Aalborg Universitet

AALBORG UNIVERSITY

CFD-Benchmarks

Nielsen, Peter V.

Published in:
Euroacademy on Ventilation and Indoor Climate

Publication date:
2008

Document Version
Publisher's PDF, also known as Version of record

Link to publication from Aalborg University

Citation for published version (APA):
Nielsen, P. V. (2008). CFD-Benchmarks. In P. Stankov (Ed.), *Euroacademy on Ventilation and Indoor Climate: Course 5: CFD Based Design of Indoor Environment* (pp. 70). The Center for Research and Design in Human Comfort, Energy and Environment, CERDECEN, Technical University of Sofia.

General rights
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

Take down policy
If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from vbn.aau.dk on: September 16, 2025

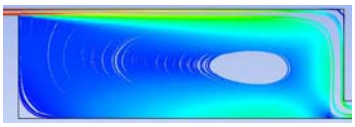
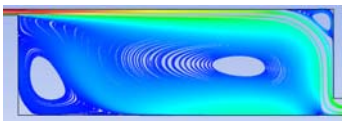
CFD-Benchmarks

Peter V. Nielsen, Aalborg University, Denmark

Two-dimensional benchmark test

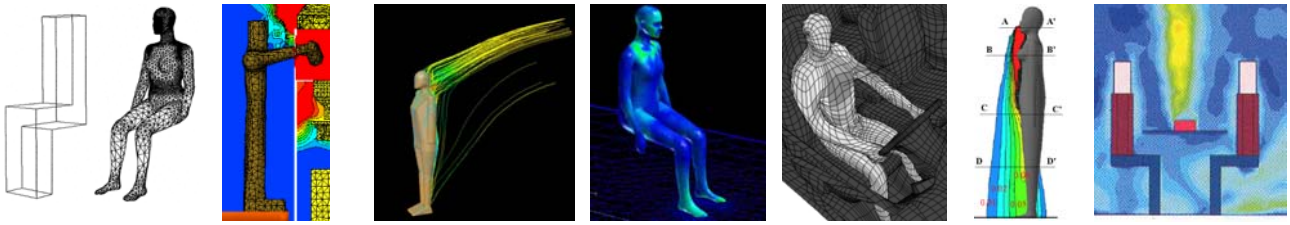
The two-dimensional benchmark test, also called the "IEA 2D test case" was defined in 1990 to be used in the IEA Annex 20 work, but there have been a very large number of papers that use this geometry in other CFD work.

We believe that it is attractive to a new user to stick to a geometry used by a number of other researchers. It is possible to compare the results with other authors' results (other turbulence models, other numerical schemes, etc.). The basic knowledge behind the benchmark test has thus expanded during the years and made the test case more useful.

Benchmark tests of flow around manikins

Research centres around the world have developed many different configurations to represent a computer simulated person. The manikins are very different with respect to size, form, heat emission details, turbulence models, etc. The variation may reflect the various possibilities in software and different standards for persons from country to country as shown in the following examples:



To support the development of a CFD Manikin, we have introduced three benchmark tests for the boundary conditions around a CFD manikin. One test is for mixing ventilation and one is for displacement ventilation, and the last one is for thermal comfort.

The idea behind a benchmark test, which define the boundary conditions around a CFD manikin, is the following: When you have tested your **own idea** of a CFD manikin under the **same** boundary conditions as a number of other researchers, you can make comparisons, and perhaps make some new decisions on geometrical details of your design, turbulence model, type of grid etc. This may hopefully lead to simplifications of a CFD manikin.

Two grids for CFD manikins are also given on the home page.

A number of seminars, forums and workshops have taken place during the years as shown in the home page.