

### LINE SIZE & PRESSURE DROP CALCULATION

DATE: \_\_\_\_\_  
BY: \_\_\_\_\_  
REV: \_\_\_\_\_



WWT

9	Line Number		1	2	3	4	5	6	7
10	Drawing Ref		1	2	3	4	5	6	7
11	from						dic	E-214	P-2306
12	to		CO service	CASE - II			E-114	v-206	Unloading arm
14	Nominal or Internal diameter (N/I)		N	N	N	N	N	N	N
15	Diameter	[in]	2	4	4	10	0.75	1.5	18
16	Schedule (X for Standard) (Note 3)		X	X	X	X	X	X	X
17	Pipe roughness (X to default)	(Note 1) [in]	X	X	X	X	X	X	X
18	Phase (L, G, or M)		L	L	G	G	L	L	L
19	Liquid Flowrate	[kg/h]	6000	9864			185.2	185	1472000
20	Gas Flowrate	[kg/h]	0	0	692.7910746	692.7910746	0	0	0
21	Temperature	[°C]	40	32	32	32	150	150	80
22	Pressure	[bars]	10.00	0.00	4.50	4.50	3.1	2.5	0.1
23	Molecular Weight		71		28	28	133.5	133.5	0
24	Liquid Density	[kg/m <sup>3</sup> ]	1560	986.4	0	0	926	926	929
25	Gas Density (X to calculate)	[kg/m <sup>3</sup> ]	0	0	4.873	4.873	X	X	X
26	Cp/Cv (X to default 1)		0	0	X	X	X	1.2	1.2
27	Gas Compressibility Factor Z (X to default 1)		0	0	X	X	X	X	X
28	Gas Visc. (X to default 0.025)	[cP]	0	0	X	X	X	X	X
29	Liquid / Mixed Phase Viscosity	[cP]	0.393	641.160			1.6	2	0
30	Liquid Surface Tension	[dynes/cm]					20.2	0	0
	FORMAL PROCESS DATA ANALYSIS		LIQUID OK	LIQUID OK	GAS OK	GAS OK	LIQUID OK	LIQUID OK	Mixing Liquid

# Manual Excel For Chemical Engineering Calculations

**Hussein K. Abdel-Aal**



## **Manual Excel For Chemical Engineering Calculations:**

**Ludwig's Applied Process Design for Chemical and Petrochemical Plants** A. Kayode Coker, 2011-08-30 This complete revision of Applied Process Design for Chemical and Petrochemical Plants Volume 1 builds upon Ernest E Ludwig's classic text to further enhance its use as a chemical engineering process design manual of methods and proven fundamentals. This new edition includes important supplemental mechanical and related data nomographs and charts. Also included within are improved techniques and fundamental methodologies to guide the engineer in designing process equipment and applying chemical processes to properly detailed equipment. All three volumes of Applied Process Design for Chemical and Petrochemical Plants serve the practicing engineer by providing organized design procedures, details on the equipment suitable for application, selection and charts in readily usable form. Process engineers, designers and operators will find more chemical/petrochemical plant design data in Volume 2 Third Edition which covers distillation and packed towers as well as material on azeotropes and ideal/non-ideal systems. Volume 3 Third Edition which covers heat transfer, refrigeration systems, compression, surge drums and mechanical drivers. A. Kayode Coker is Chairman of Chemical Process Engineering Technology department at Jubail Industrial College in Saudi Arabia. He is both a chartered scientist and a chartered chemical engineer for more than 15 years and an author of Fortran Programs for Chemical Process Design Analysis and Simulation, Gulf Publishing Co and Modeling of Chemical Kinetics and Reactor Design, Butterworth-Heinemann. Provides improved design manuals for methods and proven fundamentals of process design with related data and charts. Covers a complete range of basic day-to-day petrochemical operation topics with new material on significant industry changes since 1995. [An Applied Guide to Process and Plant Design](#) Sean Moran, 2019-06-12 An Applied Guide to Process and Plant Design 2nd edition is a guide to process plant design for both students and professional engineers. The book covers plant layout and the use of spreadsheet programs and key drawings produced by professional engineers as aids to design subjects that are usually learned on the job rather than in education. You will learn how to produce smarter plant design through the use of computer tools including Excel and AutoCAD. What-If Analysis, statistical tools and Visual Basic for more complex problems. The book also includes a wealth of selection tables covering the key aspects of professional plant design which engineering students and early career engineers tend to find most challenging. Professor Moran draws on over 20 years experience in process design to create an essential foundational book ideal for those who are new to process design, compliant with both professional practice and the IChemE degree accreditation guidelines. Includes new and expanded content including illustrative case studies and practical examples. Explains how to deliver a process design that meets both business and safety criteria. Covers plant layout and the use of spreadsheet programs and key drawings as aids to design. Includes a comprehensive set of selection tables covering aspects of professional plant design which early career designers find most challenging. **Numerical Methods in Chemical Engineering Using Python® and Simulink®** Nayef Ghasem, 2023-07-17 Numerical methods are vital to the

practice of chemical engineering allowing for the solution of real world problems Written in a concise and practical format this textbook introduces readers to the numerical methods required in the discipline of chemical engineering and enables them to validate their solutions using both Python and Simulink Introduces numerical methods followed by the solution of linear and nonlinear algebraic equations Deals with the numerical integration of a definite function and solves initial and boundary value ordinary differential equations with different orders Weaves in examples of various numerical methods and validates solutions to each with Python and Simulink graphical programming Features appendices on how to use Python and Simulink Aimed at advanced undergraduate and graduate chemical engineering students as well as practicing chemical engineers this textbook offers a guide to the use of two of the most widely used programs in the discipline The textbook features numerous video lectures of applications and a solutions manual for qualifying instructors

*Excel for Scientists and Engineers* E. Joseph Billo, 2007-04-06 Learn to fully harness the power of Microsoft Excel to perform scientific and engineering calculations With this text as your guide you can significantly enhance Microsoft Excel's capabilities to execute the calculations needed to solve a variety of chemical biochemical physical engineering biological and medicinal problems The text begins with two chapters that introduce you to Excel's Visual Basic for Applications VBA programming language which allows you to expand Excel's capabilities although you can still use the text without learning VBA Following the author's step by step instructions here are just a few of the calculations you learn to perform Use worksheet functions to work with matrices Find roots of equations and solve systems of simultaneous equations Solve ordinary differential equations and partial differential equations Perform linear and non linear regression Use random numbers and the Monte Carlo method This text is loaded with examples ranging from very basic to highly sophisticated solutions More than 100 end of chapter problems help you test and put your knowledge to practice solving real world problems Answers and explanatory notes for most of the problems are provided in an appendix The CD ROM that accompanies this text provides several useful features All the spreadsheets charts and VBA code needed to perform the examples from the text Solutions to most of the end of chapter problems An add in workbook with more than twenty custom functions This text does not require any background in programming so it is suitable for both undergraduate and graduate courses Moreover practitioners in science and engineering will find that this guide saves hours of time by enabling them to perform most of their calculations with one familiar spreadsheet package

*Applied Numerical Methods for Chemical Engineers* Navid Mostoufi, Alkis Constantinides, 2022-05-22 Applied Numerical Methods for Chemical Engineers emphasizes the derivation of a variety of numerical methods and their application to the solution of engineering problems with special attention to problems in the chemical engineering field These algorithms encompass linear and nonlinear algebraic equations eigenvalue problems finite difference methods interpolation differentiation and integration ordinary differential equations boundary value problems partial differential equations and linear and nonlinear regression analysis MATLAB is adopted as the calculation environment

throughout the book because of its ability to perform all the calculations in matrix form its large library of built in functions its strong structural language and its rich graphical visualization tools Through this book students and other users will learn about the basic features advantages and disadvantages of various numerical methods learn and practice many useful m files developed for different numerical methods in addition to the MATLAB built in solvers develop and set up mathematical models for problems commonly encountered in chemical engineering and solve chemical engineering related problems through examples and after chapter problems with MATLAB by creating application m files Clearly and concisely develops a variety of numerical methods and applies them to the solution of chemical engineering problems These algorithms encompass linear and nonlinear algebraic equations eigenvalue problems finite difference methods interpolation linear and nonlinear regression analysis differentiation and integration ordinary differential equations boundary value problems and partial differential equations Includes systematic development of the calculus of finite differences and its application to the integration of differential equations and a detailed discussion of nonlinear regression analysis with powerful programs for implementing multivariable nonlinear regression and statistical analysis of the results Makes extensive use of MATLAB and Excel with most of the methods discussed implemented into general MATLAB functions All the MATLAB language scripts developed are listed in the text and included in the book s companion website Includes numerous real world examples and homework problems drawn from the field of chemical and biochemical engineering

### **Excel for Scientists and Engineers**

E. Joseph Billo, 2007-03-16 Learn to fully harness the power of Microsoft Excel to perform scientific and engineering calculations With this text as your guide you can significantly enhance Microsoft Excel s capabilities to execute the calculations needed to solve a variety of chemical biochemical physical engineering biological and medicinal problems The text begins with two chapters that introduce you to Excel s Visual Basic for Applications VBA programming language which allows you to expand Excel s capabilities although you can still use the text without learning VBA Following the author s step by step instructions here are just a few of the calculations you learn to perform Use worksheet functions to work with matrices Find roots of equations and solve systems of simultaneous equations Solve ordinary differential equations and partial differential equations Perform linear and non linear regression Use random numbers and the Monte Carlo method This text is loaded with examples ranging from very basic to highly sophisticated solutions More than 100 end of chapter problems help you test and put your knowledge to practice solving real world problems Answers and explanatory notes for most of the problems are provided in an appendix The CD ROM that accompanies this text provides several useful features All the spreadsheets charts and VBA code needed to perform the examples from the text Solutions to most of the end of chapter problems An add in workbook with more than twenty custom functions This text does not require any background in programming so it is suitable for both undergraduate and graduate courses Moreover practitioners in science and engineering will find that this guide saves hours of time by enabling them to perform most of their calculations with one

familiar spreadsheet package      *Introduction to Chemical Engineering* Uche P. Nnaji, 2019-10-10 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      *Chemical Engineering Design and Analysis* T. Michael Duncan, Jeffrey A. Reimer, 1998-08-28 Students taking their first chemical engineering course plunge into the nuts and bolts of mass and energy balances and often miss the broad view of what chemical engineers do This 1998 text offers a well paced introduction to chemical engineering Students are first introduced to the fundamental steps in design and three methods of analysis mathematical modeling graphical methods and dimensional analysis The book then describes how to apply engineering skills such as how to simplify calculations through assumptions and approximations how to verify calculations significant figures spreadsheets graphing standard semi log and log log and how to use data maps In addition the book teaches engineering skills through the design and analysis of chemical processes and process units in order to assess product quality economics safety and environmental impact This text will help undergraduate students in chemical engineering develop engineering skills early in their studies Lecturer s solution manual available from the publisher on request      *29th European Symposium on Computer Aided Chemical Engineering* Anton A. Kiss, Edwin Zondervan, Richard Lakerveld, Leyla Özkan, 2019-06-28 The 29th European Symposium on Computer Aided Process Engineering contains the papers presented at the 29th European Symposium of Computer Aided Process Engineering ESCAPE event held in Eindhoven The Netherlands from June 16 19 2019 It is a valuable resource for chemical engineers chemical process engineers researchers in industry and academia students and consultants for chemical industries Presents findings and discussions from the 29th European Symposium of Computer Aided Process Engineering ESCAPE event      **Proceedings of the 3rd International Conference on Internet, Education and Information Technology (IEIT 2023)** Dhananjay Kumar, Pavel

Loskot, Qingliang Chen, 2023-09-01 This is an open access book The 3rd International Conference on Internet Education and Information Technology IEIT 2023 was held on April 28 30 2023 at the Xiamen China With the development of science and technology information technology and information resources should be actively developed and fully applied in all fields of education and teaching so as to promote the modernization of education and cultivate talents to meet the needs of society From the technical point of view the basic characteristics of educational informatization are digitalization networking intelligentization and multi media From the perspective of education the basic characteristics of educational information are openness sharing interaction and cooperation With the advantage of the network it can provide students with a large amount of information and knowledge by combining different knowledge and information from various aspects in a high frequency Therefore we have intensified efforts to reform the traditional teaching methods and set up a new teaching concept from the interaction between teachers and students in the past to the sharing between students In short it forms a sharing learning mode For all students strive to achieve students learning independence initiative and creativity To sum up we will provide a quick exchange platform between education and information technology so that more scholars in related fields can share and exchange new ideas The 3rd International Conference on Internet Education and Information Technology IEIT 2023 was held on April 28 30 2023 in Xiamen China IEIT 2023 is to bring together innovative academics and industrial experts in the field of Internet Education and Information Technology to a common forum The primary goal of the conference is to promote research and developmental activities in Internet Education and Information Technology and another goal is to promote scientific information interchange between researchers developers engineers students and practitioners working all around the world The conference will be held every year to make it an ideal platform for people to share views and experiences in international conference on Internet Education and Information Technology and related areas Elements of Chemical Reaction Engineering H. Scott Fogler, Bryan R. Goldsmith, Eranda Nikolla, Nirala Singh, 2025-03-19 The Essential Textbook for Mastering Chemical Reaction Engineering Now Fully Updated with Expanded Coverage of Electrochemical Reactors H Scott Fogler s Elements of Chemical Reaction Engineering now in its seventh edition continues to set the standard as the leading textbook in chemical reaction engineering This edition coauthored by Bryan R Goldsmith Eranda Nikolla and Nirala Singh still offers Fogler s engaging and active learning experience with updated content and expanded coverage of electrochemical reactors Reflecting current theories and practices and with a continuing emphasis on safety and sustainability this edition includes expanded sections on molecular simulation methods analysis of experimental reactor data and catalytic reactions Leveraging the power of Wolfram Python POLYMATH and MATLAB students can explore the intricacies of reactions and reactors through realistic simulation experiments This hands on approach allows students to clearly understand the practical applications of theoretical concepts This book prepares undergraduate students to apply chemical reaction kinetics and physics to the design of chemical reactors Advanced chapters cover graduate level topics including diffusion and reaction

models residence time distribution and tools to model non ideal reactors The seventh edition includes An expanded section on molecular simulation methods and potential energy surfaces Updated examples of experimental reactor data and its analysis Detailed discussion of definitions in catalysis and examples of catalytic reactions Additional examples and an expanded section on surface reaction mechanisms and microkinetic modeling A new chapter on electrochemical reactors with example problems reflecting the growing importance of this field in renewable energy and industrial processes About the Companion Web Site [umich.edu/elements/7e/index.html](http://umich.edu/elements/7e/index.html) Comprehensive PowerPoint slides for lecture notes for chemical reaction engineering classes Links to additional software including POLYMATH<sup>TM</sup> MATLAB<sup>TM</sup> Python Wolfram Mathematica<sup>TM</sup> AspenTech<sup>TM</sup> and COMSOL<sup>TM</sup> Interactive learning resources linked to each chapter including Learning Objectives Summary Notes Web Modules Interactive Computer Games Solved Problems FAQs additional homework problems and links to LearnChemE and other resources Living Example Problems provide interactive simulations allowing students to explore the examples and ask what if questions Professional Reference Shelf which includes advanced content on reactors weighted least squares experimental planning pharmacokinetics detailed explanations of key derivations and more Redesigned Web site to increase accessibility Register your book for convenient access to downloads updates and or corrections as they become available See inside book for details

**Methodologies and Applications for Chemoinformatics and Chemical Engineering** Haghi, A. K., 2013-05-31 In recent years significant advances have been made in the development of chemistry and computer science integration into the fields of biomedical and chemical engineering applying quantum principles to practical macro world science Methodologies and Applications for Chemoinformatics and Chemical Engineering brings together innovative research new concepts and novel developments in the application of informatics tools for applied chemistry and computer science This book is essential amongst chemists engineers and researchers in providing mutual communication between academics and industry professionals around the world *Introduction to Chemical Engineering Computing* Bruce A. Finlayson, 2014-03-05 Step by step instructions enable chemical engineers to master key software programs and solve complex problems Today both students and professionals in chemical engineering must solve increasingly complex problems dealing with refineries fuel cells microreactors and pharmaceutical plants to name a few With this book as their guide readers learn to solve these problems using their computers and Excel MATLAB Aspen Plus and COMSOL Multiphysics Moreover they learn how to check their solutions and validate their results to make sure they have solved the problems correctly Now in its Second Edition *Introduction to Chemical Engineering Computing* is based on the author's firsthand teaching experience As a result the emphasis is on problem solving Simple introductions help readers become conversant with each program and then tackle a broad range of problems in chemical engineering including Equations of state Chemical reaction equilibria Mass balances with recycle streams Thermodynamics and simulation of mass transfer equipment Process simulation Fluid flow in two and three



dimensions All the chapters contain clear instructions figures and examples to guide readers through all the programs and types of chemical engineering problems Problems at the end of each chapter ranging from simple to difficult allow readers to gradually build their skills whether they solve the problems themselves or in teams In addition the book s accompanying website lists the core principles learned from each problem both from a chemical engineering and a computational perspective Covering a broad range of disciplines and problems within chemical engineering Introduction to Chemical Engineering Computing is recommended for both undergraduate and graduate students as well as practicing engineers who want to know how to choose the right computer software program and tackle almost any chemical engineering problem

**Collaborative and Distributed Chemical Engineering. From Understanding to Substantial Design Process Support** Manfred Nagl,2008-07-18 Summarizes the work of IMPROVE Information Technology Support for Collaborative and Distributed Design Processes in Chemical Engineering a joint project of research institutions at RWTH Aachen University

*Chemical Process Design and Integration* Robin Smith,2016-08-08 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 *A Guide to Microsoft Excel 2007 for Scientists and Engineers* Bernard Liengme,2008-11-27 Completely updated guide for scientists engineers and students who want to use Microsoft Excel 2007 to its full potential Electronic spreadsheet analysis has become part of the everyday work of researchers in all areas of engineering and science Microsoft Excel as the industry standard spreadsheet has a range of scientific functions that can be utilized for the modeling analysis and presentation of quantitative data This text provides a straightforward guide to using these functions of Microsoft Excel guiding the reader from basic principles through to more complicated areas such as formulae charts curve fitting equation solving integration macros statistical functions and presenting quantitative data Content written specifically for the requirements of science and engineering students and professionals working with Microsoft Excel brought fully up to date with the new Microsoft Office release of Excel 2007 Features of Excel 2007 are illustrated through a wide variety of examples based in technical contexts demonstrating the use of the program for analysis and presentation of experimental results Updated with new examples problem sets and applications *Mass Balances for Chemical Engineers* Gumersindo Feijoo,Juan Manuel Lema,Maria Teresa Moreira,2020-07-20 The fundamentals of mass balances relevant for chemical engineers summarized in an easy comprehensible manner Plenty of example calculations schemes and flow diagrams facilitate the understanding Case studies from relevant topics such as sustainable chemistry illustrate the theory behind current applications **Chemical Engineering Primer with Computer Applications** Hussein K. Abdel-Aal,2016-10-14 Taking a highly pragmatic approach

to presenting the principles and applications of chemical engineering this companion text for students and working professionals offers an easily accessible guide to solving problems using computers The primer covers the core concepts of chemical engineering from conservation laws all the way up to chemical kinetics without heavy stress on theory and is designed to accompany traditional larger core texts The book presents the basic principles and techniques of chemical engineering processes and helps readers identify typical problems and how to solve them Focus is on the use of systematic algorithms that employ numerical methods to solve different chemical engineering problems by describing and transforming the information Problems are assigned for each chapter ranging from simple to difficult allowing readers to gradually build their skills and tackle a broad range of problems MATLAB and Excel are used to solve many examples and the more than 70 real examples throughout the book include computer or hand solutions or in many cases both The book also includes a variety of case studies to illustrate the concepts and a downloadable file containing fully worked solutions to the book's problems on the publisher's website Introduces the reader to chemical engineering computation without the distractions caused by the contents found in many texts Provides the principles underlying all of the major processes a chemical engineer may encounter as well as offers insight into their analysis which is essential for design calculations Shows how to solve chemical engineering problems using computers that require numerical methods using standard algorithms such as MATLAB and Excel Contains selective solved examples of many problems within the chemical process industry to demonstrate how to solve them using the techniques presented in the text Includes a variety of case studies to illustrate the concepts and a downloadable file containing fully worked solutions to problems on the publisher's website Offers non chemical engineers who are expected to work with chemical engineers on projects scale ups and process evaluations a solid understanding of basic concepts of chemical engineering analysis design and calculations

### **Chemical Engineering Design** Ray

Sinnott,Gavin Towler,2009-05-15 Chemical Engineering Design is one of the best known and most widely adopted texts available for students of chemical engineering It completely covers the standard chemical engineering final year design course and is widely used as a graduate text The hallmarks of this renowned book have always been its scope practical emphasis and closeness to the curriculum That it is written by practicing chemical engineers makes it particularly popular with students who appreciate its relevance and clarity Building on this position of strength the fifth edition covers the latest aspects of process design operations safety loss prevention and equipment selection and much more Comprehensive in coverage exhaustive in detail and supported by extensive problem sets at the end of each chapter this is a book that students will want to keep to hand as they enter their professional life The leading chemical engineering design text with over 25 years of established market leadership to back it up an essential resource for the compulsory design project all chemical engineering students take in their final year A complete and trusted teaching and learning package the book offers a broader scope better curriculum coverage more extensive ancillaries and a more student friendly approach at a better price than any

of its competitors Endorsed by the Institution of Chemical Engineers guaranteeing wide exposure to the academic and professional market in chemical and process engineering

**A Numerical Primer for the Chemical Engineer** Edwin Zondervan, 2014-08-12

Solve Developed Models in a Numerical Fashion Designed as an introduction to numerical methods for students A Numerical Primer for the Chemical Engineer explores the role of models in chemical engineering Combining mathematical correctness model verification with numerical performance model validation this text concentrates on numerical methods and problem solving rather than focusing on in depth numerical analysis It applies actual numerical solution strategies to formulated process models to help identify and solve chemical engineering problems Describe Motions with Accuracy The book starts with a recap on linear algebra and uses algorithms to solve linear equations nonlinear equations ordinary differential equations and partial differential equations PDEs It includes an introductory chapter on MATLAB basics contains a chapter on the implementation of numerical methods in Excel and even adopts MATLAB and Excel as the programming environments throughout the text The material addresses implicit and explicit schemes and explores finite difference and finite volume methods for solving transport PDEs It covers the methods for error and computational stability as well as curve fitting and optimization It also contains a case study chapter with worked out examples to demonstrate the numerical techniques and exercises at the end of each chapter that students can use to familiarize themselves with the numerical methods A Numerical Primer for the Chemical Engineer lays down a foundation for numerical problem solving and sets up a basis for more in depth modeling theory and applications This text addresses the needs of senior undergraduates in chemical engineering and students in applied chemistry and biochemical process engineering food process engineering

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