

Air Pollution Control Engineering By Noel De Nevers

The past few years have seen the emergence of a growing, widespread desire in this country, and indeed everywhere, that positive actions be taken to restore the quality of our environment, and to protect it from the degrading effects of all forms of pollution-air, noise, solid waste, and water. Since pollution is a direct or indirect consequence of waste, if there is no waste, there can be no pollution, and the seemingly idealistic demand for "zero discharge" can be construed as a demand for zero waste. However, as long as there is waste, we can only attempt to abate the consequent pollution by converting it to a less noxious form. In those instances in which a particular type of pollution has been recognized, three major questions usually arise: 1, How serious is the pollution? 2, Is the technology to abate it available? and 3, Do the costs of abatement justify the degree of abatement achieved? The principal intention of this series of books is to help the reader to formulate answers to the last two of the above three questions. The traditional approach of applying tried-and-true solutions to specific pollution problems has been a major factor contributing to the success of environmental engineering, and in large measure has accounted for the establishing of a "methodology of pollution control.

Air pollution control can be approached from a number of different engineering disciplines environmental, chemical, civil, and mechanical. To that end, Noel de Nevers has written an engaging overview of the subject. While based on the fundamentals of chemical engineering, the treatment is accessible to readers with only one year of college chemistry. In addition to discussions of individual air pollutants and the theory and practice of air pollution control devices, de Nevers devotes about half the book to topics that influence device selection and design, such as atmospheric models and U.S. air pollution law. The generous number of end-of-chapter problems are designed to develop more complex thinking about the concepts presented and integrate them with readers personal experience increasing the likelihood of deeper understanding.

A rigorous and thorough analysis of the production of air pollutants and their control, this text is geared toward chemical and environmental engineering students. Topics include combustion, principles of aerosol behavior, theories of the removal of particulate and gaseous pollutants from effluent streams, and air pollution control strategies. 1988 edition. Reprint of the Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1988 edition.

The Air Pollution Control Engineering Trainee Passbook(R) prepares you for your test by allowing you to take practice exams in the subjects you need to study. It provides hundreds of questions and answers in the areas that will likely be covered on your upcoming exam, including but not limited to: preparing written material; understanding and interpreting tabular material; administrative supervision; evaluating conclusions in light of known facts; effective interaction with

agency staff and the public; and more.

Leading pollution control educators and practicing professionals describe how various combinations of different cutting-edge process systems can be arranged to solve air, noise, and thermal pollution problems. Each chapter discusses in detail a variety of process combinations, along with technical and economic evaluations, and presents explanations of the principles behind the designs, as well as numerous variant designs useful to practicing engineers. The emphasis throughout is on developing the necessary engineering solutions from fundamental principles of chemistry, physics, and mathematics. The authors also include extensive references, cost data, design methods, guidance on the installation and operation of various air pollution control process equipment and systems, and Best Available Technologies (BAT) for air thermal and noise pollution control.

A 25-year tradition of excellence is extended in the Fourth Edition of this highly regarded text. In clear, authoritative language, the authors discuss the philosophy and procedures for the design of air pollution control systems. Their objective is twofold: to present detailed information on air pollution and its control, and to provide formal design training for engineering students. New to this edition is a comprehensive chapter on carbon dioxide control, perhaps the most critical emerging issue in the field. Emphasis is on methods to reduce carbon dioxide emissions and the technologies for carbon capture and sequestration. An expanded discussion of control technologies for coal-fired power plants includes details on the capture of NO_x and mercury emissions. All chapters have been revised to reflect the most recent information on U.S. air quality trends and standards. Moreover, where available, equations for equipment cost estimation have been updated to the present time. Abundant illustrations clarify the concepts presented, while numerous examples and end-of-chapter problems reinforce the design principles and provide opportunities for students to enhance their problem-solving skills.

With the advent of the Clean Air Act in 1970, the number of air pollution control equipment installations has increased at an accelerated pace. Although much has been written on attaining collection performance with the various control devices, a major void has occurred in the identification and transfer of information needed to help reduce maintenance costs and to prevent deterioration of collector performance. Although design and selection information is presented, it is the primary intention of this book to discuss operation and maintenance topics and explore many of the repetitive problems that have plagued users of air pollution control equipment. The existence of these problems may be related to the complexity of the process or to a lack of well-defined operation techniques, among other reasons. In any event, this book intends to emphasize where and how these factors can have a major impact on the maintenance problems of control devices. Operation and maintenance problems have plagued users for nearly 100 years.

Covers cost estimation, incineration, adsorption devices, flue gas desulfurization, control of nitrogen oxides, particulate emissions control, cyclonic devices, electrostatic precipitators, and fabric filters

Air quality and air pollution control are tasks of international concern as, for one, air pollutants do not refrain from crossing borders and, for another, industrial plants and motor vehicles which emit air pollutants are in widespread use today. In a number of the world's expanding cities smog situations are a frequent occurrence due to the number and emission-intensity of air pollution sources. Polluted air causes annoyances and can, when it occurs in high concentrations in these cities, constitute a serious health hazard. How important clean air is to life becomes apparent when considering the fact that humans can do without food for up to 40 days, without air, however, only a few minutes. The first step towards improving the air quality situation is the awareness that a sound environment is as much to be aspired for as the development of new technologies improving the standard of living. Technical progress should be judged especially by how environmentally benign, clean and noiseless its products are. Of these elements, clean air is of special concern to me. I hope that this book will awaken more interest in this matter and that it will lead to new impulses. Due to the increasing complexity of today's machinery and industrial processes science and technology can no longer do without highly specialized design engineers and operators. Environmental processes, however, are highly interdependent and interlinked.

Develops rational bases for the design of air pollution control devices for the removal of gases and particulate emissions from industrial sources. The practical aspects of design are emphasized through a detailed presentation of state-of-the-art procedures for the design of each major air pollution control system in general use. The book describes the theory underlying the design of each system as well as the philosophy for the design. Topics covered include: cyclones; fabric filters; wet scrubbers; absorption; and incineration. This material is appropriate for upper-division undergraduate and graduate students in environment, chemical, civil, and mechanical engineering. Annotation copyrighted by Book News, Inc., Portland, OR

This book provides a fully comprehensive, rigorous and refreshing treatment of 'Air Pollution and Control' covering present day technology and developments. It covers various new topics like bioaerosols or aeroallergens and hazardous air pollutants including diesel exhaust and dioxins. The book is intended to meet the requirements of (a) Undergraduate and postgraduate students of particularly Environmental and Mechanical Engineering and also other branches of Engineering, (b) Technologists, designers, operation and maintenance engineers of industries, electrical power plants, heat and power utilities, (c) Aspirants for competitive examinations of IAS, IES, IFS, PCS, and aspirants for various state and private technical services, etc. and (d) General readers interested in the field for better understanding and knowledge.

The book is divided into 20 chapters and presents enormous information covering all aspects of Air Pollution in various sectors relevant to Indian conditions. Each of the following chapters is followed by questions at the end based upon the text.

Air Pollution, Third Edition, Volume IV: Engineering Control of Air Pollution focuses on the sampling, measurement, analysis, and monitoring of air pollution. This book discusses the various gas and air cleaning devices used to eliminate or reduce emissions of air polluting substances. Organized into three parts encompassing 21 chapters, this edition starts with an overview of the methods of air pollution control that are designed to minimize the production or emission of contaminants. This book then discusses the techniques of rational air use management, which is based on the principle that air quality standards have been set at levels that protect the population from harm with an acceptable margin of safety. This text explores as well the waste-disposal process of incineration in which combustible wastes are burned completely under controlled conditions. Other chapters discuss the production of nonferrous metals, which has been very significant in the development of the science of air pollution control. Engineers, physicist, chemists, meteorologists, agronomists, toxicologists, sociologists, physicians, and lawyers will find this book extremely useful.

A panel of respected air pollution control educators and practicing professionals critically survey the both principles and practices underlying control processes, and illustrate these with a host of detailed design examples for practicing engineers. The authors discuss the performance, potential, and limitations of the major control processes-including fabric filtration, cyclones, electrostatic precipitation, wet and dry scrubbing, and condensation-as a basis for intelligent planning of abatement systems,. Additional chapters critically examine flare processes, thermal oxidation, catalytic oxidation, gas-phase activated carbon adsorption, and gas-phase biofiltration. The contributors detail the Best Available Technologies (BAT) for air pollution control and provide cost data, examples, theoretical explanations, and engineering methods for the design, installation, and operation of air pollution process equipment. Methods of practical design calculation are illustrated by numerous numerical calculations.

Written by experts, Indoor Air Quality Engineering offers practical strategies to construct, test, modify, and renovate industrial structures and processes to minimize and inhibit contaminant formation, distribution, and accumulation. The authors analyze the chemical and physical phenomena affecting contaminant generation to optimize system function and design, improve human health and safety, and reduce odors, fumes, particles, gases, and toxins within a variety of interior environments. The book includes applications in Microsoft Excel®, Mathcad®, and Fluent® for analysis of contaminant concentration in various flow fields and air pollution control devices.

Introductory technical guidance for mechanical engineers, environmental engineers, civil engineers and construction managers interested in air pollution control engineering. Here is what is discussed: 1. CYCLONE COLLECTORS 2. FABRIC FILTERS 3. SCRUBBERS AND PRECIPITATORS 4. SULFUR AND NITROGEN OXIDES CONTROL 5. AIR STRIPPING.

Environmental engineers work to increase the level of health and happiness in the world by designing, building, and operating processes and systems for water treatment, water pollution control, air pollution control, and solid waste management. These projects compete for resources with projects in medicine, transportation, education, and other fields that have a similar objective. The challenge is to make the investments efficient – to get the best project outputs with a minimum of inputs. Cost Engineering for Pollution Prevention and Control examines how to identify the best solution by judging alternatives with respect to some measure of system performance, such as total capital cost, annual cost, annual net profit, return on investment, cost-benefit ratio, net present worth, minimum production time, maximum production rate, minimum energy utilization, and so on. Key Features: Explains how to estimate preliminary costs, how to compare the life cycle costs of alternative projects, how to find the optimal balance between capital costs and operating costs. Emphasis is placed on formulating the problem rather than on the mathematical details of how the calculations are done. Provides numerous practical examples and case studies. Includes end-of-chapter exercises dealing with water, wastewater, air pollution, solid wastes, and remediation projects. The important concepts presented in this book can be understood by those students who have taken an introductory course in environmental engineering. Advanced knowledge of process design is not required. The material can also be utilized by engineers, managers, and others who would benefit from a better understanding of how engineers look at problems.

This textbook discusses engineering principles relating to air pollution and greenhouse gases (GHGs); it focuses on engineering principles and designs of related devices and equipment for air emission control for a variety of industries such as energy, chemical, and transportation industries. The book aims primarily at senior undergraduate and graduate students in mechanical, chemical and/or environmental engineering departments; it can also be used as a reference book by technical staff and design engineers who are interested in and need to have technical knowledge in air pollution and GHGs. The book is motivated by recent rapid advances in air pollution and greenhouse gas emissions and their control technologies. In addition to classic topics related to air pollution, this book is also featured with emerging topics related to air pollution and GHGs. It covers recent advances in engineering approaches to the reduction of GHG emissions including, but are not limited to, green energy technologies and carbon sequestration and storage. It also introduces an emerging topic in air pollution, which is referred to as Nano Air Pollution. It is a growing concern in air pollution, but largely missing in similar books, likely because of recent rapid advances in nanotechnology has outpaced the advances in nano air pollution control.

This design-oriented book discusses the causes, sources, effects & regulation of air pollution, plus the philosophy of design & economic analysis necessary for the effective control of air pollution.

This handbook provides information for professionals attempting to reduce and eliminate air pollution problems. It contains information on all aspects of air pollution, and also examines the technical aspects of air pollution control equipment. Many practical applications are provided, and the text is referenced to assist the reader in further research. The major scientific areas of air pollution are brought together with practical engineering solutions, and will help air quality and pollution control managers to reduce maintenance costs and prevent deterioration of

installations.

This Revised Edition Of The Book On Environmental Pollution Control Engineering Features A Systematic And Thorough Treatment Of The Principles Of The Origin Of Air, Water And Land Pollutants, Their Effect On The Environment And The Methods Available To Control Them. The Demographic And Environmental Trends, Energy Consumption Patterns And Their Impact On The Environment Are Clearly Discussed. Application Of The Physical, And Chemical Engineering Concepts To The Design Of Pollution Control Equipment Is Emphasized. Due Importance Is Given To Modelling, Quality Monitoring And Control Of Specific Major Pollutants. A Separate Chapter On The Management Of Hazardous Wastes Is Added. Information Pertaining To Indian Conditions Is Given Wherever Possible To Help The Reader Gain An Insight Into India Sown Pollution Problems. This Book Is Mainly Intended As A Textbook For An Integrated One-Semester Course For Senior Level Undergraduate Or First Year Post-Graduate Engineering Students And Can Also Serve As A Reference Book To Practising Engineers And Decision Makers Concerned With Environmental Pollution Control.

This book has arisen directly from a course on Air and Water Pollution Control delivered by the first named author at the Technical University of Berlin. Extractions of this course have been presented in Brazil, Turkey and India. It was at the Indian Institute of Technology of Madras where the first named author got in contact with Professor Varma, who turned out to be a suggestive, cooperative coauthor. This book is addressed primarily to chemical, environmental and mechanical engineers, engaged in the design and operation of equipment for air pollution control. But it will certainly be helpful to chemists and physicists confronted with the solution of environmental problems. Furthermore it is intended as a text book for engineering courses on environmental protection. The goal of the book is the presentation of knowledge on design and operation of equipment applicable to the abatement of harmful emissions into air. The technology of air pollution control is of relatively young age, but it has already achieved a high degree of performance, due to the research and development work invested in the last decades in this field.

Presents the fundamentals of air pollution. This book covers principles and practices of air pollution such as sampling, analysis and control. It also deals with the types, origins, sources, atmospheric movements and effects of air pollution.

From the alleys of the world environment comes a handbook dealing with air pollution, its control, and engineering. This is a step by step guide divided into segments, taking you into a long journey to make you aware of the major crisis facing the world environment today. This will transform the way you think about the atmosphere and the air we inhale. The misconceptions regarding atmospheric condition will go for a toss, on reading through this book. Air Pollution Control Engineering is geared towards the havoc air pollutants and harmful emissions creating in the sub-atmospheric strata. It is eroding the ozone layer, essential for human health and vis-a-vis, leading to a cascading effect of harmful incidents. In a threadbare explanation, all sources of air pollutants and their resultant effects are depicted in detail in this book.

Introductory technical guidance for mechanical engineers, environmental engineers, civil engineers and construction managers interested in air pollution control engineering. Here is what is discussed: 1. CYCLONE COLLECTORS 2. FABRIC FILTERS 3. SCRUBBERS AND PRECIPITATORS 4. SULFUR AND NITROGEN OXIDES CONTROL 5. AIR STRIPPING.

Engineers in multiple disciplines—environmental, chemical, civil, and mechanical—contribute to our understanding of air pollution control. To that end, Noel de Nevers has incorporated these multiple perspectives into an engaging and accessible overview of the subject. While based on the fundamentals of chemical engineering, the book is accessible to any reader with only one year of

college chemistry. In addition to detailed discussions of individual air pollutants and the theory and practice of air pollution control devices, de Nevers devotes seven chapters to topics that influence device selection and design, such as atmospheric models and U.S. air pollution law. The Third Edition's many in-text examples and end-of-chapter problems provide a more complex treatment of the concepts presented. Significant updates include more discussion on the problem of greenhouse gas emissions and a thorough look at the Volkswagen diesel-emission scandal.

Unique problem-and-solution approach for quickly mastering a broad range of calculations This book's problem-and-solution approach enables readers to quickly grasp the fundamentals of air pollution control equipment and essential applications. Moreover, the author sets forth solid principles for the design and selection of air pollution control equipment as well as for its efficient operation and maintenance. Readers gain a deep understanding of both the equipment itself and the many factors affecting performance. Following two introductory chapters, the book dedicates four chapters to examining control equipment for gaseous pollutants, including adsorption, absorption, and incineration equipment. The remaining six chapters deal with equipment for managing airborne particulate pollutants, including gravity settlers, cyclones, electrostatic precipitators, scrubbers, and baghouses. The appendix contains discussions of hybrid systems, the SI system (including conversion constants), and a cost-equipment model. Each chapter offers a short introduction to the control device discussed. Next, progressively more difficult problems with accompanying solutions enable readers to build their knowledge as they advance through the chapter. Problems reflect the most recent developments in pollution control and include a variety of performance equations and operation and maintenance calculations. Each problem includes a statement of the problem, the data used to solve the problem, and a detailed solution. Readers may further hone their skills by visiting the text's Web site for additional problems and solutions. This publication serves both as a textbook for engineering students and as a reference for engineers and technicians who need to ensure that air pollution control equipment operates efficiently and enables their facility to meet all air pollution control standards and regulations. The definitive resource for information on air pollution emission sources and the technology available to control them. The Air Pollution Engineering Manual has long been recognized as an important source of information on air pollution control issues for industries affected by the Clean Air Act and regulations in other countries. Thoroughly updated to reflect the latest emission factors and control measures for reducing air pollutants, this new edition provides industry and government professionals with the fundamental, technological, and regulatory information they need for compliance with the most recent air pollution standards. Contributing experts from diverse fields discuss the different processes that generate air pollution, equipment used with all types of gases and particulate matter, and emissions control for areas ranging from graphic arts and chemical processes to the metallurgical industry. More than 500 detailed flowcharts and photographs as well as an extensive listing of Internet resources accompany coverage of:

- * Biological air pollution control, including biofilters and bioscrubbers
- * Emissions from wood processing, brick and ceramic product manufacturing, pharmaceutical manufacturing, numerous other industrial processes, fugitive emissions, internal combustion sources, and evaporative losses
- * Water/wastewater treatment plant emissions
- * Changes in emission factors

for each source category, including particle size factors related to PM10 and PM2.5 standards * Updated MACT regulations and technologies * And much more THE AIR & WASTE MANAGEMENT ASSOCIATION is the world's leading membership organization for environmental professionals. The Association enhances the knowledge and competency of environmental professionals by providing a neutral forum for technology exchange, professional development, networking opportunities, public education, and outreach events. The Air & Waste Management Association promotes global environmental responsibility and increases the effectiveness of organizations and individuals in making critical decisions that benefit society.

Air pollution control and air quality engineering are some of the key subjects in any environmental engineering curriculum. This book will cover topics that are fundamental to pollution control engineers and professionals, including air pollution and its management through regulatory approaches, calculating and estimating emissions, and applying con

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