

Analysis of Non-dimensional Numbers of Fluid Flowing Inside Tubes of Flat Plate Solar Collector

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ABSTRACT

The aim of this paper is to discuss the non-dimensional numbers of fluid flowing through inside the tubes of flat plate solar collectors. Empirically, to abate the cost and energy consumption or to boost up the performance and efficiency of solar collectors; computational simulation plays a vital role. In this study, CFD numerical simulation of aqueous ethylene glycol (60% water + 40%) ethylene glycol fluid flow has been done with ANSYS 15.0. Non-dimensional numbers such as surface Nusselt number, Skin friction coefficient and Prandtl number of fluids have been observed based on empirical and experimental properties. The geometry of design has been prepared using Solidworks software in accordance with the actual experimental model. The analysis revealed that the Nusselt number showed effective convection behavior, the skin friction coefficient was positive while the Prandtl number was large for both properties of aqueous ethylene glycol.

KEYWORDS: Aqueous ethylene glycol; Nusselt number; Prandtl number; Skin friction coefficient

DOI: https://doi.org/10.1007/978-981-15-7309-5_12

ACKNOWLEDGMENTS

The authors would like to thank to University Malaysia Pahang (UMP), Ministry of Higher Education (MOHE) of Malaysia for the Research Grants RDU180328, 190323 and Bangabandhu Science and Technology Fellowship Trust (Bangladesh) to provide financial assistance and laboratory facilities to carry out this study.