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# Biological Process Design For Wastewater Treatment

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Biological Phosphorus Removal  
Biological Wastewater Treatment Processes  
Process Design Manual for Phosphorus Removal  
Biological Wastewater Treatment  
Process Design Manual for Upgrading Existing Wastewater Treatment Plants  
Design and Optimisation of Activated Sludge Systems  
Biological Process Design for Wastewater Treatment  
Activated Sludge and Aerobic Biofilm Reactors  
Design Guides for Biological Wastewater Treatment Processes  
Laboratory Studies of the Performance of the Contact Stabilization Process, Technical Report  
Performance of the Activated Sludge Process  
Solutions Manual  
Biological Wastewater Treatment Process Design Calculations  
Handbook of Biological Wastewater Treatment  
Biological Treatment of Industrial Wastewater  
Design Guides for Biological Wastewater Treatment Processes  
Biological Wastewater Treatment and Resource Recovery  
Mass and Heat Balances  
The Future of Effluent Treatment Plants  
WASTEWATER TREATMENT  
Biological Treatment of Industrial Wastewater  
Process Design and Control, Second Edition  
Biological Treatment Systems  
Design Guides for Biological Wastewater Treatment Processes  
Wastewater Treatment: Concepts And Design Approach  
Advanced Biological Treatment Processes for Industrial Wastewaters  
Process Design Manual, Wastewater Treatment Facilities for Sewered Small Communities  
Principles, Modelling and Design  
An Applied Guide to Water and Effluent Treatment Plant Design  
Wastewater Treatment Engineering  
Anaerobic Sewage Treatment  
Industrial Waste Treatment Process Engineering  
Design Guides for Biological Wastewater Treatment Processes  
Process Design, Performance and Economic Analysis Handbook Biological Wastewater Treatment Processes  
Industrial Waste Treatment Process Engineering  
Biological Process Design for Wastewater Treatment  
Activated Sludge

## Process Design of Biofilm Reactor for Biological Wastewater Treatment Physical Chemical and Biological Treatment Processes for Water and Wastewater

*Biological Process  
Design For Wastewater  
Treatment*

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### **ANNA SKYLAR**

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*Biological Phosphorus Removal IWA  
Publishing*

The report provides a set of guidelines for the design of biological processes for the treatment of municipal wastewater. The equations and factors which must be considered in the design of the activated sludge system, the contact stabilization system, trickling filter plants, aerated lagoons, and waste stabilization ponds are identified. The applicability and limitations of each system and mathematical model of each process are established. Operating data from treatment plants where sufficient applicable data were recorded were used to develop rate constants and other coefficients required for application of the mathematical models and other design of treatment plants. The significant design considerations are discussed, design procedures are outlined and design calculations are developed.

*Biological Wastewater Treatment*

*Processes Butterworth-Heinemann*

Water pollution occurs when toxic pollutants of varying kinds (organic, inorganic, radioactive and so on) are directly or indirectly discharged into water bodies without adequate treatment to remove such potential pollutants. Today's sources of these potential pollutants, which cause high deterioration of freshwater quality, are city sewage and industrial waste discharge, human agricultural practices, industrial waste disposal practices,

mining activities, civil and structural work activities and obviously natural contamination with climate change. When our water is polluted, it is not only devastating to the environment but also to human health. Therefore, development of water and wastewater treatment processes to alleviate water pollution has been a challenging and demanding task for engineers, scientists and researchers. Perhaps this is even more challenging for underdeveloped and developing countries, where water and wastewater treatment facilities, knowledge and infrastructure are limited. Water and wastewater treatment processes are broad and often multidisciplinary in nature, comprising a mixture of research areas including physical, chemical and biological methods to remove or transform various potential pollutants. This is in hopes to achieve acceptable water quality and satisfy governmental and environmental protection agencies laws and regulations. With these objectives, this book has been written in order to provide various research results and compilation and up-to-date development on the current states of knowledge and techniques in the broad field of water and wastewater treatment processes. Basically, this book will give a comprehensive understanding and advancement and application of various physical, chemical and biological treatment methods in the reduction of potential pollutants (inorganics/organics) from water and wastewater. There are a total 18 book chapters contributed by large number of expert authors around the world, covering the following main research areas: Physical, chemical and

biological water treatment processes such as adsorption, biosorption, coagulation/flocculation, electrocoagulation, denitration, membrane filtration/separation, photocatalytic reduction, advanced oxidation, nutrients removal by struvite crystallisation and nanotechnology; Physical, chemical and biological methods for municipal wastewater and industrial wastewater treatment plants such as primary-secondary sludge treatments, anaerobic digestions, aerobic treatment, activated sludge processes, dewaterability by flocculants, pre-treatments of sludge and rheology of sludge in wastewater treatment; Various operational units/equipment and process control of wastewater treatment plant.

*Process Design Manual for Phosphorus Removal Series on Environmental Science*

The report provides a set of guidelines for the design of biological processes for the treatment of municipal wastewater. The equations and factors which must be considered in the design of the activated sludge system, the contact stabilization system, trickling filter plants, aerated lagoons, and waste stabilization ponds are identified. The applicability and limitations of each system and mathematical model of each process are established. Operating data from treatment plants where sufficient applicable data were recorded were used to develop rate constants and other coefficients required for application of the mathematical models and other design of treatment plants. The significant design considerations are discussed, design procedures are outlined and design calculations are developed.

*Biological Wastewater Treatment* BoD – Books on Demand  
This thoroughly revised Second Edition

presents a comprehensive account of the principles of operation and design of wastewater treatment plants. Beginning with the basic concepts of treatment of wastewater and the design considerations required of an efficient treatment plant, the book moves on to spotlight the design criteria for domestic wastewater treatment units. In essence, the text gives the detailed procedures for design computations of all units of a wastewater treatment plant. It also describes the most common types of reactors used for physical operations and biological processes in wastewater treatment plants. Besides additional examples and exercises, this edition also includes a new chapter on “Disinfection of Wastewater”. The book is intended for the undergraduate students of Civil and Environmental Engineering. It will also be useful to the practising professionals involved in the design of wastewater treatment plants. Key Features • Provides several examples supported by graphs and sketches to highlight the various design concepts of wastewater treatment units. • Encapsulates significant theoretical and computational information, and useful design hints in Note and Tip boxes. • Includes well-graded practice exercises to help students develop the skills in designing treatment plants.

*Process Design Manual for Upgrading Existing Wastewater Treatment Plants*  
CRC Press

*The Future of Effluent Treatment Plants: Biological Treatment Systems* is an advanced and updated version of existing biological technologies that includes their limitations, challenges, and potential application to remove chemical oxygen demand (COD), refractory chemical oxygen demand, biochemical oxygen demand (BOD),

color removal and environmental pollutants through advancements in microbial bioremediation. The book introduces new trends and advances in environmental bioremediation with thorough discussions of recent developments. In addition, it illustrates that the application of these new emerging innovative technologies can lead to energy savings and resource recovery. The importance of respiration, nitrogen mineralization, nitrification, denitrification and biological phosphorus removal processes in the development of a fruitful and applicable solution for the removal of toxic pollutants from wastewater treatment plants is highlighted. Equally important is the knowledge and theoretical modeling of water movement through wastewater ecosystems. Finally, emphasis is given to the function of constructed wetlands and activated sludge processes. Considers different types of industrial wastewater treatments Introduces new trends in bioremediation Addresses the future of WWTPs

*Design and Optimisation of Activated Sludge Systems* CRC Press

Biological Wastewater Treatment: Principles, Model

*Biological Process Design for Wastewater Treatment* CRC Press

Basic Principles of Wastewater

Treatment is the second volume in the Biological Wastewater Treatment series, and focus on the unit operations and processes associated with biological wastewater treatment. The major topics covered are: .microbiology and ecology of wastewater treatment .reaction kinetics and reactor hydraulics .conversion of organic and inorganic matter .sedimentation .aeration. The theory presented in this volume forms

the basis upon which the other books in the series are built. The Biological Wastewater Treatment series is based on the book Biological Wastewater Treatment in Warm Climate Regions and on a highly acclaimed set of best selling textbooks. This international version is comprised by six textbooks giving a state-of-the-art presentation of the science and technology of biological wastewater treatment. Other books in the Biological Wastewater Treatment series: Volume 1: Wastewater characteristics, treatment and disposal Volume 3: Waste stabilisation ponds Volume 4: Anaerobic reactors Volume 5: Activated sludge and aerobic biofilm reactors Volume 6: Sludge treatment and disposal

*Activated Sludge and Aerobic Biofilm Reactors* PHI Learning Pvt. Ltd.

Biological Wastewater Treatment in Warm Climate Regions gives a state-of-the-art presentation of the science and technology of biological wastewater treatment, particularly domestic sewage. The book covers the main treatment processes used worldwide with wastewater treatment in warm climate regions given a particular emphasis where simple, affordable and sustainable solutions are required. This comprehensive book presents in a clear and informative way the basic principles of biological wastewater treatment, including theory and practice, and covering conception, design and operation. In order to ensure the practical and didactic view of the book, 371 illustrations, 322 summary tables and 117 examples are included. All major wastewater treatment processes are covered by full and interlinked design examples which are built up throughout the book, from the determination of wastewater

characteristics, the impact of discharge into rivers and lakes, the design of several wastewater treatment processes and the design of sludge treatment and disposal units. The 55 chapters are divided into 7 parts over two volumes: Volume One: (1) Introduction to wastewater characteristics, treatment and disposal; (2) Basic principles of wastewater treatment; (3) Stabilisation ponds; (4) Anaerobic reactors; Volume Two: (5) Activated sludge; (6) Aerobic biofilm reactors; (7) Sludge treatment and disposal. As well as being an ideal textbook, *Biological Wastewater Treatment in Warm Climate Regions* is an important reference for practising professionals such as engineers, biologists, chemists and environmental scientists, acting in consulting companies, water authorities and environmental agencies.

#### **Design Guides for Biological Wastewater Treatment Processes**

PHI Learning Pvt. Ltd.

The first part of the book is devoted to the activated sludge process, covering the removal of organic matter, nitrogen and phosphorus. A detailed analysis of the biological reactor (aeration tank) and the final sedimentation tanks is provided. The second part of the book covers aerobic biofilm reactors, especially trickling filters, rotating biological contractors and submerged aerated biofilters. For all the systems, the book presents in a clear and informative way the main concepts, working principles, expected removal efficiencies, design criteria, design examples, construction aspects and operational guidelines.

#### **Laboratory Studies of the Performance of the Contact Stabilization Process, Technical Report** BoD – Books on Demand

*Introduction to Wastewater Treatment Processes* considers various types of wastewater problems and the selection of proper mode of treatment, as well as the design of the equipment required. This book is divided into eight chapters and begins with a summary of the theory involved in the specific process, such as chemical kinetics and material and energy balances. The next chapter deals with the physical and chemical principles of wastewater treatment processes. These topics are followed by discussions of the important design parameters involved in the process and the determination of such parameters using laboratory-scale or pilot-plant equipment. Other chapters explore the development of a systematic design procedure for the treatment plant. The final chapters look into the mathematical modeling of biological treatment processes. This book will prove useful to practicing engineers and students.

Royal Society of Chemistry

Fundamentals of Process Kinetics;

Fundamentals of Microbiology;

Wastewater Characteristics and Flows;

Activated Sludge and Its Process

Modifications; Aerations; Treatment

Ponds and Aerated Lagoons; Attached

Growth Biological Treatment Processes;

Sludge Digestion.

#### **Performance of the Activated Sludge Process** IWA Publishing

Contents: Process Theory Kinetics and Sludge Quality Control: Activated Sludge

Process - Process Theory - Activated

Sludge Separation Problems -

References Activated Sludge Treatment of Municipal Wastewater U.S.A. Practice:

General Approach - Clarifier Design -

Aeration Tank (Reactor) Design -

Appurtenance Design - Configurations -

References

Solutions Manual CRC Press

This book provides useful information about bioremediation, phytoremediation, and mycoremediation of wastewater and some aspects of the chemical wastewater treatment processes, including ion exchange, neutralization, adsorption, and disinfection. Additionally, this book elucidates and illustrates the wastewater treatment plants in terms of plant sizing, plant layout, plant design, and plant location. Cutting-edge topics include wet air oxidation of aqueous wastes, biodegradation of nitroaromatic compounds, biological treatment of sanitary landfill leachate, bacterial strains for the bioremediation of olive mill wastewater, gelation of arabinoxylans from maize wastewater, and modeling wastewater evolution. *Biological Wastewater Treatment Process Design Calculations* IWA Publishing

Industrial Waste Treatment Process Engineering is a step-by-step implementation manual in three volumes, detailing the selection and design of industrial liquid and solid waste treatment systems. It consolidates all the process engineering principles required to evaluate a wide range of industrial facilities, starting with pollution prevention and source control and ending with end-of-pipe treatment technologies. Industrial Waste Treatment Process Engineering guides experienced engineers through the various steps of industrial liquid and solid waste treatment. The structure of the text allows a wider application to various levels of experience. By beginning each chapter with a simplified explanation of applicable theory, expanding to practical design discussions, and finishing with system Flowsheets and Case Study detail calculations, readers can "enter or

leave" a section according to their specific needs. As a result, this set serves as a primer for students engaged in environmental engineering studies AND a comprehensive single-source reference for experienced engineers. Industrial Waste Treatment Process Engineering includes design principles applicable to municipal systems with significant industrial influents. The information presented in these volumes is basic to conventional treatment procedures, while allowing evaluation and implementation of specialized and emerging treatment technologies. What makes Industrial Waste Treatment Process Engineering unique is the level of process engineering detail. The facility evaluation section includes a step-by-step review of each major and support manufacturing operation, identifying probable contaminant discharges, practical prevention measures, and point source control procedures. This theoretical plant review is followed by procedures to conduct a site specific pollution control program. The unit operation chapters contain all the details needed to complete a treatment process design.

#### **Handbook of Biological Wastewater Treatment** John Wiley & Sons

Description of three biological wastewater treatment processes, activated sludge, MBBR (moving bed biofilm reactor), and MBR (membrane bioreactor). Each of these processes is described and discussed in turn. For each of them there is background information about the process, a general description of the process, and description of the process design calculations for that process along with examples illustrating those calculations. Use of spreadsheets for the calculations is covered also, including numerous

screenshots of spreadsheets set up to make the various calculations discussed in the book.

### **Biological Treatment of Industrial Wastewater** IWA Publishing

Biological phosphorus (bio-P) removal has become a reliable and well-understood process within wastewater treatment, despite being one of the most complex processes in the activated sludge process. Extended fundamental and full-scale research has been carried out into the bio-P process and the state-of-the-art is described in this report. A summarising historical overview gives insight into the establishment of the appropriate microbiological and biochemical basis of the process and the development of bio-P configurations in practice. Aspects of the bio-P process that have a direct influence on the efficiency of phosphorus removal are subjected to an in-depth investigation. This report presents guidelines for design and dimensioning in order to introduce and/or optimise the bio-P process in practice. Twelve bio-P installations are extensively described and the operational results and experiences are related to existing bio-P knowledge and guidelines. Based on a number of parameters, a comparison is made between the described bio-P plants. A steady state model is verified with extensive periods of practical experience of the plants. The bio-P model, which is provided on CD-ROM (available for download here), offers a reliable insight into the bio-P process, coupled with sensitivity analyses regarding wastewater characteristics and process parameters for the anaerobic volume and the P-ortho concentration in the final effluent. The report ends with a systematic approach to the design of the bio-P process, based

on the background of the bio-P process itself, much practical experience and the analysis of operational bio-P plants. Also presented is a systematic approach to tackle operational aspects of the bio-P process in order to generate an acceptable low P effluent concentration. This optimisation of the bio-P process operation is supported by a decision diagram. Biological Phosphorus Removal will be an invaluable source of information for all those concerned with wastewater treatment, including plant managers, process designers, consultants and researchers.

### **Design Guides for Biological Wastewater Treatment Processes**

Elsevier

Biological Process Design for Wastewater Treatment Prentice Hall  
Biological Process Design for Wastewater

Treatment Solutions Manual Biological Wastewater Treatment Processes Mass and Heat Balances CRC Press

[Biological Wastewater Treatment and Resource Recovery](#) CRC Press

This comprehensive text provides the reader with both a detailed reference and a unified course on wastewater treatment. Aimed at scientists and engineers, it deals with the environmental and biological aspects of wastewater treatment and sludge disposal. The book starts by examining the nature of wastewaters and how they are oxidized in the natural environment. An introductory chapter deals with wastewater treatment systems and examines how natural principles have been harnessed by man to treat his own waste in specialist reactors. The role of organisms is considered by looking at kinetics, metabolism and the different types of micro-organisms involved. All the major biological process groups are examined in detail, in highly referenced

chapters; they include fixed film reactors, activated sludge, stabilization ponds, anaerobic systems and vegetative processes. Sludge treatment and disposal is examined with particular reference to the environmental problems associated with the various disposal routes. A comprehensive chapter on public health looks at the important waterborne organisms associated with disease, as well as removal processes within treatment systems. Biotechnology has had an enormous impact on wastewater treatment at every level, and this is explored in terms of resource reuse, biological conversion processes and environmental protection. Finally, there is a short concluding chapter that

looks at the sustainability of waste water treatment. The text is fully illustrated and supported by over 3000 references. Mass and Heat Balances IWA Publishing  
Biological Phosphorus Removal Activated Sludge Pro  
*The Future of Effluent Treatment Plants* Elsevier  
The focus of the book is on how to use mass and heat balances to simulate and design biological wastewater treatment processes. All the main processes for biological wastewater treatment are covered viz. activated sludge processes for carbon and nitrogen removal, anaerobic digestion, sequencing batch reactors, and attached growth processes.