ABSTRAK

Heat exchanger merupakan alat yang berfungsi mentransfer panas dari fluida bersuhu tinggi ke fluida bersuhu rendah. Jenis shell and tube heat exchanger banyak digunakan karena efisiensinya tinggi dan desainnya kompak. Penelitian ini bertujuan menganalisis performa perpindahan panas pada sistem tersebut menggunakan simulasi numerik berbasis matlhab tanpa eksperimen. Fokus utama adalah menganalisis suhu akhir air sebagai fluida panas, suhu dinding tabung , dan suhu udara sebagai pendingin. Simulasi dilakukan dengan variasi koefisien perpindahan panas sebesar 205–215 $W/m^2 \cdot °K$, yang dipilih agar hasil distribusi suhu tetap efisien dan tidak melebihi batas fisik sistem. Hasil menunjukkan bahwa variasi koefisien perpindahan panas sangat memengaruhi distribusi suhu, dan pemilihan nilai yang tepat penting untuk mengoptimalkan performa sistem. Simulasi ini memberikan alternatif metode analisis tanpa memerlukan banyak pengeluaran biaya.

Kata kunci: mathlab, *heat exchanger, shell and tube heat exchanger*

ABSTRACT

A heat exchanger is a device that functions to transfer heat from a high-temperature fluid to a low-temperature fluid. The shell and tube heat exchanger is widely used due to its high efficiency and compact design. This study aims to analyze the heat transfer performance of the system using numerical simulation based on mathlab without physical experimentation. The main focus is to analyze the exit temperature of water as the hot fluid, the tube wall temperature, and the air temperature as the cooling medium. The simulation is conducted with variations in the heat transfer coefficient ranging from 205 to 215 W/m²·°K, chosen to maintain efficient temperature distribution and avoid exceeding the system's physical limits. The results show that variations in the heat transfer coefficient significantly affect the temperature distribution, and selecting the appropriate value is essential to optimize system performance. This simulation provides an alternative analysis method without requiring high costs.

Keywords : mathlab, heat exchanger, shell and tube heat exchanger