Faculty of Engineering- Fayoum University

Mechanical Engineering Department

كلية الهندسة- جامعة الفيوم

قسم الهندسة الميكانيكية

ملخص البحث باللغة الإنجليزية:

"Experimental Investigation of Air Injection Effect on the Performance of Horizontal Shell and Multi-Tube Heat Exchanger with Baffles"

This paper presents a laboratory experiments for investigation of air injection into the shell side of shell-and multi-tube heat exchanger aims to augment the thermal performance. The air has been injected inside the heat exchanger shell with two methods (cross injection from shell wall and parallel injection from the shell front side) and different air flow rates to estimate the optimum performance conditions. The air and shell side water flow rates were changed between 1 and 5 LPM and 12–21 LPM respectively with constant tube side water flow rate. Also, pressure loss between the shell side outlet and inlet caused by air bubble injection was measured to know the power loss in heat exchangers under enhancement technique. The results presented that the injected air flow rate and injection method have a significant impact on the heat exchanger performance enhancement. And also presented that, increase of air flow rate increases the overall heat transfer coefficient (U). The effect of air bubble injection on effectiveness (ε), U and NTU of heat exchanger in first method flow was more than the second method for all test conditions. The shell side pressure loss for the cross injection was higher than in the case of parallel injection from. The augmentation on the U caused by cross air injection into the heat exchanger shell was 131–176% depending on air and shell side water flow rates.