

Influence of nanofluid Properties on Turbulent Forced Convection Heat Transfer in different base liquids

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Abstract

The turbulent characteristics of heat transfer and flow have been determined by applying the Van Driest model of the eddy diffusivity for water and ethylene glycol-based nanofluids. The properties of CuO, Al₂O₃ and SiO₂ nanofluids in two base liquids viz., water and EG-water mixture with the ratio of 60:40 are considered for various concentrations and bulk temperature ranges. Based on the observations, it is concluded that numerical outcomes are validated with experimental measurements for heat transfer properties. It is monitored that SiO₂ reaches a higher temperature gradient in comparison to CuO at a similar temperature and concentration in EG-water with the mixture of 60: 40. The gradients are greater for the EGW mixture compared to water-based nanofluids. However, the water-based nanofluids have higher heat transfer coefficients compared to EG-water nanofluid at identical flow velocities.

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