

A Detailed Report on
**Investigating Thermophysical Properties of Ethylene Glycol
Nanofluids**

A Project report submitted for the partial fulfillment of the requirements for
award of Degree of
BACHELOR OF TECHNOLOGY
IN
MECHANICAL ENGINEERING

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CERTIFICATE

This is to certify that the project entitled **“INVESTIGATING THERMOPHYSICAL PROPERTIES OF ETHYLENE GLYCOL NANOFLUIDS”** is the record of the work carried out by VINDULA SAI ANANTH LOHITH KUMAR (21815A0365), YELLAPU KOMAL RAM (21815A0346), NALLA SIDDHU KUMAR (21815A0330), TAMALAPAKULA JOEL MATHEW (21815A0342) & SUGGU CHAITANYA REDDY (21815A0341) students of final year B. Tech in the department of Mechanical engineering. This work is done for the partial fulfillment for the award of BACHELOR OF TECHNOLOGY in Mechanical Engineering during the year 2023-2024.

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ABSTRACT

Investigating Thermophysical Properties of Ethylene Glycol Nanofluids

The primary aim of our study is to assess the thermo-physical properties and heat transfer characteristics of solar thermic fluids containing surface modified Al_2O_3 nano particles, with Mono-ethylene-glycol as the base fluid. Al_2O_3 nanoparticles were dispersed in ethylene glycol in weight fractions of 0.125%, 0.25%, 0.5% and 1%. The investigation of zeta potential fluctuation is conducted to analyse the stability of dispersion for a duration of 30 days. The thermal conductivity and dynamic viscosity were determined using the C-therm thermal analyser and the Brookfield viscometer, respectively. A notable increase in thermal conductivity ranging from 15 to 24% was seen when the basic fluids were augmented with Al_2O_3 nanoparticles. An increase in viscosity was seen within the temperature range of 50 to 70 °C, whereas its significance was found to diminish in higher temperature ranges. A thorough mathematical equation was established to accommodate various weight fractions of Al_2O_3 nanoparticles and temperature of medium

The present work also deliberates the heat transfer performance of the base fluids and corresponding nanofluids suspended with various concentrations of Al_2O_3 nano particles.