**Abstract**

Numerical and experimental investigation is carried out to study the effect of combined vortex generator and nanofluids on turbulent heat transfer and fluid flow characteristics in an equilateral triangular duct. A triangular duct provides a lower heat transfer rate and lower pressure drop compared to other duct configurations. The improvement of heat transfer of these ducts increases their importance for providing higher heat transfer and lower pressure drop. Two different types of nanoparticles, namely Al2O3 and SiO2, suspended in distilled water with two particle concentrations are successfully prepared and experimentally tested. The numerical and experimental results show dramatic heat transfer enhancement by using a vortex generator and nanofluids, simultaneously accomplished with a moderate increase in the friction factor. A low deviation has been seen between the present numerical and experimental results.