

# Aerothermal Simulation of a Refrigerated Truck Under Open/Closed-Door Cycles

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## Abstract

Heat transfer inside a refrigerated truck is a key phenomenon that governs the temperature inside the truck and the regulation of the cooling system. Up to now, a lot of experimental studies ([Tso et al., 02]) have been carried out to assess the effect of opening the door and to minimize the external heat transfer with fan air curtain. Together with AIR LIQUIDE, the world leader in gases, technologies and services for Industry and Health, SIMTEC, a French COMSOL certified consultant company, has developed a numerical model in COMSOL Multiphysics® software to simulate the heat transfer phenomena occurring during the use of the refrigerated truck, considering both open- and closed-door periods. The model is based on a coupling between CFD ( $k$ - $\epsilon$ / $k$ - $\omega$  models) and heat transfer. Comparison with experimental results shows a reasonable agreement in terms of temperature inside the volume and at some specified points. This work demonstrates the feasibility of using COMSOL to model non-isothermal turbulent flow.

## Reference

1. C.P. Tso et al., Experimental study on the heat and mass transfer characteristics in a refrigerated truck Int. Journal of Refrigeration 25, 2002, pp340-350