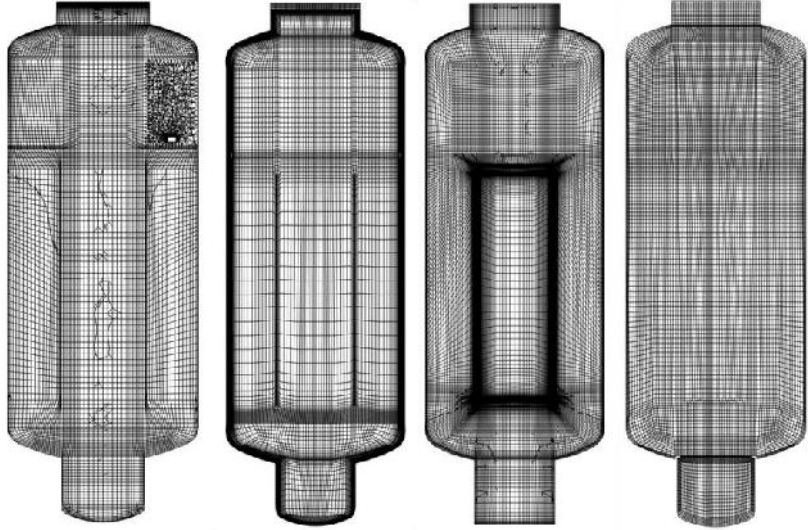


SUpport to SAfety ANalysis of Hydrogen and Fuel Cell Technologies

Verification type	Numerical Solution
Database reference	NUM-4
Topic / Application	Nuclear Reactor Safety Hydrogen Release
Physics	Jet release Stratification
Summary	Numerical verification is undertaken for eight codes (versions of CFX, Fluent, and codes APROS and MELCOR in a blind test applied to Hydrogen release and stratification of relevance to Nuclear Reactor Safety.
Description	<p>A blind and open simulation benchmark including eight participants was evaluated using data from the THAI test TH24.3.</p> <p>During the experimental transient the steam air stratification is first generated and then diluted by a thermal driven natural convection. Varying concentration with height in reactor vessel is a primary output used for comparison.</p> <p>Subsequently a set of open simulations were undertaken i.e. where practitioners were aware of the experimental data to be reproduced.</p>
Case Title	SIMULATION BENCHMARK BASED ON THAI-EXPERIMENT ON DISSOLUTION OF A STEAM STRATIFICATION BY NATURAL CONVECTION
Authors	M. Freitag, E. Schmidt, S. Gupta, G. Poss
Year	2012
Online reference	freitag@becker-technologies.com

<p>Case image</p>	 <p>Comparison of grids used during blind calculations</p>
<p>Governing equations</p>	
<p>Results</p>	<p>Concerning the steam stratification most of the codes were able to predict the increase of steam concentration at the lower vessel sections qualitatively correct as well as the build-up of the stratification in the upper vessel section. However, the strength of the stratification, the duration for its erosion and the associated mixture of water vapour at lower levels lacks good prediction quality</p> <p>For the closed simulations, one code was unable to reproduce main configuration of the release cloud.</p> <p>CFD results from the blind simulation were no better than those from a lumped-parameter model.</p> <p>With the open simulations, a key finding was that even with identical codes a “user effect” – i.e. the simulation set up – of +- 20% was apparent.</p>