

CHEMICAL PROCESS COMPUTATIONS

• Raghu Raman •

ELSEVIER APPLIED SCIENCE PUBLISHERS

Chemical Process Computations

D. C. SIKDAR



Chemical Process Computations:

Chemical Process Computations Raghu Raman, 1985 **Process Calculations** V. Venkataramani, N. Anantharaman, K. M. Meera Sheriffa Begum, 2011 This compact and highly readable text now in its second edition continues to provide a thorough introduction to the basic chemical engineering principles and calculations to enable the students to evaluate the material and energy balances in various units of a process plant Unless a chemical engineer is conversant with the energy conservation techniques at every stage of the process economy cannot be achieved in the design of process equipment The text lucidly explains the techniques involved in analyzing different chemical processes and the underlying theories by making a generous use of appropriate worked examples The examples are simple and concrete to make the book useful for self instruction In this new edition besides worked examples several exercises are included to aid students in testing their knowledge of the material contained in each chapter The book is primarily intended for undergraduate students of Chemical Engineering It would also be useful to undergraduate students of Petroleum Technology Pharmaceutical Technology and other allied branches of Chemical Engineering

KEY FEATURES Exposes the reader to background information on different systems of units dimensions and behaviour of gases liquids and solids Provides several examples with detailed solutions to explain the concepts discussed Includes chapter end exercises with answers to enhance learning

CHEMICAL PROCESS CALCULATIONS D. C. SIKDAR, 2013-05-22 Keeping the importance of basic tools of process calculations material balance and energy balance in mind the text prepares the students to formulate material and energy balance theory on chemical process systems It also demonstrates how to solve the main process related problems that crop up in chemical engineering practice The chapters are organized in a way that enables the students to acquire an in depth understanding of the subject The emphasis is given to the units and conversions basic concepts of calculations material balance with without chemical reactions and combustion of fuels and energy balances Apart from numerous illustrations the book contains numerous solved problems and exercises which bridge the gap between theoretical learning and practical implementation All the numerical problems are solved with block diagrams to reinforce the understanding of the concepts Primarily intended as a text for the undergraduate students of chemical engineering it will also be useful for other allied branches of chemical engineering such as polymer science and engineering and petroleum engineering

KEY FEATURES Methods of calculation for stoichiometric proportions with practical examples from the Industry Simplified method of solving numerical problems under material balance with and without chemical reactions Conversions of chemical engineering equations from one unit to another Solution of fuel and combustion and energy balance problems using tabular column

Chemical Process Calculations K. Asokan, 2008-04-16 Moving from raw material to finished product this book demonstrates how to solve the main process related problems that crop up in chemical engineering practice It demonstrates the steps required to determine how much of various materials and chemicals are needed to satisfy output requirements and how to compensate for energy gained or lost

for each step of the process Presenting easy to understand methods illustrations worked examples and practice problems that are ideal for students it provides access to a wealth of current calculations needed by chemical process professionals in petroleum petrochemicals and biotechnology

Chemical Process Calculations Gaikwad R.W.,2008-01-01 Contents 1 Introduction 2 Materials and Mixtures 3 System and Conservation Laws 4 Material Balance with and without Chemical Reactions 5 Energy Balances 6 Fuels and Combustion 7 Problems and Solutions References

STOICHIOMETRY AND PROCESS CALCULATIONS K. V. NARAYANAN,B. LAKSHMIKUTTY,2006-01-01 This textbook is designed for undergraduate courses in chemical engineering and related disciplines such as biotechnology polymer technology petrochemical engineering electrochemical engineering environmental engineering safety engineering and industrial chemistry The chief objective of this text is to prepare students to make analysis of chemical processes through calculations and also to develop in them systematic problem solving skills The students are introduced not only to the application of law of combining proportions to chemical reactions as the word stoichiometry implies but also to formulating and solving material and energy balances in processes with and without chemical reactions The book presents the fundamentals of chemical engineering operations and processes in an accessible style to help the students gain a thorough understanding of chemical process calculations It also covers in detail the background materials such as units and conversions dimensional analysis and dimensionless groups property estimation P V T behaviour of fluids vapour pressure and phase equilibrium relationships humidity and saturation With the help of examples the book explains the construction and use of reference substance plots equilibrium diagrams psychrometric charts steam tables and enthalpy composition diagrams It also elaborates on thermophysics and thermochemistry to acquaint the students with the thermodynamic principles of energy balance calculations Key Features SI units are used throughout the book Presents a thorough introduction to basic chemical engineering principles Provides many worked out examples and exercise problems with answers Objective type questions included at the end of the book serve as useful review material and also assist the students in preparing for competitive examinations such as GATE

Chemical Process Calculations Manual David Carr Igbinoehene,2004 This compact information dense resource provides instant access to hundreds of the calculations used in chemical process plants around the world Readers will also find a wealth of useful tables for the density of gaseous and temperature of liquids Midwest

Introduction to Process Calculations Stoichiometry KA. Gavhane,2012 *Basic Principles and Calculations in Chemical Engineering* David Mautner Himmelblau,James B. Riggs,2012 Best selling introductory chemical engineering book now updated with far more coverage of biotech nanotech and green engineering Thoroughly covers material balances gases liquids and energy balances Contains new biotech and bioengineering problems throughout

CHEMICAL PROCESS CALCULATIONS PRASAD, RAM,2022-04-13 The present textbook is written for undergraduate students of chemical engineering as per the syllabus framed by AICTE curriculum It explains the basic chemical process principles in a lucid

manner SI units chemical stoichiometry and measures of composition behaviour of gases vapour pressure of pure substances and humidity and saturation are covered in detail In addition mass and energy balances of chemical processes have also been described Chemical processes without chemical reactions include fluid flow mixing evaporation distillation absorption and stripping liquid liquid extraction leaching and washing adsorption drying crystallization and membrane separation process

SALIENT FEATURES Description of all concepts and principles with a rich pedagogy for easy understanding Correct use of SI units Over 270 solved examples for understanding the basic concepts Answers to all chapter end numerical problems for checking the accuracy of calculations

TARGET AUDIENCE BE B Tech Chemical Engineering

Fundamentals in Chemical Process Calculations Otto L. Kowalke,1951 [Chemical Process Structures and Information Flows](#) Richard S.H. Mah,2013-10-22 [Chemical Process Structures and Information Flows](#) focuses on the role of computers in the understanding of chemical processes including the use of simulation and optimization in computational problems The book first underscores graphs and digraphs and pipeline networks Discussions focus on cutsets and connectivity directed graphs trees and circuits matrix representation of digraphs and graphs reachability matrix alternative problem formulations and specifications and steady state conditions in cyclic networks The manuscript also ponders on computation sequence in process flowsheet calculations and sparse matrix computation The publication examines scheduling and design of batch plants including scheduling of products and operations characteristics of batch processes branch and bound methods and multipurpose batch plants The text also elaborates on observability and redundancy and process data reconciliation and rectification The manuscript is a valuable reference for chemical engineering students and readers interested in chemical processes and information flow

Fundamentals in Chemical Process Calculations Otto Louis Kowalke,1957

Chemical Process Engineering Harry Silla,2003-08-08 [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

Process Safety Calculations Renato Benintendi,2021-03-02 [Process Safety Calculations](#) Second Edition remains to be an essential guide for students and practitioners in process safety engineering who are working on calculating and predicting risks and consequences The book focuses on calculation procedures based on basic chemistry thermodynamics fluid dynamics conservation equations kinetics and practical models It provides helpful calculations to demonstrate compliance with regulations and standards such as Seveso directive s COMAH CLP regulation ATEX directives PED directives REACH regulation OSHA NIOSH and UK ALARP along with risk and consequence assessment stoichiometry thermodynamics stress analysis and fluid dynamics This fully revised updated and expanded second edition follows the same organization as the first including the original three main parts Fundamentals Consequence Assessment and

Quantitative Risk Assessment However the latter part is significantly expanded including an appendix consisting of five fundamental thematic areas belonging to the risk assessment framework including in depth calculations methodologies for some fundamental monothematic macro areas of process safety Revised updated and expanded new edition that includes newly developing areas of process safety that are relevant to QRA Provides engineering fundamentals to enable readers to properly approach the subject of process safety Includes a remarkable and broad numbers of calculation examples which are completely resolved and fully explained Develops the QRA subject consistently with the methodology applied in the big projects

Foundamentals in Chemical Process Calculations Otto L. Kowalke,1947 Handbook of Chemical Engineering Calculations Nicholas P. Chohey,1984 If solving chemical engineering problems quickly and accurately is key to your work here s an invaluable info packed resource McGraw Hill s Handbook of Chemical Engineering Calculations Fully revised and expanded this Third Edition delivers step by step procedures for performing a wide array of chemical engineering calculations along with fully worked out examples that help you avoid costly errors Book jacket

Handbook of Chemical Engineering Calculations Nicholas Chohey,2004 Provides detailed procedures for performing hundreds of chemical engineering calculations along with fully worked out examples

STOICHIOMETRY AND PROCESS CALCULATIONS, SECOND EDITION NARAYANAN, K. V.,LAKSHMIKUTTY, B.,2016-12-01 Designed as a textbook for the undergraduate students of chemical engineering and related disciplines such as biotechnology polymer technology petrochemical engineering electrochemical engineering environmental engineering and safety engineering the chief objective of the book is to prepare students to make analysis of chemical processes through calculations and to develop systematic problem solving skills in them The text presents the fundamentals of chemical engineering operations and processes in a simple style that helps the students to gain a thorough understanding of chemical process calculations The book deals with the principles of stoichiometry to formulate and solve material and energy balance problems in processes with and without chemical reactions With the help of examples the book explains the construction and use of reference substance plots equilibrium diagrams psychrometric charts steam tables and enthalpy composition diagrams It also elaborates on thermophysics and thermochemistry to acquaint the students with the thermodynamic principles of energy balance calculations The book is supplemented with Solutions Manual for instructors containing detailed solutions of all chapter end unsolved problems NEW TO THE SECOND EDITION Incorporates a new chapter on Bypass Recycle and Purge Operations Comprises updations in some sections and presents new sections on Future Avenues and Opportunities in Chemical Engineering Processes in Biological and Energy Systems Contains several new worked out examples in the chapter on Material Balance with Chemical Reaction Includes GATE questions with answers up to the year 2016 in Objective type questions KEY FEATURES SI units are used throughout the book All basic chemical engineering operations and processes are introduced and different types of problems are illustrated with worked out examples Stoichiometric principles are

extended to solve problems related to bioprocessing environmental engineering etc Exercise problems more than 810 are organised according to the difficulty level and all are provided with answers

Handbook of Chemical Engineering Calculations, Fourth Edition Tyler G. Hicks, Nicholas P. Chohey, 2012-07-30 Solve chemical engineering problems quickly and accurately Fully revised throughout with new procedures Handbook of Chemical Engineering Calculations Fourth Edition shows how to solve the main process related problems that often arise in chemical engineering practice New calculations reflect the latest green technologies and environmental engineering standards Featuring contributions from global experts this comprehensive guide is packed with worked out numerical procedures Practical techniques help you to solve problems manually or by using computer based methods By following the calculations presented in this book you will be able to achieve accurate results with minimal time and effort Coverage includes Physical and chemical properties Stoichiometry Phase equilibrium Chemical reaction equilibrium Reaction kinetics reactor design and system thermodynamics Flow of fluids and solids Heat transfer Distillation Extraction and leaching Crystallization Absorption and stripping Liquid agitation Size reduction Filtration Air pollution control Water pollution control Biotechnology Cost engineering

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