Review Report Of

Computational fluid dynamics analysisof nanofluids base tube in tube heat exchangers

A thesis submitted in the partial fulfilment of the requirement for the award for the degree of

BACHELOR OF TECHNOLOGY

IN

MECHANICAL ENGINEERING

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CERTIFICATE

This is to certify that project report is entitled "**CFD analysis of nanofluid base tube in tube heat exchangers**" was carried out by, **BESETTY VINAY(17811A0307), KOLLU SAINADH(17811A0332), KARRI SAI AKHIL(17811A0326), SHAIL MUBEEN(17811A0357),** in partial fulfilment of requirements for the award of the degree of bachelor of technology in **"MECHANICAL ENGINEERING"** by Jawaharlal Nehru Technological university, Kakinada During the years 2017-2021.

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ABSTRACT

Properties that mainly determine the thermal performance of a liquid for heat transfer applications are the thermal conductivity, viscosity, specific heat and density. Fluids such as air, water, ethylene glycol, and mineral oils are typically used as heat transfer media in applications such as power generation, chemical production, automobiles, air conditioning and refrigeration. However, their heat transfer capability is limited by their very low thermal conductivity. For enhancement of thermal conductivity of these fluids, much attention has been paid in the past decade to a new type of composite material i.e., nanofluids.

Nanofluids are the suspensions of nanoparticles in base fluids. Nanofluids are promising fluids for heat transfer enhancement due to their anomalously high thermal conductivity. Nanoparticles have unique features different from conventional solids liquid mixtures in which mm or micrometre sized particles of metals and non-metals are dispersed. Due to their excellent characteristics nanofluids find wide applications in enhancing heat transfer. A nanoparticles suspension is considered as a three-phase system including the solid phase (Nanoparticles), the liquid phase (fluid media), and the interfacial phase, which contributes significantly to the system properties because of their extremely high surface-to-volume ratio in nanofluids. This study provides an experimental review on the effect of nanoparticle volume concentration on convective heat transfer. It was seen that adding nanoparticles to the coolant significantly influences the heat transfer coefficient in turbulent flow region.

At present, there is significant discrepancy in nanofluid thermal conductivity data in the literature. Experimental studies are discussed in terms of the effects of some parameters such as particle volume fraction, particle size, and temperature on the thermal conductivity of nanofluids. Enhancement mechanisms proposed to explain nanofluid thermal conductivity are also summarized and associated thermal conductivity models are explained. Predictions of some thermal conductivity models are compared with the experimental data and discrepancies are indicated.