

# Air Pollution Control Engineering De Nevers

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,

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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.

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<sub>x</sub> 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. 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

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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.

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.

An authoritative introduction to the scientific principles underlying environmental pollution, this book covers the transport, toxicity, and analysis of pollutants and discusses the major types of contaminant chemicals. Students will gain an understanding of the scientific principles of pollution at the chemical level and be able to approach the contentious issues in a rational way. Taking a pollution oriented approach, the authors discuss legislative limits, analysis of metals, oestrogenic chemicals, indoor and vehicular pollution, pesticides, dioxin-like

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substances, and more.

This unique textbook examines the basic health and environmental issues associated with air pollution including the relevant toxicology and epidemiology. It provides a foundation for the sampling and analysis of air pollutants as well as an understanding of international air quality regulations. Written for upper-level undergraduate and introductory graduate courses in air pollution, the book is also a valuable desk reference for practicing professionals who need to have a broad understanding of the topic. Key features: - Provides the most up-to-date coverage of the basic health and environmental issues associated with air pollution. - Offers a broader examination of air pollution topics, beyond just the meteorological and engineering aspects of air pollution. - Includes the following Instructor Resources: Instructor's Manual, PowerPoint Presentations, and a TestBank. The Phalens have put together a timely book on a critically important topic that affects all of us -- air pollution – and they do so in a new and highly relevant way: they consider the broad societal health impacts from a fundamental science viewpoint. The epidemiology, toxicology, and risks of air pollutants are included, and ethical issues of concern are highlighted. This book is a must-read for students who wish to become professionals in the air quality field and for students of environmental science whose work includes air pollution issues. The book is a significant contribution to the discipline." - Cliff I. Davidson, Director, Center for Sustainable Engineering; Thomas C. and Colleen L. Wilmot Professor of Engineering, Syracuse Center of Excellence in Environmental and Energy Systems and Department of Civil and Environmental Engineering, Syracuse University "Truly, human well-being and public health in the 21st century may hinge on our ability to anticipate, recognize, evaluate, control, and confirm responsible management of air pollution. This timely,

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informative, and insightful text provides a solid introduction for students and a technically sound handbook for professionals seeking literacy and critical thinking, real-life examples, understanding (not just rote applications), opportunities for continuous improvement, and modern tools for assessing and managing current and evolving air pollution challenges." - Mark D. Hoover, PhD, CHP, CIH Aerosol and health science researcher, author, and editor

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. Environmental Engineering provides a profound introduction to Ecology, Chemistry, Microbiology, Geology and Hydrology engineering. The authors explain transport phenomena, air pollution control, waste water management and soil treatment to address the issue of

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energy preservation, production asset and control of waste from human and animal activities. Modeling of environmental processes and risk assessment conclude the interdisciplinary approach.

This book focuses on various aspects related to air pollution, including major sources of air pollution, measurement techniques, modeling studies and solution approaches to control. The book also presents case studies on measuring air pollution in major urban areas, such as Delhi, India. The book examines vehicles as a source of air pollution and addresses the quantitative analysis of engine exhaust emissions. Subsequent chapters discuss particulate matter from engines and coal-fired power plants as a major pollutant, as well as emission control techniques using various after treatment systems. The book's final chapter considers future perspectives and a way forward for sustainable development. It also discusses several emission control techniques that will gain relevance in the future, when stricter emission norms will be enforced for international combustion (IC) engines as well as power plants. Given its breadth of coverage, the book will benefit a wide variety of readers, including researchers, professionals, and policymakers.

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 book illustrates theories of sustainable development from physical, chemical and biological aspects, and then introduces technologies to prevent pollution of water, air, solid waste and

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noise, finally concludes with ecological environmental protection and restoration techniques. With interdisciplinary features and abundant case studies, it is an essential reference for researchers and industrial engineers.

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

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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. "This book should be read and used by all students of environmental studies, and should be an important acquisition for any research, teaching, or general academic library." Choice

Catalytic Air Pollution Control: Commercial Technology is the primary source for commercial catalytic air pollution control technology, offering engineers a comprehensive account of all modern catalytic technology. This Third Edition covers all the new advances in technology in automotive catalyst control technology, diesel engine catalyst control technology, small engine catalyst control technology, and alternate sustainable fuels for auto and diesel.

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.

A single reference to all aspects of contemporary air dispersion modeling The practice of air dispersion modeling has changed dramatically in recent years, in large part due to new EPA

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regulations. Current with the EPA's 40 CFR Part 51, this book serves as a complete reference to both the science and contemporary practice of air dispersion modeling. Throughout the book, author Alex De Visscher guides readers through complex calculations, equation by equation, helping them understand precisely how air dispersion models work, including such popular models as the EPA's AERMOD and CALPUFF. Air Dispersion Modeling begins with a primer that enables readers to quickly grasp basic principles by developing their own air dispersion model. Next, the book offers everything readers need to work with air dispersion models and accurately interpret their results, including: Full chapter dedicated to the meteorological basis of air dispersion Examples throughout the book illustrating how theory translates into practice Extensive discussions of Gaussian, Lagrangian, and Eulerian air dispersion modeling Detailed descriptions of the AERMOD and CALPUFF model formulations This book also includes access to a website with Microsoft Excel and MATLAB files that contain examples of air dispersion model calculations. Readers can work with these examples to perform their own calculations. With its comprehensive and up-to-date coverage, Air Dispersion Modeling is recommended for environmental engineers and meteorologists who need to perform and evaluate environmental impact assessments. The book's many examples and step-by-step instructions also make it ideal as a textbook for students in the fields of environmental engineering, meteorology, chemical engineering, and environmental sciences. 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

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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.

Complex environmental problems are often reduced to an inappropriate level of simplicity. While this book does not seek to present a comprehensive scientific and technical coverage of all aspects of the subject matter, it makes the issues, ideas, and language of environmental engineering accessible and understandable to the nontechnical reader. Improvements introduced in the fourth edition include a complete rewrite of the chapters dealing with risk assessment and ethics, the introduction of new theories of radiation damage, inclusion of environmental disasters like Chernobyl and Bhopal, and general updating of all the content, specifically that on radioactive waste. Since this book was first published in 1972, several generations of students have become environmentally aware and conscious of their responsibilities to the planet earth. Many of these environmental pioneers are now teaching in colleges and universities, and have in their classes students with the same sense of dedication

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and resolve that they themselves brought to the discipline. In those days, it was sometimes difficult to explain what indeed environmental science or engineering was, and why the development of these fields was so important to the future of the earth and to human civilization. Today there is no question that the human species has the capability of destroying its collective home, and that we have indeed taken major steps toward doing exactly that. And yet, while, a lot has changed in a generation, much has not. We still have air pollution; we still contaminate our water supplies; we still dispose of hazardous materials improperly; we still destroy natural habitats as if no other species mattered. And worst of all, we still continue to populate the earth at an alarming rate. There is still a need for this book, and for the college and university courses that use it as a text, and perhaps this need is more acute now than it was several decades ago. Although the battle to preserve the environment is still raging, some of the rules have changed. We now must take into account risk to humans, and be able to manipulate concepts of risk management. With increasing population, and fewer alternatives to waste disposal, this problem is intensified. Environmental laws have changed, and will no doubt continue to evolve. Attitudes toward the environment are often couched in what has become known as the environmental ethic. Finally, the environmental movement has become powerful politically, and environmentalism can be made to serve a political agenda. In revising this book, we have attempted to incorporate the evolving nature of environmental sciences and engineering by adding chapters as necessary and eliminating material that is less germane to today's students. We have nevertheless maintained the essential feature of this book -- to package the more important aspects of environmental engineering science and technology in an organized manner and present this mainly technical material to a nonengineering audience.

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This book has been used as a text in courses which require no prerequisites, although a high school knowledge of chemistry is important. A knowledge of college level algebra is also useful, but calculus is not required for the understanding of the technical and scientific concepts. We do not intend for this book to be scientifically and technically complete. In fact, many complex environmental problems have been simplified to the threshold of pain for many engineers and scientists. Our objective, however, is not to impress nontechnical students with the rigors and complexities of pollution control technology but rather to make some of the language and ideas of environmental engineering and science more understandable.

In the debate over pollution control, the price of pollution is a key issue. But which is more costly: clean up or prevention? From regulations to technology selection to equipment design, Air Pollution Control Technology Handbook serves as a single source of information on commonly used air pollution control technology. It covers environmental regulations and their history, process design, the cost of air pollution control equipment, and methods of designing equipment for control of gaseous pollutants and particulate matter. This book covers how to:

- Review alternative design methods
- Select methods for control
- Evaluate the costs of control equipment
- Examine equipment proposals from vendors

With its comprehensive coverage of air pollution control processes, the Air Pollution Control Technology Handbook is a detailed reference for the practicing engineer who prepares the basic process engineering and cost estimation required for the design of an air pollution control system. It discusses the topics in depth so that you can apply the methods and equations presented and proceed with equipment design.

The Handbook of Environment and Waste Management, Volume 1, Air and Water Pollution

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Control, is a comprehensive compilation of topics that are at the forefront of many technical advances and practices in air and water pollution control. These include air pollution control, water pollution control, water treatment, wastewater treatment, industrial waste treatment and small scale wastewater treatment. Internationally recognized authorities in the field of environment and waste management contribute chapters in their areas of expertise. This handbook is an essential source of reference for professionals and researchers in the areas of air, water, and waste management, and as a text for advanced undergraduate and graduate courses in these fields.

Air Pollution Control Engineering Second Edition Waveland Press

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.

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Energy and feedstock materials for the chemical industry show an increasing demand. With constraints related to availability and use of oil, the energy and chemical industry is subject to considerable changes. The need for the use of cheaper and widely available feedstocks, and the development of sustainable and environmentally friendly c

Sorbents Materials for Controlling Environmental Pollution: Current State and Trends presents data on current use and future trends regarding sorbent materials employed against soil, water, and air pollution. The book is organized first by use and research for a variety of geographic areas. It will then focus on different sorbent materials and their uses, followed by various pollutants and their management. Including updated and extensive data from an assortment of sources, the book is organized to be very accessible, including with an interactive table to help identify the results of appropriate sorbents for each environmental compartment. The growing concern regarding soil, water and air pollution all over the world has implications for climate change and sustainability, making Sorbents Materials for Controlling Environmental Pollution: Current State and Trends an important reference for environmental scientists to identify tools for moving forward in solving these problems. Includes data and examples from various geographic locations worldwide Synthesizes data for a variety of sorbent material

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from different sources Presents data for various kinds of pollutants across environmental spheres, including soil, water, and air Utilizes an interactive table for quicker access to data and results

This new edition of the premier air pollution textbook is completely updated and revised to include all components of the 1990 Clean Air Act Amendments. Fundamentals of Air Pollution, Third Edition covers the spectrum of topics pertinent to the study of air pollution: elements, sources, effects, measurement, monitoring, meteorology, and regulatory and engineering control. In addition, the textbook features new chapters on atmospheric emissions from hazardous waste sites, air pathways from hazardous waste sites, and the long-term effects of air pollution on the earth. It also presents updated information on acidic development, long-distance transport, atmospheric chemistry, and mathematical modeling. With extensive references, suggested reading lists, questions, and new figures and tables, this text will serve as an invaluable resource for students and practitioners alike. \* This new edition features coverage of: Regulatory requirements of the Clean Air Act Amendments of 1990 New developments in the modelling of air quality Air pollution control Air pollution engineering/atmospheric chemistry

Volume 2 provides information on source monitoring methods, particle and gas

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control technology, transport and diffusion of air pollutants, as well as computational methods available for applying control techniques to air resource management.

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.

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The objective of this book is to introduce principles of environmentally conscious products, processes, and manufacturing systems. The reader will learn the impacts of waste from manufacturing and post-use product disposal, environmental cycles of materials, and principles of environmental economics. This work is intended as a textbook on the theory and practice of sustainable air pollution management. The book discusses the fundamental aspects of traditional air pollution topics as well as some more advanced topics (such as atmospheric brown cloud, trans-boundary movement of air pollutants, air transportation of radioactive material, biological air pollutants, etc.). Though much has been written about theory of Air Pollution Management, it is still not practiced in society for a variety of reasons. Having worked at the grass roots level and travelled extensively, the authors have captured useful, cost-effective and successfully implemented practices with their cameras and notebooks. The non-technical issues that are often seen as a hindrance to adopting sustainable solutions due to political, legal and social factors are also addressed to enable readers to understand a different dimension of social problems. Topics covered include selecting a separation process, process description, materials selection logic, implementation etc. Theory, design and operation specifications are also included for each air pollution management option. The book is an excellent guide for those readers looking to understand and practice sustainable air pollution management. Readers also learn how energy-efficient and cost-effective methods can

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be successfully used to reduce the production of contaminants, providing cleaner air. The environmental impact of industrial waste is one of the most serious challenges facing the chemical process industries. From a focus on end-of-pipe treatment in the 1970s, chemical manufacturers have increasingly implemented pollution prevention policies in which pollutants are mitigated at the source or separated and recovered and then reused or sold. This book is the first to present systematic techniques for cost-effective pollution prevention, altering what has been an art that depends on experience and subjective opinion into a science rooted in fundamental engineering principles and process integration. Step-by-step procedures are presented that are widely applicable to the chemical, petrochemical, petroleum, pharmaceutical, food, and metals industries. Various levels of sophistication ranging from graphical methods to algebraic procedures and mathematical optimization, numerous applications and case studies, and integrated software for optimizing waste recovery systems make Pollution Prevention through Process Integration: Systematic Design Tools a must read for a wide spectrum of practicing engineers, environmental scientists, plant managers, advanced undergraduate and graduate students, and researchers in the areas of pollution prevention and process integration. Allows the reader to establish pollution-prevention targets for a process and then develop implementable, cost-effective solutions Contains step-by-step procedures that can be applied to environmental problems in a wide variety of process industries Integrates pollution prevention with other process

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objectives Author is internationally recognized for pioneering work in developing mass integration science and technology

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 is recognized as one of the leading contributors to the global environmental burden of disease, even in countries with relatively low concentrations of air pollution. Air Pollution: Health and Environmental Impacts examines the effect of this complex problem on human health and the environment in different settings around the world. This handbook is an important and valuable source for engineers and researchers in

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the area of internal combustion engines pollution control. It provides an excellent updated review of available knowledge in this field and furnishes essential and useful information on air pollution constituents, mechanisms of formation, control technologies, effects of engine design, effects of operation conditions, and effects of fuel formulation and additives. The text is rich in explanatory diagrams, figures and tables, and includes a considerable number of references. An important resource for engineers and researchers in the area of internal combustion engines and pollution control Presents and excellent updated review of the available knowledge in this area Written by 23 experts Provides over 700 references and more than 500 explanatory diagrams, figures and tables

Air and water pollution occurs when toxic pollutants of varying kinds (organic, inorganic, radioactive and so on) are directly or indirectly discharged into the environment without adequate treatment to remove these potential pollutants. There are a total of 13 book chapters in three sections contributed by significant number of expert authors around the world, aiming to provide scientific knowledge and up-to-date development of various solid wastes based cost-effective adsorbent materials and its sustainable application in the removal of contaminates/pollutants from air, gas and water. This book is useful for the professions, practicing engineers, scientists, researchers, academics and undergraduate and post-graduate students' interest on this specific area. ? Key Features: • Exclusive compilation of information on use of industrial and agricultural

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waste based adsorbents for air and water pollution abatement. • Explores utilization of industrial solid wastes in adsorptive purification and agricultural and agricultural by-products in separation and purification. • Discusses cost-effective solid wastes based emerging adsorbents. • Alternative adsorbents in the removal of a wide range of contaminants and pollutants from water is proposed. • Includes performance of unit operations in waste effluents treatment.

Air pollution is a universal problem with consequences ranging from the immediate death of plants and people to gradually declining crop yields and damaging buildings.

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