

Thermal Natural Convection Simulations with COMSOL Multiphysics® in Comparison with Measurements

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Abstract

In a laboratory setup a horizontal rod is heated on one side. By natural convection a stable temperature pattern is developed. Using the Nusselt formulation of the natural convection of cylindrical rods, the temperature distribution can be calculated. Only a good match of the simulations and the measurements can be reached when taking into account all the non-linear physics in the system. In this way the simulations are within 4% of the measurements. A nice showcase of multiphysics simulations.

Reference

F.P. Incropera, D.P. de Witt, Fundamentals of heat and mass transfer. third ed. 1990. John Wiley & Sons.