

Pneumatic Conveying Engineering

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Pneumatic Handbook Springer Nature

Particle Technology and Engineering presents the basic knowledge and fundamental concepts that are needed by engineers dealing with particles and powders. The book provides a comprehensive reference and introduction to the topic, ranging from single particle characterization to bulk powder properties, from particle-particle interaction to particle-fluid interaction, from fundamental mechanics to advanced computational mechanics for particle and powder systems. The content focuses on fundamental concepts, mechanistic analysis and computational approaches. The first six chapters present basic information on properties of single particles and powder systems and their characterisation (covering the fundamental characteristics of bulk solids (powders) and building an understanding of density, surface area, porosity, and flow), as well as particle-fluid interactions, gas-solid and liquid-solid systems, with applications in fluidization and pneumatic conveying. The last four chapters have an emphasis on the mechanics of particle and powder systems, including the mechanical behaviour of powder systems during storage and flow, contact mechanics of particles, discrete element methods for modelling particle systems, and finite element methods for analysing powder systems. This thorough guide is beneficial to undergraduates in chemical and other types of engineering, to chemical and process engineers in industry, and early stage researchers. It also provides a reference to experienced researchers on mathematical and mechanistic analysis of particulate systems, and on advanced computational methods. Provides a simple introduction to core topics in particle technology: characterisation of particles and powders: interaction between particles, gases and liquids; and some useful examples of gas-solid and liquid-solid systems Introduces the principles and applications of two useful computational approaches: discrete element modelling and finite element modelling Enables engineers to build their knowledge and skills and to enhance their mechanistic understanding of particulate systems

Pneumatic Handling of Powdered Materials (including Fluidization) McGraw-Hill Companies

"Bulk Solids Handling: Equipment Selection and Operation provides an overview of the major technologies involved in the storage and handling of particulate materials from large grains to fine cohesive materials. - Topics covered include characterisation of individual particles and bulk particulate materials, silo design for strength and flow, pneumatic conveying systems, mechanical conveying, and small scale operations. - Guidance is given on appropriate equipment choices depending on the type of material to be handled, and applications and limitations of current bulk solids handling equipment are discussed."--Jacket.

Pneumatic Conveying Elsevier

Fractionators, separators and accumulators, cooling towers, gas treating, blending, troubleshooting field cases, gas solubility, and density of irregular solids * Hundreds of common sense techniques, shortcuts, and calculations.

Pneumatic Conveying Design Guide Elsevier

An understanding of the properties and the handling characteristics of liquids and gases has long been regarded as an essential requirement for most practising engineers. It is therefore not surprising that, over the years, there has been a regular appearance of books dealing with the fundamentals of fluid mechanics, fluid flow, hydraulics and related topics. What is surprising is that there has been no parallel development of the related discipline of Bulk Solids Handling, despite its increasing importance in modern industry across the world. It is only very recently that a structured approach to the teaching, and learning, of the subject has begun to evolve. A reason for the slow emergence of Bulk Solids Handling as an accepted topic of study in academic courses on mechanical, agricultural, chemical, mining and civil engineering is perhaps that the practice is so often taken for granted. Certainly the variety of

materials being handled in bulk is almost endless, ranging in size from fine dust to rocks, in value from refuse to gold, and in temperature from deep-frozen peas to near-molten metal.

Belt Conveyors for Bulk Materials Butterworth-Heinemann

Covers the design and construction of material transport systems that carry free-flowing or granular material via pipes or ducts, by high-velocity air stream. Includes new innovations in low- and high-pressure conveying systems using pressure or blow tanks. Explains the handling characteristics of over 45 new substances. Includes revised and expanded coverage of system components plus a new section on conveying for the foundry and power industries.

Pneumatic Conveying Design Guide Butterworth-Heinemann

Pneumatic Conveying Design Guide, 3rd Edition is divided into three essential parts, system and components, system design, and system operation, providing both essential foundational knowledge and practical information to help users understand, design, and build suitable systems. All aspects of the pneumatic conveying system are covered, including the type of materials used, conveying distance, system constraints, including feeding and discharging, health and safety requirements, and the need for continuous or batch conveying. This new edition also covers information on the other conveying systems available and compares them to this method. The existing content is brought up-to-date and the references are expanded and updated. This guide is an almost encyclopedic coverage of pneumatic conveying and as such is an essential text for both designers and users of pneumatic conveying systems. Each aspect of the subject is discussed from basic principles to support those new to, or learning about, this versatile technique.

Chemical Engineering Design Springer Science & Business Media

Pneumatic power is ideal for the ever increasing range of 'light' applications in which a cheap, clean, adaptable source of power is needed. Used in conjunction with microprocessor control it forms the basis of manufacturing automation from basic conveying and handling lines to complex robotic assembly systems. Training courses and books aimed at the technician have not kept pace with these developments. This book is written to cover the British Fluid Power Association Pneumatics Certificate, which is also awarded as part of CGLI scheme 2340, and is in the process of NVQ accreditation at level 3. 'Practical Pneumatics' provides a clear and detailed discussion of pneumatic technology by tackling the principles of pneumatic components and the behaviour of air under compression, during treatment and in applications to production processes. The non-mathematical approach, the numerous detailed diagrams and the many exercises and examples explain concepts clearly and concisely and provide students with a foundation from which to develop practical competence.

Mechanical Conveyors Elsevier

This book takes a detailed look at design principles for pneumatic conveying systems and illustrates these with examples and case histories.

Handbook of Pneumatic Conveying Engineering Elsevier

Bulk materials are processed and refined in many industrial plants. They are transported back and forth between the various process steps. If bulk materials are dust-fine to coarse-grained, they can be transported pneumatically through pipelines with flowing gas - over distances of several metres to several kilometres. This book introduces the basics of pneumatic conveying, the construction of plants and their operation. The first three chapters deal with the physical properties of the bulk material and the conveying gas as well as their behaviour in gas-solid systems. The following chapter describes the application of these basics in pneumatic conveying: starting with different flow forms, via processes at the plug, up to pressure loss in pneumatic conveying lines. The following sections are devoted, among other things, to calculation approaches for the transfer of test models to large-scale systems, as well as to modern dense-phase conveying methods in which material to be conveyed moves at low speed in the form of threads, plugs or flowing. Separate chapters deal with the design of pneumatic conveying systems and various forms and causes of their wear. The book offers calculation examples for many topics and is state of the art. It is aimed at engineers, plant constructors and operators of product lines with pneumatic conveying. They benefit from the author's decades of experience in the development and design of plants with new conveying processes.

Particle Technology and Engineering Routledge

This reference details particle characterization, dynamics, manufacturing, handling, and processing for the employment of multiphase reactors, as well as procedures in reactor scale-up and design for applications in the chemical, mineral, petroleum, power, cement and pharmaceuticals industries. The authors discuss flow through fixed beds, elutriation and entrainment, gas distributor and plenum design in fluidized beds, effect of internal tubes and baffles, general approaches to reactor design, applications for gasifiers and combustors, dilute phase

pneumatic conveying, and applications for chemical production and processing. This is a valuable guide for chemists and engineers to use in their day-to-day work.

Mechanics of Agricultural Materials CRC Press

This book presents select peer reviewed proceedings of the International Conference on Applied Mechanical Engineering Research (ICAMER 2019). The books examines various areas of mechanical engineering namely design, thermal, materials, manufacturing and industrial engineering covering topics like FEA, optimization, vibrations, condition monitoring, tribology, CFD, IC engines, turbo-machines, automobiles, manufacturing processes, machining, CAM, additive manufacturing, modelling and simulation of manufacturing processing, optimization of manufacturing processing, supply chain management, and operations management. In addition, recent studies on composite materials, materials characterization, fracture and fatigue, advanced materials, energy storage, green building, phase change materials and structural change monitoring are also covered. Given the contents, this book will be useful for students, researchers and professionals working in mechanical engineering and allied fields.

Practical Pneumatics Butterworth-Heinemann

Handling of powders and bulk solids is a critical industrial technology across a broad spectrum of industries, from minerals processing to bulk and fine chemicals, and the food and pharmaceutical industries, yet is rarely found in the curricula of engineering or chemistry departments. With contributions from leading authors in their respective fields, Characterisation of Bulk Solids provides the reader with a sound understanding of the techniques, importance and application of particulate materials characterisation. It covers the fundamental characteristics of individual particles and bulk particulate materials, and includes discussion of a wide range of measurement techniques, and the use of material characteristics in design and industrial practice. The reader will then be in a better position to diagnose solids handling and processing problems in industry, and to deal with experts and equipment suppliers from an informed standpoint. Written for post-graduate engineers, chemical scientists and technologists at all stages of their industrial career, the book will also serve as an ideal primer in any of the specialist areas to inform further study.

Pneumatic Conveying of Solids Springer Science & Business Media

When the four of us decided to collaborate to write this book on pneumatic conveying, there were two aspects which were of some concern. Firstly, how could four people, who live on four different continents, write a book on a fairly complex subject with such wide lines of communications? Secondly, there was the problem that two of the authors are chemical engineers. It has been noted that the majority of chemical engineers who work in the field of pneumatic conveying research have spent most of their time considering flow in vertical pipes. As such, there was some concern that the book might be biased towards vertical pneumatic conveying and that the horizontal aspects (which are clearly the most difficult!) would be somewhat neglected. We hope that you, as the reader, are going to be satisfied with the fact that you have a truly international dissertation on pneumatic conveying and, also, that there is an even spread between the theoretical and practical aspects of pneumatic conveying technology.

Pneumatic Conveying Design Guide Wiley

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

Introduction to Particle Technology Partridge Publishing Singapore

This book is a comprehensive, practical guide and reference to today's mechanical conveyor systems. It covers all types of mechanical conveyors, providing in-depth information on their design, function and applications. More than 180 photographs and schematics illustrate details of design and system layout. An introductory chapter provides an understanding of the characteristics of various types of bulk solids, including their conveyability and the types of conveying systems most effective for each. Following chapters examine each of five major categories of conveying systems, with practical details on their design, operation and applications. The final chapter presents basic information on motors and drives for conveying systems, as well as related equipment such as speed reduction systems and conveyor brakes. The emphasis throughout the text is on practical engineering and operating information, with a minimum of theory. The presentation is systematic and organized for easy reference. A very detailed index enables the quick location of needed information. This guide and reference will be useful to all engineers and other personnel involved in the continuous movement of bulk solids. It serves as both a basic introduction and a desk-top reference. The Authors Dr. Fayed is a Professor and Director of the Powder Science & Technology Group at Ryerson Polytechnic University in Toronto. He is also a licensed Consulting Engineer, a Fellow of the American Institute of Chemical Engineers and the Canadian Society of Chemical Engineering. Previously he held positions in process design and development with ICI, Davy McKee, M. W. Kellogg, and Peabody. He has lectured at numerous seminars and workshops at meetings of the American Institute of Chemical Engineers, and other organizations. He has published many papers on particulate technology and is the co-editor of Powder Science & Technology Handbook. Thomas Skocir in an engineer presently with ECO-TEC

Pneumatic conveying Wiley-Blackwell

Tens of thousands of mechanical engineers are engaged in the design, building, upgrading, and optimization of various material handling facilities. The peculiarity of material handling is that there are numerous technical solutions to any problem. The engineer ’ s personal selection of the optimal solution is as critical as the technical component. Michael Rivkin, Ph.D., draws on his decades of experience in design, construction, upgrading, optimization, troubleshooting, and maintenance throughout the world, to highlight topics such as:

- physical principles of various material handling systems;
- considerations in selecting technically efficient and environmentally friendly equipment;
- best practices in upgrading and optimizing existing bulk material handling facilities;
- strategies to select proper equipment in the early phases of a new project.

Filled with graphs, charts, and case studies, the book also includes bulleted summaries to help mechanical engineers without a special background in material handling find optimal solutions to everyday problems.

Pneumatic Conveying of Solids Butterworth-Heinemann is

A review of pneumatic conveyance technology and challenges Successful Pneumatic Conveying provides a detailed overview of the field's fundamental principles and practices. Presented by the Institution of Mechanical Engineers, this book features detailed explanations, current technologies, and solutions to the challenges encountered in the design and construction of efficient pneumatic conveyance systems. Topics include vacuum versus positive pressure, blockage problems, high pressure systems, particle attention and deposition, attrition and wear, conveying fragile materials, and more to provide useful insight to engineers in the field.

Pneumotransport 5 Springer

This handbook presents comprehensive coverage of the technology for conveying and handling particulate solids. Each chapter covers a different topic and contains both fundamentals and applications. Usually, each chapter, or a topic within a chapter, starts with one of the review papers. Chapter 1 covers the characterization of the particulate materials. Chapter 2 covers the behaviour of particulate materials during storage, and presents recent developments in storage and feeders design and performance. Chapter 3 presents fundamental studies of particulate flow, while Chapters 4 and 5 present transport solutions, and the pitfalls of pneumatic, slurry, and capsule conveying. Chapters 6, 7 and 8 cover both the fundamentals and development of processes for particulate solids, starting from fluidisation and drying, segregation and mixing, and size-reduction and enlargement. Chapter 9 presents environmental aspects and the classification of the particulate materials after they have been handled by one of the above-mentioned processes. Finally, Chapter 10 covers applications and developments of measurement techniques that are the heart of the analysis of any conveying or handling system.

Pneumatic Conveying Design Guide Routledge

Pneumatic conveying systems offer enormous advantages: flexibility in plant layout, automatic operation, easy control and monitoring, and the ability to handle diverse materials, especially

dangerous, toxic, or explosive materials. The Handbook of Pneumatic Conveying Engineering provides the most complete, comprehensive reference on all types and sizes of systems, considering their selection, design, maintenance, and optimization. It offers practical guidelines, diagrams, and procedures to assist with plant maintenance, operation, and control. With well over fifty years of combined experience in the field, the authors promote practical, valuable approaches to test, evaluate, and correct both old and newly constructed systems. They include abundant checklists and approaches for preventing component wear, material degradation, and operating dilemmas and suggest lists of alternate materials and components to use if erosion does occur. Comparing various conveying system types, components, and flow mechanisms, the book explains the function of material flow, recommends conveying air velocity for different types of materials, and examines the conveying characteristics of a broad array of materials with emphasis on their impact on system performance. Brimming with invaluable checklists, models, guidelines, diagrams, and illustrations, the Handbook of Pneumatic Conveying Engineering is simply the most authoritative guide to pneumatic conveying available and a critical tool for your everyday work.

Reducing Damage to Grain from Pneumatic Conveying Springer Science & Business Media

Discover the Ingenious World of Pneumatic Conveying with Ernest George Phillips Embark on a fascinating exploration of pneumatic conveying, a groundbreaking technology that revolutionized material handling, with Ernest George Phillips' comprehensive guide. In 'Pneumatic Conveying,' Phillips unveils the inner workings of this innovative process, offering readers a deep understanding of its principles, applications, and benefits. Unraveling the Mechanics of Pneumatic Conveying With meticulous detail and expert analysis, Phillips dissects the intricate mechanisms behind pneumatic conveying systems. From the fundamentals of air flow and particle behavior to the design and operation of conveyors, readers will gain invaluable insights into the science and engineering principles that drive this efficient mode of transportation. Through clear explanations and real-world examples, Phillips illustrates the diverse applications of pneumatic conveying across industries such as manufacturing, food processing, and mining. Whether conveying powders, granules, or bulk materials, this book equips readers with the knowledge needed to optimize processes, enhance efficiency, and minimize costs. Empowering Industries with Cutting-Edge Solutions 'Pneumatic Conveying' goes beyond theory to provide practical guidance for engineers, technicians, and professionals seeking to implement or improve pneumatic conveying systems. From system design and troubleshooting to maintenance best practices, Phillips offers a comprehensive toolkit for maximizing performance and reliability. Readers will also explore the latest advancements in pneumatic conveying technology, including automation, controls, and predictive maintenance techniques. By staying abreast of industry trends and emerging innovations, readers can leverage pneumatic conveying to stay competitive in today's dynamic marketplace. Why 'Pneumatic Conveying' Is Essential Reading: In-Depth Coverage: Phillips provides a thorough examination of pneumatic conveying principles, ensuring readers develop a solid foundation in this specialized field. Practical Insights: With practical tips, case studies, and troubleshooting strategies, this book empowers professionals to overcome challenges and optimize their conveying systems for peak performance. Industry Relevance: Whether you're a seasoned engineer or a novice technician, 'Pneumatic Conveying' offers valuable insights that can be applied across a wide range of industries, making it an indispensable resource for professionals worldwide. Don't miss your opportunity to delve into the dynamic world of pneumatic conveying. Dive into 'Pneumatic Conveying' today and unlock the potential of this transformative technology to drive efficiency, productivity, and innovation in your operations.