Performance Evaluation of Heat Exchangers in a Polyethylene Plant

Barinaadaa Thaddeus Lebele-Alawa*, Innocent Okpara Ohia

Department of Mechanical Engineering, Rivers State University of Science and Technology, Port-Harcourt, Nigeria

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Abstract

This paper evaluates the performance of three heat exchanger units (2-E-2301, 3-E-901 and 3-E-401) in a polyethylene plant. Steady state monitoring and direct collection of data from the equipment in the plant were performed and the data were analyzed by using energy equations to determine the overall heat transfer coefficient, heat duty, temperature and pressure range of hot and cold fluids, capacity ratio and effectiveness. The results show that for 2-E-2301, the overall heat transfer coefficient is over 50 percent less than the design figure and the heat duty is over 75 percent than the design figure. For the 3-E-901 the heat duty and the overall heat transfer are over 75 percent less than the design figure which was traceable to fouling. This affected the effectiveness, capacity ratio and temperature range of the hot and cold fluid. For the 3-E-401, the heat duty was found to be within the limit of design figure. The temperature difference in the hot fluid side and the capacity ratio were within the limits of the design figure. Thus, the results show qualitative performance evaluation of the heat exchangers.

Keywords: heat-exchanger, heat, performance, energy

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* Corresponding author. E-mail address: lebele-alawa.thaddeus@ust.edu.ng

Tel.: +2348023253494

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