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Experimental determination of turbulent forced convection heat transfer and friction factor with SiO₂ nanofluid



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ABSTRACT

The heat transfer coefficients and friction factor with SiO₂/water nanofluid up to 4% particle volume concentration are determined for flow in a circular tube under constant heat flux boundary condition. Experiments are undertaken in the Reynolds number range of 5000–27,000 at a bulk temperature of 30 °C. The Nusselt number and friction factor at 3.0% nanofluid particle concentration is respectively greater than the values of water by 32.7% and 17.1%. The pressure drop increases with particle concentration up to 3.0% and decreases thereafter. The nanofluid friction factor decreases with increase in Reynolds number at any concentration. The particle concentration at which SiO₂ nanofluid gives maximum heat transfer has been experimentally determined.

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