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Unit Operations of Chemical Engineering *Mechanical Operations for Chemical Engineers* **Unit Operations of Chemical Engineering** *Unit Operations of Chemical Engineering Unit Operations of Chemical Engineering* Mechanical Operations Chemical Engineering **Chemical Engineering Design Chemical Engineering** *Chemical Engineering* **Unit Operations of Chemical Engineering Chemical Engineering** *Unit Operations of Chemical Engineering Unit Operations* **Chemical Engineering for Non-Chemical Engineers Introduction to Chemical Engineering** *Unit Operations-i Fluid Flow and Mechanical Operations* **Chemical Engineering and Chemical Process Technology - Volume II** Chemical Engineering: Visions of the World **Laboratory Unit Operations and Experimental Methods in Chemical Engineering Unit Operations of Chemical Engineering** Mass Transfer Operations Examples and Problems to the Course of Unit Operations of Chemical Engineering *Chemical Engineering Process Simulation* Introduction to Chemical Engineering **Mass-transfer Operations** Chemical Engineering and Chemical Process Technology - Volume V Computer Methods in Chemical Engineering Chemical Engineering in the Pharmaceutical Industry, Active Pharmaceutical Ingredients *Chemical Technology* **Principles of Unit Operations** *Drying Technology & Spray*

Drying **Experimental Methods and Instrumentation for Chemical Engineers** Fluid Mechanics, Heat Transfer, and Mass Transfer **Introduction to Chemical Engineering** *Chemical Reactor Analysis and Applications for the Practicing Engineer* **Transport Processes and Unit Operations Unit Operations in Environmental Engineering Equilibrium-Stage Separation Operations in Chemical Engineering** Unit Operations-II

this book is an outgrowth of the author s teaching experience of a course on introduction to chemical engineering to the first year chemical engineering students of the indian institute of technology madras the book serves to introduce the students to the role of a chemical engineer in society in addition to the classical industries the role of chemical engineers in several esoteric areas such as semiconductor processing and biomedical engineering is discussed besides highlighting the principles and processes of chemical engineering the book shows how chemical engineering concepts from the basic sciences and economics are used to seek solutions to engineering problems the book is rich in examples of innovative solutions found to problems faced in chemical industry it includes a wide spectrum of topics selected from the industrial interactions of the author it encourages the student to see the similarities in the concepts which govern apparently dissimilar examples it introduces various concepts using both physical and mathematical bases to facilitate the understanding of difficult processes such as the scale up process the book contains several case studies on safety ethics and environ mental issues in chemical process industries in a simple and systematic manner this book presents an exhaustive account of various mass transfer operations involved in chemical engineering emphasising the basic concepts and techniques the book discusses in detail material and energy balances distillation absorption and stripping and extraction the book also explains the

relevant aspects of equipment design recent developments like permeation ion exchange and froth floatation have also been discussed a large number of digital computer programs are included to illustrate computer aided techniques several solved examples and practice problems are presented in each chapter to illustrate the theory with all these features this is an ideal text for undergraduate chemical engineering students practising engineers and students of pharmacy and metallurgy would also find the book a useful reference source recently published unit operations of chemical engineering 7th edition continues its lengthy successful tradition of being one of mcgraw hill s oldest texts in the chemical engineering series since 1956 this text has been the most comprehensive of the introductory undergraduate chemical engineering titles available separate chapters are devoted to each of the principle unit operations grouped into four sections fluid mechanics heat transfer mass transfer and equilibrium stages and operations involving particulate solids now in its seventh edition the text still contains its balanced treatment of theory and engineering practice with many practical illustrative examples included almost 30 of the problems have been revised or are new some of which cover modern topics such as food processing and biotechnology other unique topics of this text include diafiltration adsorption and membrane operations this broad based book covers the three major areas of chemical engineering most of the books in the market involve one of the individual areas namely fluid mechanics heat transfer or mass transfer rather than all the three this book presents this material in a single source this avoids the user having to refer to a number of books to obtain information most published books covering all the three areas in a single source emphasize theory rather than practical issues this book is written with emphasis on practice with brief theoretical concepts in the form of questions and answers not adopting stereo typed question answer approach practiced in certain books in the market bridging the two areas of

theory and practice with respect to the core areas of chemical engineering most parts of the book are easily understandable by those who are not experts in the field fluid mechanics chapters include basics on non newtonian systems which for instance find importance in polymer and food processing flow through piping flow measurement pumps mixing technology and fluidization and two phase flow for example it covers types of pumps and valves membranes and areas of their use different equipment commonly used in chemical industry and their merits and drawbacks heat transfer chapters cover the basics involved in conduction convection and radiation with emphasis on insulation heat exchangers evaporators condensers reboilers and fired heaters design methods performance operational issues and maintenance problems are highlighted topics such as heat pipes heat pumps heat tracing steam traps refrigeration cooling of electronic devices nox control find place in the book mass transfer chapters cover basics such as diffusion theories analogies mass transfer coefficients and mass transfer with chemical reaction equipment such as tray and packed columns column internals including structural packings design operational and installation issues drums and separators are discussed in good detail absorption distillation extraction and leaching with applications and design methods including emerging practices involving divided wall and petluk column arrangements multicomponent separations supercritical solvent extraction find place in the book chemical engineering process simulation second edition guides users through chemical processes and unit operations using the main simulation software used in the industrial sector the book helps predict the characteristics of a process using mathematical models and computer aided process simulation tools as well as how to model and simulate process performance before detailed process design takes place content coverage includes steady state and dynamic simulation process design control and optimization in addition readers will learn about the simulation of natural gas

biochemical wastewater treatment and batch processes provides an updated and expanded new edition that contains 60 70 new content guides readers through chemical processes and unit operations using the primary simulation software used in the industrial sector covers the fundamentals of process simulation theory and advanced applications includes case studies of various difficulty levels for practice and for applying developed skills features step by step guides to using unisim design superpro designer symmetry aspen hysys and aspen plus for process simulation novices chemical engineering and chemical process technology is a theme component of encyclopedia of chemical sciences engineering and technology resources in the global encyclopedia of life support systems eolss which is an integrated compendium of twenty encyclopedias chemical engineering is a branch of engineering dealing with processes in which materials undergo changes in their physical or chemical state these changes may concern size energy content composition and or other application properties chemical engineering deals with many processes belonging to chemical industry or related industries petrochemical metallurgical food pharmaceutical fine chemicals coatings and colors renewable raw materials biotechnological etc and finds application in manufacturing of such products as acids alkalis salts fuels fertilizers crop protection agents ceramics glass paper colors dyestuffs plastics cosmetics vitamins and many others it also plays significant role in environmental protection biotechnology nanotechnology energy production and sustainable economical development the theme on chemical engineering and chemical process technology deals in five volumes and covers several topics such as fundamentals of chemical engineering unit operations fluids unit operations solids chemical reaction engineering process development modeling optimization and control process management the future of chemical engineering chemical engineering education main products which are then expanded

into multiple subtopics each as a chapter these five volumes are aimed at the following five major target audiences university and college students educators professional practitioners research personnel and policy analysts managers and decision makers and ngos the authors have written a practical introductory text exploring the theory and applications of unit operations for environmental engineers that is a comprehensive update to linvil rich s 1961 classic work unit operations in sanitary engineering the book is designed to serve as a training tool for those individuals pursuing degrees that include courses on unit operations although the literature is inundated with publications in this area emphasizing theory and theoretical derivations the goal of this book is to present the subject from a strictly pragmatic introductory point of view particularly for those individuals involved with environmental engineering this book is concerned with unit operations fluid flow heat transfer and mass transfer unit operations by definition are physical processes although there are some that include chemical and biological reactions the unit operations approach allows both the practicing engineer and student to compartmentalize the various operations that constitute a process and emphasizes introductory engineering principles so that the reader can then satisfactorily predict the performance of the various unit operation equipment while various software packages have become essential for performing unit operations and other kinds of processes in chemical engineering the fundamental theory and methods of calculation must also be understood to effectively test the validity of these packages and verify the results computer methods in chemical engineering second edition presents the most used simulation software along with the theory involved it covers chemical engineering thermodynamics fluid mechanics material and energy balances mass transfer operations reactor design and computer applications in chemical engineering the highly anticipated second edition is thoroughly updated to reflect the

latest updates in the featured software and has added a focus on real reactors introduces aveva process simulation software and includes new and updated appendixes through this book students will learn the following what chemical engineers do the functions and theoretical background of basic chemical engineering unit operations how to simulate chemical processes using software packages how to size chemical process units manually and with software how to fit experimental data how to solve linear and nonlinear algebraic equations as well as ordinary differential equations along with exercises and references each chapter contains a theoretical description of process units followed by numerous examples that are solved step by step via hand calculation and computer simulation using hysys unisim pro ii aspen plus and superpro designer adhering to the accreditation board for engineering and technology abet criteria the book gives chemical engineering students and professionals the tools to solve real problems involving thermodynamics and fluid phase equilibria fluid flow material and energy balances heat exchangers reactor design distillation absorption and liquid extraction this new edition includes many examples simulated by recent software packages in addition fluid package information is introduced in correlation to the numerical problems in book an updated solutions manual and powerpoint slides are also provided in addition to new video guides and unisim program files chemical engineering and chemical process technology is a theme component of encyclopedia of chemical sciences engineering and technology resources in the global encyclopedia of life support systems eolss which is an integrated compendium of twenty encyclopedias chemical engineering is a branch of engineering dealing with processes in which materials undergo changes in their physical or chemical state these changes may concern size energy content composition and or other application properties chemical engineering deals with many processes belonging to chemical industry or related industries petrochemical

metallurgical food pharmaceutical fine chemicals coatings and colors renewable raw materials biotechnological etc and finds application in manufacturing of such products as acids alkalis salts fuels fertilizers crop protection agents ceramics glass paper colors dyestuffs plastics cosmetics vitamins and many others it also plays significant role in environmental protection biotechnology nanotechnology energy production and sustainable economical development the theme on chemical engineering and chemical process technology deals in five volumes and covers several topics such as fundamentals of chemical engineering unit operations fluids unit operations solids chemical reaction engineering process development modeling optimization and control process management the future of chemical engineering chemical engineering education main products which are then expanded into multiple subtopics each as a chapter these five volumes are aimed at the following five major target audiences university and college students educators professional practitioners research personnel and policy analysts managers and decision makers and ngos the field of chemical engineering is undergoing a global renaissance with new processes equipment and sources changing literally every day it is a dynamic important area of study and the basis for some of the most lucrative and integral fields of science introduction to chemical engineering offers a comprehensive overview of the concept principles and applications of chemical engineering it explains the distinct chemical engineering knowledge which gave rise to a general purpose technology and broadest engineering field the book serves as a conduit between college education and the real world chemical engineering practice it answers many questions students and young engineers often ask which include how is what i studied in the classroom being applied in the industrial setting what steps do i need to take to become a professional chemical engineer what are the career diversities in chemical engineering and the engineering knowledge required how is

chemical engineering design done in real world what are the chemical engineering computer tools and their applications what are the prospects present and future challenges of chemical engineering and so on it also provides the information new chemical engineering hires would need to excel and cross the critical novice engineer stage of their career it is expected that this book will enhance students understanding and performance in the field and the development of the profession worldwide whether a new hire engineer or a veteran in the field this is a must have volume for any chemical engineer s library experimental methods and instrumentation for chemical engineers second edition touches many aspects of engineering practice research and statistics the principles of unit operations transport phenomena and plant design constitute the focus of chemical engineering in the latter years of the curricula experimental methods and instrumentation is the precursor to these subjects this resource integrates these concepts with statistics and uncertainty analysis to define what is necessary to measure and to control how precisely and how often the completely updated second edition is divided into several themes related to data metrology notions of statistics and design of experiments the book then covers basic principles of sensing devices with a brand new chapter covering force and mass followed by pressure temperature flow rate and physico chemical properties it continues with chapters that describe how to measure gas and liquid concentrations how to characterize solids and finally a new chapter on spectroscopic techniques such as uv vis ir xrd xps nmr and xas throughout the book the author integrates the concepts of uncertainty along with a historical context and practical examples a problem solutions manual is available from the author upon request includes the basics for 1st and 2nd year chemical engineers providing a foundation for unit operations and transport phenomena features many practical examples offers exercises for students at the end of each chapter

includes up to date detailed drawings and photos of equipment properties and handling of particulate solids conveyors mixing of solids and pastes size reduction mechanical separations screening filtration separation based on motion of particulate through the fluids mixing and agitation fluidization beneficiation process this new third edition provides a modern unified treatment of the basic transport processes of momentum heat and mass transfer as well as a broad treatment of the unit operations of chemical engineering coverage includes the latest membrane separation processes discussion of bioprocesses comprehensive treatment of the transport processes of momentum heat and mass transfer adsorption processes and more a useful up to date reference for practicing chemical engineers agricultural engineers food scientists environmental engineers biochemical engineers and others who work in the process industries author s purpose is to provide a vehicle for teaching either through a formal course or through self study the techniques of and principles of equipment design for the mass transfer operations of chemical engineering as before these operations are largely the responsibility of the chemical engineer but increasingly practitioners of other engineering disciplines are finding them necessary for their work this is especially true for those engaged in pollution control and environment protection where separation processes predominate and in for example extractive metallurgy where more sophisticated and diverse methods of separation are increasingly relied upon this book covers a wide variety of topics related to the application of experimental methods in addition to the pedagogy of chemical engineering laboratory unit operations the purpose of this book is to create a platform for the exchange of different experimental techniques approaches and lessons in addition to new ideas and strategies in teaching laboratory unit operations to undergraduate chemical engineering students it is recommended for instructors and students of chemical engineering and natural sciences who are interested in reading about different

experimental setups and techniques covering a wide range of scales which can be widely applied to many areas of chemical engineering interest a guide to the development and manufacturing of pharmaceutical products written for professionals in the industry revised second edition the revised and updated second edition of chemical engineering in the pharmaceutical industry is a practical book that highlights chemistry and chemical engineering the book s regulatory quality strategies target the development and manufacturing of pharmaceutically active ingredients of pharmaceutical products the expanded second edition contains revised content with many new case studies and additional example calculations that are of interest to chemical engineers the 2nd edition is divided into two separate books 1 active pharmaceutical ingredients api s and 2 drug product design development and modeling the active pharmaceutical ingredients book puts the focus on the chemistry chemical engineering and unit operations specific to development and manufacturing of the active ingredients of the pharmaceutical product the drug substance operations section includes information on chemical reactions mixing distillations extractions crystallizations filtration drying and wet and dry milling in addition the book includes many applications of process modeling and modern software tools that are geared toward batch scale and continuous drug substance pharmaceutical operations this updated second edition contains 30new chapters or revised chapters specific to api covering topics including manufacturing quality by design computational approaches continuous manufacturing crystallization and final form process safety expanded topics of scale up continuous processing applications of thermodynamics and thermodynamic modeling filtration and drying presents updated and expanded example calculations includes contributions from noted experts in the field written for pharmaceutical engineers chemical engineers undergraduate and graduate students and professionals in the

field of pharmaceutical sciences and manufacturing the second edition of chemical engineering in the pharmaceutical industry focuses on the development and chemical engineering as well as operations specific to the design formulation and manufacture of drug substance and products emphasizes common fundamentals and interrelationships covering fluid mechanics heat transfer and mass transfer update includes new technology new analyses new concepts plus a mixture of si and english systems introduction conduction convection radiation heat exchange equipments evaporation diffusion distillation gas absorption liquid liquid extraction crystallisation drying appendix i try yourself appendix ii thermal conductivity data appendix iii steam tables uses a large number of industrially significant problems to convey an in depth understanding of modern calculation procedures includes numerous topical examples and problems and both conventional and si units outlines the concepts of chemical engineering so that non chemical engineers can interface with and understand basic chemical engineering concepts overviews the difference between laboratory and industrial scale practice of chemistry consequences of mistakes and approaches needed to scale a lab reaction process to an operating scale covers basics of chemical reaction eningeering mass energy and fluid energy balances how economics are scaled and the nature of various types of flow sheets and how they are developed vs time of a project details the basics of fluid flow and transport how fluid flow is characterized and explains the difference between positive displacement and centrifugal pumps along with their limitations and safety aspects of these differences reviews the importance and approaches to controlling chemical processes and the safety aspects of controlling chemical processes reviews the important chemical engineering design aspects of unit operations including distillation absorption and stripping adsorption evaporation and crystallization drying and solids handling polymer manufacture and the basics of tank and agitation system design this

comprehensive study covers the basic principles of humidity including humidity humidity chart vapor pressure curve of water dew point and wet bulb temperature mechanism of drying has been clearly discussed in details it also covers drying rate curve and moisture content curve including both constant rate period and falling rate period within this book you will find an extensive and in depth discussion of spray drying drying equipment all common types of dryers including continuous tunnel dryer drum dryer tray dryer and rotary dryer are mentioned with detailed description experimental work that included the effect of boundary layer on drying mechanisms and mechanisms of single droplet drying are discussed in depth with enough figures tables and equations to understand mechanism of drying using spray drying in milk powder production pharmaceuticals and food industry have been discussed in details this book is a valuable reference for any researcher or student interested in drying technology and spray dryers this textbook provides an integral and integrated treatment of industrial relevant problems for students of both chemistry and chemical engineering as such this work combines the four disciplines of chemical technology chemistry thermal and mechanical unit operations chemical reaction engineering and general chemical technology and is organized into two main parts the first covers the fundamentals as well as the analysis and design of industrial processes while the second section presents 20 concrete processes exemplifying the inherent applied nature of chemical technology these are selected so that they all differ with respect to at least one important aspect such as the type and design of the reactor the chemistry involved or the separation process used as a result readers will recapitulate deepen and exercise the chemical and engineering principles and their interplay as well as being able to apply them to industrial practice instructive figures rules of thumb for swift but reliable estimating of parameters data of chemical media and examples utilizing data from industrial

processes facilitate and enhance the study process a small general survey of selected modern trends such as multifunctional and micro reactors or new solvents for homogeneous catalysis such as ionic liquids point out to the reader that this is not a concluded discipline but a developing field with many challenges waiting to be solved 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 this book presents six visionary essays on the past present and future of the chemical and process industries together with a critical commentary our world is changing fast and the visions explore the implications for business and academic institutions and for the professionals working in them the visions were written and brought together for the 6th world congress of chemical engineering in melbourne australia in september 2001 identifies trends in the chemicals business environment and their consequences discusses a wide variety of views about business and technology describes the impact of newly developing technologies this books format follows an applications oriented text and servesas a training tool for individuals in education and industryinvolved directly or indirectly with chemical reactors itaddresses both technical and calculational problems in this field while this text can be complimented with texts on chemical kineticsand or reactor design it also stands alone as a self teachingaid the first part serves as an introduction to the subject titleand contains chapters

dealing with history process variables basic operations kinetic principles and conversion variables thesecond part of the book addresses traditional reactor analysis chapter topics include batch cstrs tubular flow reactors plus acomparison of these classes of reactors part 3 keys on reactorapplications that include non ideal reactors thermal effects interpretation of kinetic data and reactor design the bookconcludes with other reactor topics chapter titles includecatalysis catalytic reactors other reactions and reactors andabet related topics an extensive appendix is also included

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