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Special Issue Reprint

## Industrial CFD and Fluid Modelling in Engineering, 2nd Edition

**Edited by: Francesco De Vanna and Ernesto Benini**

This Reprint presents a curated selection of recent research articles illustrating the evolving role of computational fluid dynamics (CFD) in industrial engineering. It reflects the state of the art in industrial CFD and fluid modeling, highlighting how advances in numerical methods, computational power, and modeling strategies enable the efficient and reliable analysis of complex real-world flows. The contributions cover a broad range of industrial applications, including mixing and multiphase flows, turbomachinery, aerodynamics, marine and offshore engineering, indoor air quality, and metallurgical processes. Several studies address practical design and optimization problems, demonstrating how CFD supports engineering decision-making by balancing performance, efficiency, and operational constraints. Others focus on methodological developments such as improved turbulence modeling, hybrid and reduced-order approaches, and the integration of CFD with machine learning and co-simulation frameworks.

A recurring theme is the balance between accuracy and computational efficiency. The collected works show how validated models, innovative numerical strategies, and multiscale approaches can reduce simulation costs while maintaining predictive reliability, making CFD increasingly accessible for industrial workflows. Overall, this Reprint provides a concise snapshot of current industrial CFD practices, encompassing both established applications and emerging directions in simulation-driven engineering.

