

Abstract Submitted
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Influence of shroud–chimney configuration on heat transfer from horizontal cylinder: Experimental and numerical investigation.¹ GHALIB Y. KAHWAJI², MOHAMED A. SAMAHA, Rochester Institute of Technology - Dubai, OMAR ALI, Zakho University, MOHANAD TAHA ALI, Rochester Institute of Technology - Dubai — In our prior study, the novel shroud–chimney configuration SCC (semicircular shrouds and expended chimney) has been numerically demonstrated to passively augment natural convection heat transfer from a horizontal cylinder. However, in order to implement such a configuration for practical utilizations, the heat flow properties must be experimentally observed and understood. In this work, well-controlled experiments are carried out to show the impact of SCC on the heat transfer from a horizontal cylinder subjected to constant measured heat fluxes. Circumferential temperature measurements at the cylinder surface, shrouds and ambient are performed using thermocouples. The emissivity of the cylinder is measured using a thermal camera that is needed for estimating the heat radiation. All presented cases are numerically simulated for validation. The measurements show that SCC promotes the convection heat transfer from the cylinder agreeing well with the numerical results. This validates the capability of this simple inexpensive passive method for practical uses. Furthermore, a parametric study is presented to show the optimum range of the design parameters for the best SCC performance.

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