

CO₂ Dispersion after Combustion

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This study deals with a numerical simulation of CO₂ dispersion after combustion of Ethanol. Numerical simulations were carried out with Reynolds averaged Navier-Stokes (RANS) approach. The mixture fraction theory was used for modeling of combustion. There were tested k- ϵ and k- ω turbulent models. Results obtained from numerical simulations were compared with results from an experiment.

Keywords: CFD, indoor air quality, non-premix combustion, carbon dioxide, ethanol

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References

- [1] ANDERSEN, I., LUNDQVIST, GR., MOLHAVE, L. (1975). Indoor air pollution due to chipboard used as a construction material, *Atmospheric Environment* [ISSN 1352-2310], 9(12): 1121-1127.
- [2] ZHANG, Z., CHEN, Q. (2006). Experimental measurements and numerical simulations of particle transport and distribution in ventilated rooms, *Atmospheric Environment* 40 3396–3408,
- [3] HRICOVA, J., SUJOVA, E., SEMANOVA, P. (2014). Monitoring the Air Quality in Conventional Wet Machining, *Manufacturing Technology*, 14, 166-172.
- [4] LAUNDER, B. E., SPALDING, D. B., (1974). The numerical computation of turbulent flows. *Computer Methods in Applied Mechanics and Engineering*, 3, 269-289.
- [5] PETERS, N. (2000). *Turbulent Combustion*, Cambridge University Press.
- [6] ROCHAYA, D. (2007). Numerical simulation of spray combustion using bio-mass derived liquid fuels, *PhD thesis*, Cranfield.
- [7] KULPERS, J. A. M., VAN SWAAIJ, W. P. M. *Computational fluid dynamics applied to chemical reaction engineering*, *Advances in Chemical Engineering* 24, 227-319.

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