

Abstract Submitted  
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**The effect of buoyancy on vortex shedding in the wake of a heated circular cylinder** ZHEYAN JIN, HUI HU, Department of Aerospace Engineering, Iowa State University — Particle Image Velocimetry (PIV) and Planar Laser Induced Fluorescence (PLIF) techniques were used to conduct velocity and temperature measurements in the wake of a heated cylinder to investigate the effect of buoyancy on wake behavior behind the heated cylinder. The experiment was conducted with the heated cylinder installed horizontally in the middle of a vertical water channel and approaching forced flow being downward, which results in the direction of buoyancy force being opposite to that of the approaching forced flow. The temperature and Reynolds number of the approaching forced flow were held constant during the experiment. The temperature of the heated cylinder was adjusted to let the Richardson number, which represents a ratio of buoyancy to inertial forces, varying from 0 (unheated cylinder) to about 3.8. The PIV and PLIF measurement results show that the wake behavior behind the heated cylinder changes dramatically as the Richardson number increasing. The effect of buoyancy on the wake behavior is quantified in terms of mean and fluctuation velocity and temperature distributions, vortex shedding pattern and frequency, wake closure length, drag coefficient and averaged Nusselt number of the heated cylinder.

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