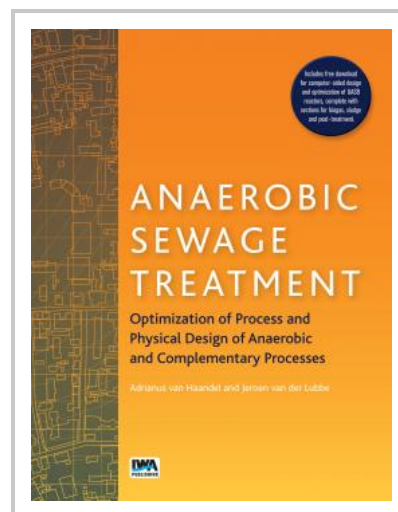


# Anaerobic Sewage Treatment: Optimization of process and physical design of anaerobic and complementary processes

Anaerobic digestion has been applied increasingly over the last decades for sewage treatment, especially in regions with a warm climate. In this book, it is shown that the Upflow Anaerobic Sludge Blanket (UASB) reactor is rightfully the most applied full-scale system, because it has a superior treatment efficiency and can be operated at a shorter retention time than other modern anaerobic wastewater treatment systems.

Anaerobic Sewage Treatment: Optimization of Process and Physical Design of Anaerobic and Complementary Processes focuses on process design and deals with start-up procedures and steady-state performance of UASB reactors, as well as the influence of operation on reactor performance. A process model is introduced that allows for optimized design of a UASB reactor as a function of sewage characteristics, temperature and sludge age. It enables to predict the reactor performance and optimize its performance for any set of sewage characteristics in terms of biogas production and residual organic material in the effluent and sludge, but it also highlights the limitations of anaerobic treatment. Design- and engineering flaws are discussed and the lessons learned transpire in the extensive chapter on the physical design of the reactor is extensively discussed, including the most important element the gas-liquid-solids separator. This will enable the reader to rationally select the dimensions of the reactor. Biogas production rates and -composition, treatment and utilization as well as rational procedures to estimate excess sludge production and design sludge drying beds are presented. Finally, post-treatment of anaerobic effluent in activated sludge systems and polishing ponds are discussed in depth.



Written primarily as a textbook to be used at higher education institutes for educational purposes, this important new publication will also of interest to practitioners and academics.

Readers of this book can download a spreadsheet for computer-aided design and optimization of UASB reactors, complete with sections for biogas, sludge and post-treatment, that will show the reader alternative designs of all aspects of UASB reactor design and complementary treatment units with every mouse click.

Appendix A3. Calculation procedure for a conventional UASB reactor (UASBc) treating municipal sewage is a downloadable file that contains three spreadsheets, for UASBb, UASBc and UASBr design. Click [here](#) [1] to download.

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