the design of separation processes can only be learned by doing, we have included exercises at the end of each chapter. Short answers are given at the end of this book; detailed solutions are given in a separate solution manual.

Diffusion Cambridge University Press  
This book introduces the fundamental principles of the mass transfer phenomenon and its diverse applications in process industry. It covers the full spectrum of techniques for chemical separations and extraction. Beginning with molecular diffusion in gases, liquids and solids within a single phase, the mechanism of inter-phase mass transfer is explained with the help of several theories. The separation operations are explained comprehensively in two

distinct ways—stage-wise contact and continuous differential contact. The primary design requirements of gas-liquid equipment are discussed. The book provides a detailed discussion on all individual gas-liquid, liquid-liquid, solid-gas, and solid-liquid separation processes. The students are also exposed to the underlying principles of the membrane-based separation processes. The book is replete with real applications of separation processes and equipment. Problems are worked out in each chapter. Besides, problems with answers, short questions, multiple choice questions with answers are given at the end of each chapter. The text is intended for a course on mass transfer, transport and separation processes prescribed for the undergraduate and

postgraduate students of chemical engineering.

**Principles and Operations** McGraw-Hill Science, Engineering & Mathematics The Definitive, Fully Updated Guide to Separation Process Engineering—Now with a Thorough Introduction to Mass Transfer Analysis Separation Process Engineering, Third Edition, is the most comprehensive, accessible guide available on modern separation processes and the fundamentals of mass transfer. Phillip C. Wankat teaches each key concept through detailed, realistic examples using real data—including up-to-date simulation practice and new spreadsheet-based exercises. Wankat thoroughly covers each of today's leading approaches, including flash, column, and batch distillation; exact

calculations and shortcut methods for multicomponent distillation; staged and packed column design; absorption; stripping; and more. In this edition, he also presents the latest design methods for liquid-liquid extraction. This edition contains the most detailed coverage available of membrane separations and of sorption separations (adsorption, chromatography, and ion exchange). Updated with new techniques and references throughout, Separation Process Engineering, Third Edition, also contains more than 300 new homework problems, each tested in the author's Purdue University classes. Coverage includes Modular, up-to-date process simulation examples and homework problems, based on Aspen Plus and easily adaptable to any simulator

Extensive new coverage of mass transfer and diffusion, including both Fickian and Maxwell-Stefan approaches Detailed discussions of liquid-liquid extraction, including McCabe-Thiele, triangle and computer simulation analyses; mixer-settler design; Karr columns; and related mass transfer analyses Thorough introductions to adsorption, chromatography, and ion exchange—designed to prepare students for advanced work in these areas Complete coverage of membrane separations, including gas permeation, reverse osmosis, ultrafiltration, pervaporation, and key applications A full chapter on economics and energy conservation in distillation Excel spreadsheets offering additional practice with problems in distillation, diffusion,

mass transfer, and membrane separation

### **Separation Process Engineering**

Academic Press

Specifically developed for food engineers, this is an in-depth reference book that focuses on transport phenomena in food preservation. First it reviews the fundamental concepts regarding momentum, heat, and mass transfer. Then the book examines specific applications of these concepts into a variety of traditional and novel processes and products.

### **Separation Process Principles with Applications Using Process**

**Simulators, 4th Edition** Pearson Education

The Definitive Reference for Food Scientists & Engineers The Second

Edition of the Encyclopedia of Agricultural, Food, and Biological Engineering focuses on the processes used to produce raw agricultural materials and convert the raw materials into consumer products for distribution. It provides an improved understanding of the processes used in

**Analysis, Synthesis and Design of Chemical Processes** PHI Learning Pvt. Ltd.

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*Fluid flow, heat transfer and mass transfer* Hassell Street Press

Part of the Essential Engineering Calculations Series, this book presents step-by-step solutions of the basic principles of mass transfer operations,

including sample problems and solutions and their applications, such as distillation, absorption, and stripping. Presenting the subject from a strictly pragmatic point of view, providing both the principles of mass transfer operations and their applications, with clear instructions on how to carry out the basic calculations needed, the book also covers topics useful for readers taking their professional exams.

John Wiley & Sons

Modeling is practiced in engineering and all physical sciences. Many specialized texts exist - written at a high level - that cover this subject. However, students and even professionals often experience difficulties in setting up and solving even the simplest of models. This can be attributed to three difficulties: the proper



choice of model, the absence of precise solutions, and the necessity to make suitable simplifying assumptions and approximations. Overcoming these difficulties is the focus of *The Art of Modeling in Science and Engineering*. The text is designed for advanced undergraduate and graduate students and practicing professionals in the sciences and engineering with an interest in Modeling based on Mass, Energy and Momentum or Force Balances. The book covers a wide range of physical processes and phenomena drawn from chemical, mechanical, civil, environmental sciences and bio-sciences. A separate section is devoted to "real World" industrial problems. The author explains how to choose the simplest model, obtain an appropriate

solution to the problem and make simplifying assumptions/approximations. HEAT TRANSFER William Andrew Mass-transfer Operations McGraw-Hill Science, Engineering & Mathematics Principles and Modern Applications of Mass Transfer Operations John Wiley & Sons Principles and Modern Applications of Mass Transfer Operations McGraw-Hill Science, Engineering & Mathematics Fundamentals and Operations in Food Process Engineering deals with the basic engineering principles and transport processes applied to food processing, followed by specific unit operations with a large number of worked-out examples and problems for practice in each chapter. The book is divided into four sections: fundamentals in food process

engineering, mechanical operations in food processing, thermal operations in food processing and mass transfer operations in food processing. The book is designed for students pursuing courses on food science and food technology, including a broader section of scientific personnel in the food processing and related industries.

Transport Processes and Unit Operations  
Pearson Education

Surveys the selection, design, and operation of most of the industrially important separation processes. Discusses the underlying principles on which the processes are based, and provides illustrative examples of the use of the processes in a modern context. Features thorough treatment of newer separation processes based on

membranes, adsorption, chromatography, ion exchange, and chemical complexation. Includes a review of historically important separation processes such as distillation, absorption, extraction, leaching, and crystallization and considers these techniques in light of recent developments affecting them.

Food Process Engineering Butterworth-Heinemann

This is a well-rounded handbook of fermentation and biochemical engineering presenting techniques for the commercial production of chemicals and pharmaceuticals via fermentation. Emphasis is given to unit operations fermentation, separation, purification, and recovery. Principles, process design, and equipment are detailed.

Environment aspects are covered. The practical aspects of development, design, and operation are stressed. Theory is included to provide the necessary insight for a particular operation. Problems addressed are the collection of pilot data, choice of scale-up parameters, selection of the right piece of equipment, pinpointing of likely trouble spots, and methods of troubleshooting. The text, written from a practical and operating viewpoint, will assist development, design, engineering and production personnel in the fermentation industry. Contributors were selected based on their industrial background and orientation. The book is illustrated with numerous figures, photographs and schematic diagrams.

**Mass Transfer in Fluid Systems** John

Wiley & Sons

This textbook is intended for courses in heat transfer for undergraduates, not only in chemical engineering and related disciplines of biochemical engineering and chemical technology, but also in mechanical engineering and production engineering. The author provides the reader with a very thorough account of the fundamental principles and their applications to engineering practice, including a survey of the recent developments in heat transfer equipment. The three basic modes of heat transfer - conduction, convection and radiation - have been comprehensively analyzed and elucidated by solving a wide range of practical and design-oriented problems. A whole chapter has been devoted to

explain the concept of the heat transfer coefficient to give a feel of its importance in tackling problems of convective heat transfer. The use of the important heat transfer correlations has been illustrated with carefully selected examples.

Fermentation and Biochemical Engineering Handbook, 2nd Ed. Springer Science & Business Media

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 •

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*Mass-transfer Operations* John Wiley & Sons  
Addresses the use of rigorous multicomponent mass transfer models

for the simulation and design of process equipment. Deals with the basic equations of diffusion in multicomponent systems. Describes various models and estimations of rates of mass and energy transfer. Covers applications of multicomponent mass transfer models to process design. Includes appendices providing necessary mathematical background. Contains a large number of numerical examples worked out in detail.  
Fundamentals of Hazardous Waste Site Remediation Routledge  
Every practicing environmental engineer should already have a firm grasp on the basics of hazardous waste site remediation-the key to confronting a site problem, and devising an effective solution. Since their original introduction to remediation, technology has kept

moving ahead with new ideas and procedures. Fundamentals of Hazardous Waste Site Remediation gives environmental professionals immediate access to the basics of the trade, along with information about recent advancements. This comprehensive overview examines the basics of such areas as hazardous materials chemistry, hydrogeology, reaction engineering, and clean-up level development. A chapter on Cost Estimating will be of particular interest to specialists, in light of recent concerns about the increased costs of remediation. After reading each chapter, test your new knowledge with the review problems. As a refresher guide for career environmental engineers, or a helpful tool to newcomers in the field, Fundamentals of Hazardous Waste Site

Remediation is a valuable resource for longtime professionals and newcomers alike.

Processing and Finishing of Polymeric Materials, 2 Volume Set CRC Press  
Coulson and Richardson's Chemical Engineering has been fully revised and updated to provide practitioners with an overview of chemical engineering. Each reference book provides clear explanations of theory and thorough coverage of practical applications, supported by case studies. A worldwide team of editors and contributors have pooled their experience in adding new content and revising the old. The authoritative style of the original volumes 1 to 3 has been retained, but the content has been brought up to date and altered to be more useful to

practicing engineers. This complete reference to chemical engineering will support you throughout your career, as it covers every key chemical engineering topic. Coulson and Richardson's Chemical Engineering: Volume 1B: Heat and Mass Transfer: Fundamentals and Applications, Seventh Edition, covers two of the main transport processes of interest to chemical engineers: heat transfer and mass transfer, and the relationships among them. Covers two of the three main transport processes of interest to chemical engineers: heat transfer and mass transfer, and the relationships between them Includes reference material converted from textbooks Explores topics, from foundational through technical Includes emerging applications, numerical

methods, and computational tools *Handbook of Separation Process Technology* Phlogiston Press This textbook is targeted to undergraduate students in chemical engineering, chemical technology, and biochemical engineering for courses in mass transfer, separation processes, transport processes, and unit operations. The principles of mass transfer, both diffusional and convective have been comprehensively discussed. The application of these principles to separation processes is explained. The more common separation processes used in the chemical industries are individually described in separate chapters. The book also provides a good understanding of the construction, the operating principles, and the selection

criteria of separation equipment. Recent developments in equipment have been included as far as possible. The procedure of equipment design and sizing has been illustrated by simple examples. An overview of different applications and aspects of membrane separation has also been provided. 'Humidification and water cooling', necessary in every process industry, is also described. Finally, elementary principles of 'unsteady state diffusion' and mass transfer accompanied by a chemical reaction are covered.

**SALIENT FEATURES :**

- A balanced coverage of theoretical principles and applications.
- Important recent developments in mass transfer equipment and practice are included.
- A large number of solved problems of varying levels of

complexities showing the applications of the theory are included.

- Many end-chapter exercises.
- Chapter-wise multiple choice questions.
- An Instructors manual for the teachers.

*Mass Transfer Operations for the Practising Engineer* PHI Learning Pvt. Ltd.

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.

**Volume 1B: Heat and Mass Transfer: Fundamentals and Applications**

Walter de Gruyter

Clear and complete description of diffusion in fluids, for undergraduate students in chemical engineering.

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