Heat Transfer Enhancement With Elliptical Tube Under Turbulent Flow Tio2-Water Nanofluid

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ABSTRACT
Heat transfer and friction characteristics were numerically investigated, employing elliptical tube to increase the heat transfer rate with a minimum increase of pressure drop. The flow rate of the tube was in a range of Reynolds number between 10000 and 100000. FLUENT software is used to solve the governing equation of CFD (continuity, momentum and energy) by means of a finite volume method (FVM). The electrical heater is connected around the elliptical tube to apply uniform heat flux (3000 W/m2) as a boundary condition. Four different volume concentrations in the range of 0.25% to 1% and different TiO2 nanoparticle diameters in the range of 27 nm to 50 nm, dispersed in water are utilized. The CFD numerical results indicate that the elliptical tube can enhance heat transfer and friction factor by approximately 9% and 6% than the circular tube respectively. The results show that the Nusselt number and friction factor increase with decreasing diameters but increasing volume concentrations of nanoparticles.

KEYWORDS: nanofluid, CFD, elliptical tube, friction factor, FLUENT

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