Experimental study of the Effect of air bubble injection on the Exergy and number of thermal units variation of a horizontal helical shell and coiled tube heat exchanger

Majal aanshar:
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Khalashe majele:
The present study investigates experimentally the air bubble injection and air flow rate effects on number of thermal units (NTU) and performance of a horizontal shell and coiled tube heat exchanger. Also the exergy loss due to air bubble injection and air flow rate has been studied. Unlike previous works, the air flow rate is considered as a variable parameter affecting the NTU and hence on the exergy loss. Besides, a new method is proposed to inject the air bubbles into the shell side of the heat exchanger. Results showed a significant augmentation in effectiveness and NTU of the heat exchanger because of both air bubbles injection and increasing air flow rate. Injecting air bubble into shell side flow, increasing the air flow rate and the motion of bubbles (due to the buoyancy effect) result in an increment in the value of NTU and exergy loss by increasing the disturbance and perhaps the turbulence intensity of the flow. In addition, due to the mixing effect occurring in thermal boundary layer as air is injected into the shell side, the velocity of shell side flow (and hence the Re number) increases.

Kalemat kalede:
Shell and coiled tube heat exchanger, Exergy loss, Air bubble injection, Number of thermal units,