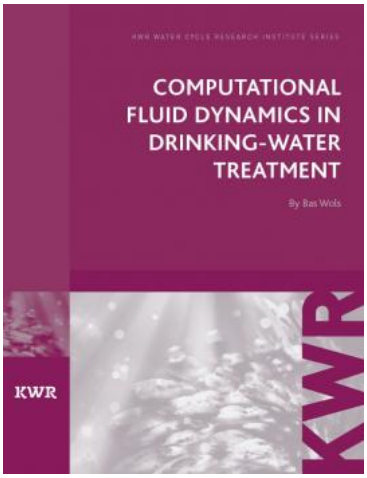
Computational Fluid Dynamics in Drinking Water Treatment



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Computational Fluid Dynamics (CFD) uses advanced numerical models to predict flow, mixing and (bio)-chemical reactions. In drinking water engineering, CFD is increasingly applied to predict the performance of treatment installations and to optimise these installations.

A lack of understanding of the hydraulics in drinking water treatment systems has resulted in suboptimal design of installations. The formation of unwanted disinfection-by-products and the energy consumption or use of chemicals is therefore higher than necessary. The aim of this work is to better understand the hydraulic and (bio)-chemical processes in drinking water treatment installations using experimental and numerical techniques. By combining these techniques, CFD modelling is further developed as a tool to evaluate the performance of these installations. This leads to new insights in the applicability of models in ozone and UV systems, and new insights in design concepts of these systems.

CFD modelling proves to be a powerful tool to understand the hydrodynamic and (bio)-chemical processes in drinking water systems. If applied properly, accounting for the complex turbulent motions and validated by experiments, this tool leads to a better design of UV reactors, ozone systems and other systems dictated by hydraulics.

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