1. Record Nr. UNINA9910133458503321

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Titolo	Mass transfer operations for the practicing engineer / / Louis Theodore, Francesco Ricci
Pubbl/distr/stampa	Hoboken, N.J., : Wiley, c2010
ISBN	1-118-21618-0 1-283-37151-0 9786613371515 0-470-60258-9 0-470-60259-7
Edizione	[1st ed.]
Descrizione fisica	1 online resource (648 p.)
Collana	Essential engineering calculations series
Altri autori (Persone)	RicciFrancesco
Disciplina	530.4/750151
Soggetti	Engineering mathematics Mass transfer
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Mass Transfer Operations for the Practicing Engineer; Preface; Part One Introduction; 1. History of Chemical Engineering and Mass Transfer Operations; References; 2. Transport Phenomena vs Unit Operations Approach; References; 3. Basic Calculations; Introduction; Units and Dimensions; Conversion of Units; The Gravitational Constant g(c); Significant Figures and Scientific Notation; References; 4. Process Variables; Introduction; Temperature; Pressure; Moles and Molecular Weight; Mass, Volume, and Density; Viscosity; Reynolds Number; pH; Vapor Pressure; Ideal Gas Law; References 5. Equilibrium vs Rate ConsiderationsIntroduction; Equilibrium; Rate; Chemical Reactions; References; 6. Phase Equilibrium Principles; Introduction; Gibb's Phase Rule; Raoult's Law; Henry's Law; Raoult's Law vs Henry's Law; Vapor-Liquid Equilibrium in Nonideal Solutions; Vapor-Solid Equilibrium; Liquid-Solid Equilibrium; References; 7. Rate Principles; Introduction; The Operating Line; Fick's Law; Diffusion in Gases; Diffusion in Liquids; Mass Transfer Coefficients; Individual Mass Transfer Coefficients; Equimolar Counterdiffusion; Diffusion of Component A Through Non-diffusing Component B

Overall Mass Transfer CoefficientsEquimolar Counterdiffusion and/or Diffusion in Dilute Solutions; Gas Phase Resistance Controlling; Liquid Phase Resistance Controlling; Experimental Mass Transfer Coefficients; References; Part Two Applications: Component and Phase Separation Processes; 8. Introduction to Mass Transfer Operations; Introduction; Classification of Mass Transfer Operations; Contact of Immiscible Phases; Miscible Phases Separated by a Membrane; Direct Contact of Miscible Phases; Mass Transfer Equipment; Distillation; Absorption; Adsorption; Extraction; Humidification and Drying
Other Mass Transfer Unit OperationsThe Selection Decision; Characteristics of Mass Transfer Operations; Unsteady-State vs Steady-State Operation; Flow Pattern; Stagewise vs Continuous Operation; References; 9. Distillation; Introduction; Flash Distillation; Batch Distillation; Continuous Distillation with Reflux; Equipment and Operation; Equilibrium Considerations; Binary Distillation Design: McCabe-Thiele Graphical Method; Multicomponent Distillation: Fenske-Underwood-Gilliland (FUG) Method; Packed Column Distillation; References; 10. Absorption and Stripping; Introduction
Description of EquipmentPacked Columns; Plate Columns; Design and Performance Equations-Packed Columns; Liquid Rate; Column Diameter; Column Height; Pressure Drop; Design and Performance Equations-Plate Columns; Stripping; Packed vs Plate Tower Comparison; Summary of Key Equations; References; 11. Adsorption; Introduction; Adsorption Classification; Activated Carbon; Activated Alumina; Silica Gel; Molecular Sieves; Adsorption Equilibria; Freundlich Equation; Langmuir Isotherms; Description of Equipment; Design and Performance Equations; Regeneration; References
12. Liquid-Liquid and Solid-Liquid Extraction

Sommario/riassunto

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.