

Heat and mass transfer in a horizontal pipe absorber for a heat transformer

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Received 30 September 2008; Accepted in revised form October 8, 2009

ABSTRACT

A dynamic model is developed which describes the heat and mass transfer of a horizontal pipe absorber applied to a heat transformer used to purify water. A specific configuration of the pipes is used to evaporate water. This absorber operates with a mixture of LiBr-H₂O, which is distributed from the top and it descends by gravity through the horizontal pipe manifold, passing from one pipe to another. This dynamic model considers three flow regimes: descendant film over each pipe of the refrigerant fluid, a drop formation regime under each pipe, and a free descendant drop from one pipe to the one below. The mathematical model is based in the mass and energy balances, with empirical heat transfer coefficients. With this model, we can identify the relevance of each flow regime. This model represents a useful tool to study the effect of different operating conditions of the absorption heat transformer.

Keywords: Heat transformer; Absorption system; Lithium bromide

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