

Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Investigation of the Nozzle Exit Conditions Influence on the Near Field and Transition Regions of Turbulent Buoyant Jets BORIS CHERNYAVSKY, Institute for Integrated Energy Systems, and Department of Mechanical Engineering, University of Victoria, Victoria, BC, V8W 3P6, Canada, FREDERIC PENEAU, CERAM, Euro American Institute of Technology, Sophia Antipolis, 06902, France, NED DJILALI, PETER OSHKAI, Institute for Integrated Energy Systems, and Department of Mechanical Engineering, University of Victoria, Victoria, BC, V8W 3P6, Canada — Influence of the nozzle exit conditions on the development of the subsonic round turbulent buoyant jet in the near-field and transition to self-similarity regions has been studied. In particular, influence of the nozzle shape, velocity profile and turbulence parameters at the nozzle exit has been investigated. Large Eddy Simulations were performed for several gases Reynolds numbers, the numerical results being validated by comparison against reference experimental data. The dependence of the potential core destabilization mode on the nozzle exit condition has been studied. It was demonstrated that the variation in the nozzle conditions has significant effect on the global jet evolution parameters, such as the virtual origin and potential core collapse locations, and on the velocity decay rate in the self-similar region.

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Date submitted: 06 Aug 2008

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