



Published on *CD-adapco* (<http://www.cd-adapco.com>)

[Home](#) > Applications of Large Eddy Simulations in Nuclear Field

---

## Applications of Large Eddy Simulations in Nuclear Field

Nuclear Engineering and Design

**Pages:**

429-439

**Volume:**

240

**Issue:**

2

**Date:**

Monday, February 1, 2010

**DOI:**

<http://dx.doi.org/10.1016/j.nucengdes.2008.08.018>

This paper presents the use of large eddy simulations for calculating turbulent flows in the nuclear field. It focuses on the knowledge of temperature or pressure fluctuations, required to address issues such as thermal fatigue or vibrations. The different subgrid models used and their integration in the commercial CFD software STAR-CD are described. A representative set of applications performed ? validation and industrial cases ? in the last 15 years is presented. The flow configurations are mainly tee junctions, but also cross-flows over obstacles and shear layers, with water, sodium and gas as fluids. The comparison with experimental results highlights the good behavior of large eddy simulations, in terms of averaged fields, amplitude and frequency of fluctuations. However, this benefit requires very fine grid modelings, notably for the heat transfer at wall, and limits the application to small domains. The paper stresses on the high importance of the upstream boundary conditions. Finally, the last section summaries the state of art and the future needs for developments.

**Rights:**

2008 Elsevier B.V.

**Author Name:**

J.P. Simoneau

J. Champigny

O. Gelineau

**Industries:**

[Energy](#)<sup>[1]</sup>

**Products:**

[STAR-CD](#)<sup>[2]</sup>

CD-adapco is the world's largest independent CFD focused provider of engineering simulation software, support and services. We have over 30 years of experience in delivering industrial strength engineering simulation.

---

**Source URL:** <http://www.cd-adapco.com/journal/applications-large-eddy-simulations-nuclear-field>

**Links:**

[1] <http://www.cd-adapco.com/industries/energy>

[2] <http://www.cd-adapco.com/products/star-cd%C2%AE>